

Space Program Operations Contract

SPACE SHUTTLE ORBITER OPERATIONAL FLIGHT LEVEL C FUNCTIONAL SUBSYSTEM SOFTWARE REQUIREMENTS

DISPLAYS AND CONTROLS VOLUME 1: GUIDANCE, NAVIGATION AND CONTROL

Prepared by The Boeing Company
Space Exploration

Under Subcontract 6000132079, PDRD P1433q

December 21, 2007

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Space Exploration

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FOREWORD

The Space Shuttle Operational Flight Subsystem Software Requirements (FSSR) represent the total computer program that operates the Orbiter general purpose flight computer. The requirements are specified at three levels:

Level A – System Level – Computer Program Development Specification (CPDS)

Level B – Functional Level – Computer Program Development Specification (CPDS)

Level C – Detail Level – Functional Subsystem Software Requirements (FSSR)

Level A specifies system-level constraints and capabilities that are not oriented toward any particular program end item. Levels B and C specify the functional and detailed level requirements and are program end-item oriented. The Level B and C requirements are specified in separate documents for guidance, navigation, and control (GN&C), Systems Management (SM), and Vehicle Utility (VU), data flow, and Payloads (PL). The Level C requirements for the subsystem operating programs (SOPs) are subdivided into five separate volumes. The requirements are described in the following FSSRs:

- STS 83 – 0001 Entry guidance
- STS 83 – 0002 Ascent/RTLS Guidance
- STS 83 – 0003 On-Orbit/Deorbit Guidance
- STS 83 – 0004 Entry Navigation
- STS 83 – 0005 Ascent/RTLS Navigation
- STS 83 – 0006 On-Orbit/Deorbit Navigation
- STS 83 – 0007 Entry/GRTLS Digital Autopilot
- STS 83 – 0008 Ascent/Transition Digital Autopilot
- STS 83 – 0009 On-Orbit Digital Autopilot
- STS 83 – 0010 Redundancy Management
- STS 83 – 0013 IMU Subsystem Operating Program
- STS 83 – 0014 Navigation Aids and Star Tracker Subsystem Operating Program
- STS 83 – 0015 Sensor/Controller Subsystem Operating Program
- STS 83 – 0016 Effector Subsystem Operating Program
- STS 87 – 0017 Remote Manipulator System (RMS)
- STS 83 – 0020 Displays and Controls
- STS 83 – 0026 Sequencing
- * JSC 19478-XXX Payload Management
- * JSC 19590-XXX Systems Management

This Level C document is:

STS 83-0020V1 Space Shuttle Orbiter,
Operational Flight, Level C,
Functional Subsystem Software Requirements,
Displays and Controls Volume 1

* Where XXX = STS Flight Number

The D&C FSSR is comprised of all cathode-ray tube (CRT) or equivalent electronic display formats for the Primary Flight Software (PFS) and the Backup Flight Software (BFS) in support of the Space Shuttle Program. This volume includes information relative to the crew interfaces with the CRT or equivalent electronic display formats and keyboards; and the data required to generate codes with the SM Preprocessor, Display Format Generator or the BFS SAV-D/Avis Processors. Detailed requirements are also included for the processing of CRT or equivalent electronic Messages, GN&C Annunciation (class 2 and 3 faults), GN&C Display Processing, Dedicated Display Processing, GN&C Interfaces, and I-Loads.

The text material describing the CRT or equivalent electronic formats and KEYBOARD ITEM numbers are reference information only for Systems Level, Systems Management and Vehicle Utility PFS displays and are requirements for Guidance, Navigation and Control and BFS displays. See section 3.1 of this FSSR for a general statement about Multifunction Electronic Display Subsystem (MEDS) equivalency. The functional and detail software processing requirements, including those in the various appendices, are under the configuration control management of the Shuttle Avionics Software Control Board (SASCB).

DOCUMENT CHANGE RECORD

The following tabulation summarizes the change activity associated with this document.

DOCUMENT CHANGE RECORD			
Issue and Date	Change Summary/Effectivity		
OI-34 Release December 21, 2007	This baseline release for effectivity OI-34 and subs includes:		
	<u>CR</u>	<u>OI</u>	<u>Title</u>
	92816D	34	Remove Software Related to FICS
	93017G	33	Baseline RSS99D0100 with Expanded Donwlist
	93160B	32	Year End Roll Over (YERO) Reset
	93167A	33	Bearing Displays Documentation Clean-up
	93172B	34	Move Horizontal Situation Display Background and Pseudo-Backgrounds to MEDS
	93175	32	Expand Effectivity of SCR 93160B
	93176	34	Remove Active MPLM Support from BFS
	93177D	32	Clarify LOAD Item Entry
	93204D	30	Item 41 Processing Clean-up
	93220A	34	Move DPS Utility Background to MEDS

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CHANGE REQUEST SUMMARY

The following tabulation lists the paragraphs, tables (T), and figures (F) that have been changed as a result of approved change requests for this release. Changes incorporated prior to this release are listed in Appendix R. Changes from approved change requests (CRs) to this document are indicated by a change bar in the outer margin of the changed page.

CHANGE REQUEST SUMMARY			
Paragraph	CR No.	OI	CR Title
N/A	93175	32	Expand Effectivity of SCR 93160B
1.3-1.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
3.6.4-1.(T)	93176	34	Remove Active MPLM Support from BFS
4.0.1-1(T)	93176	34	Remove Active MPLM Support from BFS
4.1.4-1.(F)	93220A	34	Move DPS Utility Background to MEDS
4.1.4-3.(T)	93220A	34	Move DPS Utility Background to MEDS
4.1.4.4	93220A	34	Move DPS Utility Background to MEDS
4.2.1-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.1-6.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.2-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.2-6.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.3-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.3-6.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.4-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.4-6.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.5-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.5-6.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.6-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.7-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.8-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.8-6.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.9-1.(T)	93204D	30	Item 41 Processing Clean-up
4.2.9-3A.(T)	93172B	34	Move Horizontal Situation Display Background and Pseudo-Backgrounds to MEDS
4.2.9-3B.(T)	93172B	34	Move Horizontal Situation Display Background and Pseudo-Backgrounds to MEDS
4.2.9-3C.(T)	93172B	34	Move Horizontal Situation Display Background and Pseudo-Backgrounds to MEDS
4.2.9-3D.(T)	93172B	34	Move Horizontal Situation Display Background and Pseudo-Backgrounds to MEDS
4.2.9-3E.(T)	93172B	34	Move Horizontal Situation Display Background and

CHANGE REQUEST SUMMARY			
Paragraph	CR No.	OI	CR Title
4.2.9-5.(T)	93204D	30	Pseudo-Backgrounds to MEDS Item 41 Processing Clean-up
	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.9-6.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.9.1	93172B	34	Move Horizontal Situation Display Background and Pseudo-Backgrounds to MEDS
4.2.9.2	93204D	30	Item 41 Processing Clean-up
4.2.9.4	93172B	34	Move Horizontal Situation Display Background and Pseudo-Backgrounds to MEDS
4.2.10-5.(T)	93177D	32	Clarify LOAD Item Entry
	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.10-6.(T)	93177D	32	Clarify LOAD Item Entry
	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.10.1	93177D	32	Clarify LOAD Item Entry
4.2.10.2	93177D	32	Clarify LOAD Item Entry
4.2.10.3	93177D	32	Clarify LOAD Item Entry
4.2.10.4	93177D	32	Clarify LOAD Item Entry
4.2.13-1b.(T)	92816D	34	Remove Software Related to FICS
4.2.13-2b.(T)	92816D	34	Remove Software Related to FICS
4.2.13-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
	92816D	34	Remove Software Related to FICS
4.2.13-6.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
	92816D	34	Remove Software Related to FICS
4.2.13-7.(T)	92816D	34	Remove Software Related to FICS
4.2.13.1	92816D	34	Remove Software Related to FICS
4.2.13.2	92816D	34	Remove Software Related to FICS
4.2.13.3	92816D	34	Remove Software Related to FICS
4.2.14-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.14-6.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.15-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.18-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.20-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.21-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.21-6.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.22-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.22-6.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.23-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist

CHANGE REQUEST SUMMARY			
Paragraph	CR No.	OI	CR Title
4.2.23-6.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.25-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.26-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.26-6.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.31-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.31-6.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.36-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.36-6.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.38-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.38-6.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.39-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.39-6.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.40-5.(T)	93160B	32	Year End Roll Over (YERO) Reset
	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.40-6.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.41-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
	93167A	33	Bearing Displays Documentation Clean-up
4.2.41-6.(T)	93204D	30	Item 41 Processing Clean-up
	93167A	33	Bearing Displays Documentation Clean-up
4.2.41.1	93167A	33	Bearing Displays Documentation Clean-up
4.2.41.2	93204D	30	Item 41 Processing Clean-up
	93167A	33	Bearing Displays Documentation Clean-up
4.2.41.3	93167A	33	Bearing Displays Documentation Clean-up
4.2.42-5.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
	93167A	33	Bearing Displays Documentation Clean-up
4.2.42-9.(T)	93167A	33	Bearing Displays Documentation Clean-up
4.2.42.3	93167A	33	Bearing Displays Documentation Clean-up

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1.0 INTRODUCTION

1.1 PURPOSE

The purpose of the Displays and Controls (D&C) Level C document is to specify the basic requirements for all of the CRT or equivalent electronic displays.

1.2 SCOPE

This documents contains the detailed requirements for the PFS GN&C displays and all the BFS displays. The text material also contains information only functional software requirements for all other PFS displays. The Appendices of the D&C FSSR present Level C software requirements for CRT or equivalent electronic display special processing and CRT or equivalent electronic messages as well as dedicated display processing. User information is included on dedicated D&C software interfaces along with definitions, descriptions, and derivations related to the software processing requirements.

1.3 ORGANIZATION

This document is organized as follows:

Section 1.0 defines the purpose, scope, and organization of this volume.

Section 2.0 provides a list of applicable documents.

Section 3.0 is an informational overview of keyboard and display format standards, User Interface & Multi-Function CRT Display System (MCDS) Interface display support software, coding procedures and the display numbering system. A general statement about Multifunction Electronic Display Subsystem (MEDS) equivalency is provided. CRT or equivalent electronic Display Processing Table Coding Standards (3.4.6), together with the display number assignments and OPS availability in Table 3.6.4-1, are part of the requirements baseline.

Section 4.0 presents the generic displays and related narrative descriptions for each CRT or equivalent electronic page. It also contains applicable tables (Interface Definition Document (IDD) inputs/outputs, I-Loads, K-Loads, and Constants) located at the end of each Principal Function. This section is structured as follows:

4.X	Section Name (PFS/BFS, Effectivity) Display Format	Figure X.Y-1 (PFS/BFS, Eff)
4.X.Y	Display Name	
4.X.Y.1	Purpose, Operation, and Organization	
4.X.Y-1	Keyboard Processing Table Keyboard Processing Addendum	Table 4.X.Y-1
4.X.Y-2	CRT Display Processing Table CRT Display Processing Addendum	Table 4.X.Y-2

4.X.Y-3	CRT Display Processing Background Requirements	Table 4.X.Y-3
4.X.Y-4	Mission Design Background Constants	Table 4.X.Y-4
4.X.Y-5	Input Functional Parameters	Table 4.X.Y-5
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4.X.Y-7	I-Load Parameters	Table 4.X.Y-7
4.X.Y-8	K-Load Parameters	Table 4.X.Y-8
4.X.Y-9	Constant Parameters	Table 4.X.Y-9

The automated IDD tables provided herein define signal (parameter) interface requirements either between hardware (LRU) and software elements or between software elements and other software elements. A GN&C software element is either a sequenced principal function (PF), crew generated specialist/display function, or an OPS display function. In the event of a conflict between the IDD tables and other internal text input/output tables, the SASCB data base-controlled IDD tables take precedence.

The following table defines the data elements found in the IDD input/output, I-Load, K-Load, and Constant tables for each principal function.

Table 1.3-1. Parameter Element Description		
Title	Definition	Valid Entries
CAT	Category of the I-Load (**Note)	Three alphanumeric characters: the first character must be alphabetic.
D	Dependency of the I-Load	D = Design M = Mission L = LRU
DESCRIPTION	Parameter description of the K-Load or Constant.	A string of ≤ 64 characters.
DESTINATION	Destination of the output parameter	Abbreviated functional titles. (***)Note)
DT or DATA TYPE	Data Type	* See reference (1) for valid I-Load, K-Load and Constant data types. * See reference (2) for valid IDD data types for parameters with destination TLM. * See reference (3) for valid IDD data types for all other parameters.
ENG UNITS or UNITS	Engineering Units	* See reference (1) for valid I-Load, K-Load and Constant units. * See reference (2) for valid IDD units for parameters with destination TLM. * See reference (3) for valid IDD units for all other parameters.

Table 1.3-1. Parameter Element Description

Title	Definition	Valid Entries
FSSR NAME	Requirements parameter name	A string (with no embedded blanks) of ≤ 32 characters consisting of alphanumerics, underscores, parenthesis, commas and slashes. Parenthesis are used for array elements. Commas separate the different indices of multidimensional arrays. Slashes are used to separate multiple names used for a single MSID.
LAST CR	The last CR affecting the parameter	5 digit number with an alphabetic revision letter.
MC	Memory Configuration	00=Generic 05 = SM4 Orbit P/L 01=GN1 Ascent/GN6 RTLS 06 = P/L9 MMU 02=GN2 Orbit 07 = Not Assigned 03=GN3 Entry 08 = GN8 On-Orbit C/O 04=SM2 On-Orbit 09 = GN9 Preflight
MSID or M/S ID	Measurement/Stimulus Identification	Maximum of 10 alphanumeric characters. * See reference (3) for specifications
NOMENCLATURE	Parameter description of the IDD parameter.	String of ≤ 34 characters (including underscores and blank spaces).
PR or PREC	Precision	D, DP =Double S, SP = Single
SOURCE	Origin of the input parameter	Abbreviated functional titles.
S	Software Utilization	C = Common B = BFS Unique P = Primary X = BFS Derived A = BFS Converted
PR FCTN	Cross reference of the principal function identifiers that are applicable to this parameter.	See Level B GN&C CPDS SS-P-0002-510
VALUE	The value of the K-Load or Constant	* See reference (1) for valid value formats.
REV	Revision indicator	An asterisk (*) indicates changes for the current OI version.
* References:	(1) JSC 19350 I-Load Requirements Document Volume I (2) SS-P-0002-140 Level A SS Downlist/Uplink CPDS (3) JSC 18206 Shuttle Data Integration Plan Volume III MAST II/STAR Deliverable Products.	
** Note	For additional information on any I-Load, contact the I-Load owner defined in CR 98032, JSC, USA, and Boeing I-Load Owner Assignments	
*** Note	IDD output (source) tables which reflect parameters going to input (destination) "TLM" shall not be interpreted as a signal actually being downlisted. The parameter is only available for downlist in COMPOOL and does not appear in a downlist format. Parameters actually on the downlist will be designated with a destination denoting the downlist Format with a Rate Code. The Rate Code legend appears at the end of each FSSR data table. To complete the downlist information, Parent MSIDs (indicated by a 'P' in the 9 th character of the MSID) are now included in the software function output data tables in which a Child MSID already appears. A Parent MSID will have the same downlist destinations as its Child(ren) MSID(s).	

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2.0 APPLICABLE DOCUMENTS

2.1 LEVEL A DOCUMENTS

- SS-P-0002-140 Shuttle Downlist/Uplink Software Requirements
- SS-P-0002-150 Shuttle Launch Data Bus Software Interface Requirements
- SS-P-0002-170 Shuttle Systems Level Requirements, Software

2.2 LEVEL B DOCUMENTS

- SS-P-0002-510 Shuttle Functional Level Requirements, GN&C
- SS-P-0002-550 Shuttle Functional Level Requirements, Vehicle Utility
- SS-P-0002-580 Shuttle Functional Level Requirements, Systems Management

2.3 LEVEL C DOCUMENTS

- STS 83-0001 Operational Flight Level C, Functional Subsystem Software Requirements, Guidance, Navigation, and Control, Part A, Entry Through Landing Guidance
- STS 83-0002 Operational Flight Level C, Functional Subsystem Software Requirements, Guidance, Navigation, and Control, Part A, Guidance Ascent/RTLS
- STS 83-0003 Operational Flight Level C, Functional Subsystem Software Requirements, Guidance, Navigation, and Control, Part A, Guidance on-Orbit/Deorbit
- STS 83-0004 Operational Flight Level C, Functional Subsystem Software Requirements, Guidance, Navigation, and Control, Part B, Entry Through Landing Navigation
- STS 83-0005 Operational Flight Level C, Functional Subsystem Software Requirements, Guidance, Navigation, and Control, Part B, Navigation Ascent/RTLS
- STS 83-0006 Operational Flight Level C, Functional Subsystem Software Requirements, Guidance, Navigation, and Control, Part B, On-Orbit Navigation
- STS 83-0007 Operational Flight Level C, Functional Subsystem Software Requirements, Guidance, Navigation, and Control, Part C, Flight Control Entry – GRTLS
- STS 83-0008 Operational Flight Level C, Functional Subsystem Software Requirements, Guidance, Navigation, and Control, Part C, Flight Control Volume 1, Ascent Flight Phase, Volume 2, Ascent
- STS 83-0009 Operational Flight Level C, Functional Subsystem Software Requirements, Guidance, Navigation, and Control, Part C, Flight Control Orbit DAP
- STS 83-0010 Operational Flight Level C, Functional Subsystem Software Requirements, Guidance, Navigation, and Control, Part D, Redundancy Management

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STS 83-0013	Operational Flight Level C, Functional Subsystem Software Requirements, Guidance, Navigation, and Control, Part E, Inertial Measurement Unit Subsystem Operating Program
STS 83-0014	Operational Flight Level C, Functional Subsystem Software Requirements, Guidance, Navigation, and Control, Part E, Volume 1, Navigation Aids Subsystem Operating Program, Volume 2, Star Tracker Subsystem Operating Program
STS 83-0015	Operational Flight Level C, Functional Subsystem Software Requirements, Guidance, Navigation, and Control, Part E, Subsystem Operating Programs, FC Sensor/Controller
STS 83-0016	Operational Flight Level C, Functional Subsystem Software Requirements, Guidance, Navigation, and Control, Part E, Subsystem Operating Programs, FC Effector
STS 87-0017	Operational Flight Level C, Functional Subsystem Software Requirements, Remote Manipulator System
STS 83-0020	Operational Flight Level C, Functional Subsystem Software Requirements, Volume 1 Displays and Controls, Volume 2 Systems Management, Volume 3 Appendices A, B and F
STS 83-0026	Operational Flight Level C, Functional Subsystem Software Requirements, Guidance, Navigation, and Control, Sequencing
JSC-19350	Shuttle Flight Software Initialization Load <ul style="list-style-type: none">• Volume I General Requirements• Volume II Mission I-Load Requirements
JSC-19478	Payload Management, Level C Flight Software Requirements
JSC-19590	Systems Management, Level C Flight Software Requirements
MG038101	Backup System Services Program Requirements Document
MG038104	Backup Flight System, GN&C Guidance and Navigation Program Requirements Document
MG038105	Backup Flight System, GN&C Flight Control Program Requirements Document
MG038106	Backup Flight System, GN&C, Hardware Interface Program and GN&C Interface Program Requirements Document
MG038119	Backup Flight System, Systems Management/Special Processes and Payloads Program Requirements Document
MG038120	Backup Flight System, Sequencing Program Requirements Document

2.4 ICD DOCUMENTS

ICD-3-1011-02	GPC/DEU ICD
ICD-2-1S001	Orbiter Primary Flight Software System and Backup Flight System Software Interface
ICD-3-0070-01	GPC/IDP ICD (MEDS)
ICD-3-1070-01	GPC/HUDE ICD

2.5 MISCELLANEOUS DOCUMENTS

NAS9-14444	Display Format Generator, Off Line Support Processor Requirements Document
MC615-0008	Display Electronic Unit, Orbiter
MF0004-068	Head Up Display Program Requirements Document, Revision G, Sequence 4
MG070100A1012E2	MEDS Display Application Software, Software Requirements Specification
SD 74-SH-0230	Data Processing Subsystem Principles of Operation
MG017300	CPDS for the OFT Display Electronic Unit Control Program End Item, Part I

In the event of a conflict between the documents referenced herein and the contents of this specification, the precedence shall be determined as defined in Paragraph 1.3 CPDS SS-P-0002-170, Volume I, System Level Requirements, Software.

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3.0 OVERVIEW - STANDARDS, STRUCTURES AND ORGANIZATION

3.1 DISPLAYS AND CONTROLS (D&C) FORMATS

The D&C format requirements in support of the STS are specified at three levels: System Level A, Functional Level B, and Detail Level C documents. This document presents the CRT or equivalent electronic display set which operates in conjunction with the requirements specified at the different levels of the applicable software documents.

The Multifunction Electronic Display Subsystem (MEDS) is to be installed as the replacement for the MCDS crew interface to the GPCs on each Orbiter vehicle. During the Orbiter modification period, a mixed-fleet operation will be supported. Reference documentation for MEDS is provided in section 2 of this FSSR.

While essentially transparent to the flight software code, use of the MEDS will bring the crew subtle changes in terminology, displayed color usage, and simulations of specific mechanical instrumentation displays (tape meters, ADI, AMI, AVVI, HSI, and SPI). Unique hardware instrumentation simulations provided by MEDS are depicted for information as figures 3.12.1-2, 3.12.2-2, 3.12.3-2, 3.12.4-2, and 3.12.5-2. In addition to these figures, listed below (for information only) are the known differences in terminology and display character representations for these two equivalent systems.

MCDS Item	MEDS Replacement
CRT	Multifunction Display Unit (MDU)
DDU	Integrated Display Processor (IDP)
DEU	IDP
ADI	Simulation by the MDU (see Figure 3.12.1-2)
AMI	Simulation by the MDU (see Figure 3.12.3-2)
AVVI	Simulation by the MDU (see Figure 3.12.4-2)
HSI	Simulation by the MDU (see Figure 3.12.2-2)
SPI	Simulation by the MDU (see Figure 3.12.5-2)
Fault Message Line 25 - GREEN	Fault Message Line 25 - ORANGE
POLL FAIL portion of Scratch Pad Line 26 - GREEN	POLL FAIL portion of Scratch Pad Line 26 - ORANGE
“Big X” across the entire display - GREEN	“Big X” across the entire display - ORANGE
Overbright text (2X intensity) - BRIGHT GREEN	Overbright text (2X intensity) - YELLOW
Overbright/Overwrite text (4X intensity) - BRIGHTEST GREEN	Overbright/Overwrite text (4X intensity) - YELLOW
Overwrite text (2X intensity) - BRIGHT GREEN	Overwrite text (2X intensity) - GREEN

3.1.1 Timing

Timing in this document is related to error-free processing conditions. See Level A CPDS SS-P-0002-170 paragraph 4.4.2a for timing related to error processing conditions.

3.2 KEYBOARD INFORMATION

The keyboard (Figures 3.2-1 and 3.2-2), its related interfaces and syntax are described in the Level A CPDS.

3.2.1 Simultaneous Keyboard Entries Interaction

The avionics system architecture design does not support predictable processing of keyboard entries made from multiple keyboards to the same application during the same polling cycle.

3.2.2 Keyboard Entry and Uplink Interaction

The avionics system architecture design does not support predictable processing of a keyboard entry and an uplink command to the same application during the same processing cycle.

3.3 CHARACTER SET

The production characters (Figure 3.3-1) available for displays are described in the Level A CPDS.

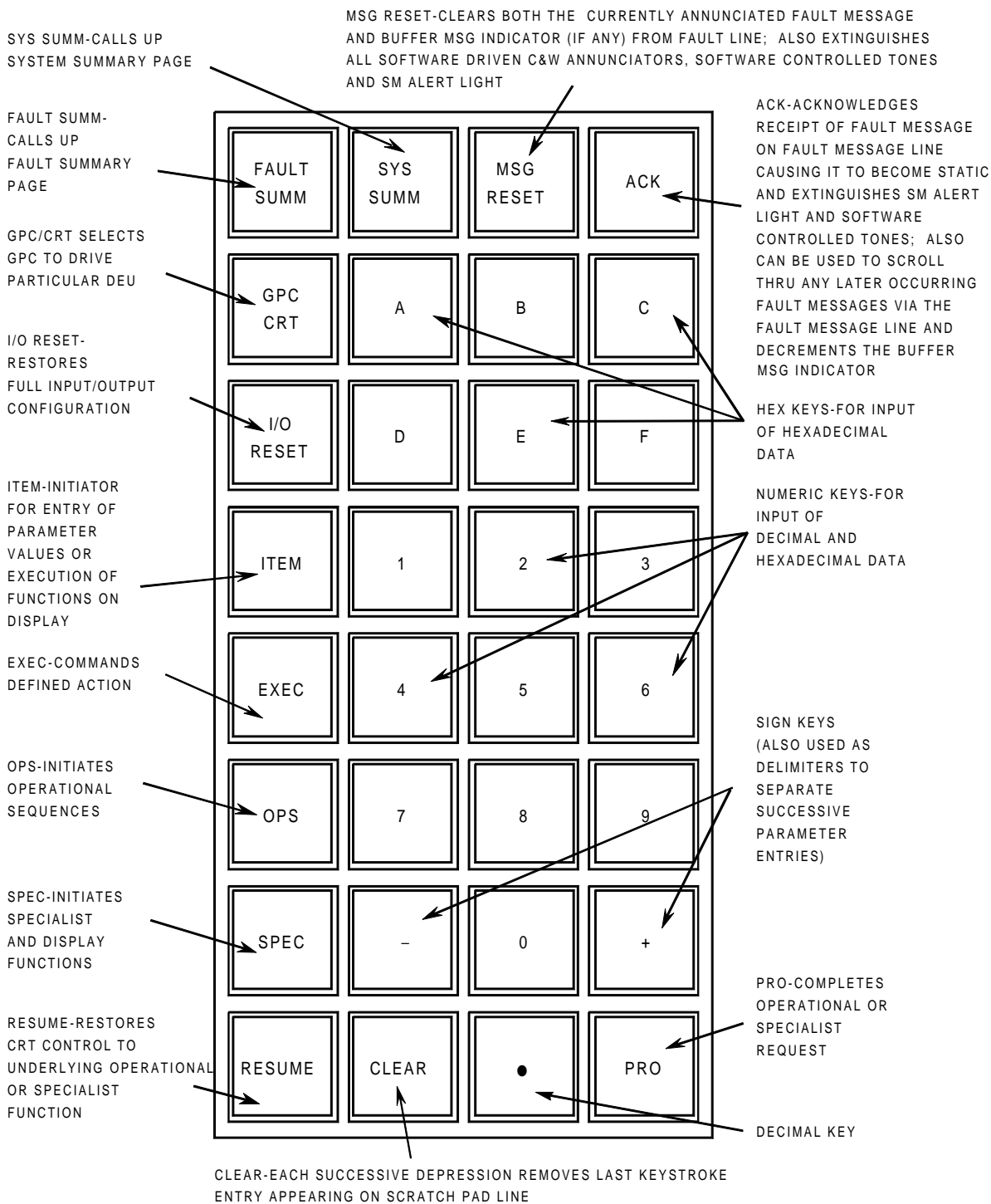
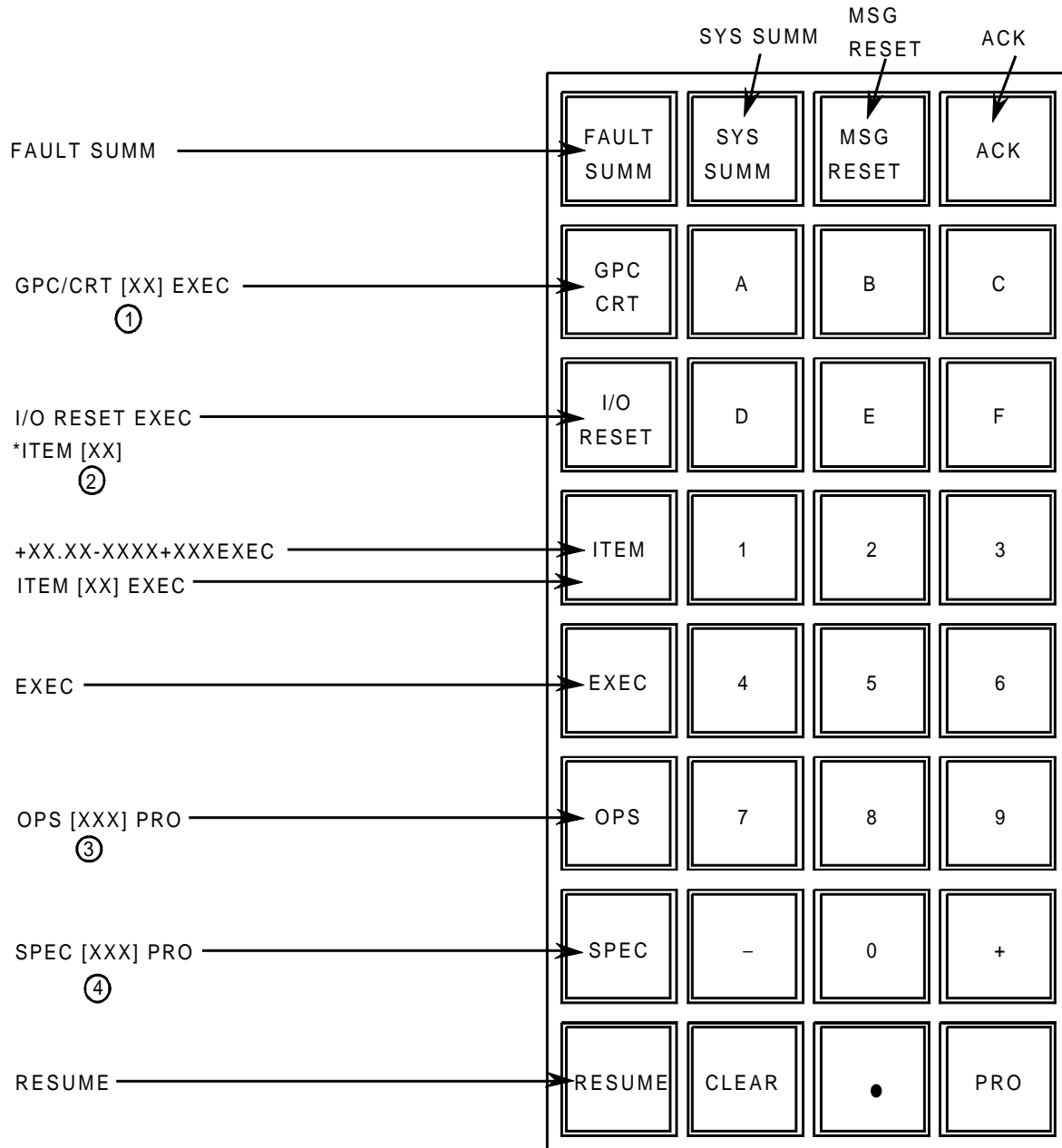


FIGURE 3.2-1. Keyboard (Functional Description)



- ① CURRENT GPC NUMBER (1 DIGIT), FOLLOWED BY DESIRED DEU NUMBER (1 DIGIT)
- ② ITEM NUMBER (1 OR 2 DIGIT)
- ③ OPS NUMBER (1 DIGIT), FOLLOWED BY MAJOR MODE NUMBER (2 DIGITS)
- ④ SPEC OR DISP NUMBER (3 DIGITS), LEADING ZEROS NEED NOT BE ENTERED

*SUCCESSIVE PARAMETERS FOLLOWING N ITEM NUMBER (SEPARATED BY "+" OR "-")
WILL BE ENTERED FOR THE NEXT ITEM NUMBERS, IN SEQUENCE

(Reference only)

FIGURE 3.2-2. Keyboard (Keystroke Syntax)

				B7	0	0	0	0	1	1	1	1
				B6	0	0	1	1	0	0	1	1
				B5	0	1	0	1	0	1	0	1
B4	B3	B2	B1	HEX	0	1	2	3	4	5	6	7
0	0	0	0	0	NULL	α	SPACE	0	γ	P	ψ	p
0	0	0	1	1	]	β	!	1	A	Q	a	q
0	0	1	0	2	[	ρ	~	2	B	R	b	r
0	0	1	1	3	SELF TEST	ω	#	3	C	S	c	s
0	1	0	0	4	.	ε	√	4	D	T	d	t
0	1	0	1	5	..	Ω	%	5	E	U	e	u
0	1	1	0	6	∇	_	&	6	F	V	f	v
0	1	1	1	7	.	—	'	7	G	W	g	w
1	0	0	0	8	BACK SPACE	|	(	8	H	X	h	x
1	0	0	1	9	÷	◇	)	9	I	Y	i	y
1	0	1	0	A	⌘	□	*	:	J	z	j	z
1	0	1	1	B	▷	·	+	;	K	Σ	k	σ
1	1	0	0	C	◁	↑	,	<	L	θ	l	|
1	1	0	1	D	CARRIAGE RETURN	↓	-	=	M	<u>OVERSCORE</u>	m	<u>UNDERSCORE</u>
1	1	1	0	E	⤴	→	.	>	N	Π	n	λ
1	1	1	1	F	⤵	←	/	?	O	Φ	o	Δ

REFERENCE ONLY

FIGURE 3.3-1. Production Character Set

3.4 DISPLAY DESCRIPTION STANDARDS

The description of each display page contains the following information.

3.4.1 Display Description (Section 4)

- a. DISPLAY FORMAT. A graphic representation of the CRT display showing full dynamic fields with associated signs and status indicators, together with static background data on a format that defines the X–Y coordinates. Background data includes all non–dynamic display titles, lines, fixed symbols, CRT names, item numbers and punctuation (see Figure 3.4.3–1). Display symbols used in the format to limit dynamic data include:
 - An “X” to represent each character of dynamic parameters, including numeric parameters, remote text, GPC indicator, error buffer message indicator and the uplink indicator.
 - An “S” to represent each single character status indicator of the associated parameter. The status indicator symbol is always located in the space following the parameter, or it can also stand alone when the parameter is not displayed.
 - A stippled (dotted) background to indicate that the parameter or static data is supported only by BFS when a common format figure for PFS and BFS is used to define the requirements.
 - Parameter signs – The space preceding the parameter is reserved for the parameter sign. There are three sign symbols:
 1. A \pm indicates that the sign of the parameter will always be displayed on the actual CRT for all values of the associated parameter.
 2. A blank indicates that normal sign convention will be used when displaying the value of the parameter on the actual CRT. Thus, only the minus sign will be displayed for parameter values less than zero.
 3. An X indicates that the sign to be displayed on the actual CRT is alphabetic instead of the normal plus or minus symbols. The CRT Display Processing Table furnished with each display must be referenced to obtain the sign processing requirements. The “Sign” column of the table will provide an alphabetic character to indicate which pair of symbols will be displayed on the actual CRT. These signs are based on the value of the parameter as follows:

Parameter Value	“Sign” Column Value	CRT Display Sign Symbol
> 0	R	R
< 0	R	L
> 0	U	U
< 0	U	D
> 0	L	L
< 0	L	R
> 0	D	D
< 0	D	U

- The underscore is used to indicate that the associated data is input from the keyboard. There is an underscore symbol for each character of a parameter, not including the sign position. For tables of similar input data only the top line is underscored.
- Brackets are used to indicate that the plus or minus sign associated with an input parameter must also be entered from the keyboard. The bracket is a tutorial stimulus to remind users to input the sign.
- PFS/BFS displays. Certain displays are labeled as PFS/BFS, indicating that at BFS ENGAGE the display is supported by BFS. Some parameters on the common display are supported only by BFS. To highlight these parameters on the CRT format, they are displayed over a stippled background.
- BFS Indicator. This field (see Figure 3.4.3–1) is reserved to indicate that the display is being driven by BFS. On the actual CRT, this indicator is displayed double overbright for high visibility.
- Other background data, including the display page line, GPC indicator, mission and CRT time lines, and other non–dynamic display titles are shown in Figure 3.4.3–1.
- Dynamic display definition and the functioning requirements must be completely defined in the level C FSSR documents, as governed by the Level A requirements in SS-P-0002-170, Section 5.3.2.6.3. The skeleton portion is most easily defined by a picture on a grid. The exact placement on the grid may be specified or left to the software contractor to interpret from the grid. Much of the variable data on the displays may be completely defined by the filling in of an appropriate table; however, more complicated displays with analog parameters or branching requirements must be at least partially defined via text. The use of addressable unit specifications for placement of graphical type objects, such as lines and circles, can be represented in pictorial definition or it can be specified by using an addendum, noted in the “ADD REF” column of the CRT Display Processing Table, to better define how the object is to appear. When the text is defined for the foreground, care should be taken when using addressable units. The desired placement requires an exact knowledge of how the DEU Symbol generator will draw the character, since most but not all symbols are referenced from the center of the character. If it is deemed necessary to use addressable units for text placement, the requirements writer should reference the DPS

Principles of Operations, SD 74-SH-0230, to determine the stroke definition. If addressable units are defined by the requirements writer, the flight software development contractor should be contacted prior to submitting a change to ensure correct addressable unit placement.

- b. TITLE BLOCK. 4.X.Y (Full title of display). This should correspond to the title used in the figure identification of the display format.

TITLE. The title as it appears on the format. If required, dynamic portions are defined with conditions and corresponding output.

TYPE. The designation of OPS, SPEC, or DISP, followed by the Display Page number. Multiple designations may occur.

AVAILABILITY. The OPS sequences in which the display may be requested and BFS availability.

- c. PURPOSE, OPERATION AND ORGANIZATION. The detailed description of the display. A separate, numbered paragraph is used to describe each section of the display. The basic organization of the data format is specified. Parameters are listed with their units. Display rates of parameters may also be defined, if appropriate. All status symbols employed are defined, together with their physical meaning in each case. Remote texts are described, along with any order of precedence that may be applicable. Any special constraints are identified. The exact function of each item number entered through the keyboard is defined, together with the response and the condition at display initialization. Where pertinent, background information on crew utilization is included.
- d. KEYBOARD PROCESSING TABLE. A tabular listing of the characteristics of all keyboard inputs. (See Section 3.4.5 for details).
- e. CRT DISPLAY PROCESSING TABLE. A tabular listing of the characteristics of all dynamic numeric/text display outputs. This table is the specification for dynamic data. (See Section 3.4.6 for details).
- f. ADDENDA. Additional information for which there is no space in the appropriate table, such as conditions for output blanking, intensity, flash, branching, remote text, unique special processing, input limit checks, or dynamic graphics formulation. The addenda are limited to user interface support, as defined in Section 3.4.4. Two subsections are reserved for I/O Table addenda descriptions: Subsection 4.X.1, Keyboard Processing Addendum, and Subsection 4.X.2, CRT Display Processing Addendum. These subsections follow the corresponding keyboard and CRT display processing tables.
- g. CRT DISPLAY BACKGROUND REQUIREMENTS, MISSION-DEPENDENT CONSTANT TABLE. A tabular listing of mission-dependent background data in the form of measurement stimuli identification numbers (MSID'S). The associated X,Y position values are with respect to the origin being at the center of the CRT. For actual values, see JSC-19350, STS Flight Software Initialization Load, for unique mission requirements.
- h. CRT DISPLAY BACKGROUND REQUIREMENTS, MISSION-INDEPENDENT CONSTANT TABLE. A tabular listing of mission-independent I-LOAD constants.

3.4.2 DELETED.

3.4.3 Standard Display Page.

A standard CRT page format depicts generic fields to be displayed on each display page called up by an operator. These fields and their functions are described as follows (see Figure 3.4.3-1 and Tables 3.4.3-1, 3.4.3-2, 3.4.3-3 and 3.4.3-4):

- A. Four-digit field used to designate the major OPS.
- B. Three-digit field designating the specialist function which overlays the OPS.
- C. Three-digit field identifying the display page which overlays OPS or SPEC.
- D. Eighteen-character alphanumeric field reserved for the title of the page being displayed. Depending upon the OPS, portions of the title may be dynamic.
- E. A two-character field for displaying uplink activities (invoked by the GPC uplink switch). The characters UL are displayed flashing.
- F. One-character field which identifies the GPC that is driving the display page.
- G. Twelve-character alphanumeric field which displays mission time (MT), either mission elapsed time (MET) or GMT as specified on the time display, in days (3 digits)/hours (2 digits):minutes (2 digits): seconds (2 digits).
- H. Twelve-character alphanumeric field used to display CRT time (CRT Timer). This field is driven by the source corresponding to the Major Function selection switch.
- I. Three-character alphanumeric field used to display (BFS) when the BFS is the source of the display. A stippled (dotted) background is used on the display format to highlight background nomenclature and/or foreground data fields that are supported and driven only by BFS.
- J. Fault messages, in alarm classes 2 through 5, are displayed on line 25. The format of the data within the Message Line is different between PFS and BFS displays as defined below. In the CRT Display Processing Tables which are common to PFS and BFS, the positions and lengths for the Message Line for both PFS and BFS are shown (see Table 3.4.3-3). Class 5 messages begin in column 1 for PFS and column 2 for BFS.
- K. The Buffer Message Indicator is a four-character field on line 25 reserved for displaying the total number of messages in the queue waiting to be processed. The format of this indicator is "(XX)", and, if there are no messages waiting in the queue, these four characters will be blank. The Buffer Message Indicator is also known as the "stacked message numeric". The position of the Buffer Message Indicator is different between PFS and BFS, and, in the CRT Display Processing Tables which are common to PFS and BFS, the positions for the Buffer Message Indicator for both PFS and BFS are shown (see Table 3.4.3-3).
- L. Line 26 is reserved for the scratch pad line which is used to echo the keyboard entries made by the crew and for display of DEU detected error messages.

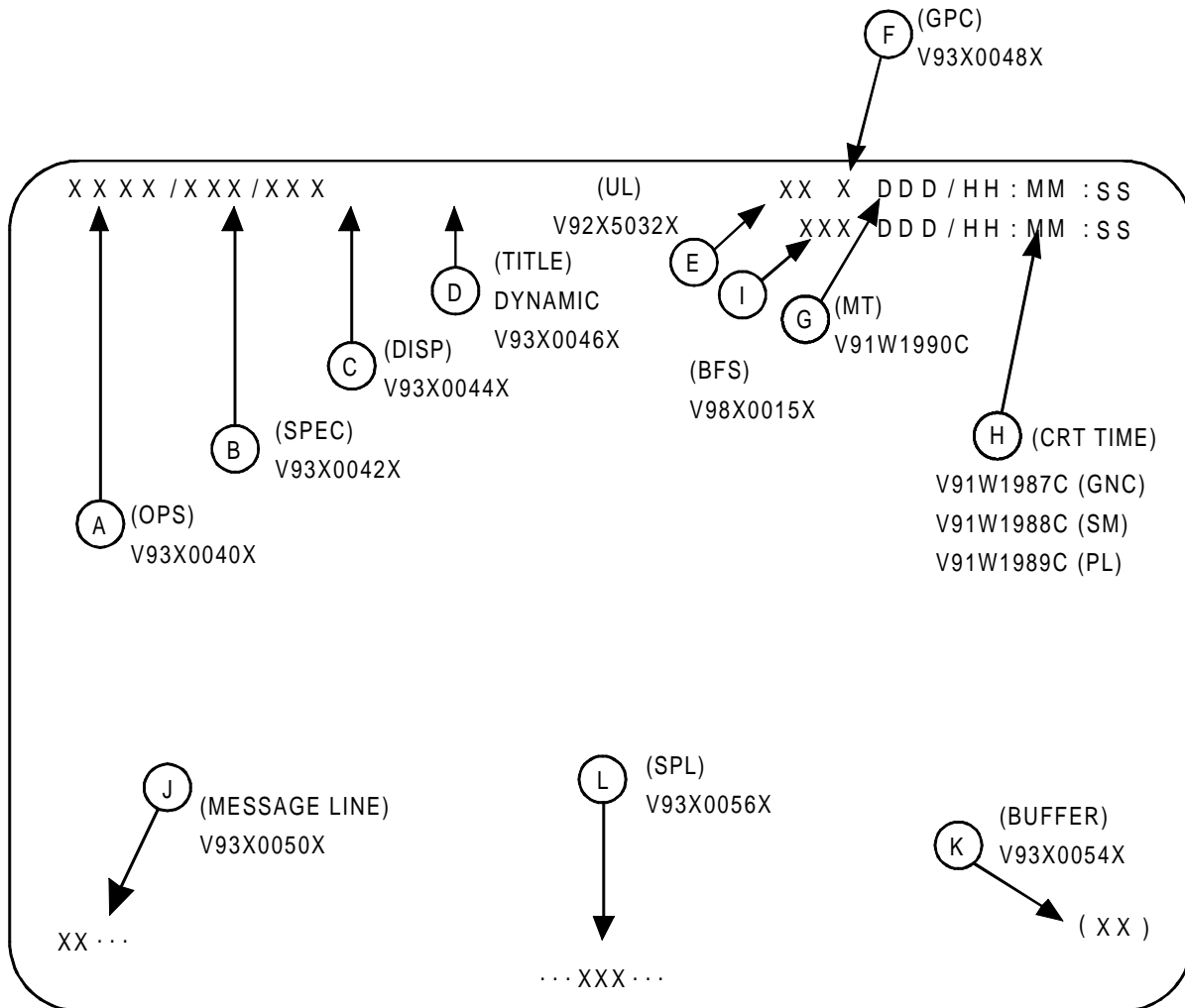


FIGURE 3.4.3-1. Standard Display Page

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Table 3.4.3-3.STANDARD DISPLAY PAGE (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source		Nomenclature		C R T		
			X	Y		CHAR	BILEVEL														TYPE	PFS	BFS				
							1	0																			
001	(OPS)	V93X0040X	2	1		5.0															UI	N/S	OPS FUNCTION PAGE		X		
002	(OPS)	V93X0040X	2	1		5.0																N/S	MI	OPS FUNCTION PAGE		X	
003	(SPEC)	V93X0042X	7	1		4.0																UI	MI	SPEC FUNCTION PAGE		X	
004	(DISP)	V93X0044X	10	1		4.0																UI	MI	DISPLAY FUNCTION PAGE		X	
005	(UL)	V92X5032X	34	1		2.0	UL							X								UI	MI	UPLINK ACTIVITY IND		X	
006	(GPC)	V93X0048X	36	1		2.0																UI	N/S	GPC DRIVER		X	
007	(GPC)	V93X0048X	36	1		2.0																N/S	MI	GPC DRIVER		X	
008	(MT)	V91W1990C	39	1		12.0			DHMS													FCOS	BOS	MISSION ELAPSED TIME		X	
009	(CRT TIMER)	V91W1987C	39	2		12.0			DHMS													FCOS	BOS	DISPLAY CRT TIMER.GNC		X	
010		*																									
011		*																									
012		*																									
013		*																									
014		*																									
015		*																									
016		*																									
017		*																									
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025		*																									
026		*																									
027		*																									
028		*																									
029		*																									
030		*																									
031		*																									
032		*																									
033	(MSG LINE)	V93X0050X	1	25		44.0																UI	N/S	MESSAGE LINE		X	
034	(MSG LINE)	V93X0050X	2	25		46.0																N/S	MI	MESSAGE LINE		X	
035	(BUFFER MSG)	V93X0054X	45	25		4.0																UI	N/S	BUFFER MESSAGE INDICATOR		X	
036	(BUFFER MSG)	V93X0054X	48	25		4.0																N/S	MI	BUFFER MESSAGE INDICATOR		X	
037	(SPL)	V93X0056X	2	26		49.0																UI	MI	SCRATCH PAD LINE		X	
101		*																									
102		*																									
103		*																									
104		*																									
200	(BFS)	V98X0015X	35	2		3.0							X									N/S	MI	BFS IDENTIFIER	BFS	X	

3.4.4 User Interface & MCDS/MEDS Interface Display Support Software.

Support software is available to convert basic types of stored data into the form, units, precision, and intensity/color required for CRT or equivalent electronic displays. Where practicable, symbols and texts are standardized for efficiency and economy of software utilization. For a general statement about MEDS equivalency see section 3.1. These capabilities are summarized in the following subsections.

3.4.4.1 Generic Data Types

Data to be displayed exists within the computer in the following types:

- a. CHARACTER STRINGS. Specific groups of characters represented by a string of bytes. Each byte consists of a uniquely arranged, fixed number of bits (8), per a standard encoding table.
- b. DISCRETES OR BOOLEANS. Single bits indicating which of two possible states is current.
- c. BOOLEAN STRINGS. Two or more related discretets, arranged in a string.
- d. NUMERIC DATA. Binary representations of numbers in one of two possible forms:
 1. Integers. Whole numbers in straight binary (least significant bit equal to unity).
 2. Scalars. Numbers in floating binary form, with certain bits set aside to represent a scale factor (analogous to scientific notation).

Either form may be single or double precision. Single precision utilizes up to one computer word (32 bits). Double precision uses double words, with appropriate subroutines.

3.4.4.2 Data Display Processing

Encoded characters are used to select the corresponding display character from the character generation matrix. Pre-defined character strings for special applications may be output as a function of message identifiers (e.g., dynamic portions of display titles).

Single discretets will normally be displayed as bilevel data. Boolean strings are often displayed as hexadecimal numbers; they are subdivided into 4-bit groups, with each group displayed as a hexadecimal numeral. Numeric data are normally converted to decimal form and edited to satisfy display format specifications. Integers may also be displayed in hexadecimal form, and scalars may be converted to integers for the same purpose. Conversion involves truncating or rounding off the fraction, with an inherent loss in precision. Unit conversion can be accomplished on numeric data, when the engineering units required for display are different than those applicable to the stored value. In a few instances, there may also be some scaling required because of a bias or nonlinearity in the transducer providing the original data. Such scaling is limited to a third degree polynomial:

$$y = A + Bx + Cx^2 + Dx^3$$

where some coefficients may be zero.

3.4.4.3 Standard Indicator Types

The following standardized types of indicators are available for display:

- a. SIGNS OR DIRECTIONS. Includes the pairs shown in Table 3.4.4–1. For flight control commands, the positive and negative values are as listed in the table. Polarities are reversed for the outputs of the feedback transducers.

Table 3.4.4-1. Available Sets of Positive and Negative Indicators	
Negative Values	Positive Values
–	(Blank)
–	+
D	U
L	R

- b. REMOTE TEXTS. Up to 100 texts, (e.g., STBY, OFF, OP) limited to four characters, stored in and retrieved from a special remote text table (Table 3.4.8–1).
- c. STATUS INDICATORS. Various single–character status symbols are available for display either beside a parameter value or as a stand–alone status indicator. These symbols, displayed at the double overbright intensity level, are shown below:

M ↑ ↓ L H ?

If an “M” is displayed as a status indicator beside a numerical parameter (mask or I/O fault), the parameter value is automatically blanked for system–level and GNC displays; however, for SM displays, the last valid data will remain displayed. Exceptions will be specifically defined. Status information may be augmented by a remote text displayed in a separate column at the normal intensity level (e.g., failure type – ON, LK, OFF).

- d. RESPONSE INDICATORS. An asterisk (*) may be driven beside an item number, component, or signal/data path to indicate selection or deselection of the item by the keyboard, a dedicated switch, or the computer. Remote text (e.g., ACT) may be similarly displayed to indicate a currently active sequence or operation. Either are displayed at the normal intensity level.
- e. CRT MESSAGES. Fault messages, in alarm classes 2 through 5, are displayed on the CRT display message line. The format of the messages is defined in Section 3.4.3. They are derived from a 14–character major field and a 4–character minor field. The combination is identified in the PFS by a 5–character numeric ID with the major field consisting of a 3–character decimal value and the minor field consisting of a 2–character decimal value for flight software designed through Release 18 or a 2–character hexadecimal value beginning with Release 19 design. The combination is identified in the BFS by a 3–character numeric decimal ID. The buffer message indicator displays the number of messages in queue. (CRT message requirements are specified in Appendix A.)

3.4.5 Keyboard Processing Table Coding Standards

Unless otherwise specified, left or right justification of the following items within their respective columns is not required. Column locations should be selected to enhance readability and must be consistent throughout a given display table.

<u>Data Column</u>	<u>Description</u>
CRT SIGNAL NAME	The exact parameter symbol used on the format background. Matrix presentations require specification of the ordinate and abscissa symbols. The appropriate item number is included.
M/SID NO.	The parameter identification number as listed in the MML. Where MML numbers are not available, the formulation mnemonic may be used.
CHAR	An entry in the form A.B, where A is the total number of characters possible in the input value including decimal point and sign. B is the number of characters following the decimal point (B = 0 for integer values).
TYPE	The format type of the input quantity. Legal entries include decimal (DEC), hexadecimal (HEX), and software control (CTRL). CTRL is the same as discretetes for the purpose of showing data type.
UNITS	The units of an input decimal quantity. (See Table 3.4.6-1)
DK (BFS)	An "X" entry in the column denotes that the BFS will listen to the PASS KEYBOARD entries. Default is blank which denotes no BFS interface. Note that any display with one or more "X"s in this column must be listed in Table 3.10-1, "DEU Resident Format Index Table".
ITEM NO.	The assigned ITEM NO's.
LIMITS MIN MAX	A numerical entry (1 to 9 decimal digit number inclusive of sign and decimal point) in the appropriate column shall specify the minimum and/or maximum boundaries not to be exceeded when limit checking of the item entry is performed. An alternate method to specify specially formatted values and/or conditions is to use the keyboard addendum reference paragraph, i.e., as specified in the "ADD REF" column provided in the table.
ADD REF	The ADD REF column refers to an addendum paragraph defining required logic or conditions. An alphanumeric entry denotes additional processing is required on the input quantity and the addendum paragraph which specifies the dependent parameters, all possible conditions, and resultant desired action. Processing is limited to User Interface and MCDS Interface support in accordance with Section 3.4.7. (Codes A through Z, then 1 through 9).
DEST	An alphanumeric code to designate the functional software module which is to receive or take action on the input. Typical codes are as in Tables 3.4.7-1 thru 3.4.7-5.

On displays that are used by the BFS, the destination field is divided and coded as shown below:

DESTINATION	
PFS	BFS
LVL B	SEE TABLE 3.4.7-5
SEE TABLE 3.4.7-2	

NOMENCLATURE An alphanumeric description of the input quantity. Where appropriate, the MML name is used.

CRT An X in this column shows that the MSID is coded as a display parameter in the MMDB/MAST II; no longer used.

3.4.6 CRT Display Processing Table Coding Standards

Unless otherwise specified, left or right justification of the following items within their respective columns is not required. Column locations should be selected to enhance readability and must be consistent throughout a given display table.

<u>Data Column</u>	<u>Description</u>
CRT SIGNAL NAME	The exact parameter symbol used on the format background. Matrix presentations require specification of the ordinate and abscissa symbols. The appropriate item number is included.
M/SID NO. (1-12)	The parameter identification number as listed in the MML. Where MML numbers are not available, the formulation mnemonic may be used and optionally denoted by parenthesis.
NOTE:	On SM OPS-2 displays, a "C" in the eleventh column indicates that the parameter status indicator is to be driven by the FDA class 2 limit sensing. If this column is blank, the parameter status indicator is driven by the FDA class 0, 3 or 4 limiting sensing. This is only required for concurrent limit sensing.
COORD X (13-16) Y (17-20)	The CRT field grid location of the left-most character of the parameter. The X denotes column (1-51) and the Y denotes row (1-26). If greater resolution is required, a 1024 x 731 (X, Y) CRT addressable unit grid can be used. If the 1024 x 731 grid is used, the coordinates specify the center of the character. The 1024 x 731 grid is denoted in the table by specifying an A after the Y numerical entry. Both entries should be right justified in their respective columns.
ITEM NO. (BFS)	BFS Utilization only. An asterisk in the column denotes (21,22) an analog symbol i.e. variable coordinates. The actual runtime values will be generated by the associated display interface processor. AVIS outputs an individual FCW output instruction (FOVI) to expedite them.

FORMAT An entry in the Form A.B, where A is the total number CHAR (23–26) of characters in the data value including decimal point and sign. All decimal values are assumed to include sign whether the sign is displayed or suppressed. B is the number of characters to the right of the decimal (B = 0 for integer values).

FORMAT BILEVEL The text displayed for the 1 and 0 state of bilevel parameters. The text is coded right justified. 0 (31–34)
1 (27–30)
0 (31–34)

FORMAT TYPE The format type of the data value. Legal entries include various (VAR), (35–38) bilevel (BLVL), hexadecimal (HEX), binary (BIN), decimal (DEC), remote text (RTXT), character string (CHAR), and status (STAT) (also see STATUS below).

UNITS (39–43) The units of displayed decimal values. (See Table 3.4.6–1)

STATUS (44) Where status checking is performed on a displayed parameter, a blank location for the parameter status indicator (PSI) is allowed immediately to the right of the parameter value on the generic format. Stand-alone, single character status indicators are also utilized. If a single MML number (or mnemonic) is utilized for a parameter and its associated status, an X entry is required. Where separate MML numbers are utilized, and for stand-alone status, the entry of “STAT” in the FORMAT TYPE is required and the X entry is not used for the status.

A numeric entry (1–9)(right justified) in the ADD REF column, indicates that additional information for status processing is to be found in the addenda. The code provides a reference to the example addenda table shown below. The column marked CODE is the digit that would appear in the ADD REF column. If the ADD REF column is blank, the default status processing is to be used as shown on DEFAULT line.

SM Displays Not Using Preprocessor	
CODE	PSI SYMBOLS
∅ (Default)	↓ ↑ H L M ∅
1	M ∅
2	H L M ∅
3	↓ M ∅
4	↓ ∅

NOTE: When an “M” is displayed for missing data, the last value of the associated data shall be displayed unless specified otherwise
∅ = blank

Other Displays				
CODE	PSI SYMBOLS			
∅ (Default)	↓		M	∅
1	↓	↑	M	∅
2		↑	M	∅
3	↓			∅
4		↑		∅
5	↓		?	∅
6	↓	↑		∅
7			M	∅
8	↓		? M	∅
9			? M	∅

NOTE: When an “M” is displayed for missing data, the last value of the associated data shall be displayed unless specified otherwise
∅ = blank

Neither of these example addenda tables applies to the reconfigurable, preprocessor generated displays described in JSC–19478 (PM Level C FSR) and JSC–19590 (SM Level C FSR).

BLANKING (45)

An X entry denotes the parameter value is to be blanked upon some condition. The ADD REF column refers to an addendum paragraph defining the condition. Default is no blanking.

SIZE (46)

An entry to specify the character size to be used. An X denotes large size. Default is normal size.

INTENSITY (47)

An entry to specify the intensity level of the parameter value. An X denotes double overbright intensity (4 times normal intensity). If X is specified, the ADD REF column refers to an addendum paragraph defining the conditions. Default is normal intensity. All single-character status indicators are automatically driven double overbright (4 times normal intensity), and an “X” entry is not required. For equivalent MEDS information see section 3.1.

COLOR (47)

A numeric entry to specify the MEDS color pallet entry to use. Default is default green (color 40). All single-character status indicators are automatically driven default yellow (color 54), and a numeric value is not required. See Section 3.1 for equivalent MEDS information. Colors specified in this field are defined in the MEDS Intergrated Display Processor (IDP) Software Requirements Specification (SRS), MG070100A1012E2.

FLASH (48)

An X entry denotes the parameter value is to FLASH upon some condition. The ADD REF column refers to an addendum paragraph to define the condition. Default is no flash.

UPDATE RATE
(49–50)

The rate at which the parameter is updated on the CRT. It is coded as follows:

- A = Once every 960 ms F = Once every 480 ms (once every
B* = Once every 1920 ms 320 ms in the BFS)
C = Once every 3840 ms G= As generated or input (applicable
D = Once every 7680 ms to uplink activity indicator only)
E = On demand only,
noncyclic

Note: "A" code for mission and CRT time is once per second by the DEU.

B* is the default option (when left blank)

Note: Selection of the "On-Demand" (E) update rate for GN&C, Systems Software (SSW), and the Vehicle Utility (VU) software areas treat the on-demand update requirement as meaning; Update the parameter on the display whenever it changes, either via item entry or by some other non-display process. The SM and RMS areas treat the on-demand requirement as meaning; Update the parameter on the display whenever it changes via item entry only.

- SIGN (51) An X entry denotes the + sign is to be displayed for decimal values. Default is no + sign displayed.
- LEADING 0s (52) An X entry denotes leading 0 characters are to be displayed for decimal and hexadecimal values. Default is no leading zeros.
- BRANCHING (53) An X entry denotes that display related branching is required on this parameter. The ADD REF column refers to the addendum to define the conditions. Default is no branching.
- DWNLST Not used.
- ADD REF (55-58) An alphanumeric entry (left justified) denotes that additional processing is required on the parameter and the addendum paragraph which specifies the dependent parameters, all viable conditions, mechanization, and the corresponding desired output. Processing is limited to User Interface and MCDS Interface support in accordance with Section 3.4.3. (Codes A through Z) (See status for coding convention for this column.)
- SOURCE (59-70) An alphanumeric code to designate the functional software module which provides the parameter. Typical codes are as defined in Tables 3.4.7-1 thru 3.4.7-5.

On displays that are used by both the PFS and BFS, the source field is divided and coded as shown below:

SOURCE	
PFS	BFS
LVL B	SEE TABLE 3.4.7-5
SEE TABLE 3.4.7-2	

NOMENCLATURE

An alphanumeric description of the displayed parameter. Where appropriate, the MML description is used.

CRT

Measurement coded in MMDB/MAST II; no longer used.

Table 3.4.6-1.ENGINEERING UNITS FOR DECIMAL VALUES

<u>ENGINEERING UNIT</u>	<u>DATA COLUMN CODE</u>
Amperes	AMPS
Counts	CTS
Days	D or DAYS
Days/Hours/Minutes/Seconds	DHMS*
Degrees	DEG
Degrees Celsius	DEG C
Degrees Fahrenheit	DEG F
Degrees Per Second	DPS
Feet	FT
Feet Per Second	FPS
Feet Per Second Per Second	FPS2
g's	G
Hours	H or HRS
Inches	INS
Inches Of Mercury	IN-HG
Kilo Feet	KFT
Kilo Feet Per Second	KFT/S
Kilo Hertz	KHZ
Kilo Watts	KW
Micro- g's	UG
MilliAmperes	MAMP
MilliGrams Per Cubic Meter	MG/M3

Table 3.4.6-1. ENGINEERING UNITS FOR DECIMAL VALUES

<u>ENGINEERING UNIT</u>	<u>DATA COLUMN CODE</u>
MilliRadians Per Second	MRS
MilliVolts Direct Current	MVDC
Minutes	M or MINS
Nautical Miles	NM
Percent	PCT
Pounds	LBS
Pounds Per Hour	LB/HR
Pounds Per Square Foot	PSF
Pounds Per Square Inch Absolute	PSIA
Pounds Per Square Inch Gauge	PSIG
Pounds Per Square Inch Per Minute	PSI/M
Pounds Per Square Inch Per Second	PSI/S
Seconds	S or SECS
Various	VAR
Volts	VOLT
Volts Direct Current	VDC
Watts	WATT

*D, H, M, S may be used in various combinations to indicate Days, Hours, Minutes, Seconds

3.4.7 Typical Source/Destination Codes

The codes listed below for each display category are representative entries in the SOURCE column of CRT display processing tables and the DEST column of keyboard processing tables. Each field is normally limited to six characters, or an addendum reference may be utilized.

The representative codes shown in Table 3.4.7-1 are listed by Sys Software Level A CPDS SS-P-0002-170 paragraph number, where applicable.

The representative GN&C codes shown in Table 3.4.7-2 are listed by GN&C Level B CPDS SS-P-0002-510 paragraph number, where applicable. In certain cases, the same code is used for closely related subfunctions and shown for two or three paragraph numbers.

The representative VU codes listed in Table 3.4.7-4 are listed by VU or GN&C Level B paragraph number, where applicable and available.

Table 3.4.7-1. Source/Destination Codes for Systems Display Interfaces			
Level A Para	Code		Source/Destination Description
	PFS	BFS	
N/A		FOP	Fault Output Processor
N/A		MI	MCDS Interface
N/A	DEU		Display Electronics Unit
N/A	MEM		Memory
5.9.1	FSP		Fault Summary Page
5.9.2	TM		Time Management
5.9.3	GPC		GPC Memory
5.9.4.1	DPS		DPS Utility
5.9.4.2	BUS		GPC/BUS STATUS

Table 3.4.7-2. Source/Destination Codes for GN&C Interfaces *			
FSSR	LEVEL B	Code	Source/Destination Description
	N/A	MI	MCDS Interface
	N/A	FCOS	Flight Computer Operating System
	N/A	HDWR	Hardware
	N/A	KYBD, KB	Computer Keyboard
	N/A	CRT	Cathode Ray Tube / Display
02	4.1	ASC 1STG GUID	Ascent First Stage Guidance
02	4.2	ASC 2STG GUID	Ascent Second Stage Guidance
02	4.3	ORB INS GUID	Orbit Insertion Guidance
02	4.4	PW RTLS GUID	Powered Return-To-Launch Site Guidance
03	4.7	ORB GUID	On-Orbit Guidance
01	4.8	ENT GUID	Entry Guidance
01	4.9	TAEM GUID	Terminal Area Energy Management Guidance
01	4.10	A/L GUID	Autoland Guidance
02	4.13	AOA/ATO TGT	Abort-Once-Around/Abort-To-Orbit Targeting
14	4.17	GPS SOP	GPS Subsystem Operating Program
04	4.18	GPS REF STATE PROC	GPS Reference State Processing

Table 3.4.7-2. Source/Destination Codes for GN&C Interfaces *			
FSSR	LEVEL B	Code	Source/Destination Description
05	4.19	ASC UPP	Ascent User Parameter Processing
05	4.20	RTLS UPP	Return-To-Launch Site User Parameter Processing
04	4.21	GPS RCVR STATE PROC	GPS Receiver State Processing
06	4.22	ORB UPP	On-Orbit User Parameter Processing
04	4.23	ENTRY UPP	Entry User Parameter Processing
04	4.24	TAEM UPP	Terminal Area Energy Management User Parameter Processing
04	4.25	A/L UPP	Autoland User Parameter Processing
09	4.35	ORB DAP	ON-Orbit Digital Autopilot
07	4.36	AEROJET DAP	Aerojet Digital Autopilot
13	4.38	IMU INT PROC	Inertial Measurement Unit Inertial Processing
15	4.39	ADTA SOP	Air Data Transducer Assembly Subsystem Operating Program
16	4.46	ELVN PFB SOP	Elevon Position Feedback Subsystem Operating Program
16	4.47	RUD PFB SOP	Rudder Position Feedback Subsystem Operating Program
16	4.48	SB PFB SOP	Speedbrake Position Feedback Subsystem Operating Program
16	4.49	BF PFB SOP	Body Flap Position Feedback Subsystem Operating Program
15	4.51	BF SLEW SOP	Body Flap Slew Command Subsystem Operating Program
16	4.52	HYD SYS SOP	Hydraulic System Subsystem Operating Program
15	4.54	THC SOP	Translation Hand Controller Subsystem Operating Program
16	4.64	OMS TVC CMD SOP	Orbital Maneuvering System Thrust Vector Control Command Subsystem Operating Program
16	4.65	OMS TVC FB SOP	Orbital Maneuvering System Thrust Vector Control Feedback Subsystem Operating Program
14	4.66	STAR TRCK SOP	Star Tracker Subsystem Operating Program
10	4.71	SF	Selection Filtering
10	4.72	IMU RM	Inertial Measurement Unit Redundancy Management
10	4.87	RHC FDIR	Rotational Hand Controller Fault Detection, Identification, and Recovery
10	4.91	RCS RM	Reaction Control System Redundancy Management

Table 3.4.7-2.Source/Destination Codes for GN&C Interfaces *			
FSSR	LEVEL B	Code	Source/Destination Description
10	4.92	OMS RM	Orbital Maneuvering System Redundancy Management
09	4.97	ORB ATT PROC	On-Orbit Attitude Processing
26	4.101	OMS/RCS QTY GUAGING	Orbit Maneuver System To Reaction Control System Quantity Gauging
26	4.102	RCS QTY MON	Reaction Control System Quantity Monitor
20	4.107	SPI PROC	Surface Position Indicator Processing
20	4.110	GAX	Guidance, Navigation, & Control Annunciation Interface
26	4.115	SRB SEP SEQ	Solid Rocket Booster Separation Sequencer
04	4.124	ENT SITE LOOKUP	Entry Site Lookup
06	4.126	ORB/RND NAV	On-Orbit/Rendezvous Navigation
06	4.148	ORB/RND NAV SEQ	Onorbit/Rendezvous Navigation Sequencer
20	4.150	ENT DIP	Entry Display Processing
20	4.154	VERT SIT DIP	Vertical Situation Display Processing
03	4.158	ORB MNVR DIP	Orbit XXXXX Maneuver YYYYYY Display Processing
20	4.160	XXXXXX TRAJ DIP	XXXXXX Trajectory Display Processing
26	4.161	VENT CNTL SEQ	Vent Door Control Sequencer
15	4.171	3-AX RHC SOP	Three-Axis Rotational Hand Controller Subsystem Operating Program
08	4.176	ADP	Ascent DAP
10	4.180	GN&C SW PROC	Guidance, Navigation, & Control Switch Processing
26	4.182	OMS FIRE SEQ	Orbital Maneuvering System Firing Sequencer
26	4.184	ABT OMS/RCS CONN	Abort Orbital Maneuvering System-To-Reaction Control System Interconnect Function
26	4.185	RCS/RCS XFEED	Reaction Control System-To-Reaction Control System Crossfeed Function
08	4.201	TRANS DAP	Transition Digital Autopilot
20	4.206	ASC DIP	Ascent Display Interface Processor (BFS Only)
13	4.208	IMU ORB A/CAL	Inertial Measurement Unit On-Orbit Align/Calibration
03	4.210	ASC MNVR DIP	Ascent XXXXX Maneuver YYYYYY Display Processing
03	4.211	DEORB MNVR DIP	Deorbit XXXXX Maneuver YYYYYY Display Processing

Table 3.4.7-2. Source/Destination Codes for GN&C Interfaces *			
FSSR	LEVEL B	Code	Source/Destination Description
03	4.213	UNIV POINT PROC	Universal Pointing Processor
20	4.218	RTLS 2 DIP	Return To Launch Site Trajectory 2 Display Processing (BFS Only)
08	4.226	A/E ATT PROC	Ascent/Entry Attitude Processing
14	4.229	RR SOP	Rendezvous Radar Subsystem Operating Program
16	4.232	HYD THERMAL COND	Hydraulic Thermal Conditioning
05	4.238	ASC SITE LOOKUP	Ascent Site Lookup
07	4.248	PTI	Program Test Input
20	5.3	GPS STATUS SPEC	GPS Status Specialist Function
20	5.7	HORIZ SIT SPEC	Horizontal Situation Specialist Function
09	5.8	ORB DAP CONFIG SPEC	Orbital DAP Configuration Specialist Function
03	5.10	ORB TGTING SPEC	Orbit Targeting Specialist Function
20	5.16	RM/RCS SPEC	Redundancy Management/Reaction Control System Specialist Function
20	5.19	RM/ORB SPEC	Redundancy Management Orbit Specialist Function
20	5.21	OVERRIDE SPEC	Override Specialist Function
03	5.24	REL NAV SPEC	Relative Navigation Specialist Function
20	5.25	CNTLS SPEC	Controls Specialist Function
20	5.26	ASC BRG SPEC	Ascent Bearing Specialist Function
20	5.27	ENT BRG SPEC	Entry Bearing Specialist Function
		DIP – Display Interface Processing	
		DAP – Digital Autopilot	
		GD – Guidance	
		NAV – Navigation	
		RM – Redundancy Management	
		SOP – Subsystem Operating Program	
		FDIR – Fault Detection, Isolation and Recovery	

* For displays that are common to the BFS, the level B paragraph number will be used. The abbreviated Level C FSSR document number is shown to provide signal traceability.

Table 3.4.7-3. Source/Destination Codes for System Management (SM) Interfaces		
Level B Para	Code	Source/Destination Description
N/A	MI	MCDS Interface
N/A	OI SMM	Operational Instrumentation Subsystem Measurement Management
N/A	PCM	Pulse Code Modulation
N/A	FDA	Fault Detection and Annunciation
5.1.1	TM	Table Maintenance
5.1.4	AM	Antenna Management
5.1.5	PBD	Payload Bay Door
5.1.12	GPCF	GPC Payload Command Filter
5.1.13	GPCF	GPC Payload Command Filter
5.1.14	GPCF	GPC Payload Command Filter

The representative SM codes shown in Table 3.4.7-3 are listed by Level B CPDS SS-P-0002-580 Paragraph number, where applicable.

Table 3.4.7-4. Source/Destination Codes for Vehicle Utility (VU) Interfaces			
Level B Para		Code	Source/Destination Description
GN&C	VU		
N/A		UI	USER Interface
N/A		SS	System Software
N/A		FDI	Fault detection and identification
N/A		PFB	Position feedback
	4.2	GPC/BTU	General purpose computer/bus terminal unit
	4.3	SST	Sensor self test
	4.4	CSL	Computer status lights
	4.5	TFL	Telemetry format load
	4.6	HDA	Housekeeping data acquisition
	4.9	G CAL	Gyro calibration
	4.10	ATT DET	Attitude determination
	4.11	GC	Gyro compassing
	4.11A	IP	Inertial processing
	4.11B	PP	Platform positioning
	4.13	DDC	Dedicated display checkout
	4.14	MSLT	Mode sequence lights test
	4.19	ADT	Aerosurface drive test
	4.30	NWSC	Nosewheel Steering Checkout
4.71		SF	Selection filtering
4.171		RHC SOP	3–Axis rotation hand controller SOP
4.180		SW PROC	GN&C switch processing
		TCS	Test control supervisor
		RM/CNTL	Redundancy management/controllers

Table 3.4.7-5. Source/Destination Codes for Backup Flight Software Interfaces				
BFS PRD			Code	Source/Destination Description
BSS	GNC	SEQ		
			N/S	Not Supported
			BOS	Backup Operating System
			CRT	Cathode Ray Tube / Display
			KYBD, KB	Computer Keyboard
			MI	MCDS Interface
			GAX	GN&C Annunciation Interface
			DOP 1	Maneuver Display Output Process or (DOP)
			DOP 2	Entry DOP
			DOP 3	Vertical Situation DOP
			DOP 4	Horizontal Situation DOP
			DOP 5	Ascent DOP
			DOP 6	RTLS TRAJ DOP
			PBD SQ	Payload Bay Door Sequence
	3.2.3.1		ASC GD	Ascent Guidance
	3.2.3.3		ENT GD	Entry Guidance
	3.2.3.3		TAEM G	TAEM Guidance
	3.2.2		NAV	Navigation
	3.2.2.3.5.2		STE LK	Site Lookup
	3.2.4.3		A DAP	Ascent Digital Auto-Pilot
	3.2.4.4		T DAP	Transition Digital Auto-Pilot
	3.2.4.5		D DAP	Descent Digital Auto-Pilot
	3.2.3.1		PFG	Powered Flight Guidance
	3.2.5.1		ATT P	Attitude Processor
	3.2.5.2		ADTA	Air Data Transducer Assembly Hardware Interface Program
	3.2.5.4		SBPFB	Speed Brake Position Feedback HIP
	3.2.5.1		EULER	Euler Angle Attitude Processor
	3.2.3.1		MNVR	OMS Maneuver Display Interface Processor
	3.2.5.5		TVCCMD	OMS Thrust Vector Control Command HIP
	3.2.5.4		TVCFB	OMS TVC Feedback HIP
	3.2.3.1		VG CMP	Velocity-to-be-gained Computation
	3.2.3.1		OMS GD	OMS Guidance
	3.2.3.10		RNGLS	Time-to-Entry-Interface Range-to-Landing-Site Computation
	3.2.5.2.4		GPS INPUT	GPS Input HIP
	3.2.5.5		RCS PM	RCS Pressure Monitor HIP

Table 3.4.7-5. Source/Destination Codes for Backup Flight Software Interfaces				
BFS PRD			Code	Source/Destination Description
BSS	GNC	SEQ		
	3.2.5.4		ELPFB	Elevon Position Feedback HIP
	3.2.5.4		RUDPFB	Rudder Position Feedback HIP
	3.2.5.4		ELDPFB	Elevon Delta Pressure Feedback HIP
		3.3.6.2	SRB SQ	Solid Rocket Booster Sequencer
		3.3.6.4	ET SEP	External Tank Separation Sequencer
		3.3.6.1	SEQ CN	Sequencing Controller
		3.3.6.9	RCS Q	RCS Quantity Gauging
		3.3.1.16	MPS HE	MPS He Suppress Monitor Sequence
		SM		
		3.2.5.1	OI SMM	Systems Management Limit Comparison
3.6.4			S-BAND	Uplink/Display Interface

3.4.8 Remote Text Summary

Table 3.4.8–1 lists the remote texts that have been identified for STS. Direction indicators and single character status symbols are included. Integers displayed as dynamic characters for item or module identification are not listed. This table is for reference only; required remote texts are specified in the CRT Processing Table and Addenda for applicable displays.

Table 3.4.8-1.STS Display Remote Text	
Text	Definition
ALPHABETIC	
A	TDRS A Target, Aft
ACT	Active
AFT	Aft
B	TDRS B Target
BAD	BAD (Data, etc.)
BATT	R/P battery voltage low
BDA	Bermuda Island
BIT	Built-In-Test in progress
BITE	Built-In Test Equipment
BSY	Busy
B/U	Backup
BYP	Bypass
CAN	Canberra, Australia DSN Site
CL	Close(d)
CPLT	Complete
CTS	Colorado Springs RTS Site
D	Down
DATA	Data (transmittal)
DEP	Deploy
DFR	Dryden Flight Research Center, CA STDN Site
DGF	Data Good Fail
DGS	Diego Garcia RTS Site
DOWN	Down
D/VO	Data/Voice (transmittal)
E	East Longitude
ENA	Enable(d)
ERR	Error
F	Forward

Table 3.4.8-1.STS Display Remote Text	
Text	Definition
FAIL	Fail(ed)
FWD	Forward
FF	Free Fall
FS	Fail Safe
G	Gravity (Acceleration Unit)
GDX	Goldstone, CA DSN Site
GNC	Guidance Navigation & Control
GOOD	Good (Status)
GTS	Guam RTS Site
HALT	Halt
HI	High
HT	Target Radius
HTS	Kaena Point, HA RTS Site
INH	Inhibit
INIT	Initialization (mode)
INS	(GPS aided Navigation submode)
IP	In Process/Progress
IT	Undefined
JSC	Johnson Space Center Engineering Site (ESTL)
L	Left Below Lower Limit
LEFT	Left
LK	Leak
LL	Lower Left (Quad Antenna)
LO	Lower (Hemi Antenna), low
LOAD	Load in Progress, Loading Flag
LOCK	Locked
LOOP	Loop (Recorder)
LOOPB	LoopB
LR	Lower Right (Quad Antenna)
M	Missing (Data) Masked (Data)
MAD	Madrid, Spain
MIL	Merritt Island, Florida
MIN	Minimum (Entry Point)
MNA	Main DC Bus A

Table 3.4.8-1.STS Display Remote Text	
Text	Definition
MNB	Main DC Bus B
N/A	Not Applicable
NFS	Northrop Field Strip
NHS	New Boston, NH RTS Site
NO	No Violation
NOLK	Not Locked
OCE	Ocean Color Experiment
OFF	Off, Fail Off (Failure to Fire)
OK	OK
ON	On, Fail On (Runaway Jet)
OP	Open
OPF	Orbiter Processing Facility
OPR	Operator
OTS	Oakhanger AFB, England RTS Site
PAD	Launch Pad
PB	Playback
PB-P	Playback-Parallel
PDL	New Smyrna Beach, Florida
PL	Payload
PORT	Portside
PRI	Primary
PT	Pitch Trim
PVA	(GPS unaided Navigation submode)
R	Right
RCDA	Record Serial A
RCDB	Record Serial B
RCDP	Record Parallel
RD	Rudder
RDY	Ready
RGHT	Right
RN	Undefined
RPF	Receiver/Processor (R/P) failure
RSET	Reset
RUN	Running, Load in Progress
S	STDN or SGLS ground site

Table 3.4.8-1.STS Display Remote Text	
Text	Definition
SB	Synchronization Bit
SM	System Management
SMIR	Shuttle Multi-Spectral Infrared Radiometer
SMRD	Spin Motor Rotation Detector
SPR	Spare
STA	(GPS Prelaunch Standby Navigation submode)
STBD	Starboard
STBY	Standby
STO	Stow
STOP	Stopped
SX	Undefined
T	Temperature or Time
TA	To Apogee
TC	To Circular (Orbit)
TEST	Test (mode)
TP	To Perigee
U	Up
UL	Upper Left (Quad Antenna)
UP	Upper (Hemi Antenna), Uplink
UR	Upper Right (Quad Antenna)
VAB	Vertical Assembly Building
VTS	Vandenberg AFB, CA RTS Site
W	West Longitude
W/B	Water Boiler
WLP	Wallops Island, VA
YES	Yes, Violation Exists

Table 3.4.8-1.STS Display Remote Text	
Text	Definition
SYMBOLS	
*	Selected, Deselected, Active
_	Underscore
#	Pounds or Numbers
∅	Blank
-	Negative
+	Positive
?	Dilemma (Miscompare)
↑	Above, Upper Limit
↓	Failed, Below Lower Limit
ALPHANUMERIC	
A1	Undefined
A2	Undefined
A3	Undefined
G1	GNC OPS 1
G2	GNC OPS 2
G3	GNC OPS 3
G6	GNC OPS 6
G8	GNC OPS 8
G9	GNC OPS 9
P9	PL OPS 9
S2	SM OPS 2
S9	SM OPS 9
1A	PAYLOAD RETENTION FITTING
1B	PAYLOAD RETENTION FITTING
1C	PAYLOAD RETENTION FITTING
2C	PAYLOAD RETENTION FITTING
3A	PAYLOAD RETENTION FITTING
3B	PAYLOAD RETENTION FITTING
4A	PAYLOAD RETENTION FITTING
4B	PAYLOAD RETENTION FITTING
4C	PAYLOAD RETENTION FITTING
5C	PAYLOAD RETENTION FITTING

Table 3.4.8-1.STS Display Remote Text	
Text	Definition
NUMERIC	
1/2	ONE & TWO
0	ZERO
1	ONE
2	TWO
3	THREE
4	FOUR
5	FIVE
6	SIX
7	SEVEN
8	EIGHT
9	NINE
10	TEN
11	ELEVEN
12	TWELVE
13	THIRTEEN
14	FOURTEEN
18	EIGHTEEN
19	NINETEEN
20	TWENTY
21	TWENTY-ONE
22	TWENTY-TWO
23	TWENTY-THREE
24	TWENTY-FOUR
25	TWENTY-FIVE
26	TWENTY-SIX
27	TWENTY-SEVEN
28	TWENTY-EIGHT
29	TWENTY-NINE
30	THIRTY
31	THIRTY-ONE
32	THIRTY-TWO
33	THIRTY-THREE
34	THIRTY-FOUR
35	THIRTY-FIVE
36	THIRTY-SIX
37	THIRTY-SEVEN
38	THIRTY-EIGHT
39	THIRTY-NINE

Table 3.4.8-1.STS Display Remote Text	
Text	Definition
40	FORTY
41	FORTY-ONE
42	FORTY-TWO
43	FORTY-THREE
44	FORTY-FOUR
45	FORTY-FIVE
46	FORTY-SIX
47	FORTY-SEVEN
48	FORTY-EIGHT
49	FORTY-NINE

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3.5 DISPLAY PARAMETER UPDATE RATES

Each display is completely generated on the first cycle after an on-demand condition is satisfied. The on-demand conditions include completion of a calling request, completion of a transfer request, execution of RESUME, release of a frozen display, and completion of an ITEM input. After display generation, cyclic parameters are updated at rates as specified in the output tables for the individual displays. The parameters which are common to all displays are updated uniformly as specified in the CRT processing tables.

Current and predicted conditions on the analog displays may be updated each 320 ms, if specified in the CRT display processing tables. For BFS, see BSS PRD (MG038101) Section 3, the paragraph entitled "Display Support" for additional Displays update criteria.

3.6 DISPLAY STRUCTURES AND ORGANIZATION

This section describes the structures and organization of the CRT display formats and the numbering systems used for the STS set.

3.6.1 OPS Format Numbering System

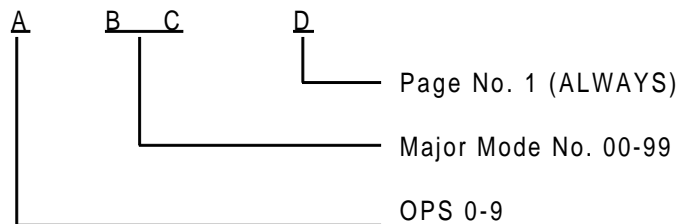


FIGURE 3.6.1-1. OPS Format Numbering System

3.6.2 OPS Organization

The information shown in the OPS section includes the following items:

- a. Page number as it appears in the top left corner of the CRT.
- b. Name of the major mode.
- c. Number representing the operational sequence.
- d. Major mode number.
- e. CRT display name.
- f. Availability—Coded for OPS 1 through 9 or all which show that the CRT display function is available in the particular OPS load.

3.6.3 Specialist (SPEC) and Display (DISP) Organization

The information shown in the SPEC or DISP section includes the following:

- a. Page No. – the number used for the calling of a SPEC or DISP function:

SPEC XXX PRO

- b. Display function – the generic name of the CRT display.
- c. Function type – coded as SPEC or DISP
- d. Availability – coded for OPS 1 through 9, BFS, or ALL which show the CRT display functions available in that particular OPS sequence load.

3.6.4 Display Availability

This paragraph includes Table 3.6.4–1 for the STS Operations software. The Table is a matrix which includes the following information: CRT page no., and OPS sequence memory configuration information which lists the displays availability by page number. A correlation is provided between GPC memory configurations, Operation Sequence (OPS), and the major functions of GNC, PL, SM and BFS. OPS page numbers are identified by four digit numbers, both SPEC and DISP page numbers are identified by three digit numbers. The page number assignments in each table are requirements; all other data are for information only.

Table 3.6.4-1.CRT PAGE NO., OPS AND MEMORY CONFIGURATION CORRELATION PFS/BFS STS OPERATIONS SOFTWARE

(3) Page	G1/G3/G6 G2/G8/G9/S2/P9		PFS									BFS			
	OPS SEQUENCE	0 0	G1/G6	G2	G3	S2	S4	P9		G8	G9	G _o	G1/G6	G3	SM0
	Memory Configurations		1	2	3	4	5	6	7	8	9				
0001	GPC MEMORY	X X													
0001	BFS MEMORY											X			
0001	THERMAL (6)														X
1011	(LAUNCH) TRAJ 1												X		
1021	(ASCENT) TRAJ 1												X /		
	(RTLS) TRAJ 1												X /		
	(ATO) TRAJ 1												X /		
1031	(ASCENT) TRAJ 2												X /		
	(TAL) TRAJ 2												X /		
	(ATO) TRAJ 2												X /		
1011	(LAUNCH) TRAJ 1		X /												
1021	(ASCENT) TRAJ 1		X /												
	(RTLS) TRAJ 1		X /												
	(ATO) TRAJ 1		X /												
1031	(ASCENT) TRAJ 2		X /												
	(TAL) TRAJ 2		X /												
	(ATO) TRAJ 2		X /												
1041	(OMS 1) MNVR (EXEC)		X /										X /		
	(ATO 1) MNVR (EXEC)		X /										X /		
	(AOA 1) MNVR (EXEC)		X /										X /		
1051	(OMS 2) MNVR (EXEC)		X /										X /		
	(ATO 2) MNVR (EXEC)		X /										X /		
	(AOA) MNVR (TRANS)		X /										X /		

Table 3.6.4-1.CRT PAGE NO., OPS AND MEMORY CONFIGURATION CORRELATION PFS/BFS STS OPERATIONS SOFTWARE															
(3) Page	G1/G3/G6 G2/G8/G9/S2/P9		PFS									BFS			
	OPS SEQUENCE	0 0	G1/G6	G2	G3	S2	S4	P9		G8	G9	G ₀	G1/G6	G3	SM0
	Memory Configurations		1	2	3	4	5	6	7	8	9				
1061	(OMS 2) MNVR (COAST)		X /										X /		
	(ATO 2) MNVR (COAST)		X /										X /		
2011	ANTENNA					X									
2011	UNIV PTG			X											
2021	PL BAY DOORS					X									
2021	(ORBIT) MNVR (EXEC)			X											
3011	(DEORB) MNVR (COAST)				X									X	
3021	(DEORB) MNVR (EXEC)				X									X	
3031	(DEORB) MNVR (COAST)				X									X	
3041	ENTRY TRAJ 1				X									X	
	ENTRY TRAJ 2				X									X	
	ENTRY TRAJ 3				X									X	
	ENTRY TRAJ 4				X									X	
	ENTRY TRAJ 5				X									X	
3051	VERT SIT 1				X									X	
	VERT SIT 2				X									X	
4011	ANTENNA						X								
4021	PL BAY DOORS						X								
6011	RTLS TRAJ 2														
6011	(RTLS) TRAJ 2		/ X												
6021	VERT SIT 1												/ X		
			/ X										/ X		

Table 3.6.4-1.CRT PAGE NO., OPS AND MEMORY CONFIGURATION CORRELATION PFS/BFS STS OPERATIONS SOFTWARE

(3) Page	G1/G3/G6 G2/G8/G9/S2/P9		PFS									BFS			
	OPS SEQUENCE	0 0	G1/G6	G2	G3	S2	S4	P9		G8	G9	G ₀	G1/G6	G3	SM0
	Memory Configurations		1	2	3	4	5	6	7	8	9				
6031	VERT SIT 1		/ X										/ X		
	VERT SIT 2		/ X										/ X		
8011	FCS/DED DISP C/O									X					
9011	MASS MEMORY R/W							X							
9011	GPC MEMORY										X				
000	GPC MEMORY	X X	X / X	X	X	X	X	X		X	X				
000	BFS MEMORY (6)											X	X / X	X	X
001	DPS UTILITY	X	X / X	X	X	X	X	X		X	X				
002	TIME	X		X		X	X	X		X	X				
006	GPC/BUS STATUS	X	X / X	X	X	X	X	X		X	X				
018	GNC SYS SUMM 1		X / X	X	X					X			X / X	X	
019	GNC SYS SUMM 2			X						X			X / X	X	
020	DAP CONFIG			X											
021	IMU ALIGN			X	X										
022	S TRK/COAS CNTL			X	X(1)										
023	RCS		X / X	X	X					X					
025	RM ORBIT			X											
031	AAPS CONFIG			X											
032	AAPS SETUP			X											
033	REL NAV			X											
034	ORBIT TGT			X											
040	SENSOR TEST									X					

Table 3.6.4-1.CRT PAGE NO., OPS AND MEMORY CONFIGURATION CORRELATION PFS/BFS STS OPERATIONS SOFTWARE

(3) Page	G1/G3/G6 G2/G8/G9/S2/P9		PFS									BFS			
	OPS SEQUENCE	0 0	G1/G6	G2	G3	S2	S4	P9		G8	G9	G _o	G1/G6	G3	SM0
	Memory Configurations		1	2	3	4	5	6	7	8	9				
078	SM SYS SUMM 1 (5)(6)					X	X								X
079	SM SYS SUMM 2 (5)(6)					X	X								X
085	MASS MEMORY R/W					X	X	X							
086	APU/HYD (5)					X	X								
087	HYD THERMAL (5)					X	X								
088	APU/ENVIRON THERM (5)					X	X								
089	PRPLT THERMAL (5)					X	X								
094	PDRS CONTROL					X	X								
095	PDRS OVERRIDE					X	X								
096	PDRS FAULTS (5)					X	X								
097	PL RETENTION (5)					X	X								
098	SPDS (5)					X	X								
099	FAULT (6)	X X	X / X	X	X	X	X	X		X	X	X	X / X	X	X
100	GTS DISPLAY														
101	SENSOR SELF-TEST														
102	RCS/RGA/ADTA TEST														
104	GND IMU CNTL/MON														
105	TCS CONTROL														
106	MANUAL CONTROLS														
111	SL MEMORY DUMP								X						
112	GPC/BTU I/F														
113	ACTUATOR CONTROL														
166	SM DISP (SPARE) (5)					X	X								

Table 3.6.4-1.CRT PAGE NO., OPS AND MEMORY CONFIGURATION CORRELATION PFS/BFS STS OPERATIONS SOFTWARE

(3) Page	G1/G3/G6 G2/G8/G9/S2/P9		PFS									BFS			
	OPS SEQUENCE	0 0	G1/G6	G2	G3	S2	S4	P9		G8	G9	G _o	G1/G6	G3	SM0
	Memory Configurations		1	2	3	4	5	6	7	8	9				
212	PL (SPEC 9) (4)					X	X								
213	PL (SPEC 10) (4)					X	X								
214	PL (SPEC 11) (4)					X	X								
215	PL (SPEC 12) (4)					X	X								
216	PL (DISP 5) (4)					X	X								
217	PL (DISP 6) (4)					X	X								
218	PL (DISP 7) (4)					X	X								
219	PL (DISP 8) (4)					X	X								
220	PL (SPEC 13) (4)					X	X								
221	PL (SPEC 14) (4)					X	X								
222	PL (SPEC 15) (4)					X	X								
223	PL (SPEC 16) (4)					X	X								
224	PL (SPEC 17) (4)					X	X								
225	PL (SPEC 18) (4)					X	X								
900	GENERAL					X	X								
THRU 999	↓														

NOTES: APPLICABLE TO TABLE 3.6.4-1 (SECT 3.6.4 DISPLAY AVAILABILITY)

- (1) Display is available in OPS G3 (MM301 only).
- (2) The “XXXXIPL MENU” display comes up automatically when Initial Program Load (IPL) is initiated. The “DEU STAND-ALONE ST” display loading and execution will be accomplished via an ITEM ENTRY on the “XXXXIPL MENU” display page. The title of the “XXXXIPL MENU” display page will read “GPCIPL MENU(1)” during GPCIPL execution and “BSL2IPL MENU(1)” when the Backup System Loader (BSL) is executing. These two displays are not callable by a “Page number”.
- (3) Page number assignments are requirements; other data are for reference only.
- (4) Payload CRT display titles (Pages 200 through 225) are mission design dependent when used and may be main memory or mass memory resident, as defined in the JSC-19478-XXX Payload Management, Level C Flight Software Requirements.
- (5) This Systems Management (SM) CRT display is classified as reconfigurable in the PFS software on a flight by flight basis via the Space Transportation Automated Reconfiguration (STAR) system and may be main memory or mass memory resident. Detail requirements for the display are defined in JSC-19590-XXX Systems Management, Level C Flight Software Requirements. Those identified as (SPARE) are not currently in the flight software and are reserved for growth capability.
- (6) “SM0” as used for BFS means display available in SM OPS 0.
- (7) The BFS GPS Status display is not available when the I-Load GPS AVAIL = 0.

CR's incorporated

2431	12390B	12614	12716A	12812A	29364	59202
12268	12447	12620	12771A	12967	29531B	59350
12353B	12492B	12658	12809A	19014A	29682C	59532B
12384	12528A			19226A	29998A	59693C
	12561A			19233A	39162A	59750
				19638A	39263E	69205G
					39266A	79556D
						89890E
						89931
						89977C
						89985C
						90051
						90118D
						90182
						90229C
						90326

3.7 MISSION DEPENDENT CONSTANTS

This section identifies the mission dependent constants that are to be included in the initial load (I-Load) requirements.

I-Loads specifying the display locations (AU coordinates) of trajectory line segments generally take the form of two-dimensional arrays, with the second dimension comprised of four elements. The first subscript identifies the line segment, and the second subscript identifies in order the X and Y coordinates of the start point and the X and Y coordinates of the end point. For example, the AU coordinates of the start and end points of the fifth line segment in the I-Load trajectory array A1_SOLID_LINE are given by A1_SOLID_LINE(5, 1-4). If two line segments are piecewise continuous, the end-point coordinates of the first line segment will equal the start-point coordinates of the second line segment.

I-Loads specifying character strings and their display locations generally take the form of two-dimensional arrays, with the second dimension comprised of three elements. The first subscript identifies a particular character or character string. The second subscript identifies the content of the character (string) with the first element, and X and Y coordinates of the character (string) with the second and third elements, respectively. For example, the fifth character string and its display location in the character string array R1_CHARACTER_STRING are given by R1_CHARACTER_STRING (5,1-3).

	Title	Table No.
1.	Entry Trajectory 1 Display I-LOADS	4.2.1-7
2.	Entry Trajectory 2 Display I-LOADS	4.2.2-7
3.	Entry Trajectory 3 Display I-LOADS	4.2.3-7
4.	Entry Trajectory 4 Display I-LOADS	4.2.4-7
5.	Entry Trajectory 5 Display I-LOADS	4.2.5-7
6.	Vertical Situation 1 Display I-LOADS	4.2.6-7
7.	Vertical Situation 2 CRT Display I-LOADS	4.2.7-7
8.	Ascent Trajectory 1 (BFS) CRT Display I-LOADS	4.2.16-7
9.	Ascent Trajectory 2 (BFS) Display I-LOADS	4.2.17-7
10.	RTLS Trajectory 2 (BFS) CRT Display I-LOADS	4.2.34-7
11.	XXXXXX TRAJ 1 (PFS) CRT Display I-LOADS	4.2.38-7
12.	XXXXXX TRAJ 2 (PFS) CRT Display I-LOADS	4.2.39-7
13.	RTLS TRAJ 2 (PFS) CRT Display I-LOADS	4.2.40-7
14.	Ascent Bearing (PFS) CRT Display I-LOADS	4.2.41-7

3.8 DESIGN-DEPENDENT CONSTANTS

This section identifies the design-dependent constants.

	Title	Table No.
1.	Entry Trajectory 1 (PFS/BFS) CRT Display Background Requirements	4.2.1-3
2.	Entry Trajectory 2 (PFS/BFS) CRT Background Requirements	4.2.1-3
3.	Entry Trajectory 3 (PFS/BFS) CRT Background Requirements	4.2.1-3
4.	Entry Trajectory 4 (PFS/BFS) CRT Background Requirements	4.2.1-3
5.	Entry Trajectory 5 (PFS/BFS) CRT Background Requirements	4.2.1-3
6.	Vertical Situation 1 (PFS/BFS) CRT Background Requirements	4.2.6-3
7.	Horizontal Situation (PFS) CRT Design-Dependent	4.2.9-3
8.	Horizontal Situation (BFS) CRT Design-Dependent	4.2.11-3
9.	Ascent Trajectory 1 (BFS) CRT Background Requirements	4.2.16-3
10.	Ascent Trajectory 2 (BFS) CRT Background Requirements	4.2.17-3
11.	RTLS Trajectory 2 (BFS) CRT Background Requirements	4.2.34-3
12.	XXXXXX TRAJ 2 (PFS) CRT Background Requirements	4.2.39-3
13.	RTLS TRAJ 2 (PFS) CRT Background Requirements	4.2.40-3
14.	Ascent Bearing (PFS) CRT Background Requirements	4.2.41-3
15.	Entry Bearing (PFS) CRT Background Requirements	4.2.42-3

3.9 BFS SCRATCH PAD LINE (SPL) REINITIALIZATION

The BFS Scratch Pad Line (SPL) can be reinitialized (i.e., “cleared”) by both BFS software and Display Control Program (DCP) software. The DCP resides within the DEU and interfaces between the shuttle crew and the PASS/BFS software in the General Purpose Computers (GPC). Requirements for SPL clears done by the DCP software are specified in the Computer Program Development Specification (CPDS) for the OFT Display Electronic Unit (DEU) Control Program End Item, Part I, MG017300.

3.9.1 General Requirements for Keyboard-initiated Reinitialization

The following SPL clearing requirements apply for a BFS assigned DEU using the keyboard assigned to it.

Whenever the following single keyboard entries are made, BFS software shall assume that the DCP will clear the SPL before displaying the keyboard entry:

1. Initiator keyboard keys: OPS, SPEC, ITEM, GPC/CRT or I/O RESET.
2. Single keystroke message keys: RESUME, FAULT SUMM, SYS SUMM and EXEC*. The single keystroke message keys ACK and MSG RESET do not affect the SPL.

*When the burn data information is displayed on the XXXXX MNVR YYYYYY display, the BFS operational software shall treat the EXEC key as a single stroke message key (Ref. STS 83-0020V1, 4.2.10.1 (12) a.). If there is no flashing data on the SPL, entering the EXEC key will enable the burn maneuver. The BFS software shall then assume that the DCP will clear the SPL and display "EXEC" on the SPL.

The BFS software shall assume that the DCP will clear the SPL whenever enough CLEAR keys are entered. If a correct complete message is being displayed, one CLEAR key entry shall clear the SPL. If an incomplete message (correct or incorrect) is being displayed on the SPL, the CLEAR key shall remove the last entered keyboard entry. The CLEAR key can be entered repeatedly until all the displayed keyboard entries are removed and the SPL is cleared. Note: dependent upon the message displayed, one or more displayed keyboard entries may be removed for each CLEAR key entry.

3.9.2 Major Function Switch Requirements

The BFS software shall clear the SPL of a BFS assigned DEU using the Major Function switch assigned to it whenever the switch is changed to a different position.

3.9.3 DEU Reassignment Requirements

The BFS software shall clear the SPL of the DEU whenever the DEU has been reassigned from PASS to BFS under any of the following conditions:

1. Upon BFS engagement.
2. Via the BFC CRT DISPLAY SELECT switches.
2. Via the GPC/CRT keyboard key.

3.9.4 OPS Entry Requirements

The BFS software shall clear the SPL of all BFS assigned DEUs whenever a valid OPS function is entered ("OPS XYY PRO", where X is the OPS number and YY is the major mode) and the OPS number has been changed. Valid means that the message entry is correct in syntax and the OPS and major mode transition is permitted.

3.9.5 SPEC and DISP Entry Requirements

The BFS software shall clear the SPL of a BFS assigned DEU whenever a valid specification (SPEC) format is entered. The BFS software shall not clear the SPL whenever a valid display (DISP) format is entered. See Shuttle System Level A CPDS SS-P-0002-170 Section 5.3.3.3, “Display Format Numbering System”, for the description of SPEC and DISP formats.

3.9.6 RTLS Abort Requirements

The BFS software shall clear the SPLs on all BFS assigned DEUs whenever a RTLS Abort is commanded. This may be via the RTLS Abort Rotary switch or successfully entering the keyboard message, “OPS 601 PRO”.

3.10 DEU RESIDENT FORMAT INDEX TABLE

The Display Electronic Unit (DEU) resident format index table provides a one to one correspondence with the format table described in the GPC/DEU ICD 3–1011–02. Each entry in the DEU resident format index table identifies the particular display format corresponding with the same entry of the format index table. A PASS display format with BFS DK listen items must be present in the table. In addition, it is advisable to include PASS OPS display formats in the table where re-entry to the OPS is problematic (e.g., OPS 1 and OPS 3). In this case, protection is provided against a GPC transmission failure of background data. Table 3.10–1 describes the DEU resident format table.

Table 3.10-1. DEU Resident Format Index Table		
Entry	Page No. (1)	Format Title
0	099	FAULT
1	050	HORIZONTAL SIT.
2	6031	VERTICAL SIT.
3	1041	MANEUVER
4	1011	XXXXXX TRAJ 1
5	018	GNC SYS SUMM 1
6	3041	ENTRY TRAJ.
7	000	GPC MEMORY
8	055	GPS STATUS
9	1031	XXXXXX TRAJ 2 / RTLS TRAJ 2
10	054	ASCENT BEARING
11	022	STAR TRACKER
12	021	IMU ALIGNMENT
13	051	OVERRIDE

Table 3.10-1. DEU Resident Format Index Table		
Entry	Page No. (1)	Format Title
14	023	RCS
15	054	ENTRY BEARING
16	Spare	
17	Spare	
18	Spare	
19	Spare	
20	Spare	
21	Spare	
22	Spare	
23	Spare	
24	Spare	
25	Spare	
26	Spare	
27	Spare	
28	Spare	
29	Spare	
30	SRB (supplemental branch instruction)	
31	Address of first word of display buffer	
Notes: (1) Page number is for reference only. (2) FCW (Format Control Word) branch to common exit, to display buffer, entry 30 of format index table. (3) Deleted. (4) These "spare" entries currently contain the address of a background page which indicates that the display background is not available as a critical format.		

3.11 DISPLAY GRID DEFINITION

The display and its functional requirements are defined in this document. The skeleton portion is most easily defined by a picture on a grid. The exact placement on the grid may be specified (refer to Paragraph A. below) or left to the software contractor to interpret from the grid. Much of the variable data on displays may be completely defined by the filling in of an appropriate table; however, more complicated displays with analog parameters or branching requirements must be at least partially defined via text.

The portion of a display identified as skeleton normally shall be processed into the skeleton table (as opposed to the Dynamic Data Processing Tables). However; in certain situations, an overall memory savings can result by producing portions of the display skeletons into the flight software in the most efficient manner possible, in terms of memory and CPU usage.

- A. Grid coordinate – This shall normally identify the 26-by-51 size grid location of the left-most character (including sign) of the parameter. The 26-by-51 size grid should be adequate for most displays; however, if necessary, other grid coordinates may be used as defined below.

The 26-by-51 grid for small size characters is derived by allowing a space between characters of 1/3 the character height for horizontal spacing and 1/2 the character height for vertical spacing. Using the same formula for large size characters, a 22-by-43 grid is derived. Therefore, displays requiring the large size characters could be defined most conveniently by using the 22-by-43 grid. The ultimate location grid is a 731-by-1,024 raster grid which may be used to define the center point of any size character (the software contractor must transform other grids to the 731-by-1,024 size for use by the Multi-Function CRT Display System (MCDS). To transform between the 731-by-1,024 and the 26-by-51 grids, the following information is required:

1. The distance between character centers on a 26-by-51 grid is 19 horizontal and 27 vertical Addressable Units (AUs).
2. The 55 unused AUs in the horizontal direction (51 characters times 19 units equals 969) shall be divided between the left and right sides of the display of 28 and 27 units, respectively. The center of the first character shall be located at AU 37.
3. Likewise, the 28 unused addressable vertical units shall be distributed equally between the top and bottom of the display. The center of the top row shall be 28. A standard transformation from the 22-by-43 grid to raster units is undefined and any use of that grid must be accompanied by a conversion to raster units.

If desired, it is possible to combine character sizes and to specify the spacing between adjacent characters. Any display that requires other than the 26-by-51 grid with small character size should be defined using the 702-by-969 size grid constrained by the occlusion zone of 14 units both top and bottom, 28 units on the left and 27 units on the right of the display.

3.12 DESCRIPTION OF GN&C DEDICATED INDICATORS

The following paragraphs and figures attempt to depict the mechanical GN&C Dedicated Indicators (ADI, HSI, AMI, AVVI, SPI, Event Lamps and Pushbutton Indicators) and their display capabilities. For information only, MEDS-like examples for the corresponding ADI, HSI, AMI, AVVI, and SPI are also shown below; and are numbered 3.12.1-2, 3.12.2-2, 3.12.3-2, 3.12.4-2, and 3.12.5-2, respectively. For a general statement about MEDS equivalency see section 3.1.

3.12.1 Attitude Director Indicator

Figure 3.12.1–1 shows a frontal view of the ADI cockpit display. The instrument is capable of displaying:

- (1) The orbiter's roll, pitch, and yaw attitude via a gimballed ball.
- (2) Attitude errors via three meter-positioned needles. The error needles are superimposed on the face of the ball. The needles have a stow (out-of-view) position which is used to indicate invalid conditions.
- (3) Attitude rates or time to HAC intercept, groundtrack error, and altitude error via three meter-positioned pointers. The pointers are positioned on the face of the indicator outside the ball. The pointers have a stow (out-of-view) position which is used to indicate invalid conditions.
- (4) Roll error and rate/time to HAC intercept scales are marked off above the ball.
- (5) Pitch error and rate/altitude error scales are marked off to the right of the ball.
- (6) Yaw error and rate/groundtrack error scales are marked off below the ball.
- (7) An OFF flag is provided to indicate when the attitude ball display may be invalid.

When the attitude ball is positioned in accordance with a command from the DDU of zero degrees in all three axes, the ball will be seen in the same position as shown in Figure 3.12.1–1. When the attitude ball starts from a position of zero degrees on all axes and is responding to a positive roll command from the DDU, the ball will appear to rotate in the counterclockwise direction. When the attitude ball starts from a position of zero degrees on all axes and is responding to a positive pitch command from the DDU, the visible ball surface will appear to move downward. When the attitude ball starts from a position of zero degrees on all axes and is responding to a positive yaw command from the DDU, the visible ball surface will appear to move to the left. A plus polarity on the signal from the DDU to the error needles and rate pointers will cause deflection in the direction indicated:

Roll error needle	left
Pitch error needle	down
Yaw error needle	left
Roll rate pointer	right
Pitch rate pointer	up
Yaw rate pointer	right

NOTE: The sign convention of the rate pointers reflects the true direction of vehicle rotation in body axes.

See Appendix F.4.103 in Volume 3 of this book for display processing.

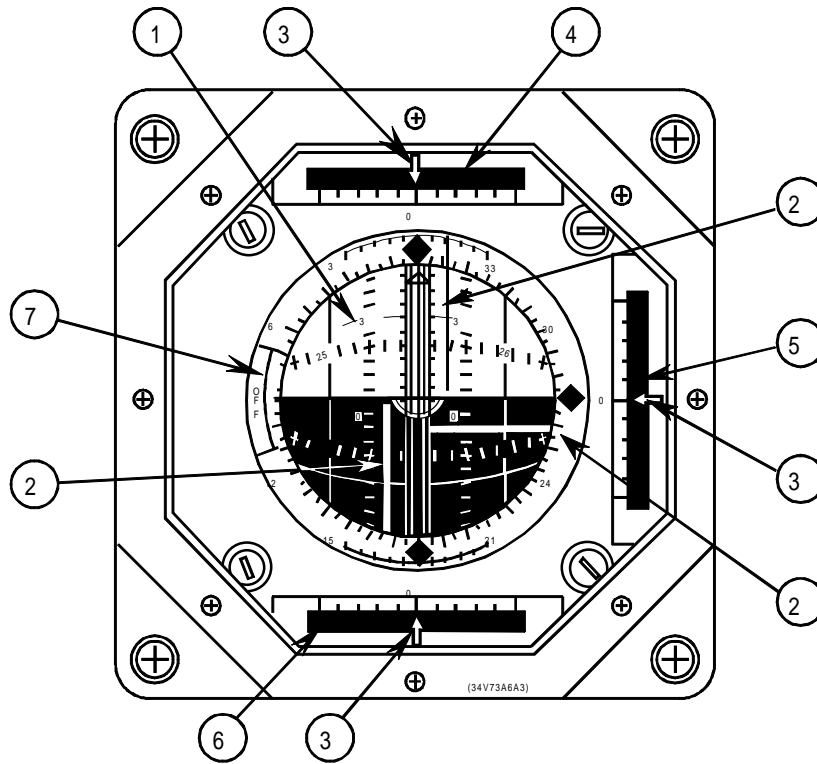


FIGURE 3.12.1-1. Attitude Director Indicator (ADI)

INFORMATION ONLY

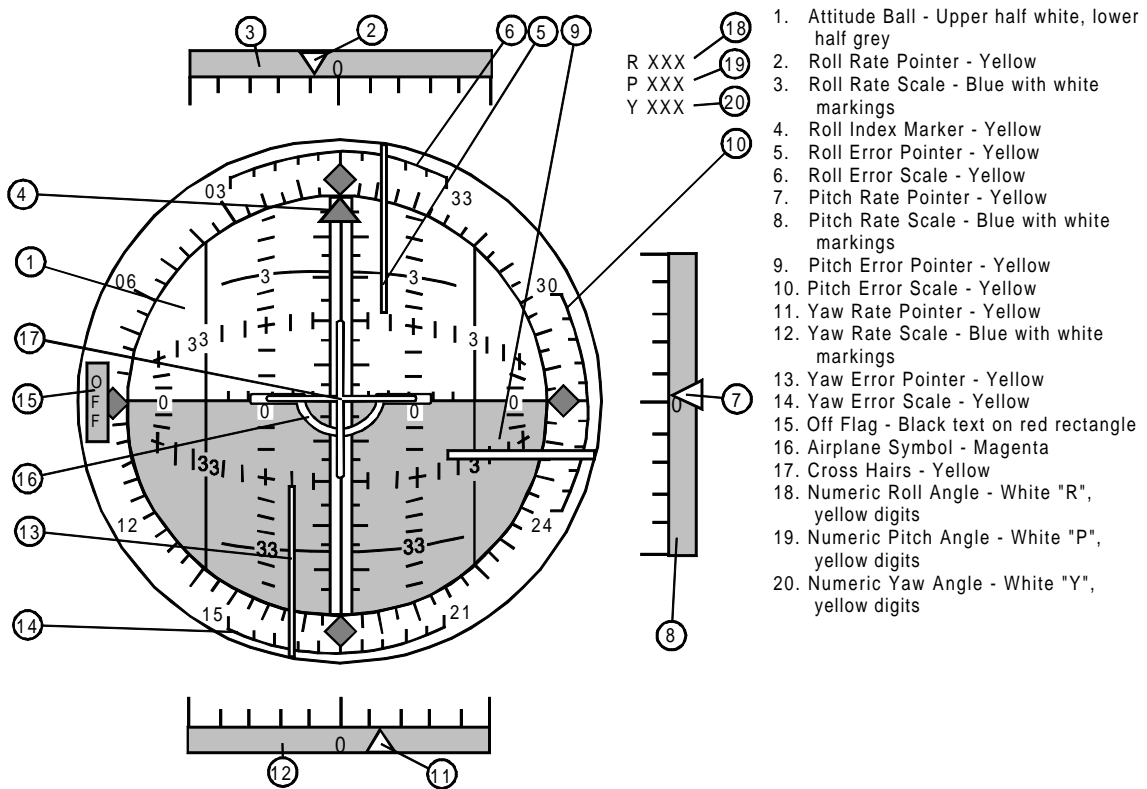


FIGURE 3.12.1-2. Attitude Direction Indicator (ADI) - MEDS

3.12.2 Horizontal Situation Indicator.

The HSI is a dual purpose navigation instrument (see Figure 3.12.2–1) that displays a pictorial view of vehicle location with respect to various navigation points. The instrument is capable of displaying:

- a. Heading
 - b. Selected course
 - c. Course deviation
 - d. Glide slope deviation
 - e. Primary and secondary bearing
 - f. Primary and secondary distance
 - g. Flags to indicate invalidity
- (1) The heading of the vehicle will be displayed by the compass card.
 - (2) The heading can be read under the fixed lubber line located at the top of the indicator dial. The compass card will be positioned at zero degrees when the heading input is zero; when the heading input is increased, the compass card rotates counterclockwise.
 - (3) The course pointer rotates around the inside edge of the compass card. The scale reading on the compass card at the tip of the course pointer is the selected course. When the course input (digital data from the DDU) is set at zero, the course pointer will be positioned at the lubber line regardless of the position of the compass card. This reflects the fact that the course pointer is driven relative to the HSI case and not relative to the HSI compass card. To assure proper indications, the software must subtract (modulo 360) the vehicle's heading from the course. It is this difference that is represented by the digital input to the HSI from the DDU. When the digital input is increased, the course pointer rotates clockwise. There will be no reversal of the pointer movement when it passes through 360 degrees in either direction.
 - (4) The displacement of the vehicle to the right or left of the selected course will be displayed by means of the deviation bar. When the course deviation input is set to zero, the deviation bar will be aligned with the ends of the course pointer. An increase in the course deviation input will cause the deviation bar to deflect to the right (command to fly right) when the course pointer is on top.
 - (5) The displacement of the vehicle above or below the glide slope will be displayed by the glide slope pointer on the right side of the HSI face. An increase in the glide slope deviation input will cause the pointer to deflect downward (command to fly down).
 - (6) Like the course pointer, the Primary (P) and Secondary (S) bearing pointers display bearings relative to the compass card when the card is positioned in accordance with the heading input data. When the bearing inputs are set to zero, the corresponding bearing pointer will be positioned at the lubber line regardless of the position of the card. When the bearing inputs are increased, the corresponding bearing pointers will rotate clockwise with respect to the compass card. There will be no reversal of the pointer movement when it passes through 360 degrees in

either direction. The software must subtract (modulo 360) the vehicle heading from these two bearings to assure appropriate indications.

- (7) The primary (PRI) and secondary (SEC) miles will be displayed by the magnetic indicator wheels in the upper corners of the instrument face. Each display ranges from 0000 to 3999 nautical miles.
- (8) The bearing (BRG) flag indicates that the heading, primary bearing or secondary bearing is invalid.
- (9) The course flag indicates that the course deviation display is invalid.
- (10) The glide slope (GS) flag indicates that the glide slope deviation display is invalid. Red and white diagonally striped flags are used to obscure the PRI and SEC miles displays whenever those respective displays are invalid. The OFF flag indicates a power-off condition or low power ($\leq 20w$).

See Appendix F.4.104 in Volume 3 of this book for Display Processing.

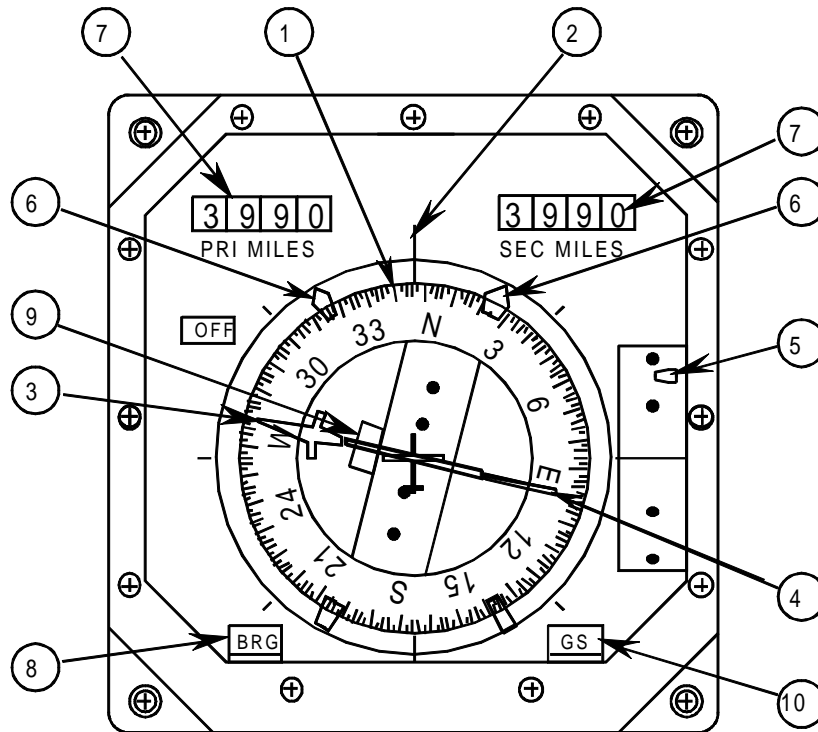
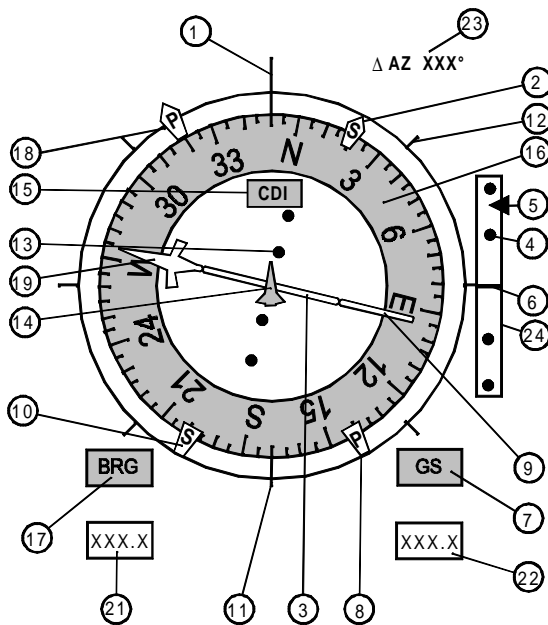


FIGURE 3.12.2-1. Horizontal Situation Indicator (HSI)

INFORMATION ONLY



1. Fixed Lubber Line - Cyan
2. Secondary Bearing Pointer - Green with black "S"
3. Course Deviation Bar - Yellow
4. Glide Slope Dev. Scale Dots (4) - White
5. Glide Slope Dev. Pointer - Yellow
6. Glide Slope Dev. Center Index - White
7. Glide Slope Dev. Flag - Black "GS" on a solid red rectangle
8. Primary Bearing Pointer Tail - Magenta with a black "P"
9. Course Pointer Tail - Yellow
10. Secondary Bearing Pointer Tail - Green with black "S"
11. Reciprocal Lubber Line - Cyan
12. Fixed Index (6) - Cyan
13. Course Dev. Bar Scale Dots (4) - White
14. Fixed Shuttle Symbol - Magenta
15. Course Dev. Flag - Black "CDI" on a solid red rectangle
16. Compas Card - Dark blue background with white markings
17. Bearing Flag - Black "BRG" on a solid red rectangle
18. Primary Bearing Pointer - Magenta with a black "P"
19. Course Pointer - Yellow
20. Deleted
21. Primary Range - White digits in a white rectangle (invalid indicator - solid red rectangle)
22. Secondary Range - White digits in a white rectangle (invalid indicator - solid red rectangle)
23. Delta Azimuth - White label, yellow digits
24. Glide Slope Dev. Scale - White rectangle

FIGURE 3.12.2-2. Horizontal Situation Indicator (HSI) - MEDS

3.12.3 Alpha/Mach Indicator.

The AMI displays essential flight parameters (see Figure 3.12.3–1) to the crew, including (1) alpha (angle of attack) in degrees, (2) Mach/Vel in M/ft/sec, (3) equivalent airspeed in knots, and (4) vehicle acceleration in feet per second square or g's. All but alpha are displayed on moving tapes behind a fixed lubber line. The Mach scale reads in Mach number up to 4 and in feet per second from 4000 to 27,000; alpha reads from –15 to +50 degrees; equivalent airspeed reads from 0 to 500 knots; and vehicle acceleration reads from –50 to 100 FPS² (in MM103, MM304, MM305, MM601 and MM603) and –5.0 to 10.0 g's (in MM602). See Appendix F.4.105 of this book for display processing.

The AMI scales shall be initialized upon entry to MM101 such that the following data is displayed prior to dynamic updates of the AMI data:

Alpha scale = 0 DEGS
ACCEL scale = +32 FPS²
M/VEL scale = 0 FPS
EAS scale = 0 KTS

The AMI scales shall be initialized upon entry to MM301 such that the following data is displayed prior to dynamic updates of the AMI data:

Alpha scale = +40 DEGS
ACCEL scale = 0 FPS²
M/VEL scale = 24400 FPS
EAS scale = 0 KTS

Failure warning flags are provided for all four scales. The flags are spring-loaded and appear in the event of malfunction within the indicator or in the received data. In the event of power failure, all four flags appear.

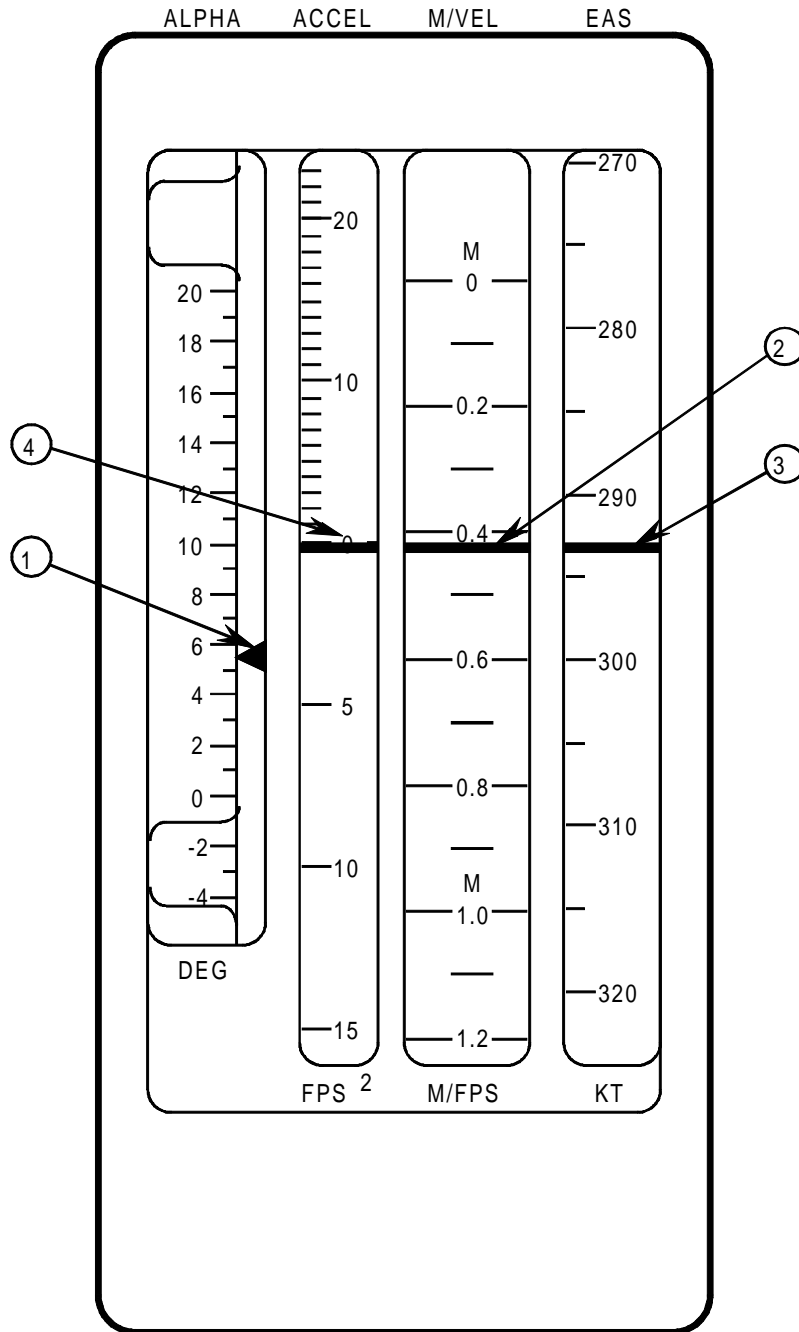


FIGURE 3.12.3-1. Alpha/Mach Indicator (AMI)

INFORMATION ONLY

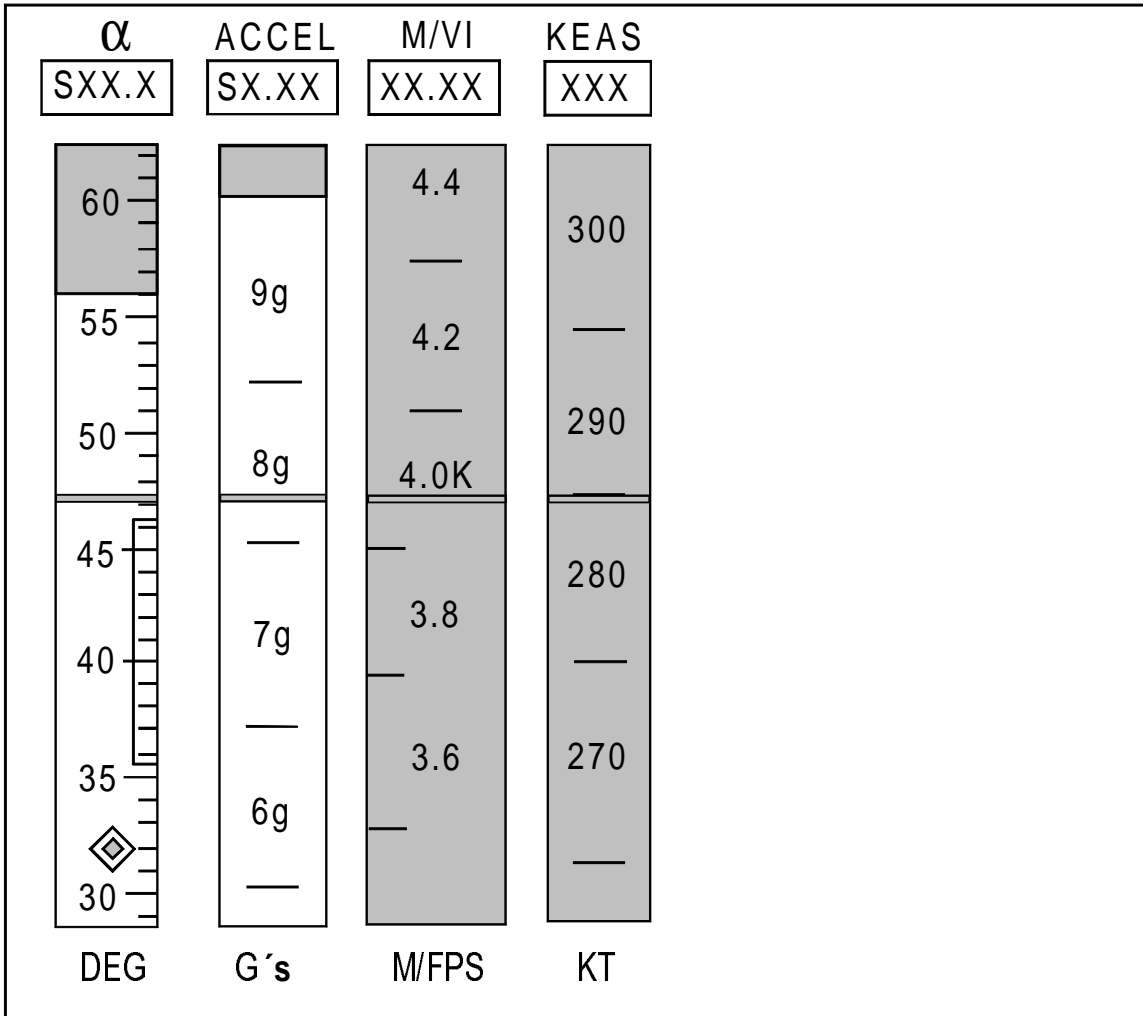


FIGURE 3.12.3-2. Alpha/Mach Indicator (AMI) - MEDS

3.12.4 Altitude/Vertical Velocity Indicator.

The AVVI displays added essential flight parameters (see Figure 3.12.4-1). They are (1) radar altitude, (2) barometric altitude, (3) altitude rate, and (4) altitude acceleration. All parameters are displayed in English units, and all but altitude acceleration are displayed on moving tapes behind a fixed lubber line. The radar altitude scale ranges from 0 to 9000 feet; the altitude rate scale ranges from -3000 to +3000 feet per second; and the altitude acceleration scale ranges from -13.3 to 13.3 FPS². The barometric altitude scale ranges from -1000 feet to 165 nautical miles. This scale is marked in feet from -1000 to 400 K feet and in nautical miles from 40 to 165 NM. There is an overlap between 40 NM and 400K feet where both feet and nautical mile markings are displayed. However, the tape is always driven as if the scale were marked in feet. See Appendix F.4.106 in Volume 3 of this book for Display Processing.

The AVVI scales shall be initialized upon entry to MM101 such that the following data is displayed prior to dynamic updates of the AVVI display:

ALT/ACCEL scale = 0 FPS²
ALT/RATE scale = 0 FPS
ALT scale = 0 FT
RDR/ALT scale = 0 FT

The AVVI scales shall be initialized upon entry to MM 301 such that the following data is displayed prior to dynamic updates of the AVVI data:

ALT/ACCEL scale = 0 FPS²
ALT/RATE scale = - 530 FPS
ALT scale = 92 NM
RDR/ALT scale = 5 KFT

Failure warning flags are provided for all four scales. The flags are spring-loaded and appear in the event of malfunction within the indicator or in the received data. In the event of power failure, all four flags appear.

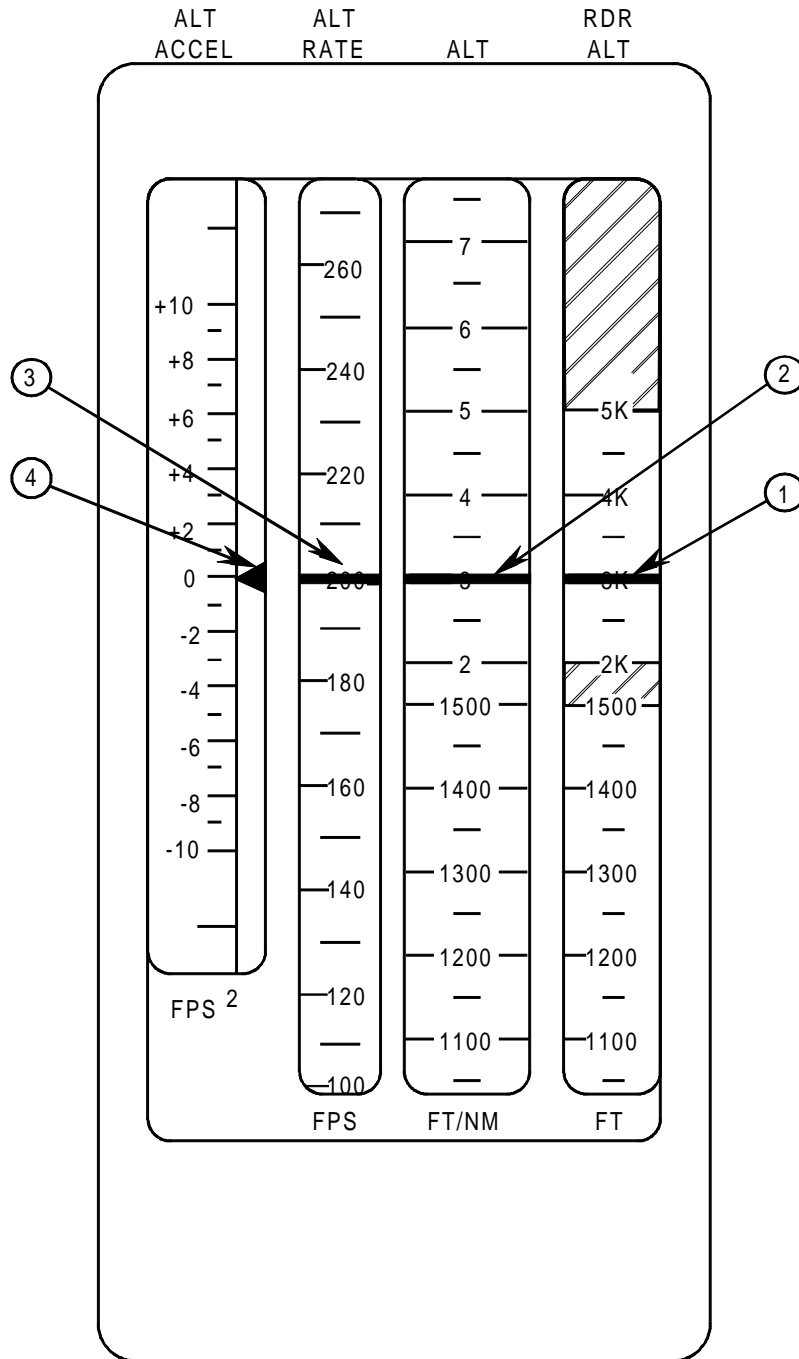


FIGURE 3.12.4-1. Altitude/Vertical Velocity Indicator (AVVI)

INFORMATION ONLY

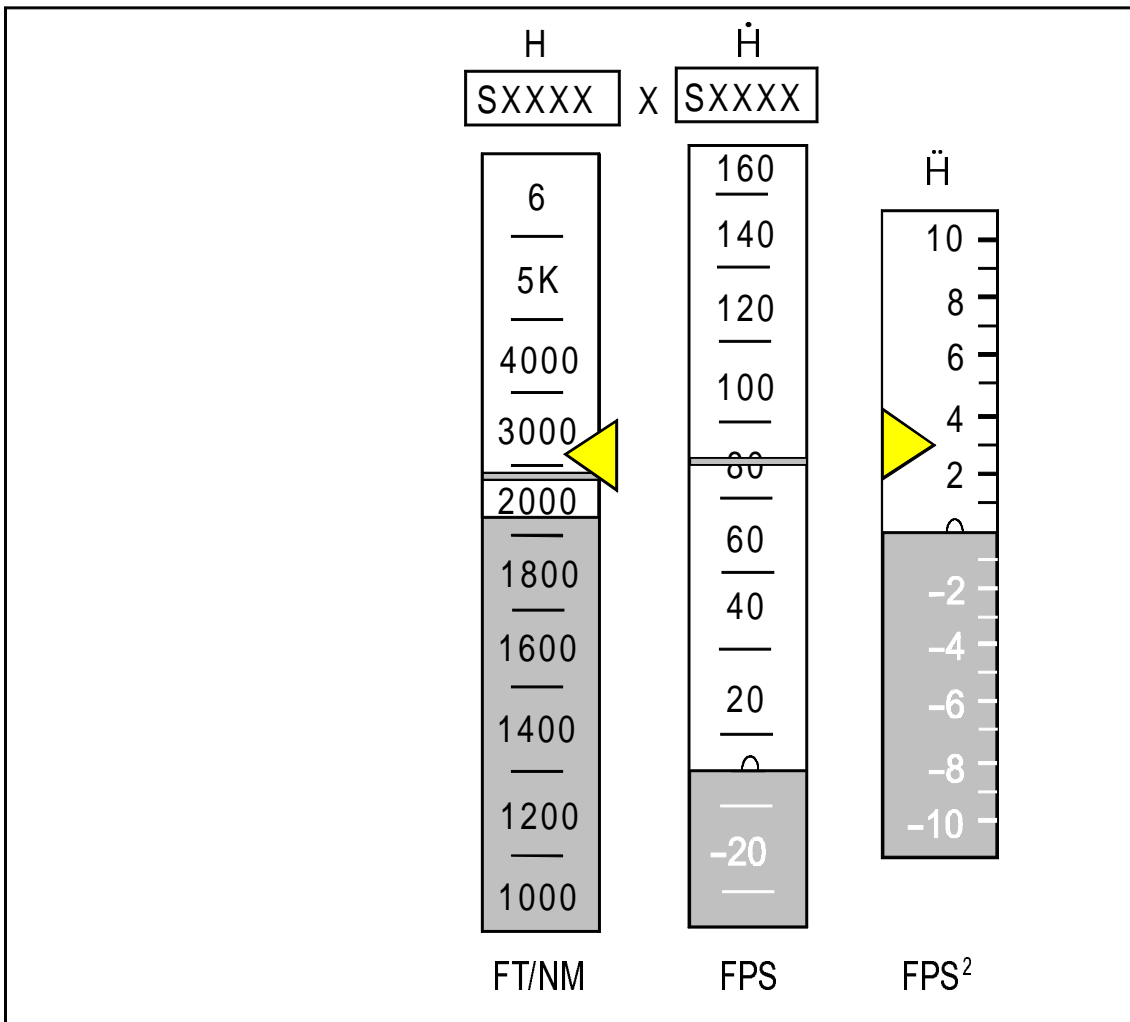


FIGURE 3.12.4-2. Altitude/Vertical Velocity Indicator (AVVI) - MEDS

3.12.5 Surface Position Indicator.

The SPI displays elevon position (see Figure 3.12.5-1) in degrees (+20 = full down, -35 = full up), body flap position (0 to 100%), rudder position (L30 to R30 degrees), aileron function (L5 to R5 degrees), and both speedbrake position and speedbrake command (0 to 100%). See Appendix F.4.107 in Volume 3 of this book for display processing.

3.12.6 Event Lamps and Pushbutton Indicators.

The event lamps and the pushbutton indicators are located on the glare shield. The event lamps are a series of five lamps for each position, commander and pilot.

The pushbutton indicators are also mounted as two groups of lighted pushbutton switches, one for the commander and one for the pilot. The pushbutton switches are used to control modes of operation of the flight control system. The indicator lights indicate the mode of the software in the flight control system. The indicator lamps are driven through the LAMP PROC function. The LAMP PROC function does not interface with the pushbutton switches.

See Appendix F.4.108 in Volume 3 of this book for display processing.

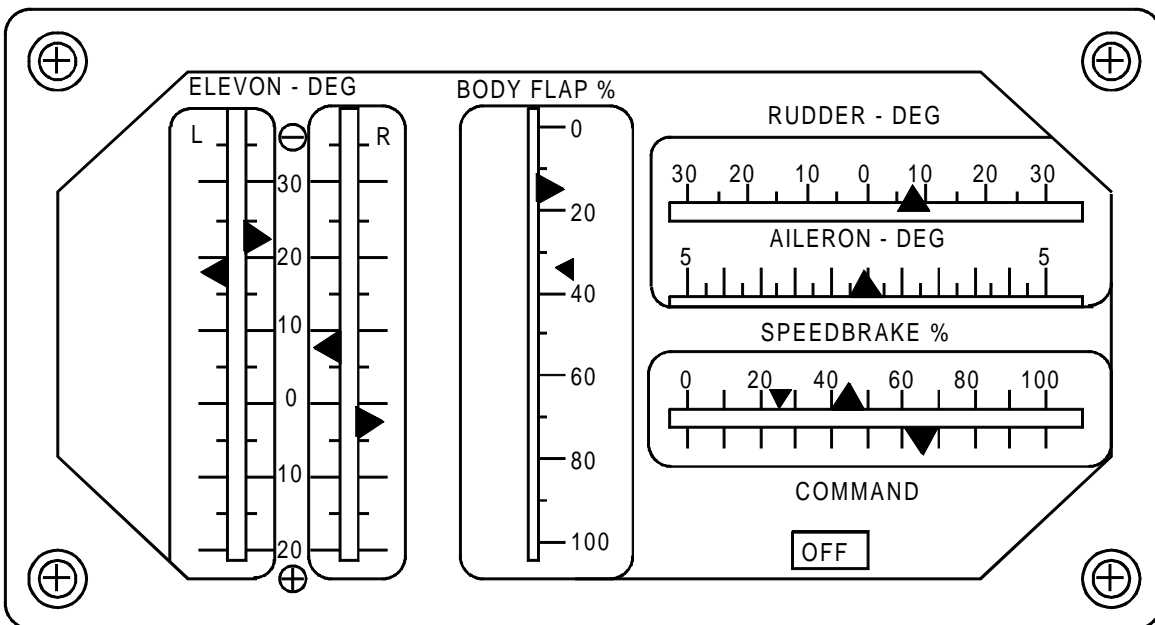


FIGURE 3.12.5-1. Surface Position Indicator (SPI)

INFORMATION ONLY

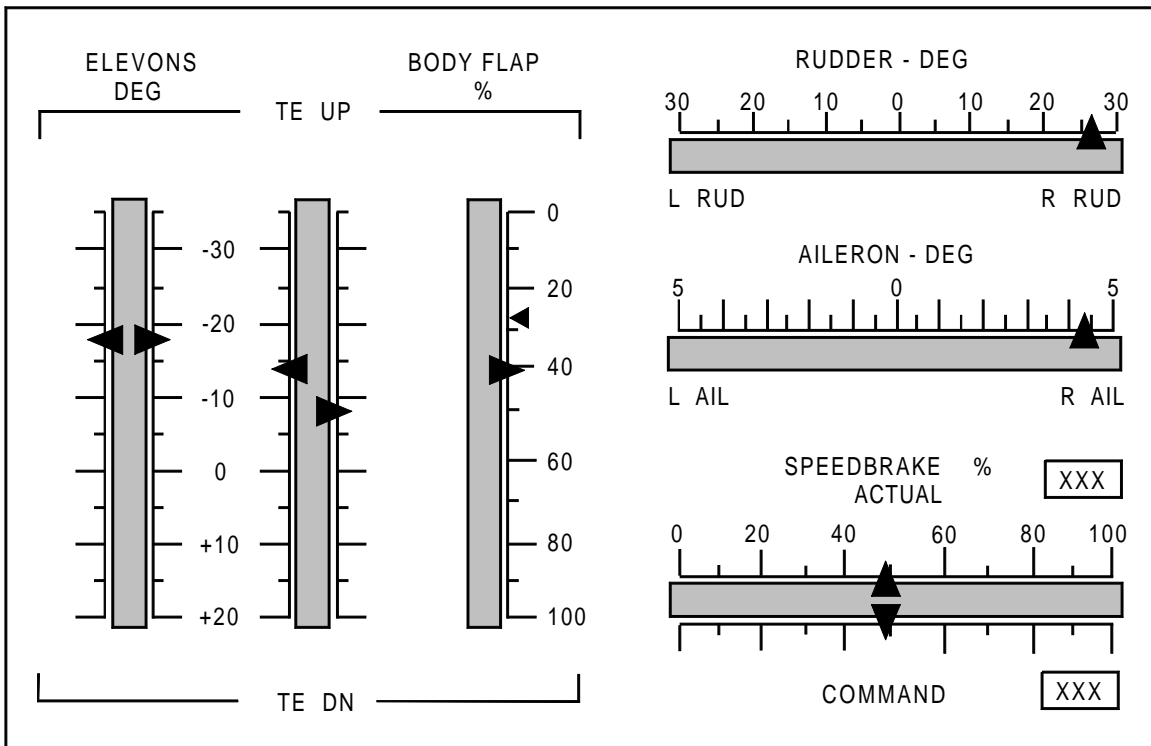


FIGURE 3.12.5-2. Surface Position Indicator (SPI) - MEDS

3.13 DISPLAY DRIVER UNIT

The DDU interfaces between the general purpose computer (GPC) and the primary flight displays. It receives data signals from the GPC, decodes them, and drives the four indicators at the same crew station. The DDU also supplies power to the flight controller transducers and to the ADI. Figure 3.13-1 shows the interfaces of the DDU. (Note that the DDU interfaces with four data buses. A panel switch selects one of the four data buses for transfer of data to the DDU.)

The DDU-to-GPC interface (via the data buses) is defined on the basis of one message per instrument (to update all four instruments requires four data bus messages). Each message consists of a command word and a sequence of command data words. The format and sequence of the command data words are shown in Appendix F of Volume 3 of this FSSR, in Tables F.4.103-1 (ADI), F.4.104-1 (HSI), F.4.105-1 (AMI), and F.4.106-1 (AVVI). The general formats for the command word and the succeeding command data words are given in Table 3.13-1 and Figure 3.13-2.

The DDU checks the validity of each word of each message. When the incoming data for a given parameter are found to be invalid, the DDU retains the last valid word for that parameter to provide output data to drive the respective display even though the display warning flag may be set. An exception occurs for those needles and pointers which are “stowed” to indicate that the data are invalid.

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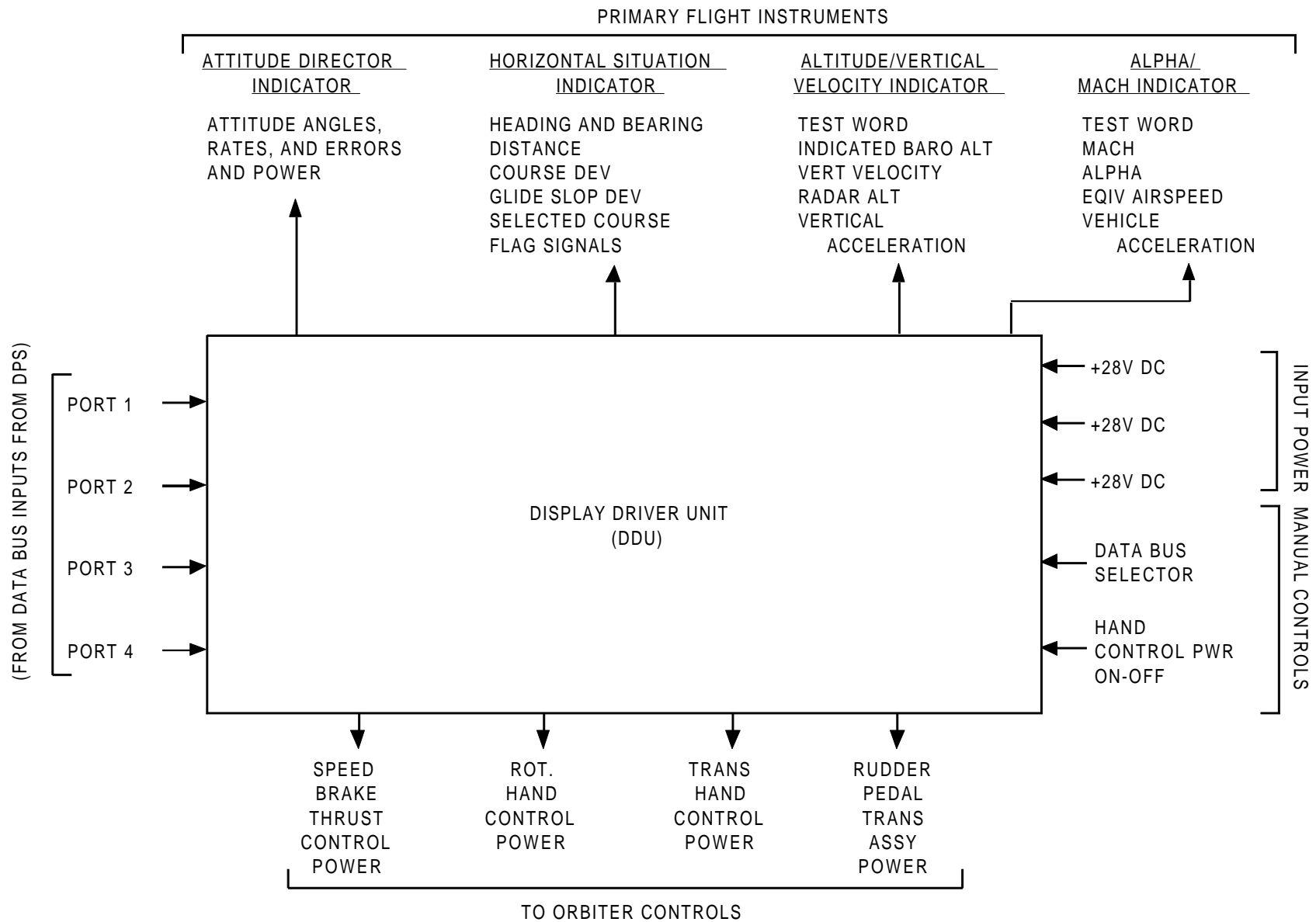


FIGURE 3.13-1. DDU Interface Diagram

TABLE 3.13-1. DEFINITION OF DPS COMMAND WORDS

Bits 1 through 28

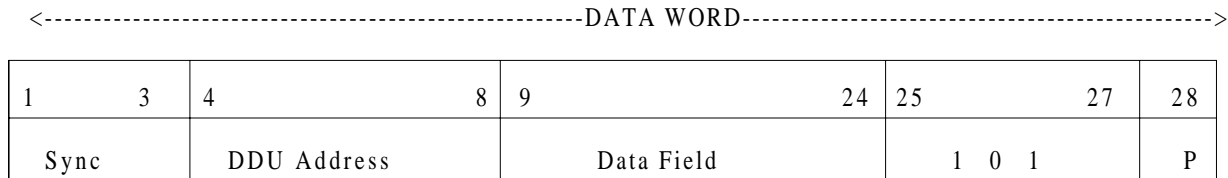
<----- Command Word ----->

1	3	4	8	9	22	23	27	28
Sync	DDU Address		Message Identification Bits			Number of Command Data Words		(3) P

Message Identification Bits (1)				Message Definition									
9	13	14	17		18	22							
1	0	0	0	0	0	0	0	0	1	DDU to receive ADI data words. Note 2.			
1	0	0	0	0	0	0	0	0	1	0	DDU to receive HSI data words. Note 2.		
1	0	0	0	0	0	0	0	0	1	0	0	DDU to receive AVVI data words. Note 2.	
1	0	0	0	0	0	0	0	0	1	0	0	0	DDU to receive AMI data words. Note 2.

Notes:

1. The 4 bit patterns shown for bits 9 through 22 are the only combinations used to identify DDU data messages. All other combinations are spares and shall be mechanized as “NO-OP” instructions in the DDU.
2. The number of words section identifies the number of data words to be transmitted after the command word. This section is a binary number with bit 23 as the most significant bit.
3. P denotes a parity bit such that the total number of “1’s” for bits 4 through 28 is an odd number.



NOTES:

1. Bits 25, 26, and 27 are pattern check bits to verify the capability of the transmission the capability of the transmission system and the receiving system and the receiving unit to process binary “1’s” and binary “0’s”.
2. P is a parity bit such that the total number of “1’s” for bits 4 through 28 is an odd number.

FIGURE 3.13-2. Data Word Format For Messages Received From The DPS

3.14 DEDICATED INSTRUMENT INFORMATION FLOW

3.14.1 Dedicated Instrument Data Flow.

The data to drive the dedicated instruments originates in various application programs, such as navigation, area navigation, flight control, etc. Figure 3.14.1–1 illustrates the generalized flow as it passes through the dedicated display processing functions to the GPC interface and through the display driver unit or multiplexer/demultiplexer.

The attitude director indicator, horizontal situation indicator, alpha/Mach indicator, and the altitude/vertical velocity indicator are driven by the DDU. The succeeding paragraphs delineate the interfaces, logical manipulations, and timing of the various dedicated display data signals.

3.14.2 Dedicated Display Flags.

The dedicated display flags are generally handled as an incidental part of the formulation. Consequently, the total logic of the flags is obscured by being distributed throughout the requirements. The following discussion is intended to bring into focus the origin, handling, and meaning of the flags. In order to organize these data, information was taken from the procurement specification for:

Display Driver Units	MC409–0023
Attitude Director Indicator	MC432–0235
Horizontal Situation Indicator	MC432–0218
Alpha/Mach Indicator	MC432–0224
Altitude/Vertical Velocity Indicator	MC432–0226

The tables are organized according to the input and output signals for each device in the string:

1. The dedicated display principal function

2. The display driver unit (DDU)
3. The instrument

The single SPI validity flag is described in Appendix F.4.107 in Volume 3 of this book.

The information flow is from the bottom of the table up, as the flags flow toward the instrument. Necessarily the output of the computer must match with the input of the DDU, and the output of the DDU must match with the input of the instrument.

ADI Flags

One validity flag is provided to the ADI PROC. The flag is used to develop sine and cosine flags within the ADI PROC. These six flags are required to drive the six attitude words into the DDU. The attitude flag from the DDU to the ADI is a single flag to drive a visible flag on the ADI. The ADI attitude flag is good only if all six attitude flags into the DDU are good.

Six flags are required to drive the rate and error data into the DDU. No flags for rate or error are required by the ADI. Instead, the DDU will drive the rate or error needle off scale into a stow position.

The attitude ball OFF flag or the stow position for the rate or error needles will occur if the invalid flag condition persists for 415 milliseconds \pm 20 percent. Table 3.14.2–1 outlines the flow of the ADI flags.

HSI Flags

During MM304, MM305, MM602 and MM603, the primary and secondary range and bearing flags will be derived from a single BRG_FLAG prepared by area navigation and the glide slope deviation flag, heading flag, and course deviation flag are prepared in area navigation for use on the HSI. All flags out of the HSI PROC are required to drive data into the DDU. If a flag is false, the data word will not be accepted by the DDU to update the data register. The validity bit or discrete output from the DDU will remain true only for 415 milliseconds \pm 20 percent after the receipt of data flagged valid. Table 3.14.2–2 outlines the flow of the HSI flags.

AMI/AVVI Flags

The AMI/AVVI flags are derived from the air data valid flags as generated by air data SOP and are selected and used to drive all the flags on the AMI and the AVVI according to the source data for air data. The one exception is radar altitude, which is derived from radar altimeter data good flags as generated in the radar altimeter SOPs.

The AMI/AVVI flags are subject to a 415 millisecond \pm 20 percent time-out factor within the DDU. Figure 3.14.2–3 outlines the flow of the AMI and the AVVI flags.

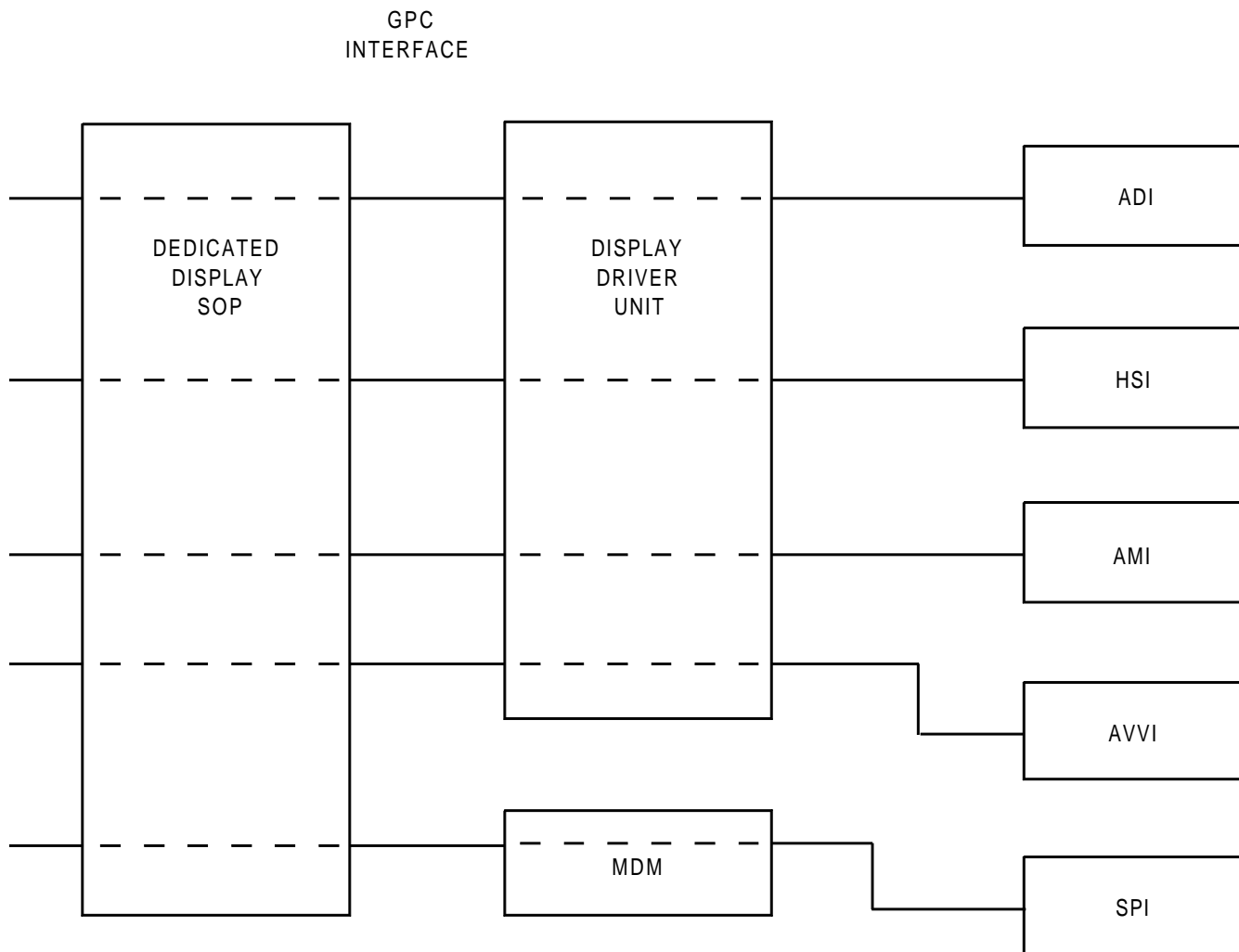


FIGURE 3.14.1-1.Dedicated Display Data Flow

		ADI								
INSTRUMENT	I	ATTITUDE BALL OFF FLAG			STOW POSITION OF RATE OR ERROR NEEDLES					
DDU	O	ATTITUDE BALL GOOD DISCRETE TRUE IF WORD 1 BITS C3 THROUGH C8 ARE ALL TRUE			DRIVES RATE OR ERROR NEEDLES TO A STOW POSITION					
	I	WORD 1 C3, C4	WORD 1 C5, C6	WORD 1 C7, C8	WORD 1 C9	WORD 1 C10	WORD 1 C11	WORD 1 C12	WORD 1 C13	WORD 1 C14
ADI PROC	O	WORD 1 C3, C4	WORD 1 C5, C6	WORD 1 C7, C8	WORD 1 C9	WORD 1 C10	WORD 1 C11	WORD 1 C12	WORD 1 C13	WORD 1 C14
	I	ATT_DG	ATT_DG	* ATT_DG	** ATT_DG	** ATT_DG	** ATT_DG	* ATT_DG	* ATT_DG	* ATT_DG
* CORRESPONDING INPUTS ARE ALWAYS VALID DURING ATMOSPHERIC FLIGHT										
** CORRESPONDING INPUTS ARE ALWAYS VALID EXCEPT ON-ORBIT										

FIGURE 3.14.2-1.ADI FLAGS

INSTRUMENT	HSI							
HSI I		BEARING FLAG			PRIMARY DISTANCE FLAG	SECONDARY DISTANCE FLAG	COURSE DEVIATION FLAG	GLIDE SLOPE DEVIATION
DDU O	COURSE FLAG WORD 1 BIT 19	HEADING FLAG WORD 2 BIT 19	PRIMARY BEARING WORD 3 BIT 19	SECONDARY BEARING WORD 4 BIT 19	PRIMARY DISTANCE WORD 5 BIT 19	SECONDARY DISTANCE WORD 6 BIT 19	COURSE DEVIATION FLAG DISCRETE	GLIDE SLOPE FLAG DISCRETE
I	* WORD 1 C3	* WORD 1 C4	* WORD 1 C5	* WORD 1 C6	** WORD 1 C7	** WORD 1 C8	* WORD 1 C9	* WORD 1 C10
HSI PROC O	WORD 1 C3 SELECTED COURSE	WORD 1 C4 HEADING	WORD 1 C5 PRIMARY BEARING	WORD 1 C6 SECONDARY BEARING	WORD 1 C7 PRIMARY RANGE	WORD 1 C8 SECONDARY RANGE	WORD 1 C9 COURSE DEVIATION	WORD 1 C10 GLIDE SLOPE DEVIATION
I	*** HDG_FLAG		*** BRG_FLAG			*** CDI_FLAG		*** GSI_FLAG
* = 1 during MM 101-103, 601 ** = 0 during MM 101-103, 601 *** = used during MM 304, 305, 602, 603								

FIGURE 3.14.2-2.HSI FLAGS

INSTRUMENT	I	AMI				AVVI			
		MACH NO. OFF FLAG	ALPHA OFF FLAG	EQUIVALENT AIRSPEED OFF FLAG	TOTAL ACCELERATION OFF FLAG	INDICATED ALTITUDE OFF FLAG	VERTICAL VELOCITY OFF FLAG	RADAR ALTITUDE OFF FLAG	VERTICAL ACCELERATION OFF FLAG
DDU	O	WORD 1 BIT 5	WORD 2 BIT 5	WORD 3 BIT 5	WORD 4 BIT 5	WORD 1 BIT 5	WORD 2 BIT 5	WORD 3 BIT 5	WORD 4 BIT 5
	I	WORD 1 C3	WORD 1 C4	WORD 1 C5	WORD 1 C6	WORD 1 C3	WORD 1 C4	WORD 1 C5	WORD 1 C6
PROC	O	MACH NO. FLAG	ALPHA FLAG	EQUIVALENT AIRSPEED FLAG	TOTAL ACCELERATION FLAG	INDICATED ALTITUDE FLAG	VERTICAL VELOCITY FLAG	RADAR ALTITUDE FLAG	VERTICAL ACCELERATION FLAG
	I	ADPVALIDL/ADPVALID/ADPVALIDR			*	ADPVALIDL/ADPVALID/ADPVALIDR	RARANGDG	*	
* CORRESPONDING INPUTS ARE ALWAYS VALID									

FIGURE 3.14.2-3.AMI/AVVI FLAGS

3.15 FIRST-ORDER HOLD (FOH)

The normal indicator processing functions contain first-order holds which are executed every time the corresponding function is executed (basically, every 80 milliseconds). These first-order holds obtain fresh data from external sources.

The first order-hold must extrapolate the lower rate input data to provide output to the indicator 12.5 times per second. The requirement to be met is that the extrapolated value of the parameter shall be an extension of the set of values defined by a linear connection of the last two input values. If times of sampling are $t(1)$, $t(2)$, and $t(4)$ and the time of output is $t(3)$, where these times satisfy:

$$t(1) < t(2) < t(3) < t(4)$$

then

$$\frac{X[t(3)] - X[t(2)]}{t(3) - t(2)} = \frac{X[t(2)] - X[t(1)]}{t(2) - t(1)}$$

where $X[t(1)]$ and $X[t(2)]$ are the last two input values and $X[t(3)]$ is an output value; i.e., on a time plot, the output value must be on a linear extension of the straight line between the preceding two input values.

The following is a suggested formulation of the first-order hold as defined in the requirements. This formulation uses an additive process for coding and execution simplicity.

Let $t'(1)$, $t'(2)$, and $t'(3)$ be three successive times at which the input values are sampled; let dt be the execution intervals of first-order hold; and suppose that $t'(2) - t'(1) = N(dt)$ and

$$T = t'(2) + n(dt), \quad n < N$$

then

$$X(t) = \frac{X[t'(2)] - X[t'(1)]}{N} \cdot n + X[t'(2)]$$

which can be written in the following iterative equation:

$$X[t'(2) + n(dt)] = X[t'(2) + (n-1)(dt)] + \frac{X[t'(2)] - X[t'(1)]}{N}$$

$$[\text{new output value}] = [\text{previous output value}] + [\text{increment}]$$

In this case, the increment

$$\frac{X[t'(2)] - X[t'(1)]}{N}$$

needs to be evaluated only every $t'(2) - t'(1)$ seconds, and each iteration requires only the single addition of the increment to the previous value.

3.16 DERIVATION OF DIP COEFFICIENTS

3.16.1 Derivation of the Entry DIP Coefficients

Table 3.16.1-1 contains constants associated with the fixed backgrounds of the entry displays. The values of VERT_1 and VERT_2 represent the endpoints of the ordinate in fps for the trajectory displays and in ft for the transition displays. The values of HORZ_1, HORZ_3 and HORZ_2 represent the endpoints and midpoint of the abscissa in nautical miles, respectively. The corresponding locations of these points are shown at the bottom of the table in tube coordinates with origin at the tube center.

Table 3.16.1-1. ENTRY DISPLAY BACKGROUND CONSTANTS					
	VERT_1	VERT_2	HORZ_1	HORZ_2	HORZ_3
TRAJECTORY 1	20000	26900	1250	2350	4500
TRAJECTORY 2	13500	20000	500	1100	2300
TRAJECTORY 3	9000	13500	290	485	875
TRAJECTORY 4	500000	1500000	85	190	400
TRAJECTORY 5	160000	500000	35	70	140
COORDINATES	-258	261	-368	51	470

These constants must satisfy the following equations. For the ordinate, the two endpoints are used to solve two simultaneous equations:

$$-258 = VC0 + VC1 (VERT_1)$$

$$261 = VC0 + VC1 (VERT_2)$$

For the abscissa, the endpoints and midpoint are used to solve three simultaneous equations.

$$-368 = HC0 + HC1 (HORZ_1) + HC2 (HORZ_1)$$

$$51 = HC0 + HC1 (HORZ_2) + HC2 (HORZ_2)$$

$$470 = HC0 + HC1 (HORZ_3) + HC2 (HORZ_3)$$

Table 3.16.1-2. ENTRY DISPLAY GRAPH COEFFICIENTS					
	VC0	VC1	HC0	HC1	HC2
TRAJECTORY 1	-1762.4	- 75.22X10 ⁻³	-1012.27	586.97X10 ⁻³	- 57.238X10 ⁻⁶
TRAJECTORY 2	-1336	- 79.85X10 ⁻³	- 823.86	1008.7X10 ⁻³	- 193.98X10 ⁻⁶
TRAJECTORY 3	-1296	- 115.33X10 ⁻³	-1249.43	3.572	- 1.8365X10 ⁻³
TRAJECTORY 4	-517.5	- 519.00X10 ⁻⁶	- 809.46	5.732	- 6.334X10 ⁻³
TRAJECTORY 5	-502.25	- 1526.47X10 ⁻⁶	- 926.67	17.957	- 57.007X10 ⁻³

Table 3.16.1–2 contains the derived values of the coefficients associated with the five entry displays.

The drag scale ranges from 0 to 40 ft/sec² on all five entry displays. The drag scale factor (D_SCALE_FACT) for the coordinate system is $(E_S_Y_MAX - E_S_Y_MIN)/40$ $(176 - (-256))/40 = + 10.8$ AU/FPS2.

The alpha scale ranges from 25 to 45 degrees on TRAJ 1, TRAJ 2 and TRAJ 3; from 10 to 30 degrees on TRANS 1; and from 0 to 20 degrees on TRANS 2. The alpha scale factor (AL_SCALE_FACT) for the coordinate system is $(E_S_Y_MAX - E_S_Y_MIN)/20 = +21.6$ AU/deg.

3.16.2 The Derivation of the Vertical Situation DIP Coefficients.

Table 3.16.2–1 contains the constants associated with the fixed backgrounds of the vertical situation displays. The values of VSVERT_1 and VSVERT_2 represent the end points of the ordinate in feet. The values of VSHORZ_1 and VSHORZ_2 represent the endpoints of the abscissa in feet. The bottom line of the table shows the corresponding locations of these points in tube coordinates with the origin at the tube center.

Table 3.16.2-1. VERTICAL SITUATION DISPLAY BACKGROUND CONSTANTS				
	VSVERT_1	VSVERT_2	VSHORZ_1	VSHORZ_2
VERT SIT 1	30000	100000	60761	493261
VERT SIT 2	8000	30000	22785	153555
COORDINATES	-225	273	-452	404

Table 3.16.2-2. VERTICAL SITUATION DIP CONSTANTS				
	RANGE SCALE		ALTITUDE SCALE	
	XSCALE	RBIAS	YSCALE	HBIAS
VERT SIT 1	.002	60761	.007	30000
VERT SIT 2	.0065	22785	.023	8000

Table 3.16.2–2 contains the derived values of the biases and scale factors associated with the vertical situation displays.

Table 3.16.2-3. ALPHA/MACH (VSI) DIP CONSTANTS							
POS_1	POS_2	SCALE_1	SCALE_2	SCALE FACTOR		BIAS	
				NAME	VALUE	NAME	VALUE
284	116	23	11	RT1_ALPHA_SC_FACT	14	RT1_ALPHA_BIAS	-38
-456	0	2.0	6.0	RT1_MACH_SC_FACT	114	RT1_MACH_BIAS	-684

NOTE: Addressable Unit (AU) position and BIAS data is with respect to the center of the CRT.

Table 3.16.2–3 contains the derived values of the biases and scale factors associated with the Alpha/Mach profile on the Vertical Situation 1 Display.

3.16.3 The Derivation of the XXXXXX TRAJ DIP Coefficients.

All of the scale factors and biases are calculated using the relationships

$$POS_1 = Bias + (Scale Factor) (SCALE 1)$$

$$POS_2 = Bias + (Scale Factor) (SCALE 2)$$

where POS_1 and POS_2 are two locations on the implied scale on the face of the CRT and SCALE_1 and SCALE_2 are the two corresponding values of the parameter represented by the scale. Table 3.16.3–1 lists the I-Load MSIDs of XXXXXX TRAJ 1/2 DIP coefficients Scale Factor and Bias, and the values or I-LOAD MSIDs of POS_1, POS_2, SCALE_1 and SCALE_2 used. Table 3.16.3–2 lists the I-LOAD MSIDs of RTLS TRAJ 2 DIP coefficients Scale Factor and Bias, and the values or I-LOAD MSIDs of POS_1, POS_2, SCALE_1 and SCALE_2 used. The tube locations are given in coordinates with origin at the center of the tube.

The derivation of the propellant remaining in the external tank is as follows. The values shown are for a typical mission BRM_3A.

EXTERNAL TANK LAUNCH WT	1,630,711 lbs.
EXTERNAL TANK – DRY WEIGHT	<u>70,420</u>

TOTAL FUEL	1,560,291
RESIDUAL FUEL	<u>7,580</u>
TOTAL USABLE FUEL (TOTAL-FUEL)	1,552,711 lbs.
WEIGHT WITH FUEL DEPLETED (R2_FINAL_WT)	
ORBITER WEIGHT (32K* PAYLOAD)	202,104 lbs.
EXTERNAL TANK – DRY WEIGHT	70,420
RESIDUAL FUEL	<u>7,580</u>
R2_FINAL_WT	280,104 lbs.

NOTE: K* indicates a multiplier of 1,000.

Table 3.16.3-1. XXXXXX TRAJ 1/2 DIP COEFFICIENTS					
POS_1	POS_2	SCALE_1	SCALE_2	SCALE FACTOR	BIAS
493	-340	V97U6718C A1_V_MAX	V97U6719C A1_V_MIN	V97U6721C A1_X_SC_FACT	V97U6720C A1_X_BIAS
270	-270	V97U6703C A1_H_MAX	V97U6704C A1_H_MIN	V97U6723C A1_Y_SC_FACT	V97U6722C A1_Y_BIAS
481	-280	V97U6735C A2_V_MAX	V97U6736C A2_V_MIN	V97U6741C A2_X_SC_FACT	V97U6740C A2_X_BIAS
243	-226	V97U6733C A2_H_MAX	V97U6734C A2_H_MIN	V97U6745C A2_Y_SC_FACT	V97U6744C A2_Y_BIAS
451	-299	V97U6738C A2_VI_MAX	V97U6739C A2_VI_MIN	V97U6743C A2_X2_SC_FACT	V97U6742C A2_X2_BIAS

Table 3.16.3-2. RTLS TRAJ 2 DIP COEFFICIENTS					
POS_1	POS_2	SCALE_1	SCALE_2	SCALE FACTOR	BIAS
498	-433	V97U6918C R2_V_MAX	V97U6919C R2_V_MIN	V97U6921C R2_X_SC_FACT	V97U6920C R2_X_BIAS
271	-239	V97U6914C R2_H_MAX	V97U6915C R2_H_MIN	V97U6923C R2_Y_SC_FACT	V97U8142C R2_Y_BIAS_PASS
-376	424	V97U6910C R2_D_R_MAX	V97U6911C R2_D_R_MIN	V97U6912C R2_D_R_SC_FACT	V97U6909C R2_D_R_BIAS

NOTE: Addressable Unit (AU) position and BIAS data is with respect to the center of the CRT.

3.17 DERIVATION OF DIP COEFFICIENTS (BFS)

3.17.1 The Derivation of the Ascent DIP Coefficients.

The scale factors and biases are calculated using the same relationships shown in paragraph 3.16.3. Table 3.17.1-1 lists the Ascent DIP coefficients used in their calculation. The tube locations are given in coordinates with origin at the center of the tube. The coefficients that are derived from the position and scale I-Loaded MSIDs are indicated with an asterisk.

Table 3.17.1-1. ASCENT DIP COEFFICIENTS					
POS_1	POS_2	SCALE_1	SCALE_2	SCALE_FACTOR	BIAS
493	-340	V97U6718C A1_V_MAX	V97U6719C A1_V_MIN	V97U6721C A1_X_SC_FACT	V97U6720C A1_X_BIAS
270	-270	V97U6703C A1_H_MAX	V97U6704C A1_H_MIN	V97U6723C A1_Y_SC_FACT	V97U6722C A1_Y_BIAS
V97U8876C A1_EAS_Y_MAX	V97U8877C A1_EAS_Y_MIN	V97U6711C A1_EAS_MAX	V97U6712C A1_EAS_MIN	V97U6713C* A1_EAS_SC_FACT	V97U6709C* A1_EAS_BIAS
481	-280	V97U6735C A2_V_MAX	V97U6736C A2_V_MIN	V97U6741C A2_X_SC_FACT	V97U6740C A2_X_BIAS
243	-226	V97U6733C A2_H_MAX	V97U6734C A2_H_MIN	V97U6745C A2_Y_SC_FACT	V97U6744C A2_Y_BIAS
451	-299	V97U6738C A2_VI_MAX	V97U6739C A2_VI_MIN	V97U6743C A2_X2_SC_FACT	V97U6742C A2_X2_BIAS
V97U8884C A2_DHD_Y_MAX	V97U8885C A2_DHD_Y_MIN	V97U6725C A2_DHD_MAX	V97U6726C* A2_DHD_MIN	V97U6727C* A2_DHD_SC_FACT	V97U6724C* A2_DHD_BIAS
V97U8886C A2_G_Y_MAX	V97U8887C A2_G_Y_MIN	V97U6730C A2_G_MAX	V97U6731C A2_G_MIN	V97U6732C* A2_G_SC_FACT	V97U6728C* A2_G_BIAS

*Derived I-Load, BFS Only

Logic for predicted position indicator is as follows:

$$\begin{aligned}
 X1 &= X2 \\
 X2 &= X3 \\
 X3 &= X_CURRENT \\
 XD1 &= XD2 \\
 XD2 &= (X3 - X2) / DTC \\
 XD &= (3XD2 - XD1) / 2 \\
 XDD &= (XD2 - XD1) / DTC \\
 X_PRED &= X3 + XD DT_j + XDD DT_j^{**2} / 2
 \end{aligned}$$

Since XD and XDD are linear functions of X1, X2 and X3 and DT_j and DTC are mission dependent constants, X_{PRED} can be expressed as a linear function of X1, X2 and X3 ($X_PRED = K1jX1 + K2jX2 + K3jX3$) where K_{ij} are functions of DTC (update time interval) and DT_j (extrapolation time).

With DTC = 2, DT₁ = 20, DT₂ = 30 and DT₃ = 60, K_{ij} for i = 1 to 3 and j = 1 to 3 are as follows:

$$\begin{array}{lll}
 K11 = 55 & K21 = 120 & K31 = 465 \\
 K12 = -120 & K22 = -255 & K32 = -960 \\
 K13 = 66 & K23 = 136 & K33 = 496
 \end{array}$$

3.17.2 The Derivation of the RTLS Transition DIP Coefficients

The scale factors and biases are derived by using the same relationships shown in paragraph 3.16.3. Table 3.17.2-1 lists the RTLS Trans DIP coefficients and the values used in their derivation.

Table 3.17.2-1. RTLS DIP CONSTANTS							
POS_1	POS_2	SCALE_1	SCALE_2	SCALE FACTOR		BIAS	
				NAME	VALUE	NAME	VALUE
284	-255	55	0	RT1_ALPHA_SC_FACT	-9.8	RT1_ALPHA_BIAS	-255
284	-256	3	0	RT1_NZ_SC_FACT	-180	RT1_NZ_BIAS	-256
321	-325	6.1	1.9	RT1_MACH_SC_FACT	153.8	RT1_MACH_BIAS	-617.2
38	284	-.25	1.25	SCALE_1	-164	RT1_EOW_BIAS	79

The value of ALPHA_CMD, expressed in AU, is derived as follows:

$$\begin{aligned}
 \text{ALPHA_CMD} &= \text{RT1_ALPHA_BIAS} + \text{RT1_ALPHA_SC_FACT} (\text{alpha command}) \\
 &= -255 + (9.8) 50 = 235
 \end{aligned}$$

4.0 CRT DISPLAYS

Section 4 defines the detailed formats and the related display interfacing parameters for all CRT formats. Requirements for BFS CRT formats are imbedded in this section. Where BFS and PFS formats are identical or nearly identical, the BFS availability and differences are noted along with the description of the PFS format.

4.0.1 Traceability of Requirements

The software baseline documents shall provide for identifying like and related requirements so that traceability of these requirements can be established up and down through the different levels of the software documentation hierarchy.

Table 4.0.1-1 shows the traceability of the software sections in this FSSR with respect to the corresponding Principal Functions identified in sections of the Level A/B CPDS documentation. In addition, it should be understood that traceability between the PASS GN&C principal functions and applicable BFS paragraphs is unnecessary, since this FSSR contains both the PASS and BFS requirements. This traceability table is provided for information only.

Table 4.0.1-1 Level-C to Level-A/B Traceability			
Level-C FSSR Section No.	Level C FSSR Title and Type	Principal Function	
		PASS	BFS
Volume 1			
4.1.1	Fault (PFS/BFS) -- SPEC/099	A5.9.1	4.1.1
4.1.2	Time (PFS) -- SPEC/002	A5.9.2	
4.1.3	GPC Memory (PFS) -- OPS/0001, /9011, SPEC/000	A5.9.3	
4.1.4	DPS Utility (PFS) -- SPEC/001	A5.9.4	
4.1.5	GPC/BUS Status (PFS) -- SPEC/006	A5.9.5	
4.1.7	XXXXIPL Menu (1) (PFS/BFS) -- SPEC	A5.8.1.1	4.1.7
4.1.7	GPCIPL Menu (2) (PFS/BFS) -- SPEC	A5.8.1.2	4.1.7
4.1.8	BFS Memory (BFS) -- GNC OPS/0001, SPEC/000		4.1.8
4.2.1	Entry Trajectory 1 Display (PFS/BFS) Generic -- OPS/3041	G6.15	4.2.1
4.2.2	Entry Trajectory 2 Display (PFS/BFS) Generic -- OPS/3041	G6.16	4.2.2
4.2.3	Entry Trajectory 3 Display (PFS/BFS) Generic -- OPS/3041	G6.17	4.2.3
4.2.4	Entry Trajectory 4 Display (PFS/BFS) Generic -- OPS/3041	G6.18	4.2.4
4.2.5	Entry Trajectory 5 Display (PFS/BFS) Generic -- OPS/3041	G6.40	4.2.5
4.2.6	Vertical Situation 1 Display (PFS/BFS) Generic -- OPS/3051, 6021, 6031	G6.19	4.2.6
4.2.7	Vertical Situation 2 Display (PFS/BFS) Generic -- OPS/3051, 6031	G6.20	4.2.7

Table 4.0.1-1 Level-C to Level-A/B Traceability			
Level-C FSSR Section No.	Level C FSSR Title and Type	Principal Function	
		PASS	BFS
4.2.8	RM Orbit Display (PFS) -- SPEC/025	G6.45	
4.2.9	Horiz Sit Display (PFS) -- SPEC/050	G6.21	
4.2.10	XXXXXX MNVR YYYYYY Display (PFS/BFS) -- OPS/1041, 1051, 1061, 2021, 3011, 3021, 3031	G6.35	4.2.10
4.2.11	Horiz Sit Display (BFS) -- SPEC/050		4.2.11
4.2.12	GNC SYS SUMM 1 Display (BFS) -- DISP/018		4.2.12
4.2.13	RCS Display (PFS) -- SPEC/023	G6.7	
4.2.14	Controls Display (PFS) -- SPEC/053	G6.46	
4.2.15	GNC SYS SUMM 1 Display (PFS) -- DISP/018	G6.31	
4.2.16	Ascent Trajectory 1 Display (BFS) -- OPS/1011, 1021		4.2.16
4.2.17	Ascent Trajectory 2 Display (BFS) -- OPS/1031		4.2.17
4.2.18	GNC SYS SUMM 2 Display (PFS/BFS) -- DISP/019	G6.32	4.2.18
4.2.20	Star Tracker/COAS Control Display (PFS) -- SPEC/022	G6.44	
4.2.21	IMU Alignment Display (PFS) -- SPEC/021	G6.26	
4.2.22	DAP Configuration Display (PFS) -- SPEC/020	G6.1	
4.2.23	Relative Navigation Display (PFS) -- SPEC/033	G6.11	
4.2.25	Orbit Targeting Display (PFS) -- SPEC/034	G6.14	
4.2.26	Universal Pointing Display (PFS) -- OPS/2011	G6.27	
4.2.31	Override Display (PFS) -- SPEC/051	G6.47	
4.2.34	RTLS Trajectory 2 Display (BFS) -- OPS/6011		4.2.34
4.2.35	Override Display (BFS) -- SPEC/051		4.2.35
4.2.36	GPS STATUS Display -- SPEC/055	G6.51	
4.2.37	GPS Status Display (BFS) -- SPEC/055		4.2.37
4.2.38	XXXXXXX TRAJ 1 Display (PFS) -- OPS/1011, 1021	G6.52	
4.2.39	XXXXXXX TRAJ 2 Display (PFS) -- OPS/1031	G6.53	
4.2.40	RTLS TRAJ 2 Display (PFS) -- OPS/6011	G6.54	
Volume 2			
4.3.1	SM SYS SUMM 1 Display (BFS) -- DISP/078		4.3.1
4.3.2	SM Table Maint Display (PFS) -- SPEC/060	S5.1.1	
4.3.4	Antenna Display (PFS) -- OPS/2011, 4011	S5.1.4	
4.3.5	PCMMU/Payload Comm Display (PFS) -- SPEC/062	S5.1.3	
4.3.12	PDRS Control Display (PFS) -- SPEC/094	S5.1.6	

Table 4.0.1-1 Level-C to Level-A/B Traceability			
Level-C FSSR Section No.	Level C FSSR Title and Type	Principal Function	
		PASS	BFS
4.3.14	Payload Bay Doors Display (PFS/BFS) -- OPS/2021, 4021 (PFS), SPEC/063 (BFS)	S5.1.5	4.3.14
4.3.17	Thermal Display (BFS) -- OPS/0001		4.3.17
4.3.19	SM SYS SUMM 2 Display (BFS) -- DISP/079		4.3.19
4.3.24	SM Ground Checkout Display (PFS) -- SPEC/064	S5.1.10	
4.3.25	PDRS Override Display (PFS) -- SPEC/095	S5.1.11	
4.5.1	FCS/DED Displays C/O Display (PFS) -- OPS/8011	V5.1.10	
4.5.2	RM Controllers Display (PFS) -- SPEC/043	V5.1.6	
4.5.3	RM Switches/Surfaces Feedback Display (PFS) -- SPEC/042	V5.1.7	
4.5.4	On-Orbit Sensor Self-Test Display (PFS) -- SPEC/040	V5.1.4	
4.5.5	On-Orbit RGA/ADTA/RCS Test Display (PFS) -- SPEC/041	V5.1.4	
4.5.6	Mass Memory Read/Write Display (PFS) -- SPEC/085, OPS/9011	V5.1.12	
4.5.7	Switches Display (PFS) -- SPEC/044	V5.1.7	
4.5.9	On Orbit Nose Wheel Steering Check Display (PFS) -- SPEC/045	V5.1.17	
4.6.1	GPC/BTU Interface Display (PFS) -- SPEC/112	V5.1.3	
4.6.2	Preflight Sensor Self-Test Display (PFS) -- SPEC/101	V5.1.4	
4.6.3	Preflight RCS/RGA/ADTA Test Display (PFS) -- SPEC/102	V5.1.4	
4.6.4	TCS Control Display (PFS) -- SPEC/105	V5.1.11	
4.6.5	General Test Support Display (PFS) -- SPEC/100	V5.1.5	
4.6.6	Ground IMU Control/Monitor Display (PFS) -- SPEC/104	V5.1.8	
4.6.7	Manual Controls Display (PFS) -- DISP/106	V5.2.1	
4.6.8	DEU Stand-Alone Self-Test Display (PFS/BFS) -- SPEC/IPL	N/A	4.6.8
4.6.10	Spacelab Memory Dump (PFS) -- SPEC/111	V5.1.15	
4.6.11	Actuator Control Display (PFS) -- SPEC/113	V5.1.16	
4.7	Head Up Display (Various HUD-Related Formats & Symbols) Note: See Vol. 3 Sections F.4.252 (PFS) and F.4.260 (BFS) below		

Table 4.0.1-1 Level-C to Level-A/B Traceability			
Level-C FSSR Section No.	Level C FSSR Title and Type	Principal Function	
		PASS	BFS
Volume 3			
A.1	PFS CRT Messages	N/A	
A.2	PFS Error Signals	N/A	
A.3	PFS/BFS C&W Light/CRT Message Correlation	N/A	A.3
A.4	PFS CRT Message Software Requirements	N/A	
A.5	BFS CRT Messages Requirements		A.5
A.6	GPCIPL Messages	N/A	
A.7	Back-Up System Loader Messages (BFS)		A.7
B.4.110	Guidance, Navigation And Control/Annunciation Interface Support (GAX) - (PFS)	G4.110	
B.4.112	Guidance, Navigation And Control/Annunciation Interface Support (GAX) - (BFS)		B.4.112
B.4.150	Entry Display Processing (PFS/BFS)	G4.150	B.4.150
B.4.154	Vertical Situation Display Processing (PFS/BFS)	G4.154	B.4.154
B.4.160	XXXXXX Traj Display Processing (PFS)	G4.160	
B.4.206	Ascent Display Interface Processing (BFS)		B.4.206
B.4.218	RTLS Traj 2 Display Interface Processing (BFS)		B.4.218
B.5.3	GPS Status Display Processing (PFS)	G5.3	
B.5.7	Horizontal Situation Display Processing (PFS/BFS)	G5.7	B.5.7
B.5.16	RM/RCS Display Processing (PFS)	G5.16	
B.5.19	RM Orbit Display Processing (PFS)	G5.19	
B.5.21	Override Specialist Function (PFS)	G5.21	
B.5.25	Controls Specialist Function (PFS)	G5.25	
F.4.103	Entry/Landing ADI Processing (PFS)	G4.103	
F.4.104	Horizontal Situation Indicator Processing (PFS)	G4.104	
F.4.105	Alpha/Mach Indicator Processing (PFS)	G4.105	
F.4.106	Altitude/Vertical Velocity Indicator Processing (PFS)	G4.106	
F.4.107	Surface Position Indicator Processing (PFS)	G4.107	
F.4.108	Entry/Landing Event Annunciation Processing (PFS)	G4.108	
F.4.168	Ascent Attitude Director Indicator Processing (PFS)	G4.168	
F.4.169	On-Orbit Attitude Director Indicator Processing (PFS)	G4.169	
F.4.230	RCS Activity Light Processing (PFS)	G4.230	
F.4.252	Head Up Display Processing (HUD Proc) - (PFS)	G4.252	

Table 4.0.1-1 Level-C to Level-A/B Traceability			
Level-C FSSR Section No.	Level C FSSR Title and Type	Principal Function	
		PASS	BFS
F.4.260	BFS Head Up Display Processing (BFS HUD Proc)		F.4.260

4.1 SYSTEM LEVEL DISPLAYS

4.1.1 FAULT (PFS/BFS)

TITLE: FAULT

TYPE: DISP/099 or FAULT SUMM Key

AVAILABILITY: PFS: ALL OPS

BFS: ALL OPS

4.1.1.1 Purpose, Operations, and Organization

- (1) The Fault Display provides a historical summation of the most recent Class 2 and 3 CRT messages. The display output functions as a push-down list. The most recent message appears on the top; the next most recent, one row below, etc. The PFS display supports the last 15 messages. After 15 messages have been generated, the oldest (bottom) message on the display disappears when the next fault occurs. The display is independent of the major function selected and can be called by the FAULT SUMM key at any time. The display can also be called by its display page number (SPEC 099 PRO); however, this reinitializes the display, blanking all messages. Figure 4.1.1-1 is the Fault Display Format (PFS) and Figure 4.1.1-2 is the Fault Display Format (BFS).
- (2) Each line on the fault summary page is comprised of five fields: CRT ID, FAULT, C/W, GPC, and TIME. The CRT ID and FAULT fields comprise a total of 19 characters, which includes a blank space to separate major and minor fields. The leftmost 14 characters are referred to as the major field of a CRT message. The rightmost four characters of the fault field are referred to as the minor field of the message. The CRT ID part of the major field (leftmost three alphanumeric characters) is intended to aid the crewman in determining the display page number on which the fault is displayed and the major function in which the display resides. However, the CRT ID is not included in messages that are not referenced to a CRT display page. Major functions are defined as (G) GNC, (S) System Management or (2) System Management (Payload Unique Displays) and (P) Payload and are identified by the first character of the major field. The FAULT field identifies either the problem (caution and warning) or the subsystem group (alerts) which incurred the fault as part of the major field and the particular subsystem or string that has the fault as the minor field.

The C&W field is a single-character indicator used with caution and warning (class 2) CRT messages only. This indicator (asterisk) will indicate to the crew that the fault is C/W related. The GPC field is used to identify the source GPC or GPC's that detected the fault as an aid in trouble shooting internal GPC or I/O type errors. The TIME field specifies the mission time tag in MET of annunciation for each CRT message, and like the CRT ID, FAULT, and GPC fields is included as part of every message.

All messages on this display are, or have been, enabled for output to the CRT message line (line 25) of all operating CRT's independent of major function switch selection. The content of the CRT messages is identical to the FSP messages except for the truncation of days in the TIME field on the CRT message line, and for PASS the exceptions listed in the note in section 5.3.5.7.4 of the SSW Level A CPDS (SS-P-0002-170). The messages displayed on the message line are formatted as shown in Section 3.4.3 of this FSSR. CRT message requirements for the Space Shuttle are described in Appendix A of this FSSR.

The capability exists to prevent repetition of identical CRT messages:

In PASS when a CRT message is generated, its major and minor (CRT and FAULT ID) fields are compared to the same field of the top message (i.e., most recent) on the display. If the fields agree and the new message has occurred within an interlock period of 4.8 seconds of the top displayed message, the output of the new message is inhibited.

In BFS, any new message is compared to all messages annunciated within the past 4.8 seconds and the new message will not be annunciated if it had previously occurred during that lockout period.

All CRT messages can be cleared from the display. This capability is initiated by calling the FAULT summary page via its display number (SPEC 099 PRO).

4.1.1.2 BFS Supplemental Requirements

1. The last twenty (20) CRT messages are supported by BFS on the FAULT summary page.

TABLE 4.1.1-1. Fault Keyboard Processing

Not applicable

4.1.1.3 Fault Keyboard Processing Addendum

Not applicable

4.1.1.4 Fault CRT Display Processing Addendum

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word "STAT" being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT Display Processing Table 4.1.1-2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the "M" PSI is displayed (for commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)
Blank (default)	↓ M ∅
1	↓ ↑ M ∅
2	↑ M ∅
3	↓ ∅
4	↑ ∅
5	↓ ? ∅
6	↓ ↑ ∅
7	M ∅
8	↓ ? M ∅
9	? M ∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.1.1–2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. The five fields composing the fault summary message line are derived as follows:
1. Major Field. UI retrieves this field from the Major Fault Message Table (see Appendix A) entry designated by the Major Fault Message Index.
 2. Minor Field. UI retrieves this field from the Minor Fault Message Table entry designated by the Minor Fault Message Index.
 3. C/W indicator – An asterisk indicates the parameter is a C/W parameter.
 4. GPC. The ID numbers (1-5) of the GPC’s involved in detection of the fault are displayed.
 5. Time. Day/hour:minute:second in MET at the time the fault is detected.

No more than 15 (PFS) or 20 (BFS) fault messages are displayed at one time. Earlier messages push-down on the CRT to make room for the latest fault message to be displayed on line 9 (PFS) or on line 5 (BFS).

The fault summary message line will be constructed as shown here:

BLANK (4)				MAJOR FIELD (14)														MINOR FIELD		BLANK (3)	GPC (5)					BLANK												TIME (12)						BLANK (4)												
BLANK (4)				CRT ID (3)		BLANK		MESSAGE (10)										BLANK		MSG (4)	BLANK		C / W	BLANK (3)					GPC (5)					BLANK												D D D / H H : M M : S S						BLANK (4)				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51						

NOTES:

1. CRT format “X” coordinate locations 5 through 18 correspond to card columns 5 through 18 of the “G” card type.

2. All messages which do not have a CRT ID included in the major field will start in card column 9.
 3. Those messages which have a CRT ID in the major field will start in card column 5.
- B. The measurement number representing the CRT TIMER is dependent upon which major function this display is called in and is defined by the following table:

MAJOR FUNCTION SETTING	MSID
GNC	V91W1987C
SM	V91W1988C
PL	V91W1989C

4.1.1.5 Fault Figure/Table References

- Figure 4.1.1-1 Fault Display (PFS)
- Figure 4.1.1-2 Fault Display (BFS)
- Table 4.1.1-1 Keyboard Processing Table N/A
- Table 4.1.1-2 CRT Display Processing Table
- Table 4.1.1-3 CRT Display Processing Background Requirements N/A
- Table 4.1.1-4 Mission Design Background Constants N/A
- Table 4.1.1-5 Input Functional Parameters N/A
- Table 4.1.1-6 Output Functional Parameters N/A
- Table 4.1.1-7 I-Loads N/A
- Table 4.1.1-8 K-Loads N/A
- Table 4.1.1-9 Constants N/A

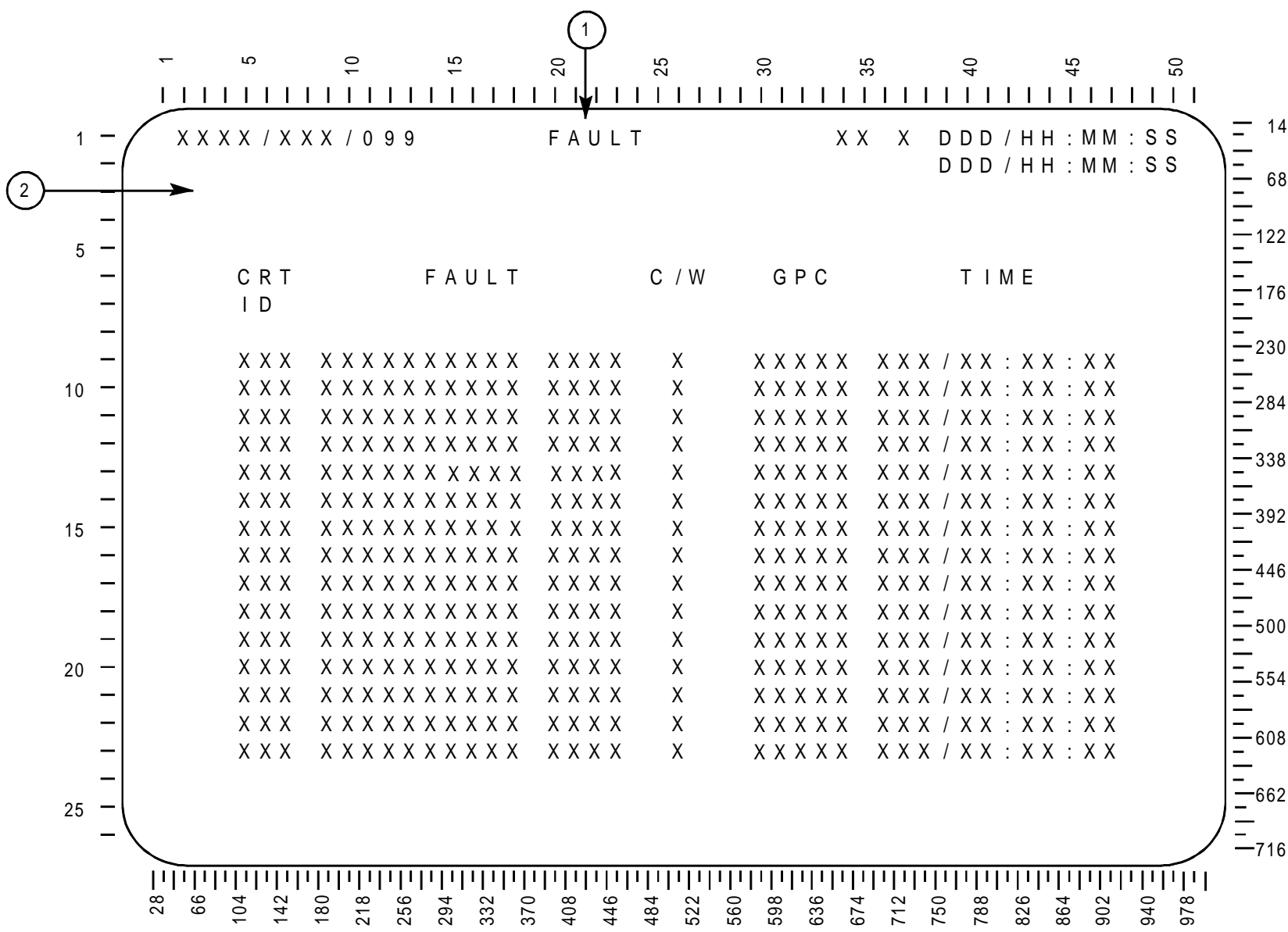


FIGURE 4.1.1-1. Fault Display (PFS)

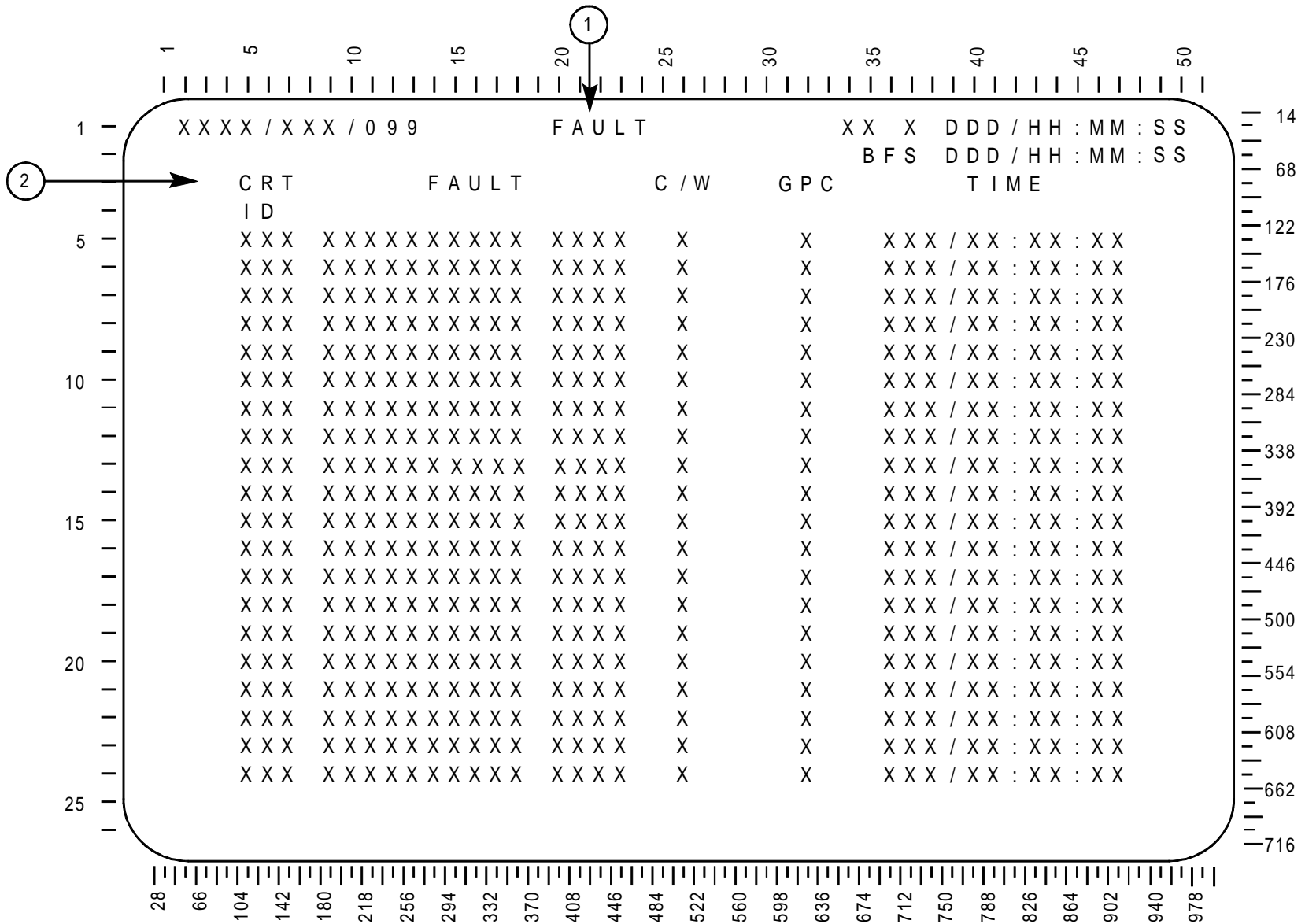


FIGURE 4.1.1-2. Fault Display (BFS)

Table 4.1.1-2.FAULT (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A K E	S I Z E	I N T E N S	F L A S H	R A T E	S I G N E R	L E A D E R	B R A N D C H T	D W N L S	Add Ref	Source		Nomenclature	C R T		
			X	Y		CHAR	BILEVEL														TYPE	PFS			BFS	
							1	0																		
001	(OPS)	V93X0040X	2	1		5.0															UI	N/S	OPS FUNCTION PAGE	X		
002	(OPS)	V93X0040X	2	1		5.0															N/S	MI	OPS FUNCTION PAGE	X		
003	(SPEC)	V93X0042X	7	1		4.0															UI	MI	SPEC FUNCTION PAGE	X		
004	(DISP)	V93X0044X	10	1		4.0															UI	MI	DISPLAY FUNCTION PAGE	X		
005	(UL)	V92X5032X	34	1		2.0	UL							X							UI	MI	UPLINK ACTIVITY IND	X		
006	(GPC)	V93X0048X	36	1		2.0															UI	N/S	GPC DRIVER	X		
007	(GPC)	V93X0048X	36	1		2.0															N/S	MI	GPC DRIVER	X		
008	(MT)	V91W1990C	39	1		12.0															FCOS	BOS	MISSION ELAPSED TIME	X		
009	(CRT TIMER)	V91W1987C	39	2		12.0			DHMS												A	B	FCOS	BOS	DISPLAY CRT TIMER,GNC	X
010	FSML 1	V91U0901C	5	9		43.0															A	FSP	FOP	FAULT MESSAGE LINE 1	X	
011	FSML 2	V91U0902C	5	10		43.0															A	FSP	FOP	FAULT MESSAGE LINE 2	X	
012	FSML 3	V91U0903C	5	11		43.0															A	FSP	FOP	FAULT MESSAGE LINE 3	X	
013	FSML 4	V91U0904C	5	12		43.0															A	FSP	FOP	FAULT MESSAGE LINE 4	X	
014	FSML 5	V91U0905C	5	13		43.0															A	FSP	FOP	FAULT MESSAGE LINE 5	X	
015	FSML 6	V91U0906C	5	14		43.0															A	FSP	FOP	FAULT MESSAGE LINE 6	X	
016	FSML 7	V91U0907C	5	15		43.0															A	FSP	FOP	FAULT MESSAGE LINE 7	X	
017	FSML 8	V91U0908C	5	16		43.0															A	FSP	FOP	FAULT MESSAGE LINE 8	X	
018	FSML 9	V91U0909C	5	17		43.0															A	FSP	FOP	FAULT MESSAGE LINE 9	X	
019	FSML 10	V91U0910C	5	18		43.0															A	FSP	FOP	FAULT MESSAGE LINE 10	X	
020	FSML 11	V91U0911C	5	19		43.0															A	FSP	FOP	FAULT MESSAGE LINE 11	X	
021	FSML 12	V91U0912C	5	20		43.0															A	FSP	FOP	FAULT MESSAGE LINE 12	X	
022	FSML 13	V91U0913C	5	21		43.0															A	FSP	FOP	FAULT MESSAGE LINE 13	X	
023	FSML 14	V91U0914C	5	22		43.0															A	FSP	FOP	FAULT MESSAGE LINE 14	X	
024	FSML 15	V91U0915C	5	23		43.0															A	FSP	FOP	FAULT MESSAGE LINE 15	X	
025	FSML 16	V91U0916C	5	24		43.0															A	N/S	FOP	FAULT MESSAGE LINE 16	X	

Table 4.1.1-2.FAULT (PFS/BFS) CRT DISPLAY PROCESSING																										
Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T S	B A A K	S I Z E	I N T E N S	F L A T S E N H	R A T E	S I G N E R	L E A D E R H	B A N D W I D T H	D E L E T E	Add Ref	Source		Nomenclature	C R T		
			X	Y		CHAR	BILEVEL														TYPE	PFS			BFS	
							1	0																		
026	FSML 17	V91U0917C	5	5		43.0															A	N/S	FOP	FAULT MESSAGE LINE 17	X	
027	FSML 18	V91U0918C	5	6		43.0															A	N/S	FOP	FAULT MESSAGE LINE 18	X	
028	FSML 19	V91U0919C	5	7		43.0															A	N/S	FOP	FAULT MESSAGE LINE 19	X	
029	FSML 20	V91U0920C	5	8		43.0															A	N/S	FOP	FAULT MESSAGE LINE 20	X	
030	(MSG LINE)	V93X0050X	1	25		44.0																UI	N/S		MESSAGE LINE	X
031	(MSG LINE)	V93X0050X	2	25		46.0																N/S	MI		MESSAGE LINE	X
032	(BUFFER MSG)	V93X0054X	45	25		4.0																UI	N/S		BUFFER MESSAGE INDICATOR	X
033	(BUFFER MSG)	V93X0054X	48	25		4.0																N/S	MI		BUFFER MESSAGE INDICATOR	X
034	(SPL)	V93X0056X	2	26		49.0																UI	MI		SCRATCH PAD LINE	X
200	(BFS)	V98X0015X	35	2		3.0							X									N/S	MI		BFS IDENTIFIER BFS	X

4.1.2 TIME (PFS)

TITLE: TIME

TYPE: SPEC/002

AVAILABILITY: PFS: OPS 0, GNC OPS 2, 8 and 9;
SM OPS 2 and 4;
PL OPS 9

4.1.2.1 Purpose, Operation, and Organization

- (1) TIME SPECIALIST. This function provides control of the GPC Time Management Processor (TMP), the GPC-generated Event Timer, and provides updates to the Master Timing Unit (MTU) MET/GMT accumulators and GPC MET/GMT. In addition, provisions are made for monitoring the MTU accumulator strings, the GPCs self-time used in the last TMP cycle (biased to allow visual comparison), and the TMP source selection. Figure 4.1.2-1 is the Time Display Format.

The crew uses this SPEC for initial configuration of the timing system to provide updates to the MTU GMT, MTU MET, and CRT TIMER. As a result of an FDA fault summary message, the crew may be directed to view the TIME management SPEC to exercise control functions or simply to monitor MTU subsystem parameters.

The TIME display is formatted into three major segments. The upper segment contains controls for mission time selection, CRT Timer, and tone. The middle segment displays the status of the MTU and contains the MTU MET/GMT and GPC TMP update controls. The bottom segment contains the MTU and GPC-GMT outputs. Also displayed in this segment are the GPC TMP source selections. The controls to force selection of the GPC TMP inputs and a time sync complete the bottom segment.

In MM101 the CRT TIMER will be loaded by the R/S Launch Sequencer to countdown to time of SRB ignition. Initiation of the timer will be done in OPS G9.

For the TIME management SPEC, the failed state of a bi-level will be displayed as alphanumeric text, and the normal state of the bi-level will be blank.

- (2) MISSION TIME. Items 1 and 2 are used to select either GMT (Item 1) or MET (Item 2) as the source for mission time for all displays. An asterisk(*) is displayed opposite the selected source, and a blank will indicate that a source, GMT or MET, is not selected for driving mission time. Source selection carries forward across OPS transitions until manually changed.
- (3) CRT TIMER. Control of the CRT TIMER is exercised by Items 9 through 19 for the three (one per Major Function) CRT Timers. (Note: CRT Timers if initiated and counting at the time of the OPS request, will continue to count across the OPS transition and Memory Configurations (MC's) not containing this SPEC).

Items 9, 10, and 11 allow the CRT TIMER to be loaded with any combination of hours, minutes, and seconds. The sign of the lowest item number entered with a non-zero value determines the sign of the entire set of data entries. A minus (-) causes the TIMER to count down from the input time to zero, then up, while a plus (+) causes the TIMER to count up. Upon execution of Item 12 (START timer), the values loaded in Items 9, 10, and/or 11 are

input to the CRT TIMER, counting will be initiated and the data fields in Items 9, 10 and 11 will be blanked. Additionally, Items 14, 15 and 16 (since the "SET" values for "start at" have been cleared), and items 17, 18 and 19 (since the CRT TIMER will not be consistent with a previous "count to" time) will blank.

Items 14, 15 and 16 (MSN T) can be used to specify a future mission time when the CRT TIMER is to be loaded with any combination of hours, minutes and seconds specified in Items 9, 10 and/or 11. Upon the execute command following the last Item 14, 15 and 16 entered, a comparison between the values entered in Items 14, 15 and 16 and the mission time is initiated. When the mission time has been reached, the CRT TIMER starts counting from the value loaded in Items 9, 10, and/or 11 and the fields in Items 9, 10, and 11, Items 14, 15, and 16, and Items 17, 18, and 19 will be blanked. Upon recall of the SPEC, Items 14, 15 and 16 will display the last user entered START AT MSN T value for the selected Major Function. (Note: If an OPS transition to a MC in which this SPEC is not available is performed prior to reaching the input START AT MSN T, that MC will not monitor the START AT MSN T. If another OPS transition is later performed to a MC in which this SPEC is available, the previously entered START AT MSN T will again be monitored. This new MC will immediately load and start the CRT TIMER and blank the appropriate fields if the input START AT MSN T was reached while in the MC in which this SPEC was not available.)

Items 17, 18 and 19 (COUNT TO MSN T) allow for entry of some upcoming mission time in hours, minutes, and seconds. This time will be subtracted from the current mission time and the delta value loaded into the CRT TIMER. After loading, the CRT TIMER will proceed to count down to zero from the loaded delta value. When zero is reached on the CRT TIMER, the data field for Items 17, 18, and 19 will be blanked. Upon recall of the SPEC, Items 17, 18, and 19 shall display the last user entered COUNT TO MSN T value for the selected Major Function.

In all the above cases, when the CRT TIMER is required to count down to zero, it will continue counting up after zero is reached.

Upon execution of Item 13 (STOP), the CRT TIMER is stopped and zeroed.

- (4) TONE. Items 3 through 5 allow for an alert tone to be annunciated when the loaded mission time MSN T value has been reached. Items 6, 7 and 8 allow for a second independent MSN T entry. These data fields are blanked when the entered mission time has been reached.

Items 20, 21, and 22 provide for an alert tone annunciation based on a CRT TIMER value. Either sign may be input; the sign of the lowest item number entered with nonzero field determines the sign of the set. A negative sign on the input CRT T will cause the tone to annunciate when the CRT TIMER is counting down; a positive sign will cause the tone to annunciate when the CRT TIMER is counting up. Values entered which are in the past relative to the CRT TIMER will cause an immediate alert.

The data fields are blanked when the entered CRT TIMER value has been reached.

(Note: If an OPS transition to a MC in which this SPEC is not available is performed prior to reaching the alert tone times, that MC will not monitor the alert tone times. If another OPS transition is later performed to a MC in which this SPEC is available, the previously entered alert tone time(s) will again be monitored. This new MC will immediately annunciate and blank

the appropriate fields for any alert tone times reached while in the MC in which this SPEC was not available.)

- (5) DURATION. Item 23 allows for the alert tone duration to be changed. Upon entry of a decimal value of seconds (up to 99, in Item 23), all future alert tones sound for the entered time duration. The alert tone will be inhibited whenever zero entry is made for the duration time. The initial time duration value is 1.0 second. (Note: The alert tone time duration value is carried across OPS transitions.)
- (6) MTU. Items 24 through 31 are the controls used to update the MTU and GPC times, GMT and/or MET.

Items 24 through 27 (See Note 1) allow the input of a delta time in days, hours, minutes, seconds and milliseconds to the MTU and GPC. Upon execution of Item 32, (time UPDATE), the values loaded in Items 24 through 27 are used by the GPC to construct and initiate the necessary commands to the MTU to cause GMT to be updated by the input delta time and the TMP shall then select MTU accumulator 1 for time source. In addition, however, the value of the update is rejected if the request is for more than 15 milliseconds. Each GPC adjusts its RUN TIME and processing by the requested update. By limiting the update to 15 milliseconds, no GPC goes inactive for more than 15 milliseconds. The single exception to an update of more than 15 milliseconds is limited to a single active simplex GPC in GPC OPS 0 – 00. During this process, GMT may be updated by days, hours, minutes, seconds, and milliseconds up to a full year.

Items 28 through 31 (See Note 1) allow the input of a delta time in days, hours, minutes, seconds, and milliseconds to the mission elapsed time MET of the MTU and GPC. Upon execution of Item 32 (time UPDATE), the values loaded in Items 28 through 31 are used by the GPC to construct and initiate the necessary commands to the MTU to cause MET to be updated by the input delta time. In addition, each GPC shall adjust its MET clock by the requested update. (The Coincident Time is computed by rounding the current time to the next minute and adding one minute).

It should be noted that the update does not occur immediately upon execution of Item 32. A time referred to as Coincidence Time is computed when Item 32 is executed and the update is delayed until this time. The Coincident Time is computed by rounding the current time to the next minute and adding one minute. Thus the update will occur from one to two minutes after execution of Item 32.

A Simultaneous update of MET and GMT with a single Item 32 EXECUTE shall not be possible (See Note 1). The sign of the lowest item number entered determines the sign of the entire set (i.e., Item 24–27 or 28–31). The GMT/MET update item entries are blanked following a EXECUTE of Item 32.

Note 1: Items 24–27 and 28–31 are mutually exclusive. Entry of Item 24–27 or 28–31 (at least one item in each set) results in blanking of any existing input into Item 28–31 or 24–27, respectively.

- (7) MET RESET. Execution of Item 33 initiates a resetting of MET in both the MTU and the common set GPC's. This results in the equalization of GPC and MTU MET.

- (8) GPC TIME. Monitoring and status of the time sources from the MTU accumulator and internal GPC prime clock are accomplished by four GMT time words located in the bottom third of the display. These time words are the input sources of the GPC Time Management Processor (TMP) and are controlled via the item numbers to the right (TRY). Status (STAT) information is maintained on the three MTU accumulators. The results of the TMP filter for input source failure are displayed adjacent to each GMT time word with a down arrow (↓) as an indication of the failure or “M” as an indication of data loss.
- (9) GPC CONTROLS. Items 34 through 37 are the controls used to manage the inputs to the GPC TMP. User input of ACUM 1, ACUM 2, ACUM 3, or GPC forces the TMP in each GPC, on a given cycle, to start selection, with the time obtained from the requested source.

If the requested source is found to be out of tolerance by cycle, for automatic source selection, the TMP in each GPC shall sequentially difference the other time sources with GPC time (GPCmt–internal GPC time) until an absolute delta of less than a constant, K_1 , is found, and then select this source as TIME3. If the selected source is an MTU accumulator source, and if it fails the K_1 test in that GPC, then the other two MTU accumulator sources are tested before trying a GPC source. As a result, TMP faults down to a GPC source when all three MTU sources fail the K_1 test on a single given cycle or all MTU’S are COMMFAULTED for two consecutive cycles (a TMP time correction is skipped on the first COMMFAULTED PASS). Additionally, TMP will fault down to a GPC time source after only one cycle in the event one of the first three flight critical strings is not being commanded and the other two MTUs are COMMFAULTED. However, once the MTU’S are deselected, they are no longer examined until the TMP is reinitialized or a user input for GMT update, time sync, or a request via Items 34 through 37 is received to select an MTU source. If TMP has faulted down to a GPC, and no source passes the K_1 test, then GPCmt is used until TMP or a user input request via Items 34 through 37 is received. Whenever a source selection is changed due to a failed condition of the selected source, that GPC generates an appropriate error message.

- (10) TIME SYNC. Execution of Item 38 forces all GMT time sources to be set equal to the source currently selected by the lowest GPC ID in the Common Set having control of at least one of the FC 1–3 buses; that is, if the current source selected by that GPC is an MTU, each GPC computes and attempts to command a zero delta MTU/GMT update via the bus containing that source. This results in all other sources being synchronized to the MTU selected by that GPC. Following the time sync procedure, the TMP shall select MTU accumulator 1 for the time source.
- (11) GPC SOURCE. These messages indicate which of the four available sources, ACCUM 1, ACCUM 2, ACCUM 3, or GPC are presently selected for the TMP of each operating GPC. An alphanumeric ID (“A1” – “A3” for accumulators 1–3 and 1–5 for GPC 1–5) is displayed in the appropriate GPC row to indicate which time source is being used by that GPC.

4.1.2.2 Time Keyboard Processing Addendum

- A. The measurement numbers that contain the keystrokes that make up the hours, minutes, and seconds which define the alert tone inputs are dependent on which major function (GNC or SM) is selected on the major function switch. The following table defines the measurement numbers which shall be used to transmit the information from the keyboard to the TIME SPEC Function:

Major Function Switch Setting	Measurement Number	Nomenclature
GNC	V93W4165C	Time GNC MSN T1 for ALERT WD 1
	V93W4166C	Time GNC MSN T1 for ALERT WD 2
	V93W4167C	Time GNC MSN T1 for ALERT WD 3
	V93W4170C	Time GNC MSN T2 for ALERT WD 1
	V93W4171C	Time GNC MSN T2 for ALERT WD 2
	V93W4172C	Time GNC MSN T2 for ALERT WD 3
SM	V93W4114C	Time SM MSN T1 for ALERT WD 1
	V93W4115C	Time SM MSN T1 for ALERT WD 2
	V93W4116C	Time SM MSN T1 for ALERT WD 3
	V93W4117C	Time SM MSN T2 for ALERT WD 1
	V93W4118C	Time SM MSN T2 for ALERT WD 2
	V94W4119C	Time SM MSN T2 for ALERT WD 3

- B. The measurement numbers that contain the keystrokes that make up the hours, minutes, and seconds which define the CRT set time are dependent on which major function (GNC or SM) is selected on the major function switch. The following table defines the measurement numbers which shall be used to transmit the information from the keyboard to the TIME SPEC function:

Major Function Switch Setting	Measurement Number	Nomenclature
GNC	V93W4175C	Time GNC CRT T SET WD 1
	V93W4176C	Time GNC CRT T SET WD 1
	V93W4177C	Time GNC CRT T SET WD 1
SM	V93W4135C	Time SM CRT T SET WD 1
	V93W4136C	Time SM CRT T SET WD 1
	V93W4137C	Time SM CRT T SET WD 1

- C. The measurement numbers that contain the keystrokes that make up the commands for start and stop of the CRT TIMER are dependent on which major function is selected. The following table defines the measurement numbers which shall be used to transmit the commands from the keyboard to the TIME SPEC function:

Major Function Switch Setting	Measurement Number	Nomenclature
GNC	V93X4131X	Time GNC CRT T start
	V93X4132X	Time GNC CRT T stop
SM	V93X4180X	Time SM CRT T start
	V93X4181X	Time SM CRT T stop

- D. The measurement numbers that contain the keystrokes that make up the hours, minutes, and seconds which define the mission time that will start the CRT TIMER are dependent on which major function is selected. The following table defines the measurement numbers which shall be used to transmit the information from the keyboard to the TIME SPEC function:

Major Function Switch Setting	Measurement Number	Nomenclature
GNC	V93W4185C	Time MSN T for GNC CRT T start WD 1
	V93W4186C	Time MSN T for GNC CRT T start WD 2
	V93W4187C	Time MSN T for GNC CRT T start WD 3
SM	V93W4140C	Time MSN T for SM CRT T start WD 1
	V93W4141C	Time MSN T for SM CRT T start WD 2
	V93W4142C	Time MSN T for SM CRT T start WD 3

- E. The measurement numbers that contain the keystrokes that make up the hours, minutes, and seconds which define the mission time that the CRT TIMER is to count to are dependent on which major function is selected. The following table defines the measurement numbers which shall be used to transmit the information from the keyboard to the TIME SPEC function:

Major Function Switch Setting	Measurement Number	Nomenclature
GNC	V93W4189C	Time MSN T for GNC CRT T to CT to WD 1
	V93W4190C	Time MSN T for GNC CRT T to CT to WD 2
	V93W4191C	Time MSN T for GNC CRT T to CT to WD 3
SM	V93W4145C	Time MSN T for SM CRT T to CT to WD 1
	V93W4146C	Time MSN T for SM CRT T to CT to WD 2
	V93W4147C	Time MSN T for SM CRT T to CT to WD 3

- F. The measurement numbers that represent the keystrokes that make up the hours, minutes, and seconds that control the CRT TIMER alert tone are dependent on which major function (GNC or SM) is selected on the major function switch. The following table defines the measurement

numbers which shall be used to transmit the information from the keyboard to the TIME SPEC function:

Major Function Switch Setting	Measurement Number	Nomenclature
GNC	V93W4193C	Time GNC CRT T for ALERT WD 1
	V93W4194C	Time GNC CRT T for ALERT WD 2
	V93W4195C	Time GNC CRT T for ALERT WD 3
SM	V93W4135C	Time SM CRT T for ALERT WD 1
	V93W4136C	Time SM CRT T for ALERT WD 2
	V93W4137C	Time SM CRT T for ALERT WD 3

4.1.2.3 Time CRT Display Processing Addendum

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word "STAT" being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT Display Processing Table 4.1.2-2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the "M" PSI is displayed (for commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)		
Blank (default)	↓	M	∅
1	↓ ↑	M	∅
2	↑	M	∅
3	↓		∅
4	↑		∅
5	↓ ?		∅
6	↓ ↑		∅
7		M	∅
8	↓ ?	M	∅
9	? ?	M	∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.1.2-2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. The mission times at which the alert tone is initiated are provided in seconds to user interface software which converts it into HR:MIN:SEC. The starting times are dependent on which

major function (GNC or SM) is selected on the major function switch. The following table defines the measurement number which shall be used depending on which major function is selected.

Major Function Switch Setting	Measurement Number	Nomenclature
GNC	V91W1085C	Time GNC MSN T1 FOR ALERT
	V91W1086C	Time GNC MSN T2 FOR ALERT
SM	V91W1087C	Time SM MSN T1 FOR ALERT
	V91W1088C	Time SM MSN T2 FOR ALERT

- B. The CRT set time is provided in seconds to user interface software which converts it into HR:MIN:SEC. This set time is dependent on which major function (GNC or SM) is selected on the major function switch. The following table defines the measurement number which shall be used depending on which major function is selected.

Major Function Switch Setting	Measurement Number	Nomenclature
GNC	V91W1089C	Time GNC CRT T LOAD
SM	V91W1090C	Time SM CRT T LOAD

- C. The mission time that initiates the CRT TIMER is provided in seconds to user interface software which converts it into HR:MIN:SEC. This mission time is dependent on which major function (GNC or SM) is selected on the major function switch. The following table defines the measurement numbers which shall be used depending on which major function is selected.

Major Function Switch Setting	Measurement Number	Nomenclature
GNC	V91W1091C	Time MSN T FOR GNC CRT T START
SM	V91W1092C	Time MSN T FOR SM CRT T START

- D. The mission time that the CRT TIMER will count to is provided in seconds to user interface software which converts it into HR:MIN:SEC. This mission time is dependent on which major function (GNC or SM) is selected on the major function switch. The following table defines the measurement numbers which shall be used depending on which major function is selected.

Major Function Switch Setting	Measurement Number	Nomenclature
GNC	V91W1094C	Time MSN T FOR GNC CRT T CT TO
SM	V91W1095C	Time MSN T FOR SM CRT T CT TO

- E. The CRT times at which the alert tone is initiated are provided in seconds to the user interface software which converts it into HR:MIN:SEC. The starting times are dependent on which major function (GNC or SM) is selected on the major function switch. The following table defines the measurement numbers which shall be used depending on which major function is selected.

Major Function Switch Setting	Measurement Number	Nomenclature
GNC	V91W1097C	Time GNC CRT T FOR ALERT
SM	V91W1098C	Time SM CRT T FOR ALERT

- F. GMT and MET delta update—outputs shall be provided in seconds to user interface which will convert it into DAYS:HRS:MINS:SECS for display. Upon completion of an update all delta time entries will be cleared from the software, thereby ensuring that new delta time entries will not conflict with previous entries.
- G. The status indicators for GPC 1, 2, 3, 4, or 5 TMP sources are defined by one measurement number for each GPC. This measurement is a 16 bit word where the state of bits 14, 15, and 16 determines the TMP source. For example, GPC 1 TMP source is determined by V91Q1710C. The format of this measurement and how it is used to indicate TMP source is defined in the following table:

TIME SOURCE	MSID STATUS		V91Q__				
	BIT 8	BITS 14, 15, 16	1710C GPC 1	1711C GPC 2	1712C GPC 3	1713C GPC 4	1714C GPC 5
ACCUM 1	1	001	A1	A1	A1	A1	A1
ACCUM 2	1	010	A2	A2	A2	A2	A2
ACCUM 3	1	011	A3	A3	A3	A3	A3
GPC 1	0	001	1	1	1	1	1
GPC 2	0	010	2	2	2	2	2
GPC 3	0	011	3	3	3	3	3
GPC 4	0	100	4	4	4	4	4
GPC 5	0	101	5	5	5	5	5

- H. The sign of the entire set is determined by the sign of the first non-zero datum in the set.
- I. These fields shall blank when the corresponding entered mission time values have been reached.
- J. This field blanks when the START (Item 12) is executed. It also blanks when the mission time has reached the START AT MSN T input (Items 14, 15 and 16) values. When the GPC determines the START AT MSN T has been reached or exceeded, the values previously loaded

in Item 9, 10 and 11 will be input to the CRT TIMER, counting will start and all the fields in Items 17, 18 and 19, Items 14, 15 and 16, and Items 9, 10 and 11 will blank.

- K. Deleted.
- L. The field blanks when the entered CRT TIMER value has been reached.
- M. The measurement number representing the CRT TIMER is dependent upon which major function this display is called in and is defined by the following table:

MAJOR FUNCTION SETTING	MSID
GNC	V91W1987C
SM	V91W1988C
PL	V91W1989C

4.1.2.4 Time Figure/Table References

- Figure 4.1.2-1 Time Display (PFS)
- Table 4.1.2-1 Keyboard Processing Table
- Table 4.1.2-2 CRT Display Processing Table
- Table 4.1.2-3 CRT Display Processing Background Requirements N/A
- Table 4.1.2-4 Mission Design Background Constants N/A
- Table 4.1.2-5 Input Functional Parameters N/A
- Table 4.1.2-6 Output Functional Parameters N/A
- Table 4.1.2-7 I-Loads N/A
- Table 4.1.2-8 K-Loads N/A
- Table 4.1.2-9 Constants N/A

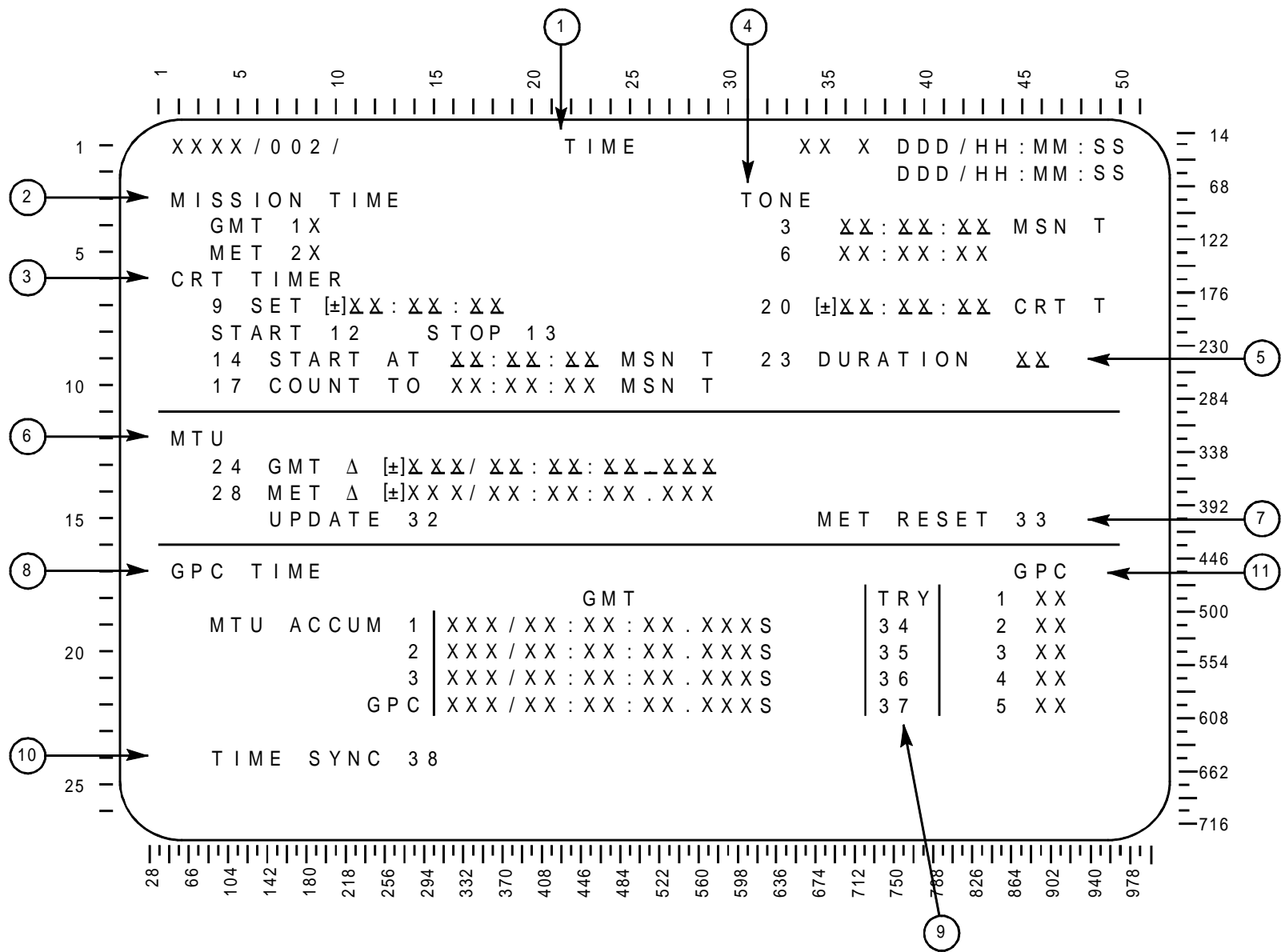


FIGURE 4.1.2-1. Time Display (PFS)

Table 4.1.2-1. TIME (PFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
001	GMT 1	V93X4110X	0.0	CTRL			1				TM	SELECT GMT/MET FOR MSN T	X
002*	MET 2	V93X4110X	0.0	CTRL			2				TM	SELECT GMT/MET FOR MSN T	X
003	TONE 3 MSN T	V93W4165C	2.0	DEC	H		3		A		TM	GNC MSN T1 FOR ALERT WD 1	X
004	TONE 4 MSN T	V93W4166C	2.0	DEC	M		4		A		TM	GNC MSN T1 FOR ALERT WD 2	X
005	TONE 5 MSN T	V93W4167C	2.0	DEC	S		5		A		TM	GNC MSN T1 FOR ALERT WD 3	X
006	TONE 6 MSN T	V93W4170C	2.0	DEC	H		6		A		TM	GNC MSN T2 FOR ALERT WD 1	X
007	TONE 7 MSN T	V93W4171C	2.0	DEC	M		7		A		TM	GNC MSN T2 FOR ALERT WD 2	X
008	TONE 8 MSN T	V93W4172C	2.0	DEC	S		8		A		TM	GNC MSN T2 FOR ALERT WD 3	X
009	9 SET CRT TIMER HRS	V93W4175C	2.0	DEC	H		9		B		TM	GNC CRT T SET WD 1	X
010	10 SET CRT TIMER MNS	V93W4176C	2.0	DEC	M		10		B		TM	GNC CRT T SET WD 2	X
011	11 SET CRT TIMER SEC	V93W4177C	2.0	DEC	S		11		B		TM	GNC CRT T SET WD 3	X
012	START CRT TIMER 12	V93X4131X	0.0	CTRL			12		C		TM	GNC CRT T START	X
013	STOP CRT TIMER 13	V93X4132X	0.0	CTRL			13		C		TM	GNC CRT T STOP	X
014	14 START AT HRS	V93W4185C	2.0	DEC	H		14		D		TM	MSN T FOR GNC CRT T START WD 1	X
015	15 START AT MNS	V93W4186C	2.0	DEC	M		15		D		TM	MSN T FOR GNC CRT T START WD 2	X
016	16 START AT SEC	V93W4187C	2.0	DEC	S		16		D		TM	MSN T FOR GNC CRT T START WD 3	X
017	17 COUNT TO HRS	V93W4189C	2.0	DEC	H		17		E		TM	MSN T FOR GNC CRT T TO CT TO WD 1	X
018	18 COUNT TO MNS	V93W4190C	2.0	DEC	M		18		E		TM	MSN T FOR GNC CRT T TO CT TO WD 2	X
019	19 COUNT TO SEC	V93W4191C	2.0	DEC	S		19		E		TM	MSN T FOR GNC CRT T TO CT TO WD 3	X
020	TONE 20 CRT T HRS	V93W4193C	2.0	DEC	H		20		F		TM	GNC CRT T FOR ALERT WD 1	X
021	TONE 21 CRT T MNS	V93W4194C	2.0	DEC	M		21		F		TM	GNC CRT T FOR ALERT WD 2	X
022	TONE 22 CRT T SEC	V93W4195C	2.0	DEC	S		22		F		TM	GNC CRT T FOR ALERT WD 3	X
023	23 TONE DURATION	V93W4139C	2.0	DEC	S		23				TM	ALERT TONE DURATION	X
024	24 GMT DELTA DYS	V93W4108C	3.0	DEC	D		24				TM	GMT DELTA UPDATE WD 1	X
025	25 GMT DELTA HRS	V93W4160C	2.0	DEC	H		25				TM	GMT DELTA UPDATE WD 2	X
026	26 GMT DELTA MNS	V93W4161C	2.0	DEC	M		26				TM	GMT DELTA UPDATE WD 3	X
027	27 GMT DELTA S/MS	V93W4162C	7.3	DEC	S.S		27				TM	GMT DELTA UPDATE WD 4	X
028	28 MET DELTA DYS	V93W4102C	2.0	DEC	D		28				TM	MET DELTA UPDATE WD 1	X
029	29 MET DELTA HRS	V93W4104C	2.0	DEC	H		29				TM	MET DELTA UPDATE WD 2	X
030	30 MET DELTA MNS	V93W4106C	2.0	DEC	M		30				TM	MET DELTA UPDATE WD 3	X

Table 4.1.2-1. TIME (PFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
031	31 MET DELTA S/MS	V93W4126C	7.3	DEC	S.S		31				TM	MET DELTA UPDATE WD 4	X
032	UPDATE 32	V93X4155X	0.0	CTRL			32				TM	GMT/MET UPDATE EXEC	X
033	MET RESET 33	V93X4158X	0.0	CTRL			33				TM	MTU/GPC MET RESET	X
034	MTU ACCUM 1 TRY 34	V93X4101X	0.0	CTRL			34				TM	SELECT MTU 1	X
035	MTU ACCUM 2 TRY 35	V93X4103X	0.0	CTRL			35				TM	SELECT MTU 2	X
036	MTU ACCUM 3 TRY 36	V93X4105X	0.0	CTRL			36				TM	SELECT MTU 3	X
037	MTU GPC TRY 37	V93X4107X	0.0	CTRL			37				TM	SELECT GPC SOURCE	X
038	TIME SYNC 38	V93X4100X	0.0	CTRL			38				TM	MTU/GPC SYNC EXEC	X

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4.1.3 GPC MEMORY (PFS)

TITLE: GPC MEMORY

TYPE: OPS/0001/9011, SPEC/000

AVAILABILITY: PFS:ALL OPS

4.1.3.1 Purpose, Operation, and Organization

- (1) GPC MEMORY. This display provides a crew interface to:
 - a. Review and/or to modify the memory configuration and string and bus assignment tables;
 - b. Review and change the value contained in any GPC location;
 - c. Perform a main memory dump;
 - d. Select a GPC for downlisting and control downlist of non–prime OPS 0 GPC;
 - e. Reset the I/O error log and CAM, restart the sync history log;
 - f. Load a desired memory configuration into a target GPC without initiating execution (GPC Freeze–Dry);
 - g. Control OPS 3 overlay uplink to a GPC in OPS 0 and initialize the GPC after receipt of the overlay via uplink;
 - h. Select by Major Function an area of Mass Memory for GPC memory overlay.

Figure 4.1.3–1 is the GPC Memory Display Format.

The GPC Memory display is organized into seven separate groupings: The MEM/BUS configuration controls are located on the left, the Read/Write controls are located on the center right, the Memory Dump controls are directly below the Read/Write controls, the Downlist control is directly below the Memory Dump controls, and the OPS 3 Uplink controls are directly below the MEM/BUS configuration controls. Mass Memory overlay controls are located at the lower right and GPC Freeze–Dry controls are located at the center right.

- (2) MEMORY/BUS CONFIGURATION CONTROLS. Nineteen Item entries are provided to review and/or to modify the Memory Configuration (MC), String Assignment and Bus assignment tables. Item 1 allows the user to input a 2–digit code for a desired memory configuration to be loaded into a GPC. When the input has been accepted, the two character text (in brackets) displays the Major Function/OPS configuration that is resident in the GPC after the load. Items 2 through 6 are used to input the target GPC’s for the memory loads. The Item numbers are assigned as follows:

ITEM	TARGET GPC & INPUT VALUE	DESELECT VALUE
2	1	0
3	2	0
4	3	0
5	4	0
6	5	0

These items accept only the values specified.

The MF/OPS configuration displayed for Item 1 is coded so that the first digit indicates the MF and the second digit indicates the numeric OPS number (0–9). Referring to Figure 4.1.3–1, if the user inputs 03 for Item 1, G3 is displayed to indicate that the target GPC's will be loaded with the GNC OPS 3 memory configuration. The desired memory configuration is set by Item 1 and the corresponding MC/GPC and MC/STRG assignments and calling OPS number are displayed. The calling OPS identifies to the user the OPS that must be called to initiate loading of the input memory configuration. The OPS number is indicated by major function (G, S, or P) and a number. The MC/GPC assignment is modified by inputting the desired GPC in the appropriate location (i.e., 1 in position one indicates GPC 1 is selected as the target GPC). Deselection is done by inputting a zero (0) in the appropriate location for each GPC. The GPC/STRG assignments are modified by inputting the desired GPC for each string via Items 7 through 10. The bus assignments are modified by inputting the desired GPC for each bus via Items 11 through 19. If the input GPC is not 0 to 5, then an appropriate error message is generated.

- a. OPS Transition. At an OPS transition from G1 to G3, the active G1 memory/bus configuration shall be used by the software to determine the G3 memory/bus assignment (Items 2–19), but only if the G3 nominal memory/bus configuration has not been changed during OPS 1. A change in the G3 nominal memory/bus configuration is defined as any item entry performed via items 2–19.
 - b. Display Initialization. Memory configuration selection controls are initialized to blank the first time the OPS/SPEC is called and from then on, the display reflects the crew inputs.
- (3) READ/WRITE CONTROLS. The capability for a general memory read and write function is provided on this OPS/SPEC. The display provides the means for the crew to review and to change the value contained in any specified GPC memory location. The display is primarily intended to address data (unprotected) sections of memory. However, a special operating mode is provided to address code (protected) memory locations. The general use of the display is to first read the present value of a given location. The read function requires crew data inputs to specify memory location, scaling, and conversion requirements. The value may then be changed by a two–step load function. The desired new value is displayed separately as crew input data. The new value is verified, then transferred to memory by a crew controlled input. Additional control inputs allow reading of sequential locations with minimal inputs/operating mode selection.

DISPLAY INITIALIZATION. The display is initialized with all data fields blank except for MODE and the selected major function field. Read/write display format selection is initialized to the HEX format. The available modes are DATA, CODE, BIT SET, or BIT RESET. The modes are mutually exclusive and only one of the four may be active at a time. The display is initialized with MODE reflecting (DATA). The operating mode is changed by the control input MODE (Item 20, 21, 22, or 23).

Upon executing any of these inputs, the active mode is indicated by an asterisk to the right of the corresponding item number and all data fields are blanked. The asterisk remains next to the selected MODE until changed by another mode entry or until the display is terminated. When the "CODE" mode is selected, the word "CODE" flashes. The selected major function output field is an indication of which GPC set receives inputs upon execution of the WRITE command. The input value is sent to only those GPC's which contain the major function selected on the initiating CRT and are therefore listening to the inputting DEU. The receiving GPC set is selected by the currently active major function of the inputting DEU and consists only of those GPC's listening to that DEU.

- (4) READ/WRITE TARGET MAJOR FUNCTION. The major function selected is identified by the Major Function switch at the inputting CRT and is displayed on the format. The identified major function is the destination for memory write inputs. When inputting to a major function in OPS 000, the target GPC must be in command of the inputting DEU (i.e., the input is made to only those GPC's "listening" to the inputting DEU).
- (5) MODE SELECT. A set of item entries (Items 20,21,22 & 23) allows the user to select the mode of operation, DATA/CODE for altering complete memory locations or BIT SET/RESET, setting or resetting of individual bits in memory. Any selection also causes HEX to be re-selected and all Read/Write fields except major function to blank.
- (6) BIT SET/RESET. Items 22 & 23 provide the capability to set/reset individual bits in GPC memory using the common logic of the Launch Data Bus (LDB) General Memory Read/Write and the Uplink General Memory Read/Write functions. Bit manipulations are performed on half words (16 bits) and do not require user knowledge of the state of adjacent bits. The function is implemented using a mask (user input) that identifies the bits that are to be set or reset. Any combination of bits in a 16-bit word can be specified in the mask word and up to 6 half-words can be modified with a single WRITE execution. This function applies only to the unprotected areas of memory. The CODE mode is used to alter bits in protected areas since the state of adjacent bits does not change.

To set a bit(s) in memory, Item 22 is executed to initialize the BIT SET mode: The memory location of the half-word containing the bit(s) is then entered with the appropriate ADD ID item number. In order to visually verify the load, it is necessary to display the memory contents in hexadecimal representation. Therefore, HEX (Item 27) must be selected. Upon executing the ADD ID entries, the contents of the memory location are displayed in the ACTUAL field. The desired mask is then entered in the DESIRED field. The mask word is a 16-bit word that is entered with four hexadecimal characters. The 16 bits of the mask word have a one-for-one correspondence with the 16 bits of the memory word and identify the bits to be set/reset and unaltered. Thus, the bit(s) to be set in the memory word must have the corresponding bit(s) set in the mask word. Upon executing the WRITE (Item 25), the memory word(s) is altered according to the mask(s) and the new representation(s) as stored in memory is displayed in the ACTUAL field.

To reset a bit(s), the user executes Item 23 and uses the above procedure. Note that the mask is entered the same for setting or resetting bits (i.e., a “one” in the mask identifies the bits to be set or reset).

- (7) **CONTROL INPUTS.** Control parameters are entered by item numbers. Implied item numbers are used whenever practical to minimize the number of keystrokes. In addition to the mode control input, the following parameters are defined for display control:

ADD ID (Memory Location). A five-digit hexadecimal number identifying the memory location being addressed. For quantities stored in full words (i.e., 32 bits), the identified location is the starting or most significant part of the word.

- (8) **SCALING AND CONVERSION.** Two controls are provided to allow the crew to select the display format for the Read option. The two options are Engineering Units (Item 26) and Hex (Item 27). The options for Engineering Units are Single precision floating point (32 bit) or Single precision fixed point (16 bit). The first digit identifies fixed or floating point. The second and third digits select the desired unit conversion. The table below shows how Item 26 is used to determine the conversion factors and to select the precision.

26 ENG UNITS X X X

A	B	B	SPECIFICATION
1			16 Bit/Fixed
2			32 Bit/Floating
	0	0	– Units in Memory (no conversion)
	0	1	– NM from FT
	0	2	– NM from KFT
	0	3	– FT from NM
	0	4	– KFT from NM
	0	5	– FPS2 from G’s
	0	6	– DEG/SEC from MRS
	0	7	– DEG from ARC SEC
	0	8	– FPS2 from micro G’s
	0	9	– DEG from Radians
	1	0	– KFT from FT

- (9) **SEQ ID.** (Sequential Read). Item 24 provides the capability to initiate a sequential read command. This command addresses sequential locations in the GPC without requiring the crew to input data for individual locations. Before initiating the sequential read command, the desired ENG UNIT or HEX selection must be made by keying Item 26 or 27 and the ADD ID specifying the starting location must be entered.

Upon execution of the SEQ ID control, the sequential locations following the starting locations are displayed, and the corresponding DESIRED fields are blanked. The ADD ID and ACTUAL values are displayed with the value specified in either ENG UNITS or HEX. If multiple locations are displayed when the sequential read is executed, the most recently entered

ADD ID is assumed to be the starting address. The sequential capability is for readout only and does not apply to the WRITE function. However, the capability is provided to write into an ACTUAL list of values that has been displayed using the sequential read function.

- (10) MEMORY READ. The actual value stored in the identified location is displayed in the format specified by Digit A of the ENG UNIT word in decimal quantities of the format XXXXX.XXXXX, and the displayed units of those stored internally, unless a conversion is specified by Digits BB of the Eng Unit word. Hexadecimal quantities are output as four characters per GPC half-word. The four-character half-word is displayed right-adjusted. The memory value is displayed in the ACTUAL field upon entering the ADD ID and ENG UNIT inputs. This field is dynamic and updated at a rate of 1/2 HZ.

To display or review the present value of a quantity in memory, the appropriate ADD ID and ENG UNIT/HEX inputs are made by individual item entries. The ADD ID may be entered in any row by using the corresponding item number (28, 30, 32...38). Upon entering the ADD ID, the corresponding DESIRED field is blanked and the present value is displayed in the ACTUAL field of the same row in either ENG UNIT or HEX as selected. Reselection or selection of either ENG UNITS or HEX (Item 26 or 27) will clear the data fields (ADD ID, DESIRED, and ACTUAL) of the read/write portion of the GPC Memory Spec. If it is necessary to change the displayed value, the new value is entered in the DESIRED field of the row.

- (11) WRITE (Execute Load). Item 25 is used to initiate transfer of DATA, CODE, BIT SET, or BIT RESET to memory.

MEMORY WRITE. All changes to memory are done in an arm/fire manner. This requires that the new value be entered and displayed for verification, then sent to memory for storage. The value being addressed must be entered in hexadecimal. Hexadecimal values are 4 characters (with no sign) for half words. The DESIRED field is not blanked upon executing Item 25. For WRITE operations, new values are entered as Items 29, 31, 33,...39. After verifying the DESIRED entry, the memory load is initiated by executing Item 25 (WRITE). The DESIRED field remains displayed for comparison with the ACTUAL field which reflects the new stored value until MODE is reselected or changed. Item 25 shall only invoke DESIRED fields that have been entered subsequent to address ID inputs.

Selected values in the ACTUAL list can be changed by supplying DESIRED data for only those values and then performing a WRITE command. Blank rows in the DESIRED column are skipped and their current values unchanged, if at least one DESIRED value in the list has been supplied prior to a WRITE command.

- (12) MEMORY DUMP.

- a. Main Memory Dump. Two item numbers are provided to define the memory data to be dumped via the downlist. For main memory dumps, the/absolute main memory address of the START of the dump is entered (in Hexadecimal) in the START ID Item and the number of sequential 16-bit words of main memory to be dumped is entered via Item 41 NO WORDS (Number of Words). The data for these two items are displayed upon entry. The entire main memory may be dumped by execution of these two item numbers along with the WDS/Frame (Item 42). If the addition of the starting address and the number of words totals beyond the GPC address limit, an operator error message is generated and the input rejected.

- b. WDS/FRAME (Item 42) is provided to define the number of 16-bit words in the downlist frame to be used for header and main or mass memory data. This item controls the length of the data content of the downlist frame so that a subset of the total downlist frame can be used for the 64 KBPS downlink frame. The item entry is in decimal. (Refer to Table 5-1 of CPDS SS-P-0002-140, DOWNLIST/UPLINK SOFTWARE REQUIREMENTS for the frame lengths of each downlist format in the 128 and 64 KBPS downlink formats.)
 - c. There shall exist two ways in which data can be entered into START ID (Item 40), NO WORDS (Item 41), and WDS/FRAME (Item 42) described in sections a and b. The first is through the default setting of the single item entry dump. If no values have been entered for the items in a and b, and the dump item is executed, table driven data for the current OPS will be inserted into the appropriate item entry (see Table 3.3.2.1-1 in the Downlist/Uplink Software Requirements, SS-P-0002-140). The second method is to manually input the data for all three item entries. Once data has been manually entered into one or more of the items from a and b, it will be necessary to manually enter values for all three or an error message shall be generated and the input rejected, when DUMP START/STOP (Item 43) is executed.
 - d. DUMP START/STOP (Item 43) is provided to initiate/terminate the dump and will function as a toggle for both a manual and default dump. Upon the first execution of this item the dump will be initiated, the 'START ID' (Item 40) will start incrementing, and the 'NO WORDS' (Item 41) will decrement. At dump completion or termination (via a second entry of the DUMP START/STOP item), both items as well as 'WDS/FRAME' (Item 42) will be blanked. After the completion or termination of either Dump (Single Item Entry Dump or Manual Dump), the dump will be reset to the default setting of the Single Item Entry Dump.
- (13) DOWNLIST GPC SELECT. Downlist GPC (Item 44) provides the capability to select a GPC for downlisting. Item 44 displays the current GPC that is in command of the PMU Toggle Buffer number 1 which is the downlist buffer. Since Item 44 does not require an ARM/FIRE sequence, the resulting input is displayed only after the selected GPC takes control of the Toggle Buffer Number 1. Values entered in Item 44 that are not legal GPC ID (1-5) will be rejected and an "ILLEGAL ENTRY" message output.

OPS 0 ENA (Item 49) provides the capability to enable or disable the downlist of a non-prime OPS 0 GPC. The display is initialized with the downlist disabled. Execution of Item 49 enables the downlist and causes an asterisk (*) to be displayed next to Item 49. Subsequent execution of Item 49 will alternately disable/enable the downlist.

- (14) GPC FREEZE-DRY LOAD. The GPC Freeze-Dry Load provides the capability to load a desired Memory Configuration (MC) into a target GPC without initiating an execution of the associated application operational sequence.

Three item numbers are provided for the freeze-dry controls. Item 45 (CONFIG) is used to select the desired memory configuration, Item 46 (GPC) is used to select the target GPC, and Item 47 (STORE) is used to initiate the load. The MC resident in the GPC driving this display is permanently displayed and verification of a successful freeze-dry load shall be the resident MC changing to equal the input MC. The MC variable is blanked if no valid MC is resident (i.e., memory overlay has started but not completed) in the driving GPC.

- (15) ERROR LOG RESET ITEM 48. Provides the capability to reset the I/O ERROR LOG, GPC ERROR LOG, DEU IPL ERROR LOG, SOFT ERROR COUNTER, restart the sync history log and reset the CAM.

Error Conditions

The GPC software tests for violations of any input constraints described in the preceding paragraphs. Specifically, the following violations are detected and annunciated with an error message.

- A. Sequential read (SEQ ID) executed when all ADD ID fields are blanked.
 - B. Sequential Read (SEQ ID) executed when last entered ADD ID plus number of blank ADD ID slots is outside the range of memory. (Requested addresses are displayed until memory range is exceeded).
 - C. WRITE executed when no ADD ID has data entered in corresponding DESIRED column.
 - D. WRITE executed when data entered in DESIRED with no corresponding ADD ID.
 - E. WRITE executed if any ADD ID with corresponding DESIRED has a protect status bit (i.e, CODE location) when selected MODE is DATA (attempt to write into code location when DATA MODE is selected).
 - F. ENG UNITS value entered outside the ranges of 100–110 or 200–210.
 - G. ADD ID entered outside the range of memory.
 - H. Odd ADD ID entered when selected ENG UNITS option is 32 bit floating point (200–210).
 - I. DESIRED entered when HEX not selected.
 - J. DESIRED entered greater than four digits.
 - K. NO WORDS greater than defined range of memory.
 - L. Manual DUMP START/STOP WDS/FRAME value entered outside the range of 16–128.
 - M. Manual DUMP START/STOP executed with data entered in one or more but not all of START ID, NO WORDS, and WDS/FRAME items.
 - N. Manual DUMP START/STOP executed when START ID and NO WORDS define a range outside of memory.
- (16) OPS 3 UPLK 50 and OPS 3 INIT 51 Items. These items provide the capability to enable/disable the OPS 3 Uplink capability (Item 50) and the capability to initialize the GPC after the uplink of an OPS 3 load (Item 51). The display shall be initialized with the OPS 3 Uplink capability disabled. Execution of item 50 in an OPS 0 GPC shall result in an asterisk being displayed next to item 50; subsequent selection of item 50 shall alternately disable and enable OPS 3 uplink. Execution of item 51 when item 50 is enabled shall initialize the display to indicate that Memory Configuration (MC) 3 is loaded (see paragraph 14 above), and shall blank the asterisk next to item 50. Selection of item 50 while in a Memory Configuration (MC) other than overlay failure MC 0 (not Post-IPL) or selection of item 51 while item 50 is deselected shall result in an “ILLEGAL ENTRY” message.

- (17) MM AREA (Items 52, 53, & 54). These items provide the capability to select by Major Function (MF) the desired area of Mass Memory (MM) to be used for GPC memory overlays. The display shall be initialized with the MM area from which the GPC was IPL'ed. Item entries 'PL 52' (Payload MF), 'GNC 53' (Guidance, Navigation & Control MF), and 'SM 54' (Systems Management MF) allow selection of the Mass Memory area 1, 2, or 3 by entering the desired number. Upon entry and execution, the selected area number will be displayed after the item number. After selection of one of the Mass Memory areas, all memory overlays for the selected MF requiring data from MM will acquire that data from the selected area. Entry of an area number other than 1, 2, or 3 shall result in its rejection and the output of an "ILLEGAL ENTRY" message.

4.1.3.2 GPC Memory Keyboard Processing Addendum

- A. The input values for GPC's 1-5 are as follows:

GPC	SELECTED VALUE	DESELECT VALUE
1	1	0
2	2	0
3	3	0
4	4	0
5	5	0

- B. The input values for CONFIG are 0-6 or 8-9.
- C. The input values for these parameters are 0-5. Where 1-5 indicate the GPC assignment and 0 indicates no GPC assignment for the selected MC.
- D. Upon execution of any Mode Selection-DATA, CODE, BIT SET or BIT RESET (V93J4390C), all output data fields shall blank except the asterisk(*) indicating which mode is selected.
- E. Upon execution of WRITE (Item 25), all desired data fields shall remain displayed until the MODE has been changed or reselected.
- F. The input values for this parameter are 1-5.
- G. If the value of Item 45 (CONFIG) is not equal to (0-6) or (8-9) and Item 46 (GPC) is not equal to (1-5) and Item 47 (STORE) is executed an "ILLEGAL ENTRY" error message shall be annunciated and the request rejected.

4.1.3.3 GPC Memory CRT Display Processing Addendum

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word "STAT" being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT Display Processing Table 4.1.3-2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed.

If there is no numeric code entry, the status processing is defined by the default code.

When the “M” PSI is displayed (for Commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)			
Blank (default)	↓		M	∅
1	↓	↑	M	∅
2		↑	M	∅
3	↓			∅
4		↑		∅
5	↓		?	∅
6	↓	↑		∅
7			M	∅
8	↓		?	M ∅
9			?	M ∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.1.3–2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. The measurement number representing the CRT TIMER is dependent upon which major function this display is called in and is defined by the following table:

MAJOR FUNCTION SETTING	MSID
GNC	V91W1987C
SM	V91W1988C
PL	V91W1989C

- B. The following remote text shall be driven depending upon the value (state) of V93J4068C as follows:

STATE	RTXT
0	(blank)
1	G1
2	G2
3	G3
4	S2
5	S4
6	P9
7	S9
8	G8
9	G9

- C. The following remote text shall be driven depending upon the value (state) of the MSID as follows.

STATE	RTXT
1	0
2	1
3	2
4	3
5	4
6	5

Where RTXT 1-5 indicates the GPC assignment and 0 indicate no GPC assignment for the selected Memory Configuration (MC)

- D. The following remote text is displayed depending upon the value (state) of the MSID as follows.

STATE	RTXT
1	GNC
2	SM
3	PL

- E. The MODE SELECT indicator is defined by one measurement number with four states as follows:

STATE	DATA	CODE	BIT SET	BIT RST
0	*			
1		*		
2			*	
3				*

The word 'CODE' is always displayed. When CODE is selected, then the word 'CODE' shall be flashed but becomes static when CODE is deselected and/or DATA selected.

- F. The data format for ACTUAL will vary as a function of whether ENG UNITS or HEX units are selected (Items 26 and 27). When ENG UNITS are selected, either 16 bit fixed decimal or 32 bit floating point decimal will be specified by the first character of the ENG UNITS (Item 26) data word as follows:

	CHAR	X COORD
1 – 16 bit fixed	12.5	38
2 – 32 bit floating	12.5	38

The last two characters of the ENG UNITS (Item 26) will be used to specify the desired type of engineering units to be displayed (i.e., NM, FT, DEG, RAD, etc.). There will be a set of TEN

different engineering units that can be displayed which will be specified by entering 00–10 for the last two characters as follows:

ENTRY	UNITS TO BE DISPLAYED
00	UNITS IN MEMORY (No Conversion)
01	NM from FT
02	NM from KFT
03	FT from NM
04	KFT from NM
05	FPS2 from G's
06	DEG/SEC from MRS
07	DEG from ARC SEC
08	FPS2 from micro G's
09	DEG from Radians
10	KFT from FT

When HEX is selected (Item 27), the data presented in ACTUAL will be 16 bit hexadecimal as follows:

CHAR

X COORD

4.0

46 (right adjusted)

When Item 27 (HEX) is selected, the data for Item 26 will be blanked. When Item 26 data is entered and executed, Item 27 will be deselected, i.e., the asterisk after Item 27 blanked.

- G. Data fields for START ID (Item 40), NO WORDS (Item 41) and WDS/FRAME (Item 42) are blanked after completion/termination of the main memory dump initiated via DUMP START/STOP (Item 43).

4.1.3.4 GPC Memory Figure/Table References

Figure 4.1.3-1 GPC Memory Display (PFS)

Table 4.1.3-1 Keyboard Processing Table

Table 4.1.3-2 CRT Display Processing Table

Table 4.1.3-3 CRT Display Processing Background Requirements N/A

Table 4.1.3-4 Mission Design Background Constants N/A

Table 4.1.3-5 Input Functional Parameters N/A

Table 4.1.3-6 Output Functional Parameters N/A

Table 4.1.3-7 I-Loads N/A

Table 4.1.3-8 K-Loads N/A

Table 4.1.3-9 Constants N/A

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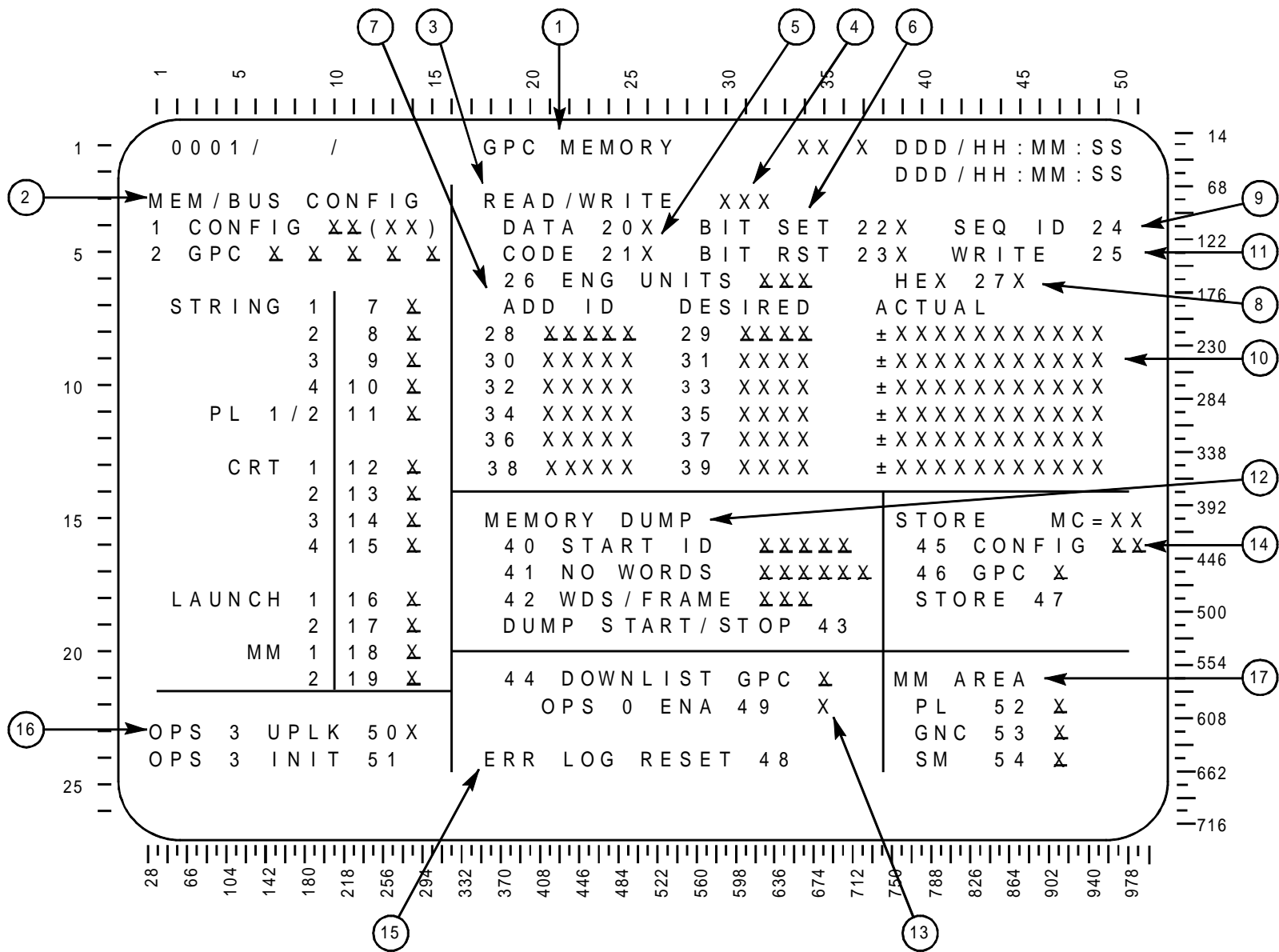


FIGURE 4.1.3-1. GPC Memory Display (PFS)

Table 4.1.3-1.GPC MEMORY (PFS) KEYBOARD PROCESSING													
Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
001	1 CONFIG	V93J4068C	3.0	DEC			1			B	FCOS	MC NO FOR NOM ASSIGN	X
002	2 GPC 1 SEL	V93J4069C	2.0	DEC			2			A	FCOS	GPC 1 SEL/DES FOR SELECTED MC	X
003	3 GPC 2 SEL	V93J4071C	2.0	DEC			3			A	FCOS	GPC 2 SEL/DES FOR SELECTED MC	X
004	4 GPC 3 SEL	V93J4080C	2.0	DEC			4			A	FCOS	GPC 3 SEL/DES FOR SELECTED MC	X
005	5 GPC 4 SEL	V93J4082C	2.0	DEC			5			A	FCOS	GPC 4 SEL/DES FOR SELECTED MC	X
006	6 GPC 5 SEL	V93J4086C	2.0	DEC			6			A	FCOS	GPC 5 SEL/DES FOR SELECTED MC	X
007	STRING 1 GPC 7	V93J4084C	2.0	DEC			7			C	FCOS	STRING 1/GPC ASGN FOR SEL MC	X
008	STRING 2 GPC 8	V93J4085C	2.0	DEC			8			C	FCOS	STRING 2/GPC ASGN FOR SEL MC	X
009	STRING 3 GPC 9	V93J4088C	2.0	DEC			9			C	FCOS	STRING 3/GPC ASGN FOR SEL MC	X
010	STRING 4 GPC 10	V93J4089C	2.0	DEC			10			C	FCOS	STRING 4/GPC ASGN FOR SEL MC	X
011	PL 1/2 GPC 11	V93J4005C	2.0	DEC			11			C	FCOS	PL 1&2/GPC ASSIGN FOR SEL MC	X
012	CRT 1 GPC 12	V93J4006C	2.0	DEC			12			C	FCOS	CRT 1/GPC ASSIGN FOR SEL MC	X
013	CRT 2 GPC 13	V93J4007C	2.0	DEC			13			C	FCOS	CRT 2/GPC ASSIGN FOR SEL MC	X
014	CRT 3 GPC 14	V93J4008C	2.0	DEC			14			C	FCOS	CRT 3/GPC ASSIGN FOR SEL MC	X
015	CRT 4 GPC 15	V93J4009C	2.0	DEC			15			C	FCOS	CRT 4/GPC ASSIGN FOR SEL MC	X
016	LAUNCH 1 GPC 16	V93J4015C	2.0	DEC			16			C	FCOS	LDB 1/GPC ASSIGN FOR SEL MC	X
017	LAUNCH 2 GPC 17	V93J4016C	2.0	DEC			17			C	FCOS	LDB 2/GPC ASSIGN FOR SEL MC	X
018	MM 1 GPC 18	V93J4017C	2.0	DEC			18			C	FCOS	MM 1/GPC ASSIGN FOR SEL MC	X
019	MM 2 GPC 19	V93J4018C	2.0	DEC			19			C	FCOS	MM 2/GPC ASSIGN FOR SEL MC	X
020	DATA SELECT 20	V93J4390C	0.0	CTRL			20			D	FCOS	MODE SELECT	X
021*	CODE SELECT 21	V93J4390C	0.0	CTRL			21			D	FCOS	MODE SELECT	X
022*	BIT SET 22	V93J4390C	0.0	CTRL			22			D	FCOS	MODE SELECT	X
023*	BIT RESET 23	V93J4390C	0.0	CTRL			23			D	FCOS	MODE SELECT	X
024	SEQ ID 24	V93X4381X	0.0	CTRL			24				FCOS	SEQ READ	X
025	WRITE 25	V93X4380X	0.0	CTRL			25			E	FCOS	EXEC WRITE	X
026	26 ENG UNITS	V93Q4363C	4.0	DEC			26				FCOS	ENG UNITS	X
027	HEX 27	V93X4364X	0.0	CTRL			27				FCOS	HEX/ENG UNIT	X
028	ADD ID 28	V93U4300C	5.0	HEX			28				FCOS	ADD ID WORD 1 INPUT	X
029	DESIRED 29	V93U4340C	4.0	HEX			29			E	FCOS	DESIRED WORD 1 INPUT	X
030	ADD ID 30	V93U4301C	5.0	HEX			30				FCOS	ADD ID WORD 2 INPUT	X

Table 4.1.3-1.GPC MEMORY (PFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
031	DESIRED 31	V93U4341C	4.0	HEX			31			E	FCOS	DESIRED WORD 2 INPUT	X
032	ADD ID 32	V93U4302C	5.0	HEX			32				FCOS	ADD ID WORD 3 INPUT	X
033	DESIRED 33	V93U4342C	4.0	HEX			33			E	FCOS	DESIRED WORD 3 INPUT	X
034	ADD ID 34	V93U4303C	5.0	HEX			34				FCOS	ADD ID WORD 4 INPUT	X
035	DESIRED 35	V93U4343C	4.0	HEX			35			E	FCOS	DESIRED WORD 4 INPUT	X
036	ADD ID 36	V93U4304C	5.0	HEX			36				FCOS	ADD ID WORD 5 INPUT	X
037	DESIRED 37	V93U4344C	4.0	HEX			37			E	FCOS	DESIRED WORD 5 INPUT	X
038	ADD ID 38	V93U4305C	5.0	HEX			38				FCOS	ADD ID WORD 6 INPUT	X
039	DESIRED 39	V93U4345C	4.0	HEX			39			E	FCOS	DESIRED WORD 6 INPUT	X
040	40 START ID	V93U4612C	5.0	HEX			40				FCOS, CRT	START ADDRESS MEMORY DUMP	X
041*	41 NO WORDS	V93Q4610C	7.0	DEC			41				FCOS,CRT	NUMBER WDS IN MEMORY DUMP	X
042	42 WDS/FRAME	V93Q4644C	4.0	DEC			42				FCOS,CRT	WDS/FRAME IN MEMORY DUMP	X
043	DUMP START/STOP 43	V93X4618X	0.0	CTRL			43				FCOS,CRT	GPC MEMORY DUMP START/STOP EXEC	X
044	44 DOWNLIST GPC	V93J5531C	2.0	DEC			44			F	FCOS,CRT	DOWNLIST GPC ASSIGN	X
045	45 CONFIG	V93J4365C	2.0	DEC			45			B	FCOS,CRT	MC NO FOR FROZEN OVERLAY INPUT	X
046	46 GPC	V93J4366C	1.0	DEC			46			C	FCOS,CRT	GPC NO FOR FROZEN OVERLAY INPUT	X
047	STORE 47	V93X4367X	0.0	CTRL			47			G	FCOS,CRT	FREEZE DRY EXEC CMD	X
048	ERR LOG RESET 48	V93X4368X	0.0	CTRL			48				FCOS,CRT	ERROR LOG RESET INITIATE	X
049*	DNLIST OPS 0 ENA 49	V93X4369X	0.0	CTRL			49				FCOS,CRT	NON-PRIME OPS 0 GPC DOWNLIST ENA	X
050	OPS 3 UPLK 50	V93X4377X	0.0	CTRL			50				FCOS,CRT	OPS 3 UPLINK ENABLE	
051	OPS 3 INIT 51	V93X4378X	0.0	CTRL			51				FCOS	OPS 3 INITIALIZATION	
052	MM AREA PL 52	V93X4385X	1.0	DEC			52				FCOS,CRT	PL MASS MEMORY AREA	
053	MM AREA GNC 53	V93X4386X	1.0	DEC			53				FCOS,CRT	GNC MASS MEMORY AREA	
054	MM AREA SM 54	V93X4387X	1.0	DEC			54				FCOS,CRT	SM MASS MEMORY AREA	

Table 4.1.3-2. GPC MEMORY (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S I T Y	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
001	(OPS)	V93X0040X	2	1		5.0															UI	OPS FUNCTION PAGE	X	
002	(SPEC)	V93X0042X	7	1		4.0															UI	SPEC FUNCTION PAGE	X	
003	(DISP)	V93X0044X	10	1		4.0															UI	DISPLAY FUNCTION PAGE	X	
004	(UL)	V92X5032X	34	1		2.0	UL							X							UI	UPLINK ACTIVITY IND	X	
005	(GPC)	V93X0048X	36	1		2.0															UI	GPC DRIVER	X	
006	(MT)	V91W1990C	39	1		12.0															A	FCOS	MISSION ELAPSED TIME	X
007	(CRT TIMER)	V91W1987C	39	2		12.0															A	FCOS	DISPLAY CRT TIMER.GNC	X
008	1 CONFIG	V93J4068C	9	4		3.0															B	KYBD	MC NO FOR NOM ASSIGN	X
009*	(XX)	V93J4068C	13	4		2.0															B	KYBD	MC NO FOR NOM ASSIGN	X
010	2 GPC 1 SEL	V91X1672X	7	5		1.0	1	0														FCOS	GPC 1 SEL/DES IND	X
011	3 GPC 2 SEL	V91X1674X	9	5		1.0	2	0														FCOS	GPC 2 SEL/DES IND	X
012	4 GPC 3 SEL	V91X1676X	11	5		1.0	3	0														FCOS	GPC 3 SEL/DES IND	X
013	5 GPC 4 SEL	V91X1678X	13	5		1.0	4	0														FCOS	GPC 4 SEL/DES IND	X
014	6 GPC 5 SEL	V91X1680X	15	5		1.0	5	0														FCOS	GPC 5 SEL/DES IND	X
015	STRING 1 GPC 7	V91J1682C	14	7		1.0															C	FCOS	STRING 1/GPC ASSIGNED FOR MC	X
016	STRING 2 GPC 8	V91J1683C	14	8		1.0															C	FCOS	STRING 2/GPC ASSIGNED FOR MC	X
017	STRING 3 GPC 9	V91J1685C	14	9		1.0															C	FCOS	STRING 3/GPC ASSIGNED FOR MC	X
018	STRING 4 GPC 10	V91J1686C	14	10		1.0															C	FCOS	STRING 4/GPC ASSIGNED FOR MC	X
019	PL 1/2 GPC 11	V91J1681C	14	11		1.0															C	FCOS	PL 1/2/GPC ASSIGNED FOR MC	X
020	CRT 1 GPC 12	V91J1684C	14	13		1.0															C	FCOS	CRT 1/GPC ASSIGNED FOR MC	X
021	CRT 2 GPC 13	V91J1687C	14	14		1.0															C	FCOS	CRT 2/GPC ASSIGNED FOR MC	X
022	CRT 3 GPC 14	V91J1689C	14	15		1.0															C	FCOS	CRT 3/GPC ASSIGNED FOR MC	X
023	CRT 4 GPC 15	V91J1691C	14	16		1.0															C	FCOS	CRT 4/GPC ASSIGNED FOR MC	X
024	LAUNCH 1 GPC 16	V91J1693C	14	18		1.0															C	FCOS	LDB 1/GPC ASSIGNED FOR MC	X
025	LAUNCH 2 GPC 17	V91J1695C	14	19		1.0															C	FCOS	LDB 2/GPC ASSIGNED FOR MC	X
026	MM 1 GPC 18	V91J1697C	14	20		1.0															C	FCOS	MM 1/GPC ASSIGNED FOR MC	X
027	MM 2 GPC 19	V91J1700C	14	21		1.0															C	FCOS	MM 2/GPC ASSIGNED FOR MC	X
028	XXX	V91J1175C	30	3		3.0															D	FCOS	GPC SELECT MF ID	X
029	DATA SELECT 20	V91J1192C	26	4		1.0															E	FCOS	MODE SELECT IND	X
030*	(CONTROL) CODE	V91J1192C	19	5		4.0							X								E	FCOS	MODE SELECT IND	X
031*	CODE SELECT 21	V91J1192C	26	5		1.0															E	FCOS	MODE SELECT IND	X
032*	BIT SET 22	V91J1192C	39	4		1.0															E	FCOS	MODE SELECT IND	X
033*	BIT RESET 23	V91J1192C	39	5		1.0															E	FCOS	MODE SELECT IND	X
034	26 ENG UNITS	V93Q4363C	31	6		4.0															F	KYBD	ENG UNITS	X
035	HEX 27	V93X4364X	45	6		1.0	*														F	KYBD	HEX/ENG UNIT	X
036	ADD ID 28	V91U1100C	21	8		5.0																FCOS	ADD ID WORD 1	X
037	DESIRED 29	V93U4340C	31	8		4.0																KYBD	DESIRED WORD 1 INPUT	X
038	ACTUAL 1	V91U1160C	38	8		12.0															F	FCOS	CURRENT WORD 1	X
039	ADD ID 30	V91U1101C	21	9		5.0																FCOS	ADD ID WORD 2	X
040	DESIRED 31	V93U4341C	31	9		4.0																KYBD	DESIRED WORD 2 INPUT	X

Table 4.1.3-2.GPC MEMORY (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T			
			X	Y		CHAR	BILEVEL																	TYPE		
							1	0																		
041	ACTUAL 2	V91U1161C	38	9		12.0															F	FCOS	CURRENT WORD 2	X		
042	ADD ID 32	V91U1102C	21	10		5.0																	FCOS	ADD ID WORD 3	X	
043	DESIRED 33	V93U4342C	31	10		4.0																	KYBD	DESIRED WORD 3 INPUT	X	
044	ACTUAL 3	V91U1162C	38	10		12.0																	FCOS	CURRENT WORD 3	X	
045	ADD ID 34	V91U1103C	21	11		5.0																	FCOS	ADD ID WORD 4	X	
046	DESIRED 35	V93U4343C	31	11		4.0																	KYBD	DESIRED WORD 4 INPUT	X	
047	ACTUAL 4	V91U1163C	38	11		12.0																	FCOS	CURRENT WORD 4	X	
048	ADD ID 36	V91U1104C	21	12		5.0																	FCOS	ADD ID WORD 5	X	
049	DESIRED 37	V93U4344C	31	12		4.0																	KYBD	DESIRED WORD 5 INPUT	X	
050	ACTUAL 5	V91U1164C	38	12		12.0																	FCOS	CURRENT WORD 5	X	
051	ADD ID 38	V91U1105C	21	13		5.0																	FCOS	ADD ID WORD 6	X	
052	DESIRED 39	V93U4345C	31	13		4.0																	KYBD	DESIRED WORD 6 INPUT	X	
053	ACTUAL 6	V91U1165C	38	13		12.0																	FCOS	CURRENT WORD 6	X	
054	40 START ID	V93U4612C	32	16		5.0					X												G	UI, KYBD	START ADDRESS MEMORY DUMP	X
055*	41 NO WORDS	V93Q4610C	31	17		7.0					X												G	UI, KYBD	NUMBER WDS IN MEMORY DUMP	X
056	42 WDS/FRAME	V93Q4644C	31	18		4.0					X												G	UI, KYBD	WDS/FRAME IN MEMORY DUMP	X
057	44 DOWNLIST GPC	V93J5531C	34	21		2.0																	KYBD	DOWNLIST GPC ASSIGN	X	
058*	STORE MC=	V91J1702C	49	15		3.0																	FCOS	GPC-SELF RESIDENT MC NO	X	
059	45 CONFIG	V91J1694C	49	16		3.0																	FCOS	MC NO FOR FROZEN OVERLAY	X	
060	46 GPC	V91J1696C	46	17		2.0																	F	FCOS	GPC NO FOR FROZEN OVERLAY	X
061*	DNLIST OPS 0 ENA	49 V93X4369X	35	22		1.0	*																	KYBD	NON-PRIME OPS 0 GPC	X
062	OPS 3 UPLK	50 V93X4377X	14	23		1.0	*																	FCOS, KYBD	DOWNLIST ENA	
063	MM AREA PL	52 V93X4385X	46	22		2.0																		KYBD	PL MASS MEMORY AREA	
064	MM AREA GNC	53 V93X4386X	46	23		2.0																		KYBD	GNC MASS MEMORY AREA	
065	MM AREA SM	54 V93X4387X	46	24		2.0																		KYBD	SM MASS MEMORY AREA	
066	(MSG LINE)	V93X0050X	1	25		44.0																		UI	MESSAGE LINE	X
067	(BUFFER MSG)	V93X0054X	45	25		4.0																		UI	BUFFER MESSAGE INDICATOR	X
068	(SPL)	V93X0056X	2	26		49.0																		UI	SCRATCH PAD LINE	X

4.1.4 DPS UTILITY (PFS)

TITLE: DPS UTILITY

TYPE: SPEC/001

AVAILABILITY: PFS: ALL OPS

4.1.4.1 Purpose, Operation, and Organization

- (1) DPS Utility Display. This Data Processing System (DPS) display is always associated with Spec 001. This display provides crew controls to:
 - a. Assign a Major Function (MF) to a Mass Memory Unit (MMU 1 or MMU 2).
 - b. Provide the status (ready or busy) for each MMU.
 - c. Select the memory source and bus or GPC reconfiguration.
 - d. Enable checkpoint data retrieval from Mass Memory.
 - e. Issue Real-Time Commands (RTC)
 - f. Select primary or secondary port assignments for strings 1 through 4 and the PL MDMs.
 - g. Select the variable parameters for use in the downlist format.
 - h. Select automatic enabling and inhibiting of uplink or manual enabling/inhibiting of uplink.
 - i. Mask the software use of the IPL source select discrete for non-IPL uses of the MMU's.
 - j. Load G3 archive program overlay from Mass Memory and retrieve the G3 archived program overlay on a subsequent G3 OPS transition.
 - k. Enable/Disable the Ground Support Equipment (GSE) Function.
 - l. Select controls for Ground Operations to inhibit GSE polling in SM, enable/disable checkout software in SM and GNC, enable/disable Backup Flight Control (BFC) checkout, and select an alternate toggle buffer for PL OPS 9.

Figure 4.1.4-1 is the DPS Utility Display format.

- (2) MMU Assignments. Eight item entries (1 through 8) are provided for the crew to assign Major Functions (GNC, SM, and PL), or OPS 0 Memory Configurations to interface with the two available Mass Memories Unit (MMU's).

This display is initialized with the GNC, SM, PL Major Functions and the OPS 0 functions assigned to MMU 1. Asterisks are displayed to show the assignments. MF or OPS 0 assignments are carried forward across OPS transitions until they are changed via the item entries on this display or SPEC 060 (SM Table Maintenance) via items 21 and 22 for the SM MMU assignment (refer to section 4.3.2, FSSR STS 83-0020V2).

- (3) MMU Status. The MMU status shows the state of each MMU. Remote texts displaying RDY (Ready) or BSY (Busy) are generated by the latest MMU–Ready DISCRETES from each MMU.
- (4) MMU Source/Bus. Three item entries (9, 10, and 11) are provided for the crew to control the memory source (MMU’s or another GPC) and the data path for post IPL reconfigurations. The controls are used as follows:
 - a. GPC/MMU (Item 9). When executed, the available GPC is loaded using either MMU bus as the path. If the desired load is not in a GPC, the path selected is defaulted to use the MMU.
 - b. MMU/MMU (Item 10). When executed, the appropriate MF/OPS overlay is retrieved and force loaded into the assigned GPC overlaying its current content using its assigned MM data bus.
 - c. GPC/LDB (Item 11). When executed, the available GPC is loaded using the LDB data path. If the desired load is not in a GPC, the logic will not attempt any further action, leaving the current OPS in execution.

The three options are mutually exclusive and the asterisk is displayed to show the selection involved. The display is initialized with Item 9 selected and is automatically re–selected by GPC reconfiguration following successful OPS transitions involving memory overlays.

- (5) Check Point Retrieval. (CKPT RETRV ENA) – Check point retrieval (Item 12), is provided for the crew to retrieve checkpoint data from Mass Memory. The enabling of the item provides a one–shot process, which terminates upon completion of a single request. Item 12 controls both the enable and inhibit status, and an asterisk(*) indicates the enable state of the control. This capability is available to all GPC’s that are in the common set. This function can also be performed on SPEC 060 (SM Table Maintenance) via item 23 (refer to section 4.3.2, FSSR STS 83-0020V2).
- (6) Real Time Command (RTC). Two item entries (Items 13 and 14) are provided for the crew to use the Real Time Command (RTC) functions.

Item 13 is used to enter RTC commands using eight HEX characters which represent its components. The first four characters represent Bits 17 through 32 of the uplink RTC and the last four characters represent Bits 33 through 48 of the RTC format. (Refer to section 6.3.1, CPDS SS–P–0002–140, for detailed requirements.) Item 14 is used to execute the RTC processes after the data is entered via Item 13.

It is the user’s responsibility to ensure that the RTC data is available on the data bus that is under control of the particular Major Function which is controlling the GPC Memory Spec.

- (7) Port Assignment Controls. Ten item entries are provided to control the Port Assignments for strings 1 through 4 and the PL MDM’s. Strings 1 through 4 may be assigned to the Primary (Port 1) or the Secondary (Port 2) port of all MDM’s on the particular string using item numbers 15 through 22. The Primary Port assignment selects the lowest numbered FLIGHT CRITICAL (FC) Bus of the pair to drive the Flight Forward (FF) MDM and the other is used

to drive the Flight AFT (FA) MDM. The secondary port assignment selects the lowest numbered of the pair to drive the FA MDM and the other to drive the FF MDM.

Item entries 23 and 24 are provided for Payload (PL) MDM Port assignments similar to string assignment procedures. The primary assignment (Item 23) command provides PL BUS 1 access to MDM 1 and MDM 3 via Port 1, and PL BUS 2 access to MDM 2 and MDM 4 via Port 2. The secondary assignment (Item 24) command provides PL BUS 2 access to MDM 1 and MDM 3 via Port 2, and PL BUS 1 access to MDM 2 and MDM 4 via Port 1.

Crew input of Primary/Secondary assignments remains in effect until a subsequent change is made. Following an IPL, the SPEC is initialized to primary assignments and are not affected by OPS transitions (i.e., they are carried across).

- (8) Variable Parameter Select Controls. Ten item entries (25 through 34) are provided for the crew to select up to ten parameters for downlisting. These parameters are initialized to a nominal set that can be changed by entering the Hex values of the absolute memory address of the desired parameter. These parameters are available in half words (16-bits) and are defined in the OPS 0 Common Downlist Format.

Changed parameters are immediately effective in all GPC's supporting that Major Function (i.e., GPC's listening on the input DEU's DK bus). These parameters are carried forward across OPS transitions until altered by subsequent item inputs affecting that GPC.

NOTE: Since these item inputs are major function dependent (i.e., not ICC'd), the user should procedurally assure that Redundant Set (RS) member GPC's contain the same variable D/L parameter set. Otherwise variable parameters may be different in some RS GPC(s) (not an error case).

- (9) UL Control. Three item entries (35–37) are provided for the crew to select how uplink is Enabled or Inhibited. Item 35 provides automatic enabling and inhibiting of uplink via an ICC of the site in view FLAG from SM. Item 36 allows uplink to be enabled all the time. Item 37 allows uplink to be inhibited all the time. These items are mutually exclusive and an asterisk(*) will be displayed after the selected item.
- (10) IPL SOURCE SWITCH discrete mask. Item 38 is used to allow for control over software use of the IPL SOURCE select discrettes for non-IPL use of the MMUs. The entry is used to mask or unmask the discrettes. The presence of an asterisk indicates that the discrettes are masked. If no asterisk is displayed, the discrettes are not being masked. When masked, the FCOS shall ignore the status of the MMU 1 IPL and MMU 2 IPL select discrettes in determining the availability of a MMU to support a request for MMU I/O other than an IPL. The mask shall be initialized to the unmasked state during primary GPC initialization except that the initialization of Memory Configuration (MC) 1 (GNC OPS 1) shall set the mask to the masked state. After MC 1 initialization, the discrettes can be unmasked by execution of item 38. Each time the display is called, or upon execution of an item 38 entry, the item 38 asterisk will reflect the actual status of the FCOS mask for the discrettes. This capability is available to all GPCs that are in the common set.
- (11) G3 Archive Function. Two item entries are provided to control the G3 Archive Function. Item 48 (LOAD) provides the capability to load the G3 program overlay into upper GPC memory

(128K–256K), and item 49 (RETRIEVE) provides the capability to retrieve the G3 program overlay from upper memory upon a subsequent G3 transition.

Both item 48 and item 49 are toggle items, and subsequent executions of an item shall result in the alternate control state. An asterisk shall be displayed after items 48 and 49 to indicate that they are enabled, a blank is displayed otherwise. The status of both items shall be maintained across the common set. Item 48 (initialized enabled) is valid in G9, and item 49 (initialized disabled) is valid in G1, G2, G8, and OPS 0. Execution in any OPS not specified for each item control shall result in an operator error and the “ILLEGAL ENTRY” CRT message annunciated.

Whenever, item 48 is executed (enabled), item 49 shall automatically become disabled, and remain so until after the archiving G9 to G1 OPS transition. If the G3 Load Function was successful, then a positive indication that ALL participating GPCs obtained the G3 archive program overlay shall be that item 48 shall be disabled, and item 49 shall be enabled.

(12) GROUND OPS. Four item entry controls (50 thru 53) are provided to facilitate launch site ground checkout of Orbiter vehicle functions.

- Item 50 (GSE POLL ENA) allows the GSE polling function to be enabled/disabled; the item shall be initialized with the GSE polling disabled. At SRB ignition, the GSE polling function will automatically be disabled.
- Item 51 (SM GSE INH) provides the capability to inhibit GSE polling upon entry to any SM OPS; the item shall be initialized to allow GSE polling in SM.
- Item 52 (SM C/O ENA) provides the capability to enable/disable the Systems Management checkout software function in SM OPS 2 or 4. This item shall be initialized disabled.
- Item 53 (GNC C/O ENA) provides the capability to enable/disable the GNC checkout software function in GNC OPS 1, 2, or 3. This item shall be initialized disabled.

Items 50 thru 53 are toggle items, subsequent executions of the item resulting in the selection of the alternate control state. An asterisk shall be displayed after items 50, 52, and 53 to indicate they are enabled and after item 51 to indicate that it is inhibited. The selected active status of each item shall be maintained Common Setwide.

Item 50 is valid only in OPS G9, P9 and Post IPL OPS O. Items 51, 52 and 53 are valid only in G9 and OPS O. Execution of any of these items in any OPS except as specified shall result in rejection of the input and output of a Class 5 “ILLEGAL ENTRY” CRT message.

Two additional ground checkout items (54, 55) are provided to facilitate Backup Flight Controller (BFC) testing and to assign an alternate downlist toggle buffer for PL OPS 9–01.

Item 54 (BFC C/O ENA) provides the capability to have the GPC which is commanding the DEU on which the item entry is made set or reset its BFS RUN output discrete to facilitate BFC checkout. The item is initialized to the DISABLE state (BFS RUN discrete reset), and reverts to the DISABLE state when the GPC is transitioned from OPS 0–00 to any other OPS. The state of this item is maintained independently by each common set GPC.

Item 55 (ALT PL9 TB) provides the capability to assign downlist toggle buffer 5 to the PL 9 OPS. The state of this item is initially DISABLE (PL 9 downlist is via toggle buffer 4), and reverts to disable state upon transition to any OPS other than PL OPS 9–01 or OPS 0–00. The state of this item is maintained independently by each common set GPC. Item 54 and 55 are toggle items, subsequent execution of the item resulting in the alternate control state. An asterisk shall be displayed next to item 54 to indicate that the GPC commanding the DEU is exhibiting BFS RUN discrete; an asterisk next to item 55 shall indicate that the GPC commanding the DEU will use an alternate toggle buffer for PL OPS 9–01.

Both items 54 and 55 are valid only in GPC & OPS 0–00. Execution of either item in any other OPS shall result in an “ILLEGAL ENTRY” CRT message.

- (13) IMPLIED ITEMS NUMBERS. Items numbers 39 through 47 are implied. If any of these items are executed, an operator error shall result and the “ILLEGAL ENTRY” CRT message will be displayed.

4.1.4.2 DPS Utility Keyboard Processing Addendum

Not applicable

4.1.4.3 DPS Utility CRT Display Processing Addendum

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word “STAT” being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT Display Processing Table 4.1.4–2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the “M” PSI is displayed (for commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)			
Blank (default)	↓		M	∅
1	↓ ↑		M	∅
2	↑		M	∅
3	↓			∅
4	↑			∅
5	↓	?		∅
6	↓ ↑			∅
7			M	∅
8	↓	?	M	∅
9		?	M	∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.1.4–2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. The measurement number representing the CRT TIMER is dependent upon which major function this display is called in and is defined by the following table:

MAJOR FUNCTION SETTING	MSID
GNC	V91W1987C
SM	V91W1988C
PL	V91W1989C

- B. The data field for RTC (Item 13) is blanked upon the execution of CMD (Item 14).

4.1.4.4 DPS Utility Figure/Table References

Figure 4.1.4–1	DPS Utility Display (PFS)
Table 4.1.4–1	Keyboard Processing Table
Table 4.1.4–2	CRT Display Processing Table
Table 4.1.4–3	CRT Display Processing Background Requirements
Table 4.1.4–4	Mission Design Background Constants N/A
Table 4.1.4–5	Input Functional Parameters N/A
Table 4.1.4–6	Output Functional Parameters N/A
Table 4.1.4–7	I–Loads N/A
Table 4.1.4–8	K–Loads N/A
Table 4.1.4–9	Constants N/A

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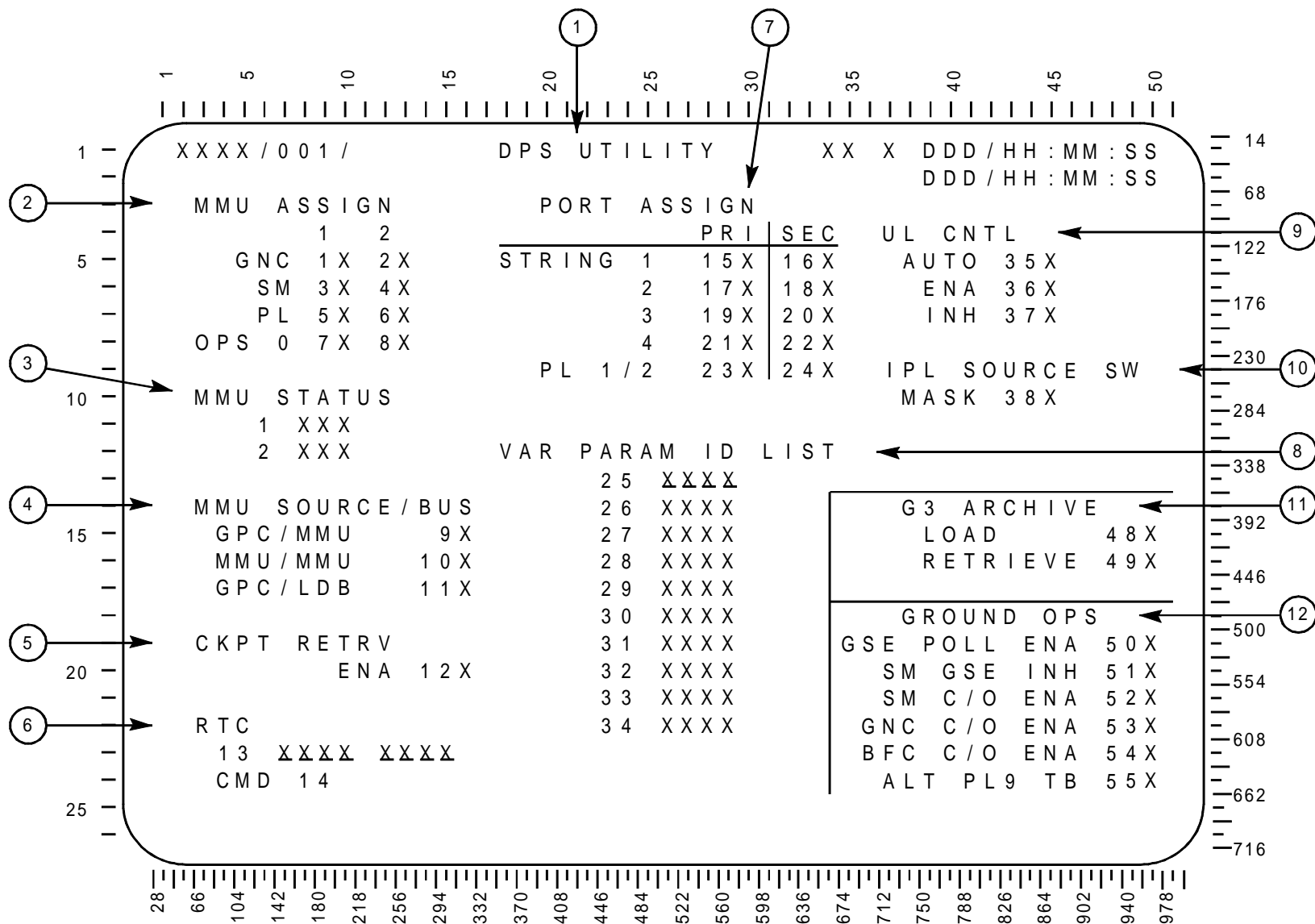


FIGURE 4.1.4-1. DPS Utility Display (PFS)

Table 4.1.4-1.DPS UTILITY (PFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
001	GNC 1 (MMU 1)	V93X4040X	0.0	CTRL			1				FCOS	GNC MMU ASSIGN	X
002*	GNC 2 (MMU 2)	V93X4040X	0.0	CTRL			2				FCOS	GNC MMU ASSIGN	X
003	SM 3 (MMU 1)	V93X4042X	0.0	CTRL			3				FCOS	SM MMU ASSIGN	X
004*	SM 4 (MMU 2)	V93X4042X	0.0	CTRL			4				FCOS	SM MMU ASSIGN	X
005	PL 5 (MMU 1)	V93X4050X	0.0	CTRL			5				FCOS	PL MMU ASSIGN	X
006*	PL 6 (MMU 2)	V93X4050X	0.0	CTRL			6				FCOS	PL MMU ASSIGN	X
007	OPS 0 7 (MMU 1)	V93X4055X	0.0	CTRL			7				FCOS	OPS 0 MMU ASSIGN	X
008*	OPS 0 8 (MMU 2)	V93X4055X	0.0	CTRL			8				FCOS	OPS 0 MMU ASSIGN	X
009	GPC/MMU 9	V93J4371C	0.0	CTRL			9				FCOS	MEMORY SOURCE SELECT	X
010*	MMU/MMU 10	V93J4371C	0.0	CTRL			10				FCOS	MEMORY SOURCE SELECT	X
011*	GPC/LDB 11	V93J4371C	0.0	CTRL			11				FCOS	MEMORY SOURCE SELECT	X
012	CKPT RETRV ENA 12	V93X4095X	0.0	CTRL			12				FCOS	CHECKPT RETRIEVE ENA/INH	X
013	RTC 13	V93U4682C	8.0	HEX			13				FCOS	REAL TIME COMMAND LOAD	X
014	RTC CMD 14	V93X4600X	0.0	CTRL			14				FCOS	REAL TIME COMMAND EXEC	X
015	STRING 1 PRI 15	V93X5501X	0.0	CTRL			15				FCOS	STRING 1/MDM PORT ASSIGN	X
016*	STRING 1 SEC 16	V93X5501X	0.0	CTRL			16				FCOS	STRING 1/MDM PORT ASSIGN	X
017	STRING 2 PRI 17	V93X5509X	0.0	CTRL			17				FCOS	STRING 2/MDM PORT ASSIGN	X
018*	STRING 2 SEC 18	V93X5509X	0.0	CTRL			18				FCOS	STRING 2/MDM PORT ASSIGN	X
019	STRING 3 PRI 19	V93X5514X	0.0	CTRL			19				FCOS	STRING 3/MDM PORT ASSIGN	X
020*	STRING 3 SEC 20	V93X5514X	0.0	CTRL			20				FCOS	STRING 3/MDM PORT ASSIGN	X
021	STRING 4 PRI 21	V93X5519X	0.0	CTRL			21				FCOS	STRING 4/MDM PORT ASSIGN	X
022*	STRING 4 SEC 22	V93X5519X	0.0	CTRL			22				FCOS	STRING 4/MDM PORT ASSIGN	X
023	PL 1/2 PRI 23	V93X5528X	0.0	CTRL			23				FCOS	PL BUSSES/MDM PORT ASSIGN	X
024*	PL 1/2 SEC 24	V93X5528X	0.0	CTRL			24				FCOS	PL BUSSES/MDM PORT ASSIGN	X
025	VAR PARAM ID 25	V93U4632C	4.0	HEX			25				FCOS,CRT	ADDRESS OF VAR PARAMETER 1 INPUT	X
026	VAR PARAM ID 26	V93U4634C	4.0	HEX			26				FCOS,CRT	ADDRESS OF VAR PARAMETER 2 INPUT	X
027	VAR PARAM ID 27	V93U4636C	4.0	HEX			27				FCOS,CRT	ADDRESS OF VAR PARAMETER 3 INPUT	X
028	VAR PARAM ID 28	V93U4638C	4.0	HEX			28				FCOS,CRT	ADDRESS OF VAR PARAMETER 4	X
029	VAR PARAM ID 29	V93U4640C	4.0	HEX			29				FCOS,CRT	ADDRESS OF VAR PARAMETER 5	X
030	VAR PARAM ID 30	V93U4660C	4.0	HEX			30				FCOS,CRT	ADDRESS OF VAR PARAMETER 6	X

Table 4.1.4-1.DPS UTILTY (PFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
031	VAR PARAM ID 31	V93U4662C	4.0	HEX			31				FCOS,CRT	ADDRESS OF VAR PARAMETER 7	X
032	VAR PARAM ID 32	V93U4664C	4.0	HEX			32				FCOS,CRT	ADDRESS OF VAR PARAMETER 8	X
033	VAR PARAM ID 33	V93U4666C	4.0	HEX			33				FCOS,CRT	ADDRESS OF VAR PARAMETER 9	X
034	VAR PARAM ID 34	V93U4668C	4.0	HEX			34				FCOS,CRT	ADDRESS OF VAR PARAMETER 10	X
035	UL CNTL AUTO 35	V93X5543X	0.0	CTRL			35				FCOS,CRT	UL CNTL AUTO CMD	X
036	UL CNTL ENA 36	V93X5544X	0.0	CTRL			36				FCOS,CRT	UL CNTL ENA CMD	X
037	UL CNTL INH 37	V93X5545X	0.0	CTRL			37				FCOS,CRT	UL CNTL INH CMD	X
038	IPL SOURCE SW MASK38	V93X5530X	0.0	CTRL			38				FCOS,CRT	MMU IPL SOURCE DISCRETE MASK	
039	G3 ARCHIVE LOAD 48	V93X5440X	0.0	CTRL			48				UI,CRT	G3 ARCHIVE LOAD ENABLE/STATUS	
040	G3 ARCH RETRIEVE 49	V93X5441X	0.0	CTRL			49				UI,CRT	G3 ARCHIVE RETRIEVE ENABLE/STATUS	
041	GSE POLL ENA 50	V93X4062X	0.0	CTRL			50				LDB	GSE POLL ENA COMMAND	
042	SM GSE INH 51	V93X5533X	0.0	CTRL			51				FCOS,CRT	SM GSE POLLING INHIBIT	
043	SM C/O ENA 52	V93X3512X	0.0	CTRL			52				FCOS,CRT	SM GROUND CHECKOUT ENABLE	
044	GNC C/O ENA 53	V93X5538X	0.0	CTRL			53				UI,CRT,TLM	GNC GROUND CHECKOUT ENABLE	
045	BFC C/O ENA 54	V93X3524X	0.0	CTRL			54				FCOS,CRT	BKUP FLIGHT CTRL CHECKOUT ENABLE	
046	ALT PL9 TB 55	V93X3525X	0.0	CTRL			55				FCOS,CRT	ALTERNATE PL9 TOGGLE BUFFER SELECT	

Table 4.1.4-2.DPS UTILITY (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
031	PL 1/2 PRI 23	V91X1769X	30	9		1.0	*		BLVL						B						FCOS	PL BUSES MDM PORT ASSIGN IND	X	
032*	PL 1/2 SEC 24	V91X1769X	34	9		1.0		*	BLVL						B						FCOS	PL BUSES MDM PORT ASSIGN IND	X	
033	VAR PARAM ID 25	V93U4632C	26	13		4.0			HEX						E						KYBD	ADDRESS OF VAR PARAMETER 1 INPUT	X	
034	VAR PARAM ID 26	V93U4634C	26	14		4.0			HEX						E						KYBD	ADDRESS OF VAR PARAMETER 2 INPUT	X	
035	VAR PARAM ID 27	V93U4636C	26	15		4.0			HEX						E						KYBD	ADDRESS OF VAR PARAMETER 3 INPUT	X	
036	VAR PARAM ID 28	V93U4638C	26	16		4.0			HEX						E						KYBD	ADDRESS OF VAR PARAMETER 4	X	
037	VAR PARAM ID 29	V93U4640C	26	17		4.0			HEX						E						KYBD	ADDRESS OF VAR PARAMETER 5	X	
038	VAR PARAM ID 30	V93U4660C	26	18		4.0			HEX						E						KYBD	ADDRESS OF VAR PARAMETER 6	X	
039	VAR PARAM ID 31	V93U4662C	26	19		4.0			HEX						E						KYBD	ADDRESS OF VAR PARAMETER 7	X	
040	VAR PARAM ID 32	V93U4664C	26	20		4.0			HEX						E						KYBD	ADDRESS OF VAR PARAMETER 8	X	
041	VAR PARAM ID 33	V93U4666C	26	21		4.0			HEX						E						KYBD	ADDRESS OF VAR PARAMETER 9	X	
042	VAR PARAM ID 34	V93U4668C	26	22		4.0			HEX						E						KYBD	ADDRESS OF VAR PARAMETER 10	X	
043	UL CNTL AUTO 35	V93X5543X	45	5		1.0	*		BLVL						E						KYBD	UL CNTL AUTO CMD	X	
044	UL CNTL ENA 36	V93X5544X	45	6		1.0	*		BLVL						E						KYBD	UL CNTL ENA CMD	X	
045	UL CNTL INH 37	V93X5545X	45	7		1.0	*		BLVL						E						KYBD	UL CNTL INH CMD	X	
046	G3 ARCHIEVE LOAD 48	V93X5440X	50	15		1.0	*		BLVL						E						ULKYBD	G3 ARCHIEVE LOAD ENABLE/STATUS		
047	G3 ARCH RETRIEVE 49	V93X5441X	50	16		1.0	*		BLVL						E						ULKYBD	G3 ARCHIEVE RETRIEVE ENABLE/STATUS		
048	IPL SOURCE SW MASK38	V93X5530X	45	10		1.0	*		BLVL						E						KYBD	MMU IPL SOURCE DISCRETE MASK		
049	GSE POLL ENA 50	V91X1840X	50	19		1.0	*		BLVL												LDB	GSE POLL ENABLE IND		
050	SM GSE INH 51	V93X5533X	50	20		1.0	*		BLVL												KYBD	SM GSE POLLING INHIBIT		
051	SM C/O ENA 52	V93X3512X	50	21		1.0	*		BLVL												KYBD	SM GROUND CHECKOUT ENABLE		
052	GNC C/O ENA 53	V93X5538X	50	22		1.0	*		BLVL												KYBD	GNC GROUND CHECKOUT ENABLE		
053	BFC C/O ENA 54	V93X3524X	50	23		1.0	*		BLVL												KYBD	BKUP FLIGHT CTRL CHECKOUT ENABLE		
054	ALT PL9 TB 55	V93X3525X	50	24		1.0	*		BLVL												KYBD	ALTERNATE PL9 TOGGLE BUFFER SELECT		
055	(MSG LINE)	V93X0050X	1	25		44.0			CHAR						G						UI	MESSAGE LINE	X	
056	(BUFFER MSG)	V93X0054X	45	25		4.0			CHAR						G						UI	BUFFER MESSAGE INDICATOR	X	
057	(SPL)	V93X0056X	2	26		49.0			CHAR						G						UI	SCRATCH PAD LINE	X	

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Table 4.1.4-3.DPS UTILITY (PFS) CRT DISPLAY PROCESSING BACKGROUND
REQUIREMENTS

The DPS Utility Display shall display the following virtual display:

Virtual Display Name	Virtual Display Number
DPS Utility Display Background	09E Hex

4.1.5 GPC/BUS STATUS (PFS)

TITLE: GPC BUS STATUS

TYPE: DISP/006

AVAILABILITY: PFS: ALL OPS

4.1.5.1 Purpose, Operation, and Organization

- (1) GPC/BUS STATUS. This display provides the user the capability to monitor the GPC data Bus Configuration and Status. Figure 4.1.5-1 is the GPC/BUS Status Display Format.
- (2) GPC Operational Status. The operational status of each GPC is displayed. A fail indicator down arrow (↓) is displayed to the right of the failed GPC number. The GPC status indicator shall attempt to duplicate the diagonal elements on the CAM hardware. From the software version of the Composite CAM discrete outputs collected from all the GPC's, the display software shall perform the following:
 - a. A GPC shall utilize only status reports of the GPC's considered to be its current common set.
 - b. The status fail indicator shall be presented against a GPC when any two GPC's in a CS have a fail discrete set against that GPC or a GPC has a fail indicator set against itself.
 - c. Resetting the status indicators tracks the resetting of the CAM output discretetes.
- (3) Mode/OPS Indicators.
 - a. MODE switch status indicators for each GPC (i.e., HALT or RUN) are displayed under each GPC.

The Resident Major Functions (MF) and active Operational Sequences (OPS) for each GPC are displayed under the mode indicator. MF is indicated by "G", "S", or "P" for GNC, SM, or PL, respectively. The second character is the OPS number. When a GPC is in HALT or STBY, the last active OPS (Non OPS 0) is displayed.
- (4) Control/Status Indicators:

The I/O configuration/status for each bus (Strings 1 through 4 (FF and FA), PL, Launch Data and CRT, i.e., DEU) is displayed.

An asterisk(*) indicates which GPC is in control of a particular bus. FF and FA, MDM's and PL 1 and 2 MDM's are commanded as pairs. The asterisks are driven by data generated by actual IOP transmitter status signals.

A down arrow (↓) is provided for each GPC to show the data path for each STRING [PL, LAUNCH and DEU (CRT)].

A down arrow (↓) is provided for each GPC to show the data path for each STRING, PL, LAUNCH and DEU (CRT).

 - a. The down arrow (↓) indicator for the STRINGS are driven from the BTU port failure indicator or the appropriate FF or FA MDM or when a bus has been masked.

- b. The PL and LAUNCH down arrow (↓) indicator is driven when a GPC isolates any BTU port on the buses to be the error source or if any of the buses were masked. The LAUNCH BUS indicators will not reflect GSE BTU failures.
- b. The PL and LAUNCH down arrow (↓) indicator is driven when a GPC isolates a PF/LL/LR MDM or MCIU BTU port on the buses to be the error source or if any of the buses were masked. The LAUNCH BUS indicators will not reflect GSE BTU failures.
- c. The DEU (CRT) down arrow (↓) indicator is driven for a continuous I/O error condition on a DEU or if the bus was masked.

The controls/status indications itemized above are subject to the following requirements and definitions.

There are four strings defined which contain, between them, all the BTU's on the flight-critical buses. The nominal definition of strings is described below:

- String 1 contains all BTU's on FC1 and FC5.
- String 2 contains all BTU's on FC2 and FC6.
- String 3 contains all BTU's on FC3 and FC7.
- String 4 contains all BTU's on FC4 and FC8.

TABLE 4.1.5-1. GPC/BUS Status Keyboard Processing

Not applicable.

4.1.5.2 GPC/BUS Status Keyboard Processing Addendum

Not applicable.

4.1.5.3 GPC/BUS Status CRT Display Processing Addendum

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word "STAT" being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT Display Processing Table 4.1.5-2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the "M" PSI is displayed (for commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)			
Blank (default)	↓		M	∅
1	↓	↑	M	∅
2		↑	M	∅
3	↓			∅
4		↑		∅
5	↓		?	∅
6	↓	↑		∅
7			M	∅
8	↓		?	M ∅
9			?	M ∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.1.5–2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. The measurement number representing the CRT TIMER is dependent upon which major function this display is called in and is defined by the following table:

MAJOR FUNCTION SETTING	MSID
GNC	V91W1987C
SM	V91W1988C
PL	V91W1989C

4.1.5.4 GPC/BUS Status Figure/Table References

- Figure 4.1.5–1 GPC/BUS Status Display (PFS)
- Table 4.1.5–1 Keyboard Processing Table N/A
- Table 4.1.5–2 CRT Display Processing Table
- Table 4.1.5–3 CRT Display Processing Background Requirements N/A
- Table 4.1.5–4 Mission Design Background Constants N/A
- Table 4.1.5–5 Input Functional Parameters N/A
- Table 4.1.5–6 Output Functional Parameters N/A
- Table 4.1.5–7 I–Loads N/A
- Table 4.1.5–8 K–Loads N/A
- Table 4.1.5–9 Constants N/A

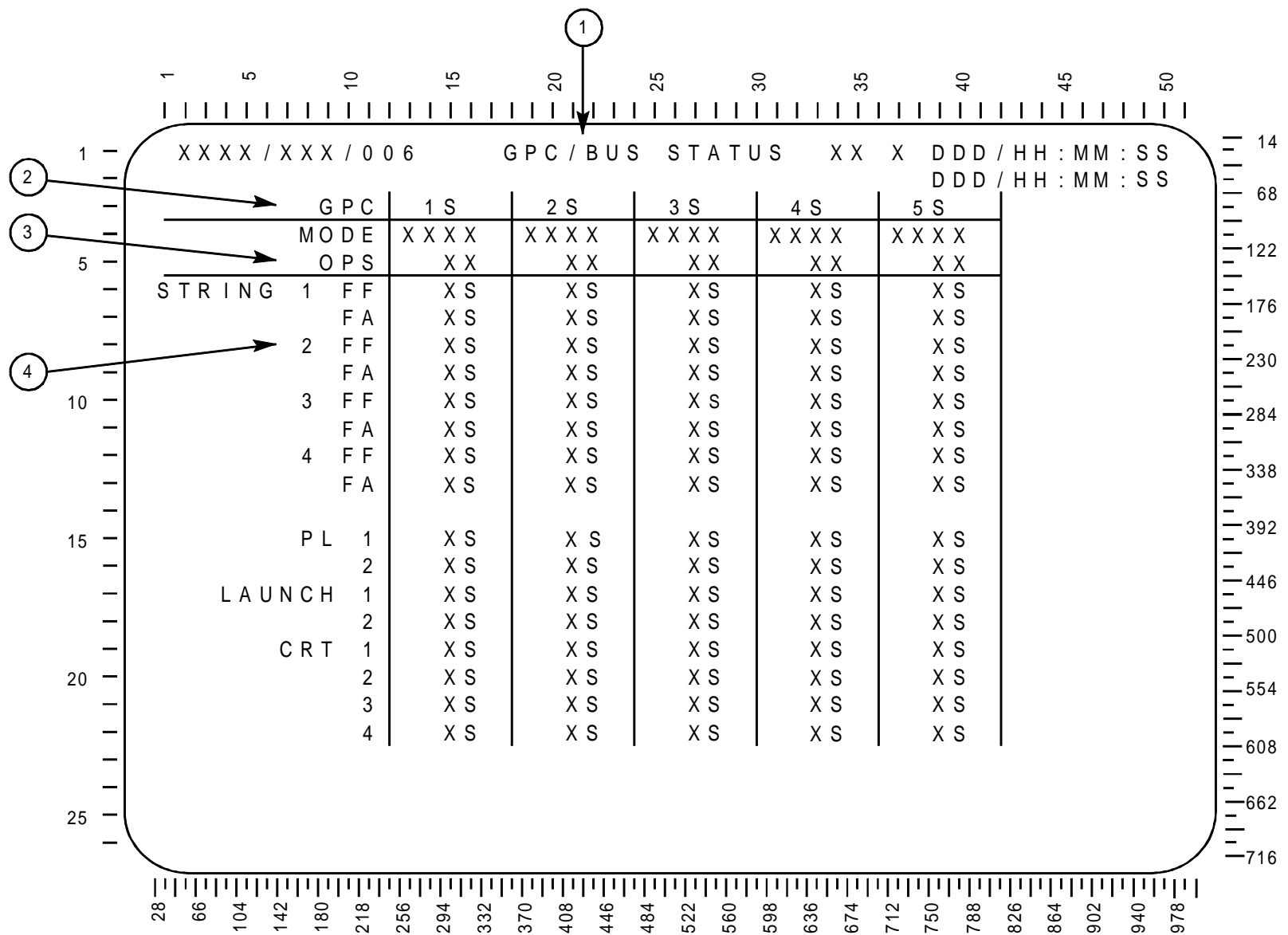


FIGURE 4.1.5-1. GPC/BUS Status Display (PFS)

Table 4.1.5-2.GPC/BUS STATUS (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format				U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S I T Y	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL		TYPE																
							1	0																	
116	STRING 2 FF (4) (S)	V91X1815X	34	8		1.0							X		B						3	FCOS	GPC 4 STRING 2 FF STATUS	X	
117	STRING 2 FF (5) (S)	V91X1826X	40	8		1.0							X		B							3	FCOS	GPC 5 STRING 2 FF STATUS	X
118	STRING 2 FA (1) (S)	V91X1376X	16	9		1.0							X		B							3	FCOS	GPC 1 STRING 2 FA STATUS	X
119	STRING 2 FA (2) (S)	V91X1381X	22	9		1.0							X		B							3	FCOS	GPC 2 STRING 2 FA STATUS	X
120	STRING 2 FA (3) (S)	V91X1386X	28	9		1.0							X		B							3	FCOS	GPC 3 STRING 2 FA STATUS	X
121	STRING 2 FA (4) (S)	V91X1391X	34	9		1.0							X		B							3	FCOS	GPC 4 STRING 2 FA STATUS	X
122	STRING 2 FA (5) (S)	V91X1396X	40	9		1.0							X		B							3	FCOS	GPC 5 STRING 2 FA STATUS	X
123	STRING 3 FF (1) (S)	V91X1747X	16	10		1.0							X		B							3	FCOS	GPC 1 STRING 3 FF STATUS	X
124	STRING 3 FF (2) (S)	V91X1778X	22	10		1.0							X		B							3	FCOS	GPC 2 STRING 3 FF STATUS	X
125	STRING 3 FF (3) (S)	V91X1794X	28	10		1.0							X		B							3	FCOS	GPC 3 STRING 3 FF STATUS	X
126	STRING 3 FF (4) (S)	V91X1816X	34	10		1.0							X		B							3	FCOS	GPC 4 STRING 3 FF STATUS	X
127	STRING 3 FF (5) (S)	V91X1827X	40	10		1.0							X		B							3	FCOS	GPC 5 STRING 3 FF STATUS	X
128	STRING 3 FA (1) (S)	V91X1377X	16	11		1.0							X		B							3	FCOS	GPC 1 STRING 3 FA STATUS	X
129	STRING 3 FA (2) (S)	V91X1382X	22	11		1.0							X		B							3	FCOS	GPC 2 STRING 3 FA STATUS	X
130	STRING 3 FA (3) (S)	V91X1387X	28	11		1.0							X		B							3	FCOS	GPC 3 STRING 3 FA STATUS	X
131	STRING 3 FA (4) (S)	V91X1392X	34	11		1.0							X		B							3	FCOS	GPC 4 STRING 3 FA STATUS	X
132	STRING 3 FA (5) (S)	V91X1397X	40	11		1.0							X		B							3	FCOS	GPC 5 STRING 3 FA STATUS	X
133	STRING 4 FF (1) (S)	V91X1748X	16	12		1.0							X		B							3	FCOS	GPC 1 STRING 4 FF STATUS	X
134	STRING 4 FF (2) (S)	V91X1779X	22	12		1.0							X		B							3	FCOS	GPC 2 STRING 4 FF STATUS	X
135	STRING 4 FF (3) (S)	V91X1795X	28	12		1.0							X		B							3	FCOS	GPC 3 STRING 4 FF STATUS	X
136	STRING 4 FF (4) (S)	V91X1817X	34	12		1.0							X		B							3	FCOS	GPC 4 STRING 4 FF STATUS	X
137	STRING 4 FF (5) (S)	V91X1828X	40	12		1.0							X		B							3	FCOS	GPC 5 STRING 4 FF STATUS	X
138	STRING 4 FA (1) (S)	V91X1378X	16	13		1.0							X		B							3	FCOS	GPC 1 STRING 4 FA STATUS	X
139	STRING 4 FA (2) (S)	V91X1383X	22	13		1.0							X		B							3	FCOS	GPC 2 STRING 4 FA STATUS	X
140	STRING 4 FA (3) (S)	V91X1388X	28	13		1.0							X		B							3	FCOS	GPC 3 STRING 4 FA STATUS	X
141	STRING 4 FA (4) (S)	V91X1393X	34	13		1.0							X		B							3	FCOS	GPC 4 STRING 4 FA STATUS	X
142	STRING 4 FA (5) (S)	V91X1398X	40	13		1.0							X		B							3	FCOS	GPC 5 STRING 4 FA STATUS	X
143	PL 1 (1) (S)	V91X1749X	16	15		1.0							X		B							3	FCOS	GPC 1 PL1 BUSES STATUS	X
144	PL 1 (2) (S)	V91X1780X	22	15		1.0							X		B							3	FCOS	GPC 2 PL1 BUSES STATUS	X
145	PL 1 (3) (S)	V91X1796X	28	15		1.0							X		B							3	FCOS	GPC 3 PL1 BUSES STATUS	X
146	PL 1 (4) (S)	V91X1818X	34	15		1.0							X		B							3	FCOS	GPC 4 PL1 BUSES STATUS	X
147	PL 1 (5) (S)	V91X1829X	40	15		1.0							X		B							3	FCOS	GPC 5 PL1 BUSES STATUS	X
148	PL 2 (1) (S)	V91X1379X	16	16		1.0							X		B							3	FCOS	GPC 1 PL 2 BUS STATUS	X
149	PL 2 (2) (S)	V91X1384X	22	16		1.0							X		B							3	FCOS	GPC 2 PL 2 BUS STATUS	X
150	PL 2 (3) (S)	V91X1389X	28	16		1.0							X		B							3	FCOS	GPC 3 PL 2 BUS STATUS	X
151	PL 2 (4) (S)	V91X1394X	34	16		1.0							X		B							3	FCOS	GPC 4 PL 2 BUS STATUS	X
152	PL 2 (5) (S)	V91X1399X	40	16		1.0							X		B							3	FCOS	GPC 5 PL 2 BUS STATUS	X
153	LAUNCH 1 (1) (S)	V91X1755X	16	17		1.0							X		B							3	FCOS	GPC 1 LB 1 STATUS	X
154	LAUNCH 1 (2) (S)	V91X1786X	22	17		1.0							X		B							3	FCOS	GPC 2 LB 1 STATUS	X
155	LAUNCH 1 (3) (S)	V91X1797X	28	17		1.0							X		B							3	FCOS	GPC 3 LB 1 STATUS	X

Table 4.1.5-2.GPC/BUS STATUS (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format				U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S H	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S	Add Ref	Source	Nomenclature	C R T
			X	Y		CHAR	BILEVEL		TYPE															
							1	0																
156	LAUNCH 1 (4) (S)	V91X1819X	34	17		1.0			STAT				X		B						3	FCOS	GPC 4 LB 1 STATUS	X
157	LAUNCH 1 (5) (S)	V91X1830X	40	17		1.0			STAT				X		B						3	FCOS	GPC 5 LB 1 STATUS	X
158	LAUNCH 2 (1) (S)	V91X1756X	16	18		1.0			STAT				X		B						3	FCOS	GPC 1 LB 2 STATUS	X
159	LAUNCH 2 (2) (S)	V91X1787X	22	18		1.0			STAT				X		B						3	FCOS	GPC 2 LB 2 STATUS	X
160	LAUNCH 2 (3) (S)	V91X1798X	28	18		1.0			STAT				X		B						3	FCOS	GPC 3 LB 2 STATUS	X
161	LAUNCH 1 (4) (S)	V91X1820X	34	18		1.0			STAT				X		B						3	FCOS	GPC 4 LB 2 STATUS	X
162	LAUNCH 2 (5) (S)	V91X1831X	40	18		1.0			STAT				X		B						3	FCOS	GPC 5 LB 2 STATUS	X
163	CRT 1 (1) (S)	V91X1757X	16	19		1.0			STAT				X		B						3	FCOS	GPC 1 CRT 1 STATUS	X
164	CRT 1 (2) (S)	V91X1788X	22	19		1.0			STAT				X		B						3	FCOS	GPC 2 CRT 1 STATUS	X
165	CRT 1 (3) (S)	V91X1810X	28	19		1.0			STAT				X		B						3	FCOS	GPC 3 CRT 1 STATUS	X
166	CRT 1 (4) (S)	V91X1821X	34	19		1.0			STAT				X		B						3	FCOS	GPC 4 CRT 1 STATUS	X
167	CRT 1 (5) (S)	V91X1832X	40	19		1.0			STAT				X		B						3	FCOS	GPC 5 CRT 1 STATUS	X
168	CRT 2 (1) (S)	V91X1758X	16	20		1.0			STAT				X		B						3	FCOS	GPC 1 CRT 2 STATUS	X
169	CRT 2 (2) (S)	V91X1789X	22	20		1.0			STAT				X		B						3	FCOS	GPC 2 CRT 2 STATUS	X
170	CRT 2 (3) (S)	V91X1811X	28	20		1.0			STAT				X		B						3	FCOS	GPC 3 CRT 2 STATUS	X
171	CRT 2 (4) (S)	V91X1822X	34	20		1.0			STAT				X		B						3	FCOS	GPC 4 CRT 2 STATUS	X
172	CRT 2 (5) (S)	V91X1833X	40	20		1.0			STAT				X		B						3	FCOS	GPC 5 CRT 2 STATUS	X
173	CRT 3 (1) (S)	V91X1759X	16	21		1.0			STAT				X		B						3	FCOS	GPC 1 CRT 3 STATUS	X
174	CRT 3 (2) (S)	V91X1790X	22	21		1.0			STAT				X		B						3	FCOS	GPC 2 CRT 3 STATUS	X
175	CRT 3 (3) (S)	V91X1812X	28	21		1.0			STAT				X		B						3	FCOS	GPC 3 CRT 3 STATUS	X
176	CRT 3 (4) (S)	V91X1823X	34	21		1.0			STAT				X		B						3	FCOS	GPC 4 CRT 3 STATUS	X
177	CRT 3 (5) (S)	V91X1834X	40	21		1.0			STAT				X		B						3	FCOS	GPC 5 CRT 3 STATUS	X
178	CRT 4 (1) (S)	V91X1760X	16	22		1.0			STAT				X		B						3	FCOS	GPC 1 CRT 4 STATUS	X
179	CRT 4 (2) (S)	V91X1791X	22	22		1.0			STAT				X		B						3	FCOS	GPC 2 CRT 4 STATUS	X
180	CRT 4 (3) (S)	V91X1813X	28	22		1.0			STAT				X		B						3	FCOS	GPC 3 CRT 4 STATUS	X
181	CRT 4 (4) (S)	V91X1824X	34	22		1.0			STAT				X		B						3	FCOS	GPC 4 CRT 4 STATUS	X
182	CRT 4 (5) (S)	V91X1835X	40	22		1.0			STAT				X		B						3	FCOS	GPC 5 CRT 4 STATUS	X
183	(MSG LINE)	V93X0050X	1	25		44.0			CHAR						G							UI	MESSAGE LINE	X
184	(BUFFER MSG)	V93X0054X	45	25		4.0			CHAR						G							UI	BUFFER MESSAGE INDICATOR	X
185	(SPL)	V93X0056X	2	26		49.0			CHAR						G							UI	SCRATCH PAD LINE	X

4.1.6 DELETED.

4.1.7 XXXXIPL MENU (1) & (2) (PFS/BFS)

TITLE: XXXXIPL MENU
TYPE: SPEC
AVAILABILITY: POST IPL GPC

4.1.7.1 Purpose, Operation, and Organization

The Initial Program Load (IPL) MENU display provides access to the GPC Self-Test Program (STP) and the Real Time Processor (RTP) functions of the GPC IPL program during self-test operation. This display provides the user the capability to run STP and RTP. This display also provides the means to control and monitor memory purge operations for the DEU, MMU and/or GPC.

To load this display, GPC IPL must be initiated and a DEU selected as per Table 4.1.7.1-1.

GPC IPL is selected by placing the IPL source switch (MMU1/OFF/MMU2) to the MMU1 or MMU2 positions and applying power to the MMU's. The GPCn mode switch (HALT/STBY/RUN) is positioned to HALT. The IOPn terminate switch (BACKUP/NORMAL/TERMINATE) is positioned to NORMAL or TERMINATE and the GPCn power switch (OFF/ON) is positioned to OFF then to ON. Then the GPC IPL push button is depressed. The talk back (Barber-Pole/IPL/RUN) will position to IPL and upon successful completion of the auto-load will position to barber-pole.

The BFS CRT select switch is set to 1+2, or 2+3, or 3+1 and BFC CRT display switch "ON" to select DEU 1,2, or 3 respectively for use by the GPC IPL program. The DEU initialization switch is positioned to load, then released and DEU load will appear on the lower left corner of the display unit. The GPC mode switch is then moved from HALT to STBY and STP is initiated and run once. Then the DEU is IPLed with the display control program, critical formats and the PC IPL menu display and DEU update is initiated.

The following describes the meaning of the display content and a description of usage.

- (1) XXXXIPL. The display consists of two pages (Figures 4.1.7-1 and 4.1.7-2). The title of page 1 is partially dynamic. During execution of the GPC IPL program, the title will read "GPC IPL MENU (1)". If and when control is passed to the Backup System Loader (BSL), the title will then read "BSL2IPL MENU (1)".

Page 2 can only be displayed while GPC IPL is running. This page provides additional self-test information to the user and is accessed by depressing the System Summary Key. A second depression of the System Summary Key will cause page 1 to be displayed.

- (2) GPC ID. The GPC IPL MENU provides the GPC identification number of the GPC driving this display.
- (3) Functions. Item entries 1-16 on the display provide for selection of the system software to be loaded from the mass memory when the GPC has completed its STP operation.

- (4) DEU FORMAT LOAD. Item 17 provides the capability to load the DEU with a selected format load. The format load consists of static background Format Control Words (FCW's) to be used at a later time by the PFS or BFS.
- (5) Selected Testing. Item entries 18 and 19 initiate and terminate GPC Self-Test. Item 20 initiates DEU Self-Test. DEU Self-Test is terminated by depression of the Resume Key or the DEU initialization switch positioned to Load, then released.
- (6) Item entries 21-23 do not exist and are not supported by the display. Execution of items 21-23 shall result in an 'ILLEGAL ENTRY' CRT message.
- (7) Self-Test Controls. Items 24-25 provide GPC Self-Test controls. These item entries are only meaningful if GPC Self-Test has been initiated (Item 18). "STOP ON ERROR" causes GPC Self-Test to halt when a STP error is encountered. Self-Test can then be reactivated via the Item 18 entry or an Item 25 entry "CONTINUE STP ON ERR". "CONTINUE STP ON ERR" (prior to an Item 24 entry) is the default case and will allow GPC Self-Test to run until 99 errors have been logged.
- (8) Error Information. As a result of GPC IPL execution, the following general information is displayed: (1) the number of complete cycles through GPC Self-Test or Memory Purge Operations (STP/PURGE CYCLE COUNT); (2) the latest error code to be encountered/acknowledged by the user (ERROR CODE); (3) the number of times the error code has occurred (ERROR CODE COUNT); (4) the total number of errors that have occurred (TOTAL ERROR COUNT); and (5) the number of errors yet to be viewed/acknowledged by the user (ERRORS STILL IN LIST).
- (9) MCDS BITE Status. MCDS Bite registers are displayed to allow the user to monitor the status of the DEU. The status displayed is that received (during a DEU poll) just prior to a DEU update.
- (10) Deleted.
- (11) ERROR Information. The contents of the old Program Status Word, Register Sets 0 and 1, and the Floating Point Register Set are displayed for each error encountered. The major cycle count, minor cycle count, minor cycle scheduler word, and clock 1 value (in microseconds) are also displayed. The information in this block corresponds to contents of the registers and pertinent data locations when the error, which is currently being displayed as "ERROR CODE", occurred. In addition, certain of these fields contain information which will prove useful in determining the precise nature of some of the GPC failures STP can detect.
- (12) IMU Checkpoint Data Load. Item 26 allows the user the option to inhibit the loading of IMU checkpoint data from mass memory into the BFS GPC. The load consists of 510 halfwords of IMU calibration data that replaces pre-stored nominal I-Load calibration values.
- (13) Memory Purge Control. Item entries 27-29 allows the user to control memory purge operations. Table 4.1.7.1-2 is the list of purge options available where overwrite is defined to be a single pass memory write and where erase is a multiple pass memory write with alternating bit patterns. The DEU and GPC erase options overwrite the DEU display buffer and GPC memory, respectively, 100 times. The MMU erase option overwrites the mass memory 3 times, except for a designated safe area. Both the MMU overwrite and erase options are completed by

a checksum of the modified mass memory locations. The MMU checksum option allows the user to retry checksumming without performing the more time consuming purge operations. The user selects the purge option desired, starts the option, and may stop the option in progress allowing the user to reselect an option or restart. The stop item entry is valid during all purge operations except during the final phase of a GPC erase. Execution of any option other than those listed (i.e. integer input) will result in an operator error advisory CRT message.

Table 4.1.7.1-1. GPCIPL DEU Selection

MMU <u>Source Select</u>		BFS CRT <u>Select</u>		<u>DEU Selected</u>
MMU1	MMU2	Disretes		
		<u>A</u>	<u>B</u>	
0	0	0	0	None
0	0	0	1	None
0	0	1	0	None
0	0	1	1	None
1	0	0	0	None
0	1	0	0	None
1	0	0	1	1
1	0	1	0	2
1	0	1	1	3
0	1	0	1	1
0	1	1	0	2
0	1	1	1	3

Table 4.1.7.1-2. Memory Purge Operations Options	
Option	Description
1	DEU Erase
2	MMU1 Overwrite
3	MMU1 Erase
4	MMU1 Checksum
5	MMU2 Overwrite
6	MMU2 Erase
7	MMU2 Checksum
8	GPC Erase

MEMORY PURGE TITLE

The title on the GPCIPL Menu 1 for 'MEMORY PURGE' will reflect the option selected. The DEFAULT TITLE, i.e. when an option is not selected, will be MEMORY PURGE. Once a PURGE OPTION is selected, the title will reflect the option selected.

Option	Description
1	DEU Erase
2	MMU1 Overwrite
3	MMU1 Erase
4	MMU1 Checksum
5	MMU2 Overwrite
6	MMU2 Erase
7	MMU2 Checksum
8	GPC Erase

4.1.7.2 XXXXIPL Menu Keyboard Processing Addendum

A. ILLEGAL ENTRY CHECK FOR ITEM ENTRY NUMBERS.

1. GPCIPL MENU (1) AND BSL2IPL MENU (1) page:

Item entries less than 1 and greater than 29 shall be rejected and cause the message "ITEM NUMBER < 1 AND > 29 NOT SUPPORTED" to be output and annunciated.

2. GPCIPL MENU (2) page:

Item entries less than 17 and greater than 26 shall be rejected and cause the message "ITEM NUMBER < 17 AND > 26 NOT SUPPORTED" to be output and annunciated.

3. Item entries numbered 21, 22 & 23 do not exist on either page of the display and shall not be supported. Upon execution of any of these item numbers, the input shall be rejected and cause an "ILLEGAL ENTRY" CRT message to be output and annunciated.

4.1.7.3 XXXXIPL Menu CRT Display Processing Addendum

Not applicable.

4.1.7.4 XXXXIPL Menu Figure/Table References

Figure 4.1.7-1	XXXXIPL Menu (1) Display (PFS/BFS)
Figure 4.1.7-2	GPCIPL Menu (2) Display (PFS/BFS)
Table 4.1.7-1	Keyboard Processing Table
Table 4.1.7-2	CRT Display Processing Table
Table 4.1.7-3	CRT Display Processing Background Requirements N/A
Table 4.1.7-4	Mission Design Background Constants N/A
Table 4.1.7-5	Input Functional Parameters N/A
Table 4.1.7-6	Output Functional Parameters N/A
Table 4.1.7-7	I-Loads N/A
Table 4.1.7-8	K-Loads N/A
Table 4.1.7-9	Constants N/A

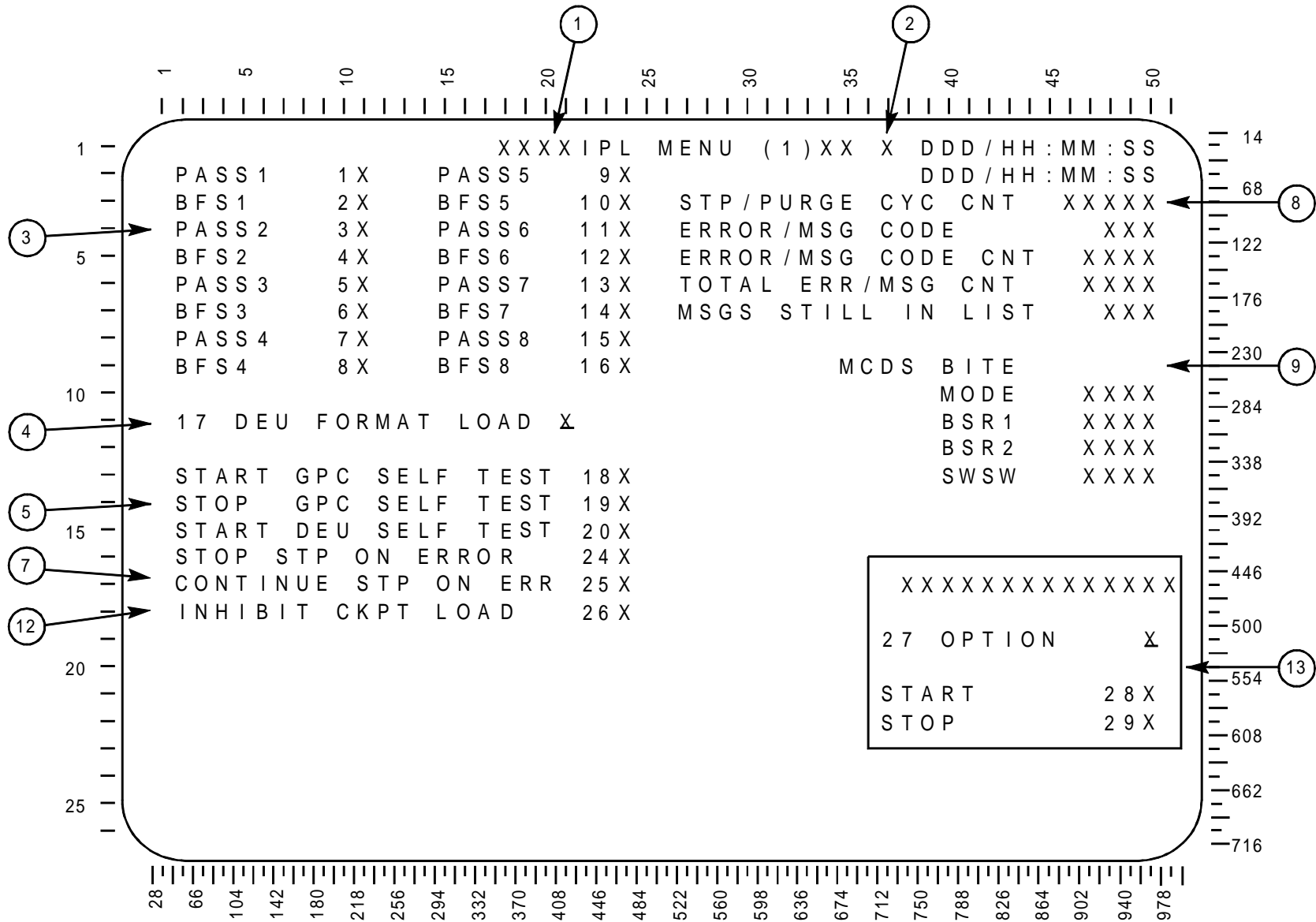


FIGURE 4.1.7-1. XXXXIPL Menu (1) Display (PFS/BFS)

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Table 4.1.7-1(1). XXXXIPL MENU (1) (PFS/BFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination		Nomenclature	C R T
								MIN	MAX		PFS	BFS		
001	PASS1 1	V93X3701X	0.0	CTRL			1			A	SSL	SSL	SYS SOFTWARE VERSION-PASS 1	X
002	BFS1 2	V93X3702X	0.0	CTRL			2			A	BSL	BSL	SYS SOFTWARE VERSION-BFS 1	X
003	PASS2 3	V93X3703X	0.0	CTRL			3			A	SSL	SSL	SYS SOFTWARE VERSION-PASS 2	X
004	BFS2 4	V93X3704X	0.0	CTRL			4			A	BSL	BSL	SYS SOFTWARE VERSION-BFS 2	X
005	PASS3 5	V93X3705X	0.0	CTRL			5			A	SSL	SSL	SYS SOFTWARE VERSION-PASS 3	X
006	BFS3 6	V93X3706X	0.0	CTRL			6			A	BSL	BSL	SYS SOFTWARE VERSION-BFS 3	X
007	PASS4 7	V93X3707X	0.0	CTRL			7			A	SSL	SSL	SYS SOFTWARE VERSION-PASS 4	X
008	BFS4 8	V93X3708X	0.0	CTRL			8			A	BSL	BSL	SYS SOFTWARE VERSION-BFS 4	X
009	PASS5 9	V93X3709X	0.0	CTRL			9			A	SSL	SSL	SYS SOFTWARE VERSION-PASS 5	X
010	BFS5 10	V93X3710X	0.0	CTRL			10			A	BSL	BSL	SYS SOFTWARE VERSION-BFS 5	X
011	PASS6 11	V93X3711X	0.0	CTRL			11			A	SSL	SSL	SYS SOFTWARE VERSION-PASS 6	X
012	BFS6 12	V93X3712X	0.0	CTRL			12			A	BSL	BSL	SYS SOFTWARE VERSION-BFS 6	X
013	PASS7 13	V93X3713X	0.0	CTRL			13			A	SSL	SSL	SYS SOFTWARE VERSION-PASS 7	X
014	BFS7 14	V93X3714X	0.0	CTRL			14			A	BSL	BSL	SYS SOFTWARE VERSION-BFS 7	X
015	PASS8 15	V93X3715X	0.0	CTRL			15			A	SSL	SSL	SYS SOFTWARE VERSION-PASS 8	X
016	BFS8 16	V93X3716X	0.0	CTRL			16			A	BSL	BSL	SYS SOFTWARE VERSION-BFS 8	X
017	17 DEU FORMAT LOAD	V93X3718X	1.0	DEC			17			A	GPC	GPC	DEU FORMAT LOAD CMD	X
018	START GPC STP 18	V93X3720X	0.0	CTRL			18			A	GPC	GPC	START GPC SELF TEST	X
019	STOP GPC STP 19	V93X3722X	0.0	CTRL			19			A	GPC	GPC	STOP GPC SELF TEST	X
020	START DEU STP 20	V93X3723X	0.0	CTRL			20			A	GPC	GPC	START DEU SELF TEST CMD	X
021	STOP ON ERROR 24	V93X3732X	0.0	CTRL			24			A	GPC	GPC	STOP STP ON ERROR	X
022	CONT STP ON ERR 25	V93X3735X	0.0	CTRL			25			A	GPC	GPC	CONTINUE STP ON ERROR	X
023	INHIBIT CKPT LOAD 26	V93X3737X	0.0	CTRL			26			A	BSL	BSL	INHIBIT IMU CKPT DATA LOAD	X
024	MEM PURGE 27 OPTION	V93J3740C	1.0	DEC			27	1	8	A	GPC	GPC	MEMORY PURGE OPTION SELECTION	X
025	MEM PURGE START 28	V93X3741X	0.0	CTRL			28			A	GPC	GPC	START MEMORY PURGE OPTION	X
026	MEM PURGE STOP 29	V93X3742X	0.0	CTRL			29			A	GPC	GPC	STOP MEMORY PURGE OPTION	X

Table 4.1.7-1(2). GPCIPL MENU (2) (PFS/BFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination		Nomenclature	C R T
								MIN	MAX		PFS	BFS		
001	17 DEU FORMAT LOAD	V93X3718X	1.0	DEC			17			A	GPC	GPC	DEU FORMAT LOAD CMD	X
002	START GPC STP 18	V93X3720X	0.0	CTRL			18			A	GPC	GPC	START GPC SELF TEST	X
003	STOP GPC STP 19	V93X3722X	0.0	CTRL			19			A	GPC	GPC	STOP GPC SELF TEST	X
004	START DEU STP 20	V93X3723X	0.0	CTRL			20			A	GPC	GPC	START DEU SELF TEST CMD	X
005	STOP ON ERROR 24	V93X3732X	0.0	CTRL			24			A	GPC	GPC	STOP STP ON ERROR	X
006	CONT STP ON ERR 25	V93X3735X	0.0	CTRL			25			A	GPC	GPC	CONTINUE STP ON ERROR	X
007	INHIBIT CKPT LOAD 26	V93X3737X	0.0	CTRL			26			A	BSL	BSL	INHIBIT IMU CKPT DATA LOAD	X

Table 4.1.7-2(1). XXXXIPL MENU (1) (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S	Add Ref	Source		Nomenclature	C R T		
			X	Y		CHAR	BILEVEL														TYPE	PFS			BFS	
							1	0																		
001	(TITLE)	V93X0046X	17	1		17.0																UI	MI	CRT TITLE	X	
002	(GPC)	V93X0048X	36	1		2.0																	N/S	MI	GPC DRIVER	X
003	(MT)	V91W1990C	39	1		12.0																	FCOS	BOS	MISSION ELAPSED TIME	X
004	(CRT TIMER)	V91W1987C	39	2		12.0																	N/S	N/S	DISPLAY CRT TIMER,GNC	X
005	PASS1 1	V93X3701X	11	2		1.0	*																KYBD	KYBD	SYS SOFTWARE VERSION-PASS 1	X
006	(GPC)	V93X0048X	36	1		2.0																	UI	N/S	GPC DRIVER	X
007	BFS1 2	V93X3702X	11	3		1.0	*																KYBD	KYBD	SYS SOFTWARE VERSION-BFS 1	X
008	PASS2 3	V93X3703X	11	4		1.0	*																KYBD	KYBD	SYS SOFTWARE VERSION-PASS 2	X
009	BFS2 4	V93X3704X	11	5		1.0	*																KYBD	KYBD	SYS SOFTWARE VERSION-BFS 2	X
010	PASS3 5	V93X3705X	11	6		1.0	*																KYBD	KYBD	SYS SOFTWARE VERSION-PASS 3	X
011	BFS3 6	V93X3706X	11	7		1.0	*																KYBD	KYBD	SYS SOFTWARE VERSION-BFS 3	X
012	PASS4 7	V93X3707X	11	8		1.0	*																KYBD	KYBD	SYS SOFTWARE VERSION-PASS 4	X
013	BFS4 8	V93X3708X	11	9		1.0	*																KYBD	KYBD	SYS SOFTWARE VERSION-BFS 4	X
014	PASS5 9	V93X3709X	24	2		1.0	*																KYBD	KYBD	SYS SOFTWARE VERSION-PASS 5	X
015	BFS5 10	V93X3710X	24	3		1.0	*																KYBD	KYBD	SYS SOFTWARE VERSION-BFS 5	X
016	PASS6 11	V93X3711X	24	4		1.0	*																KYBD	KYBD	SYS SOFTWARE VERSION-PASS 6	X
017	BFS6 12	V93X3712X	24	5		1.0	*																KYBD	KYBD	SYS SOFTWARE VERSION-BFS 6	X
018	PASS7 13	V93X3713X	24	6		1.0	*																KYBD	KYBD	SYS SOFTWARE VERSION-PASS 7	X
019	BFS7 14	V93X3714X	24	7		1.0	*																KYBD	KYBD	SYS SOFTWARE VERSION-BFS 7	X
020	PASS8 15	V93X3715X	24	8		1.0	*																KYBD	KYBD	SYS SOFTWARE VERSION-PASS 8	X
021	BFS8 16	V93X3716X	24	9		1.0	*																KYBD	KYBD	SYS SOFTWARE VERSION-BFS 8	X
022	17 DEU FORMAT LOAD	V93X3718X	20	11		2.0																	KYBD	KYBD	DEU FORMAT LOAD CMD	X
023	START GPC STP 18	V93X3720X	24	13		1.0	*																KYBD	KYBD	START GPC SELF TEST	X
024	STOP GPC STP 19	V93X3722X	24	14		1.0	*																KYBD	KYBD	STOP GPC SELF TEST	X
025	START DEU STP 20	V93X3723X	24	15		1.0	*																KYBD	KYBD	START DEU SELF TEST CMD	X
026	STOP ON ERROR 24	V93X3732X	24	16		1.0	*																KYBD	KYBD	STOP STP ON ERROR	X
027	CONT STP ON ERR 25	V93X3735X	24	17		1.0	*																KYBD	KYBD	CONTINUE STP ON ERROR	X
028	STP/PURGE CYC CNT	V98U4801C	45	3		6.0																	GPCIPL	BSL 2	STP OR PURGE CYCLE COUNT	X
029	INHIBIT CKPT LOAD 26	V93X3737X	24	18		1.0	*																KYBD	KYBD	INHIBIT IMU CKPT DATA LOAD	X
030	ERROR/MSG CODE	V98U4802C	47	4		4.0																	GPCIPL	BSL 2	ERROR CODE	X

Table 4.1.7-2(1). XXXXIPL MENU (1) (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source		Nomenclature	C R T		
			X	Y		CHAR	BILEVEL														TYPE	PFS			BFS	
							1	0																		
031	ERROR/MSG CODE CNT	V98U4803C	46	5		5.0									B							GPCIPL	BSL 2	ERROR CODE COUNT	X	
032	TOTAL ERR/MSG CNT	V98U4806C	46	6		5.0									B								GPCIPL	BSL 2	TOTAL ERROR COUNT	X
033	MSGs STILL IN LIST	V98U4809C	47	7		4.0									B								GPCIPL	BSL 2	ERRORS STILL IN LIST	X
034	MCDS BITE MODE	V98U4810C	47	10		4.0									B								DEU	DEU	MCDS BITE MODE	X
035	MCDS BITE BSR1	V98U4812C	47	11		4.0									B								DEU	DEU	MCDS BITE BSR1	X
036	MCDS BITE BSR2	V98U4813C	47	12		4.0									B								DEU	DEU	MCDS BITE BSR2	X
037	MCDS BITE SWSW	V98U4815C	47	13		4.0									B								DEU	DEU	MCDS BITE SWSW	X
038	(MEMORY PURGE TITLE)	V93X3739X	38	17		14.0									E								UI	MI	MEMORY PURGE TITLE	X
039	MEM PURGE 27 OPTION	V93J3740C	49	19		2.0									B								KYBD	KYBD	MEMORY PURGE OPTION SELECTION	X
040	MEM PURGE START 28	V93X3741X	50	21		1.0	*								B								KYBD	KYBD	START MEMORY PURGE OPTION	X
041	MEM PURGE STOP 29	V93X3742X	50	22		1.0	*								B								KYBD	KYBD	STOP MEMORY PURGE OPTION	X
042	(MSG LINE)	V93X0050X	1	25		44.0									G								UI	N/S	MESSAGE LINE	X
043	(MSG LINE)	V93X0050X	2	25		46.0									G								N/S	MI	MESSAGE LINE	X
044	(BUFFER MSG)	V93X0054X	45	25		4.0									G								N/S	N/S	BUFFER MESSAGE INDICATOR	X
045	(BUFFER MSG)	V93X0054X	48	25		4.0									G								N/S	N/S	BUFFER MESSAGE INDICATOR	X
046	(SPL)	V93X0056X	2	26		49.0									G								UI	MI	SCRATCH PAD LINE	X

Table 4.1.7-2(2). GPCIPL MENU (2) (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S	Add Ref	Source		Nomenclature	C R T		
			X	Y		CHAR	BILEVEL														TYPE	PFS			BFS	
							1	0																		
001	(GPC)	V93X0048X	36	1		2.0																N/S	MI	GPC DRIVER	X	
002	(MT)	V91W1990C	39	1		12.0			DHMS														FCOS	BOS	MISSION ELAPSED TIME	X
003	(CRT TIMER)	ADDENDUM	39	2		12.0			DHMS														N/S	N/S	DISPLAY CRT TIMER	
004	17 DEU FORMAT LOAD	V93X3718X	20	3		2.0																	KYBD	KYBD	DEU FORMAT LOAD CMD	X
005	START GPC STP 18	V93X3720X	24	5		1.0	*																KYBD	KYBD	START GPC SELF TEST	X
006	(GPC)	V93X0048X	36	1		2.0																	UI	N/S	GPC DRIVER	X
007	STOP GPC STP 19	V93X3722X	24	6		1.0	*																KYBD	KYBD	STOP GPC SELF TEST	X
008	START DEU STP 20	V93X3723X	24	7		1.0	*																KYBD	KYBD	START DEU SELF TEST CMD	X
009	STOP ON ERROR 24	V93X3732X	24	8		1.0	*																KYBD	KYBD	STOP STP ON ERROR	X
010	CONT STP ON ERR 25	V93X3735X	24	9		1.0	*																KYBD	KYBD	CONTINUE STP ON ERROR	X
011	INHIBIT CKPT LOAD 26	V93X3737X	24	10		1.0	*								B								KYBD	KYBD	INHIBIT IMU CKPT DATA LOAD	X
012	STP/PURGE CYC CNT	V98U4801C	45	3		6.0									B								GPCIPL	BSL 2	STP OR PURGE CYCLE COUNT	X
013	ERROR/MSG CODE	V98U4802C	47	4		4.0									B								GPCIPL	BSL 2	ERROR CODE	X
014	ERROR/MSG CODE CNT	V98U4803C	46	5		5.0									B								GPCIPL	BSL 2	ERROR CODE COUNT	X
015	TOTAL ERR/MSG CNT	V98U4806C	46	6		5.0									B								GPCIPL	BSL 2	TOTAL ERROR COUNT	X
016	MSGS STILL IN LIST	V98U4809C	47	7		4.0									B								GPCIPL	BSL 2	ERRORS STILL IN LIST	X
017	MCDS BITE MODE	V98U4810C	47	10		4.0									B								DEU	DEU	MCDS BITE MODE	X
018	MCDS BITE BSR1	V98U4812C	47	11		4.0									B								DEU	DEU	MCDS BITE BSR1	X
019	MCDS BITE BSR2	V98U4813C	47	12		4.0									B								DEU	DEU	MCDS BITE BSR2	X
020	MCDS BITE SWSW	V98U4815C	47	13		4.0									B								DEU	DEU	MCDS BITE SWSW	X
021	OLD PSW	V98U4819C	10	15		20.0									B								GPC	GPC	OLD PSW	X
022	REGISTER 0 SET 0	V98U4830C	16	16		8.0									B								GPC	GPC	REGISTER 0 SET 0	X
023	REGISTER 1 SET 0	V98U4831C	25	16		8.0									B								GPC	GPC	REGISTER 1 SET 0	X
024	REGISTER 2 SET 0	V98U4832C	34	16		8.0									B								GPC	GPC	REGISTER 2 SET 0	X
025	REGISTER 3 SET 0	V98U4833C	43	16		8.0									B								GPC	GPC	REGISTER 3 SET 0	X
026	REGISTER 4 SET 0	V98U4834C	16	17		8.0									B								GPC	GPC	REGISTER 4 SET 0	X
027	REGISTER 5 SET 0	V98U4835C	25	17		8.0									B								GPC	GPC	REGISTER 5 SET 0	X
028	REGISTER 6 SET 0	V98U4836C	34	17		8.0									B								GPC	GPC	REGISTER 6 SET 0	X
029	REGISTER 7 SET 0	V98U4837C	43	17		8.0									B								GPC	GPC	REGISTER 7 SET 0	X
030	REGISTER 0 SET 1	V98U4840C	16	19		8.0									B								GPC	GPC	REGISTER 0 SET 1	X

Table 4.1.7-2(2). GPCIPL MENU (2) (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I S T S	S T A T U S	B L A N K	S I Z E	I N T E N S I T Y	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source		Nomenclature	C R T		
			X	Y		CHAR	BILEVEL														TYPE	PFS			BFS	
							1	0																		
031	REGISTER 1 SET 1	V98U4841C	25	19		8.0		HEX														GPC	GPC	REGISTER 1 SET 1	X	
032	REGISTER 2 SET 1	V98U4842C	34	19		8.0		HEX															GPC	GPC	REGISTER 2 SET 1	X
033	REGISTER 3 SET 1	V98U4843C	43	19		8.0		HEX															GPC	GPC	REGISTER 3 SET 1	X
034	REGISTER 4 SET 1	V98U4844C	16	20		8.0		HEX															GPC	GPC	REGISTER 4 SET 1	X
035	REGISTER 5 SET 1	V98U4845C	25	20		8.0		HEX															GPC	GPC	REGISTER 5 SET 1	X
036	REGISTER 6 SET 1	V98U4846C	34	20		8.0		HEX															GPC	GPC	REGISTER 6 SET 1	X
037	REGISTER 7 SET 1	V98U4847C	43	20		8.0		HEX															GPC	GPC	REGISTER 7 SET 1	X
038	FLOATING PT REGS 0	V98U4850C	16	22		8.0		HEX															GPC	GPC	FLOATING POINT REGISTER 0	X
039	FLOATING PT REGS 1	V98U4851C	25	22		8.0		HEX															GPC	GPC	FLOATING POINT REGISTER 1	X
040	FLOATING PT REGS 2	V98U4852C	34	22		8.0		HEX															GPC	GPC	FLOATING POINT REGISTER 2	X
041	FLOATING PT REGS 3	V98U4853C	43	22		8.0		HEX															GPC	GPC	FLOATING POINT REGISTER 3	X
042	FLOATING PT REGS 4	V98U4854C	16	23		8.0		HEX															GPC	GPC	FLOATING POINT REGISTER 4	X
043	FLOATING PT REGS 5	V98U4855C	25	23		8.0		HEX															GPC	GPC	FLOATING POINT REGISTER 5	X
044	FLOATING PT REGS 6	V98U4856C	34	23		8.0		HEX															GPC	GPC	FLOATING POINT REGISTER 6	X
045	FLOATING PT REGS 7	V98U4857C	43	23		8.0		HEX															GPC	GPC	FLOATING POINT REGISTER 7	X
046	MAJ=	V98U4820C	5	24		6.0		DEC															GPCIPL	BSL 2	MAJOR CYCLE COUNT	X
047	MIN=	V98U4821C	16	24		3.0		DEC															GPCIPL	BSL 2	MINOR CYCLE COUNT	X
048	SCHEDWRD=	V98U4822C	29	24		8.0		HEX															GPCIPL	BSL 2	MINOR CYCLE SCHEDULE	X
049	CLOCK1=	V98U4823C	45	24		6.0		DEC															GPCIPL	BSL 2	CLOCK 1 INTERRUPT VALUE	X
050	(MSG LINE)	V93X0050X	1	25		44.0		CHAR															UI	N/S	MESSAGE LINE	X
051	(MSG LINE)	V93X0050X	2	25		46.0		CHAR															N/S	MI	MESSAGE LINE	X
052	(BUFFER MSG)	V93X0054X	45	25		4.0		CHAR															N/S	N/S	BUFFER MESSAGE INDICATOR	X
053	(BUFFER MSG)	V93X0054X	48	25		4.0		CHAR															N/S	N/S	BUFFER MESSAGE INDICATOR	X
054	(SPL)	V93X0056X	2	26		49.0		CHAR															UI	MI	SCRATCH PAD LINE	X

4.1.8 BFS MEMORY (BFS)

TITLE: BFS MEMORY

TYPE: GNC OPS 0001, SPEC/000

AVAILABILITY: BFS, GNC OPS 0, 1, 3, 6
SM OPS 0

4.1.8.1 Purpose, Operation, and Organization

- (1) BFS MEMORY. This display provides a crew interface to:
 - a. Review and change the value contained in any BFS GPC location.
 - b. Perform a main memory dump.
 - c. Enable reception of one-shot transfer data from PASS by BFS.
 - d. Initiate & terminate polling of Launch Data Bus (LDB1) and (LDB2) for the BFS GPC.
 - e. Enable the automatic Telemetry Format Load (TFL) function.
 - f. Update BFS GMT and MET.
 - g. Toggle the BFS Mission Time display field between MET and GMT.

Figure 4.1.8-1 is the BFS Memory Display Format for BFS. The BFS Memory display controls are described below.

- (2) READ/WRITE CONTROLS. The capability for a general memory read and write function is provided on this OPS/SPEC. The display provides the means for the crew to review and to change the value contained in any specified BFS GPC memory location. The display is primarily intended to address data (unprotected) sections of memory. However, a special operating mode is provided to address code (protected) memory locations. The general use of the display is to first read the present value of a given location. The read function requires crew data inputs to specify memory location, scaling, and conversion requirements. The value may then be changed by a two-step load function. The desired new value is displayed separately as crew input data. The new value is verified, then transferred to memory by a crew controlled input. Additional control inputs allow reading of sequential locations with minimal inputs/operating mode selection.

DISPLAY INITIALIZATION. The display is initialized with all data fields blank except for MODE. Read/Write display format selection is initialized to the HEX format. The available modes are DATA, CODE, BIT SET, or BIT RESET. The modes are mutually exclusive and only one of the four may be active at a time. The display is initialized with MODE reflecting (DATA). The operating mode is changed by the control input MODE (Item 1, 2, 3 or 4). Upon executing any of these inputs, the active mode is indicated by an asterisk to the right of the corresponding item number and all data fields are blanked. The asterisk(*) remains next to the selected MODE until changed by another mode entry or until the display is terminated. When the CODE mode is selected, the word CODE flashes.

- (3) MODE SELECT. A set of item entries (Items 1,2,3 & 4) allows the user to select the mode of operation, DATA/CODE for altering complete memory locations or BIT SET/RESET, setting or resetting of individual bits in memory. Any selection also causes HEX to be reselected and all Read/Write fields to be blanked.
- (4) BIT SET/RESET. Items 3 & 4 provide the capability to Set/Reset individual bits in GPC memory using the common logic of the LDB General Memory Read/Write and the Uplink General Memory Read/Write functions. Bit manipulations are performed on half words (16 bits) and do not require user knowledge of the state of adjacent bits. The function is implemented using a mask (user input) that identifies the bits that are to be set or reset. Any combination of bits in a 16-bit word can be specified in the mask word and up to 6 half-words can be modified with a single WRITE execution. This function applies only to the unprotected areas of memory. The CODE mode is used to alter bits in protected areas since the state of adjacent bits does not change.

To set a bit(s) in memory, Item 3 is executed to initialize the BIT SET mode: The memory location of the half-word containing the bit(s) is then entered with the appropriate ADD ID item number. In order to visually verify the load, it is necessary to display the memory contents in hexadecimal representation. Therefore, HEX (Item 8) must be selected. Upon executing the ADD ID entries, the contents of the memory location is displayed in the ACTUAL field. The desired mask is then entered in the DESIRED field. The mask word is a 16-bit word that is entered with four hexadecimal characters. The 16 bits of the mask word have a one-for-one correspondence with the 16 bits of the memory word and identify the bits to be set/reset and unaltered. Thus, the bit(s) to be set in the memory word must have the corresponding bit(s) set in the mask word. Upon executing the WRITE (Item 6), the memory word(s) is altered according to the mask(s) and the new representation(s) as stored in memory is displayed in the ACTUAL field.

To reset a bit(s), the user executes Item 4 and applies the above logic. Note that the mask is entered the same for setting or resetting bits (i.e., a “one” in the mask identifies the bits to be set or reset).

- (5) CONTROL INPUTS. Control parameters are entered by item numbers. In addition to the mode control input, the following parameters are defined for display control:
- ADD ID (Memory Location). A five-digit hexadecimal number identifying the memory location being addressed. For quantities stored in full-words (i.e., 32 bits), the identified location is the starting or most significant part of the word.
- (6) SCALING AND CONVERSION. Two controls are provided to allow the crew to select the display format for the Read option. The two options are Engineering Units (Item 7) and Hex (Item 8). The options for Engineering Units are Single precision floating point (32 bit) or Single precision fixed point (16 bit). The first digit identifies fixed or floating point. The second and third digits select the desired unit conversion. The table below shows how Item 7 is used to determine the conversion factors and to select the precision.

7 ENG UNITS X X X

A	B	B	SPECIFICATION
1			16 Bit/Fixed
2			32 Bit/Floating
	0	0	– Units in Memory (no conversion)
	0	1	– NM from FT
	0	2	– NM from KFT
	0	3	– FT from NM
	0	4	– KFT from NM
	0	5	–FPS2 from G's
	0	6	– DEG/SEC from MRS
	0	7	– DEG from ARC SEC
	0	8	– FPS2 from micro G's
	0	9	– DEG from Radians
	1	0	– KFT from FT

- (7) SEQ ID. (Sequential Read). Item 5 provides the capability to initiate a sequential read command. This command addresses sequential locations in the GPC without requiring the crew to input data for individual locations. Before initiating the sequential read command, the desired ENG UNIT or HEX selection must be made by keying Item 7 or 8 and the ADD ID to specify the starting location must be entered.

Upon execution of the SEQ ID control, the sequential locations following the starting locations are displayed and the corresponding DESIRED fields are blanked. The ADD ID and ACTUAL values are displayed with the value specified in either ENG UNITS or HEX. If multiple locations are displayed when the sequential read is executed, the most recently entered ADD ID is assumed to be the starting address. The sequential capability is for readout only and does not apply to the WRITE function. However, the capability is provided to write into an ACTUAL list of values that has been displayed using the sequential read function.

- (8) MEMORY READ. The actual value stored in the identified location is displayed in the format specified by Digit A of the ENG UNIT word in decimal quantities of the format $\pm\text{XXXXX.XXXXX}$, and the displayed units of those stored internally, unless a conversion is specified by Digits BB of the Eng Unit word. Hexadecimal quantities are output as four characters per GPC half-word. The four-character half-word is displayed right-justified. The memory value is displayed in the ACTUAL field upon entering the ADD ID and ENG UNIT inputs. This field is dynamic and updated at a rate of 1 HZ.

To display or review the present value of a quantity in memory, the appropriate ADD ID and ENG UNIT/HEX inputs are made by individual item entries. The ADD ID may be entered in any row by using the corresponding item number (9, 11, 13...19). Upon entering the ADD ID, the corresponding DESIRED field is blanked and the present value is displayed in the ACTUAL field of the same row in either ENG UNIT or HEX as selected. It is possible to change the units or format (hexadecimal/decimal) by reentering the appropriate ENG UNIT/HEX input. The ACTUAL field is updated to reflect the new ENG UNIT/HEX value. If it is

necessary to change the displayed value, the new value is entered in the DESIRED field of the row.

- (9) WRITE (Execute Load). Item entry (Item 6) issued to initiate transfer of DATA, CODE, BIT SET, or BIT RESET to memory.

MEMORY WRITE. All changes to memory are done in an arm/fire manner. This requires that the new value be entered and displayed for verification, then sent to memory for storage. The value being addressed must be entered in hexadecimal format. Hexadecimal values are 4 characters (with no sign) for half words. The DESIRED field is not blank upon executing the control input (Item 6) for execute load. For WRITE operations, new values are entered as Items 10, 12, 14,...20. After verifying the DESIRED entry, the memory load is initiated by executing the control input WRITE (Item 6). The DESIRED field remains displayed for comparison with the ACTUAL field which reflects the new stored value until MODE is reselected or changed. The write item shall only invoke Desired fields that have been entered subsequent to address ID inputs.

Selected values in the ACTUAL list can be changed by supplying DESIRED data for only those values and then performing a WRITE command. Blank rows in the DESIRED column are skipped and their current values unchanged, if at least one DESIRED value in the list has been supplied prior to a WRITE command.

For information only, an attempt to write to a protected memory address will cause the GPC to reset the Soft Error Counter.

- (10) MEMORY DUMP.

- a. Main Memory Dump. Two item numbers are provided to define the memory data to be dumped via the downlist. For main memory dumps, the absolute main memory address in hexadecimal of the START of the dump is entered in the START ID (Item 21) and the number of sequential 16-bit words of main memory to be dumped is entered via NUMBER WDS (Item 22). The data for these two items are displayed upon entry. The entire main memory may be dumped by execution of these two item numbers along with the WDS/Frame (Item 23). If the starting address plus the number of words is greater than the number of words in GPC Memory, an operator error message is generated and the input rejected.
- b. WDS/Frame (Item 23) is provided to define the number of 16-bit words in the downlist frame to be used for header and main memory data. Entry of this item controls the length of the data content of the downlist frame so that a subset of the total downlist frame can be used for the 64 KBPS downlink frame. The number of words per frame data entry is limited to two values, 16 or 32, and entry of any other value will be rejected and result in an operator error message.
- c. There shall exist two ways in which data can be entered into START ID (Item 21), NUMBER WDS (Item 22), and WDS/FRAME (Item 23) described in sections a and b. The first is through the default setting of the Single Item Entry Dump. If no values have been entered for the items in a and b, and DUMP START/STOP (Item 24) is executed, default values will be inserted into the appropriate item entry as follows:

START ID	00000
NUMBER WDS	262144
WDS/FRAME	32

The second method is to manually input the data for all three item entries. Once data has been manually entered into one or more of the items from a and b, it will be necessary to manually enter values for all three or an error message shall be generated and the input rejected, when DUMP START/STOP (Item 24) is executed.

- d. DUMP START/STOP (Item 24) is provided to initiate/terminate the dump and will function as a toggle for both a manual and default dump. Upon the first execution of this item the dump will be initiated, the 'START ID' (Item 21) will start incrementing, and the 'NUMBER WDS' (Item 22) will decrement. At dump completion or termination (via a second entry of the DUMP START/STOP item), both items as well as 'WDS/FRAME' (Item 23) will be blanked. After the completion or termination of either dump (Single Item Entry Dump or Manual Dump), the dump will be reset to the default setting of the Single Item Entry Dump.

NOTE: Memory dump controls are always active in the BFS.

- (11) PASS/BFS XFER ENA. Execution of Item 25 enables BFS reception of one shot transfer initialization data from PFS. An asterisk appears adjacent to Item 25 when the crew has enabled its transfer via keyboard. The asterisk shall disappear when the data transfer has been successfully completed. This transfer is only valid in BFS GNC OPS 0, and will be treated as an operator error in any other OPS.

NOTE: The process for the on-demand one-shot transfer of the data is initiated in the PFS GN&C OPS 9 by the PASS/BFS TRANSFER item entry located on the "GTS DISPLAY" (SPEC 100)–See Section 4.6.5.(The initialization data to be transferred is specified in the PASS/BFS SOFTWARE INTERFACE Document ICD-2-1S001.)

- (12) LAUNCH BUS 1/2 AND OFF. Three item numbers (Items 26, 27 and 28) are provided to initiate or terminate polling of LDB1 or LDB2. These three items are mutually exclusive, and an asterisk(*) beside the item indicates the current state of the controls. Item 28 is used to terminate polling of either LDB1 or LDB2. These controls can be changed by crew control or by the ground, via uplink. The display is initialized with OFF selected.
- (13) TFL ENA. This item is a toggle control which enables/disables the auto TFL function. If enabled, the auto TFL function will load and verify the Pulse Code Modulation Master Unit (PCMMU), whenever a PCMMU switchover occurs. An asterisk(*) adjacent to Item 29 indicates the TFL function is enabled. The display is initialized with Item 29 (TFL ENA) enabled and will thereafter reflect crew inputs.
- (14) BFS TIME UPDATES. Items 30 through 38 provide the capability to update the BFS GPC GMT and/or MET.

Items 30 through 33 allow the input of a delta time in days, hours, minutes, seconds and milliseconds to the GMT of the BFS GPC. Upon execution of item 38 (time UPDATE), the values loaded in Items 30 through 33 are used to update the BFS GPC GMT. The resulting GMT must be greater than or equal to day 1 and less than day 400. If Item 38 is executed, and the resulting GMT is not within these limits, an "ILLEGAL ENTRY" message shall be displayed, the GMT shall not be updated, all delta time entries shall be reset to zero and

blanked on the display, and the GMT sign shall be blanked on the display. An update of the BFS GMT shall be legal in OPS 0 only. Therefore, if the BFS is not in OPS 0, an entry of Items 30 – 33 shall result in an “ILLEGAL ENTRY” message being displayed and the input rejected.

Items 34 through 37 allow the input of a delta time in days, hours, minutes, seconds and milliseconds to the MET of the BFS GPC. Upon execution of Item 38 (time UPDATE), the values loaded in Items 34 through 37 are used to update the BFS GPC MET. The resulting MET must be greater than or equal to day 0 and less than day 400. If Item 38 is executed, and the resulting MET is not within these limits, an “ILLEGAL ENTRY” message shall be displayed, the MET shall not be updated, all delta time entries shall be reset to zero and blanked on the display, and the MET sign shall be blanked on the display. An update of the BFS MET shall be legal in MM 301 only. Therefore, if the BFS is not in MM 301, an entry of Items 34 – 37 shall result in an “ILLEGAL ENTRY” message being displayed and the input rejected.

The sign of the lowest item number entered in a set (with a non-zero value) shall determine the sign of the entire set (i.e., Item 30 – 33 or 34 – 37). If a value of zero is entered for any of the Items 30 – 37, that item shall be blanked on the display and its sign shall not contribute to the determination of the sign of the entire set.

Items 30 – 37 shall be initialized to zero and shall be initially blank on the display. The GMT/MET delta sign fields shall also be initially blank. These items shall be re-initialized and blanked upon any Major Mode transition, including the GMT/MET sign fields.

Item 38 shall be legal in OPS 0 or MM 301 only, and is only legal when at least one of Items 30 – 37 has a non-zero value. Therefore, if the BFS is not in OPS 0 or MM 301, or if all of Items 30 – 37 have zero values, an entry of Item 38 shall result in an “ILLEGAL ENTRY” message being displayed and the input rejected.

Upon a valid entry of Item 38, the GMT/MET delta time entries shall be converted to seconds prior to being sent to MTU Redundancy Management (MTURM), where the actual update will occur.

- (15) MISSION TIME. Items 39 and 40 are used to select either GMT (Item 39) or MET (Item 40) as the source for mission time for all BFS driven displays. An asterisk (*) shall be displayed next to the selected source, and a blank shall indicate that a source, GMT or MET, is not selected for driving mission time. Source selection carries forward across OPS transitions until manually changed. Items 39 and 40 shall be legal in OPS 0, 1, 3, and 6. The source selection shall be initialized to MET and an asterisk shall be initially displayed next to Item 40.

Error Conditions

The GPC software tests for violations of any input constraints described in the preceding paragraphs. Specifically, the following violations are detected and annunciated with an error message.

- A. Sequential read (SEQ ID) executed when all ADD ID fields are blank.
- B. WRITE executed when no ADD ID has data entered in corresponding desired column.
- C. WRITE executed when data entered in DESIRED with no corresponding ADD ID.
- D. WRITE executed if any ADD ID with corresponding DESIRED has protected status disagreeing with

selected MODE (attempt to write CODE into DATA or DATA into CODE locations).

- E. WRITE executed when HEX is not selected.
- F. ENG UNITS value entered outside the ranges of 100–110 or 200–210.
- G. ADD ID entered outside the range of memory.
- H. Odd ADD ID entered when selected ENG UNITS option is 32 bit floating point (200–210).
- I. DESIRED entered when HEX not selected.
- J. DESIRED entered not equal to four digits.
- K. MEMORY DUMP START ID and/or NUMBER WDS define a range outside of memory.
- L. MANUAL DUMP START/STOP WDS/FRAME value entered not equal to 16 or 32.
- M. MANUAL DUMP START/STOP executed with data entered in one or more but not all of START ID, NUMBER WDS and WDS/FRAME.
- N. PASS/BFS XFER ENA executed when mode is not GNC OPS 000 and BFS is not stand-alone.
- O. Items 30 – 33 entered while BFS is not in OPS 0.
- P. Items 34 – 37 entered while BFS is not in MM 301.
- Q. Item 38 entered while BFS is not in OPS 0 or MM 301.
- R. Item 38 entered when all GMT/MET delta time entries have zero values.
- S. Resulting GMT less than day 1.
- T. Resulting GMT greater than or equal to day 400.
- U. Resulting MET less than day 0.
- V. Resulting MET greater than or equal to day 400.

4.1.8.2 BFS Memory Keyboard Processing Addendum

- A. Upon execution of any Mode selection – DATA CODE, BIT SET or BIT RESET (V93J4390C), all “ADD ID’s,” “DESIRED & ACTUAL’s” shall blank and Item 8 (HEX) shall be selected.
- B. Upon execution of WRITE (Item 6), all desired data shall remain displayed until the MODE has been changed or reselected.
- C. The resulting GMT must be greater than or equal to day 1 and less than day 400. If Item 38 is executed, and the resulting GMT is not within these limits, an “ILLEGAL ENTRY” message shall be displayed, the GMT shall not be updated, all delta time entries shall be reset to zero and blanked on the display, and the GMT sign shall be blanked on the display.
- D. The resulting MET must be greater than or equal to day 0 and less than day 400. If Item 38 is executed, and the resulting MET is not within these limits, an “ILLEGAL ENTRY” message shall be displayed, the MET shall not be updated, all delta time entries shall be reset to zero and blanked on the display, and the MET sign shall be blanked on the display.
- E. Upon a valid entry of Item 38, the GMT/MET delta time entries shall be converted to seconds prior to being sent to MTU Redundancy Management (MTURM), where the actual update will occur.

- F. Items 39 and 40 shall be mutually exclusive. Upon execution of Item 39/40, an asterisk (*) shall be displayed next to Item 39/40 and Item 40/39 shall be blanked on the display, respectively.

4.1.8.3 BFS Memory CRT Display Processing Addendum

The following alpha code(s) appear (left justified) in the ADD REF column of the Table 4.1.8–2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. The measurement number representing the CRT TIMER is dependent upon which major function this display is called in and is defined by the following table:

MAJOR FUNCTION SETTING	MSID
GNC	V91W1987C
SM	V91W1988C
PL	V91W1989C

- B. The MODE SELECT indicator is defined by one measurement number with four states as follows:

STATE	DATA	CODE	BIT SET	BIT RST
0	*			
1		*		
2			*	
3				*

The word ‘CODE’ is always displayed. When CODE is selected, then the word ‘CODE’ shall be flashed but becomes static when CODE is deselected and/or DATA selected.

- C. The data format for ACTUAL will vary as a function of whether ENG UNITS or HEX units are selected (Items 7 and 8). When ENG UNITS are selected, either 16 bit/fixed/decimal or 32 bit/floating point/decimal will be specified by the first character of the ENG UNITS (Item 7) data word as follows:

	<u>CHAR</u>	<u>X COORD</u>
1 – 16 bit/fixed	12.5	30
2 – 32 bit/floating	12.5	30

The last two characters of the ENG UNITS (Item 7) will be used to specify the desired type of engineering units to be displayed (i.e., NM, FT, DEG, RAD, etc.). There will be a set of ten different engineering units that can be displayed which will be specified by entering 00–10 for the last two characters as follows:

ENTRY	UNITS TO BE DISPLAYED
00	UNITS IN MEMORY (No Conversion)
01	NM from FT
02	NM from KFT
03	FT from NM
04	KFT from NM
05	FPS2 from G's
06	DEG/SEC from Millirad/SEC
07	DEG from ARC SEC
08	FPS2 from micro G's
09	DEG from Radians
10	KFT from FT

When HEX is selected (Item 8), the data presented in ACTUAL will be 16 bit/hexadecimal as follows:

<u>CHAR</u>	<u>X COORD</u>
4.0	38 (right adjusted)

When Item 8 (HEX) is selected, the data for Item 7 will be blanked. When Item 7 data is entered and executed, Item 8 will be deselected, i.e., the asterisk after Item 8 blanked.

- D. Data fields for START ID (Item 21), and NO WORDS (Item 22) are blanked upon completion of the dump initiated by DUMP START/STOP (Item 24).
- E. Upon completion of an update (Item 38), all delta time entries shall be blanked on the display and reset to zero by the software, thereby ensuring that new delta time entries shall not conflict with previous entries. The GMT/MET delta sign shall also be blanked on the display.
- F. The sign of the lowest item number entered in a set (with a non-zero value) shall determine the sign of the entire set (i.e., Item 30 – 33 or 34 – 37). If a value of zero is entered for any of the Items 30 – 37, that item shall be blanked on the display and its sign shall not contribute to the determination of the sign of the entire set. The sign of the entire set shall be displayed next to the days field. The individual signs of Items 30–37 shall not be displayed.
- G. Items 30 – 37 shall be initialized to zero and shall be initially blank on the display. The GMT/MET delta sign fields shall also be initially blank. These items shall be re-initialized and blanked upon any Major Mode transition, including the GMT/MET sign fields.
- H. Items 39 and 40 shall be mutually exclusive. Upon execution of Item 39/40, an asterisk (*) shall be displayed next to Item 39/40 and Item 40/39 shall be blanked on the display, respectively. The source selection shall be initialized to MET and an asterisk shall be initially displayed next to Item 40.

4.1.8.4 BFS Memory Figure/Table References

Figure 4.1.8.1	BFS Memory Display (BFS)
Table 4.1.8-1	Keyboard Processing Table
Table 4.1.8-2	CRT Display Processing Table
Table 4.1.8-3	CRT Display Processing Background Requirements N/A
Table 4.1.8-4	Mission Design Background Constants N/A
Table 4.1.8-5	Input Functional Parameters N/A
Table 4.1.8-6	Output Functional Parameters N/A
Table 4.1.8-7	I-Loads
Table 4.1.8-8	K-Loads
Table 4.1.8-9	Constants N/A

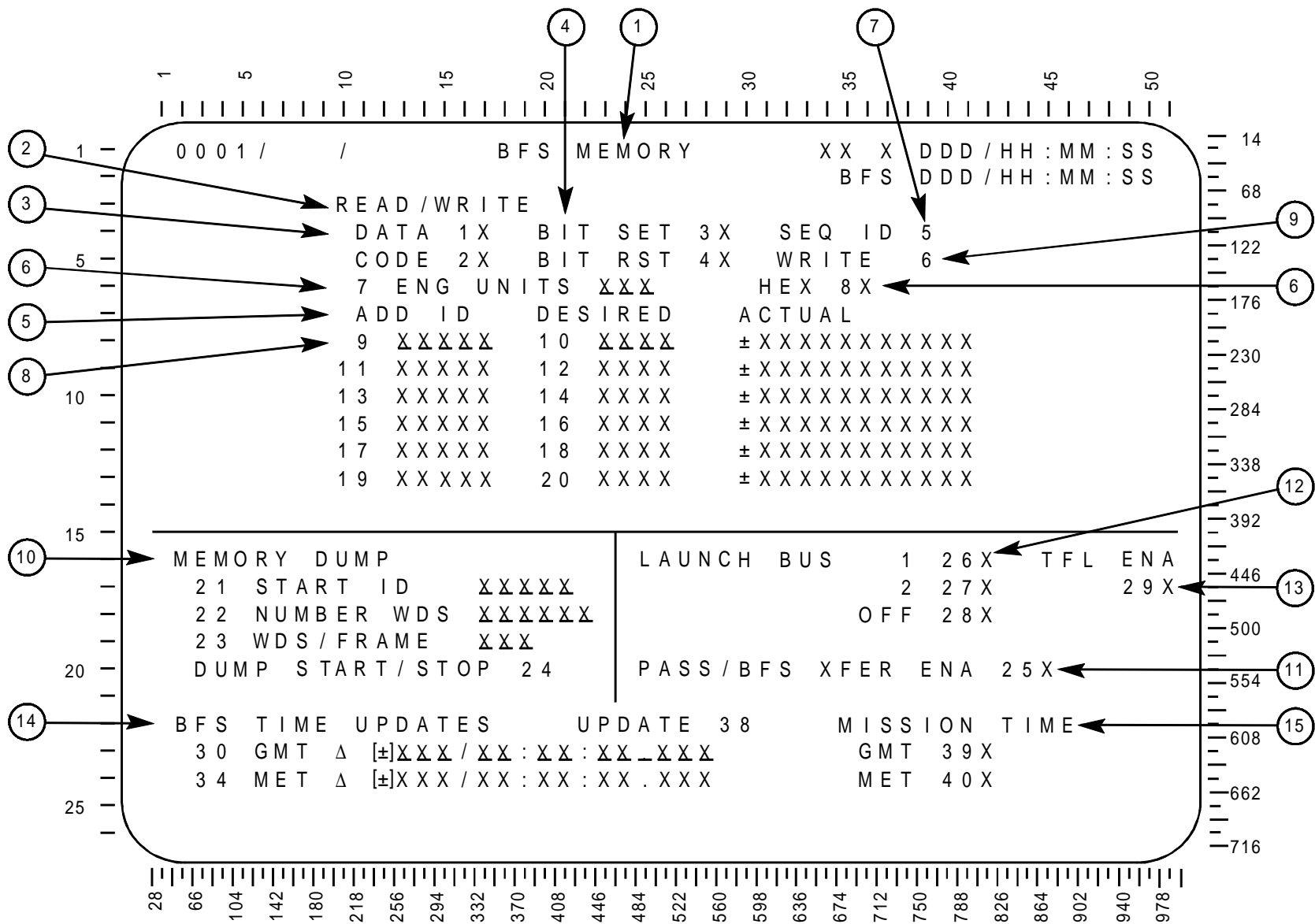


FIGURE 4.1.8-1. BFS Memory Display (BFS)

Table 4.1.8-1.BFS MEMORY (BFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination		Nomenclature	C R T
								MIN	MAX		PFS	BFS		
001*	DATA SELECT 1	V93J4390C	0.0	CTRL			1			A	N/S	DOP	MODE SELECT	X
002*	CODE SELECT 2	V93J4390C	0.0	CTRL			2			A	N/S	DOP	MODE SELECT	X
003*	BIT SET 3	V93J4390C	0.0	CTRL			3			A	N/S	DOP	MODE SELECT	X
004*	BIT RESET 4	V93J4390C	0.0	CTRL			4			A	N/S	DOP	MODE SELECT	X
005*	SEQ ID 5	V93X4381X	0.0	CTRL			5				N/S	DOP	SEQ READ	X
006*	WRITE 6	V93X4380X	0.0	CTRL			6			B	N/S	DOP	EXEC WRITE	X
007*	ENG UNITS 7	V93Q4363C	4.0	DEC			7				N/S	DOP	ENG UNITS	X
008*	HEX 8	V93X4364X	0.0	CTRL			8				N/S	DOP	HEX/ENG UNIT	X
009*	ADD ID 9	V93U4300C	5.0	HEX			9				N/S	DOP	ADD ID WORD 1 INPUT	X
010*	DESIRED 10	V93U4340C	4.0	HEX			10			B	N/S	DOP	DESIRED WORD 1 INPUT	X
011*	ADD ID 11	V93U4301C	5.0	HEX			11				N/S	DOP	ADD ID WORD 2 INPUT	X
012*	DESIRED 12	V93U4341C	4.0	HEX			12			B	N/S	DOP	DESIRED WORD 2 INPUT	X
013*	ADD ID 13	V93U4302C	5.0	HEX			13				N/S	DOP	ADD ID WORD 3 INPUT	X
014*	DESIRED 14	V93U4342C	4.0	HEX			14			B	N/S	DOP	DESIRED WORD 3 INPUT	X
015*	ADD ID 15	V93U4303C	5.0	HEX			15				N/S	DOP	ADD ID WORD 4 INPUT	X
016*	DESIRED 16	V93U4343C	4.0	HEX			16			B	N/S	DOP	DESIRED WORD 4 INPUT	X
017*	ADD ID 17	V93U4304C	5.0	HEX			17				N/S	DOP	ADD ID WORD 5 INPUT	X
018*	DESIRED 18	V93U4344C	4.0	HEX			18			B	N/S	DOP	DESIRED WORD 5 INPUT	X
019*	ADD ID 19	V93U4305C	5.0	HEX			19				N/S	DOP	ADD ID WORD 6 INPUT	X
020*	DESIRED 20	V93U4345C	4.0	HEX			20			B	N/S	DOP	DESIRED WORD 6 INPUT	X
021*	START ID 21	V93U4612C	5.0	HEX			21				N/S	DOP	START ADDRESS MEMORY DUMP INPUT	X
022*	NUMBER WDS 22	V93Q4610C	7.0	DEC			22				N/S	DOP	NUMBER WDS IN MEMORY DUMP INPUT	X
023*	WDS/FRAME 23	V93Q4644C	3.0	DEC			23				N/S	DOP	WDS/FRAME IN MEMORY DUMP	X
024*	DUMP START/STOP 24	V93X4618X	0.0	CTRL			24				N/S	DOP	GPC MEMORY DUMP START/STOP EXEC	X
025	PASS/BFS XFER ENA25	V93X4650X	0.0	CTRL			25				N/S	DOP	PASS/BFS TRANSFER ENABLE	X

Table 4.1.8-1.BFS MEMORY (BFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination		Nomenclature	C R T
								MIN	MAX		PFS	BFS		
026	LAUNCH BUS 1 26	V93X4383X	0.0	CTRL			26				N/S	DOP	LAUNCH BUS 1 CMD	X
027	LAUNCH BUS 2 27	V93X4384X	0.0	CTRL			27				N/S	DOP	LAUNCH BUS 2 CMD	X
028	LAUNCH BUS OFF 28	V93X4336X	0.0	CTRL			28				N/S	DOP	LAUNCH BUS OFF CMD	X
029	TFL ENA 29	V93X4651X	0.0	CTRL			29				N/S	DOP	TELEMETRY FORMAT LOAD EXEC CMD	X
030	30 GMT DELTA DYS	V98W0682C	4.0	DEC	D		30			C	N/S	DOP	BFS GMT DELTA UPDATE WD1	X
031	31 GMT DELTA HRS	V98W0683C	3.0	DEC	H		31			C	N/S	DOP	BFS GMT DELTA UPDATE WD2	X
032	32 GMT DELTA MNS	V98W0684C	3.0	DEC	M		32			C	N/S	DOP	BFS GMT DELTA UPDATE WD3	X
033	33 GMT DELTA S/MS	V98W0685C	7.3	DEC	S		33			C	N/S	DOP	BFS GMT DELTA UPDATE WD4	X
034	34 MET DELTA DYS	V98W0687C	4.0	DEC	D		34			D	N/S	DOP	BFS MET DELTA UPDATE WD1	X
035	35 MET DELTA HRS	V98W0688C	3.0	DEC	H		35			D	N/S	DOP	BFS MET DELTA UPDATE WD2	X
036	36 MET DELTA MNS	V98W0689C	3.0	DEC	M		36			D	N/S	DOP	BFS MET DELTA UPDATE WD3	X
037	37 MET DELTA S/MS	V98W0690C	7.3	DEC	S		37			D	N/S	DOP	BFS MET DELTA UPDATE WD4	X
038	UPDATE 38	V98X0691X	0.0	CTRL			38			C,D,E	N/S	DOP	BFS GMT/MET UPDATE EXEC	X
039	GMT 39	V98X0692X	0.0	CTRL			39			F	N/S	BSS	MET/GMT SELECT	X
040	MET 40	V98X0692X	0.0	CTRL			40			F	N/S	BSS	MET/GMT SELECT	X

Table 4.1.8-2.BFS MEMORY (BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
031*	DESIRED 20	V93U4345C	23	13		4.0															DOP	DESIRED WORD 6 INPUT	X	
032	ACTUAL 6	V91U1165C	30	13		12.0															C	DOP	CURRENT WORD 6	X
033*	21 START ID	V93U4612C	17	17		5.0					X										D	DOP	START ADDRESS MEMORY DUMP INPUT	X
034*	22 NUMBER WDS	V93Q4610C	16	18		7.0					X										D	DOP	NUMBER WDS IN MEMORY DUMP INPUT	X
035*	23 WDS/FRAME	V93Q4644C	16	19		4.0					X										D	DOP	WDS/FRAME IN MEMORY DUMP	X
036	PASS/BFS XFER ENA25	V93X4650X	45	20		1.0	*								E							MI	PASS/BFS TRANSFER ENABLE	X
037	LAUNCH BUS 1 26	V93X4383X	42	16		1.0	*															DOP	LAUNCH BUS 1 CMD	X
038	LAUNCH BUS 2 27	V93X4384X	42	17		1.0	*															DOP	LAUNCH BUS 2 CMD	X
039	LAUNCH BUS OFF 28	V93X4336X	42	18		1.0	*															DOP	LAUNCH BUS OFF CMD	X
040	TFL ENA 29	V93X4651X	51	17		1.0	*								E							MI	TELEMETRY FORMAT LOAD EXEC CMD	X
041	GMT DELTA SIGN	V98U0681C	12	23		1.0					X				E						EFG	KYBD	BFS GMT DELTA SIGN	X
042	30 GMT DELTA DYS	V98W0682C	12	23		4.0			D		X				E						EFG	KYBD	BFS GMT DELTA UPDATE WD1	X
043	31 GMT DELTA HRS	V98W0683C	16	23		3.0			H		X				E						EFG	KYBD	BFS GMT DELTA UPDATE WD2	X
044	32 GMT DELTA MNS	V98W0684C	19	23		3.0			M		X				E						EFG	KYBD	BFS GMT DELTA UPDATE WD3	X
045	33 GMT DELTA S/MS	V98W0685C	22	23		7.3			S		X				E						EFG	KYBD	BFS GMT DELTA UPDATE WD4	X
046	MET DELTA SIGN	V98U0686C	12	24		1.0					X				E						EFG	KYBD	BFS MET DELTA SIGN	X
047	34 MET DELTA DYS	V98W0687C	12	24		4.0			D		X				E						EFG	KYBD	BFS MET DELTA UPDATE WD1	X
048	35 MET DELTA HRS	V98W0688C	16	24		3.0			H		X				E						EFG	KYBD	BFS MET DELTA UPDATE WD2	X
049	36 MET DELTA MNS	V98W0689C	19	24		3.0			M		X				E						EFG	KYBD	BFS MET DELTA UPDATE WD3	X
050	37 MET DELTA S/MS	V98W0690C	22	24		7.3			S		X				E						EFG	KYBD	BFS MET DELTA UPDATE WD4	X

Table 4.1.8-2.BFS MEMORY (BFS) CRT DISPLAY PROCESSING																								
Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	STATUS	BLANK	SIZE	INTENS	FLASH	RATE	SIGN	LEADER	BRANCH	DOWNLIST	Add Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
051	GMT 39	V98X0692X	42	23		1.0	*													H	KYBD	MET/GMT SELECT	X	
052	MET 40	V98X0692X	42	24		1.0		*												H	KYBD	MET/GMT SELECT	X	
053	(MSG LINE)	V93X0050X	2	25		46.0															MI	MESSAGE LINE	X	
054	(BUFFER MSG)	V93X0054X	48	25		4.0															MI	BUFFER MESSAGE INDICATOR	X	
055	(SPL)	V93X0056X	2	26		49.0															MI	SCRATCH PAD LINE	X	
200	(BFS)	V98X0015X	35	2		3.0						X									MI	BFS IDENTIFIER BFS	X	

TABLE 4.1.8-7. BFS MEMORY (4.1.8) I-LOADS

BFS NAME	MSID	ENG UNITS	DT	PR	D	S	PARA	MC	CAT	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.1.8-8. BFS MEMORY (4.1.8) K-LOADS

BFS NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PARA	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2 GUIDANCE, NAVIGATION & CONTROL CRT DISPLAYS

4.2.1 ENTRY TRAJECTORY 1 (PFS/BFS)

TITLE: ENTRY TRAJ 1

TYPE: OPS/3041

AVAILABILITY: OPS 3, PFS/BFS

4.2.1.1 Purpose, Operation, and Organization

Entry Traj X (1–5) displays present navigational and guidance information to the crew during entry from entry interface to TAEM interface. The fixed backgrounds, configured for five sub–phases of entry, are mission dependent and are designed to allow the crew to monitor the vehicle’s progression compared to planned entry profiles and to the guidance trajectory. Figures 4.2.1–1 and 4.2.1–2 present the display format of ENTRY TRAJ 1 for the PFS and BFS, respectively. The circled numbers and arrows on the figures correspond to those which appear in the following requirements definition.

- (1) The title is partially dynamic, the digit represented by X ranging from 1 through 5. Upon PRO to MM304 the first display, ENTRY TRAJ 1, is presented on the CRT and as the vehicle progresses through entry (MM304) the displays sequence automatically as the shuttle symbol moves out of range of one display to next.
- (2) The mission–dependent backgrounds of the displays consist of solid nominal trajectory guidelines and dashed nominal constant drag acceleration lines. The solid lines are unlabeled and are plotted as functions of relative velocity (ENTRY TRAJ 1 through 3) or Energy Over Weight (EOW) (ENTRY TRAJ 4, 5) and range. The number of solid lines is dependent on the entry subphase. Every display will contain lines corresponding to the nominal flight profile and supplementary lines representing sub–phase dependent flight regimes. These lines can represent temperature control, constant drag or linear drag profiles, constant bank angles to achieve equilibrium or maximum range, or can represent maintaining full lift. The nominal constant drag acceleration lines, each labeled with the drag acceleration value represented, show the drag acceleration required at various combinations of range and relative velocity or EOW to attain a flight profile that will have the correct trajectory shaping and targeted transition interface conditions. Also located on the mission–dependent background are nominal altitude rates required to guide the shuttle trajectory parallel to the guidelines when actual drag acceleration is matched to the nominal value.
- (3) A shuttle profile symbol (pointed left) shall be located on the central plot corresponding to the current range and relative velocity/EOW. As the shuttle moves on the display, a triangle symbol (pointed down) shall be placed at the Shuttle’s current location every 28.8 seconds (15 guidance cycles) for ENTRY TRAJ 1, 2 or 15.36 seconds (8 cycles) for ENTRY TRAJ 3, 4 and 5. This series of triangles trailing the Shuttle allows the pilot to compare the trend of the actual trajectory to the guide lines. When the entry guidance is active, a square symbol shall appear on the display with a series of dot symbols, similar to the triangle trailers discussed above, trailing the square. The square shall be located using the current relative velocity and a reference range computed by a processor from quantities provided by the entry guidance. By observing the movement of the square with respect to the Shuttle, the pilot can monitor the performance of the primary guidance system.

All dots and triangles shall remain on the display until the next triangle on the display causes the number of triangles on the central plot to exceed 6. Then the oldest triangle and the corresponding dot shall be removed from the display.

Symbols for two alternate landing sites shall be displayed for PFS. These symbols utilize the alternate character set and color capabilities of MEDS. A shaded circle symbol in white shall be located on the central plot corresponding to the range to the first alternate landing site and current relative velocity/EOW. A shaded diamond symbol in cyan shall be located on the central plot corresponding to the range to the second alternate landing site and current relative velocity/EOW. These colors match those used for respective alternate site data on the Entry Bearing Display.

- (4) A phugoid bank scale with a down pointing triangle symbol, driven by roll error and calculated by the entry DIP based on achieving a biased reference drag shall be displayed.
- (5) Item 1 (BIAS) shall be provided to allow the crew to enter data to bias the entry DIP reference drag. The data entry field shall always reflect the current bias value. It shall be initialized to zero upon entry to MM304. A digital readout of biased reference drag calculated by the entry DIP shall be displayed below Item 1.
- (6) Vertical tape scales shall be provided for angle of attack (α) and drag acceleration (D) in degrees and fps^2 respectively. Two dynamic symbols shall appear on the drag tape scale and two dynamic symbols on the alpha tape scale. The symbols on the tape scales are placed on the same side as the scale identifiers and point toward the scale.

The symbols on the alpha tape scale shall be (1) a triangle located using the actual angle of attack and (2) an arrow located using the nominal angle of attack command reference (i. e., scheduled angle of attack) from guidance.

The symbols on the drag tape scale shall be (1) a triangle located by the actual drag acceleration and (2) an arrow located using the guidance-computed reference drag.

- (7) The symbols on the drag scale, phugoid scale, and the alpha scale shall be required to flash in accordance with the following: the processor in which the value and position of each symbol is computed shall set a flag depending on the value of the computed quantity with respect to scale limits. When the symbol reaches the off-scale position, it shall remain there and flash. In addition, the triangle symbol on the alpha scale will be flashed whenever the absolute value of the difference between the actual and commanded alpha is greater than two degrees. If the value of the flag is 0, the symbol shall not flash; if the value of the flag is 1, the symbol shall flash. If the symbol is flashing and the value it symbolizes returns to an on-scale state, the flag shall be reset to 0, and the flash shall terminate.
- (8) The shuttle symbol and phugoid bank vector shall be flashed whenever two conditions are met: (1) when the absolute value of the heading error exceeds the maximum allowed and (2) the heading error and bank angle are both left or both right. One flag driving this flash function shall be set by the processor in which the computations are made. When the flag state is 1, flash shall occur; if the flag returns to 0, flash shall cease.
- (9) Digital readouts of dynamic pressure (\bar{q}) in psf shall be displayed.

- (10) Digital readouts of lateral acceleration (NY) in g's, lateral acceleration trim (NY TRIM) in g's, aileron (AIL) and rudder (RUD) trims in degrees, guidance-computed altitude correction term (H DOT BIAS) in fps, guidance-computed reference altitude rate (H DOT REF) in fps, guidance computed reference body roll angle (ROLL REF) in degrees, and commanded body roll angle (ROLL CMD) in degrees, shall be displayed.
- (11) Item 2 (ZERO H DOT BIAS) shall be provided to reset the guidance computed altitude rate correction term to zero. The term shall be zeroed upon each execution of item 2.
- (12) A digital readout of the heading error with respect to the HAC tangent point (ΔAZ) in degrees shall be displayed.
- (13) A PTI indicator is displayed to alert the crew that a PTI maneuver is imminent or in progress. PTI maneuvers are scheduled and executed under software control based on q or MACH conditions. Whenever a PTI window (q or MACH range) is entered, "PTI" will be displayed oversized and overbright below the ΔAZ display. If the PTI maneuver is inhibited via manual controls or automatic criteria (see the Spec 50 (4.2.9) description for details), "PTI" will flash. Once the maneuver is started, "PTI" will not flash. "PTI" will be blanked as soon as the maneuver is terminated. If no maneuver is started in a PTI window, "PTI" will be blanked when the window is exited. The PTI INDICATOR will be blanked if a TAL or AOA abort is in progress.
- (14) The low-energy item entry (Item 3) provides the crew with the capability to enable the contingency abort TAL low-energy entry guidance. This item shall be initialized inhibited and can be enabled only by crew item entry. Execution of Item 3 shall alternately inhibit and enable the low-energy entry guidance as indicated by displaying the character string "INH" or "ENA" as appropriate.

Display of the low-energy status character string "LO ENRGY" indicates when the low-energy entry guidance is active. It shall be initialized at normal brightness intensity and shall remain that way unless the low-energy entry guidance is enabled (by the crew) and then activated by the entry software. Activation of the low-energy entry guidance shall be indicated by displaying the character string double overbright.

If, after the low-energy entry guidance has been enabled (by the crew) and then activated by the entry software, the low-energy logic is deactivated by the entry software, the entry software will set the low-energy item entry (Item 3) to inhibited after convergence to nominal entry guidance has been attained. Item 3 shall then remain inhibited unless it is later enabled by crew item entry.

- (15) Item 4 (ALT SITES) shall be a toggle function to allow the crew to enable/inhibit display of symbols for two alternate landing sites during entry. This item shall be initialized inhibited. An asterisk (*) shall be displayed next to Item 4 when enabled and a blank when inhibited.

4.2.1.2 BFS Supplemental Requirements

When any variable on the central plot exceeds the maximum or minimum scale value, it shall not disappear from the plot but shall be displayed at the appropriate limit. All symbols shall be initialized on the first pass of the display processor and updated at the end of each guidance cycle or required frequency between guidance cycles.

- (1) Item 1 shall respond to PASS keyboard inputs via a selective DK listen mode as well as to inputs made on a keyboard dedicated to the BFS (Reference: MG038101, Sec. 3.3.7.1).
- (2) Prior to BFS ENGAGE the ADI errors in roll, pitch and yaw computed by BFS software shall be displayed for comparison with the PASS driven ADI error needles. These parameters and their text labels shall be dynamically driven. Signs of the error values shall be driven U, D, L, R to indicate fly-to errors, i.e., the action required to null these errors is:

R yaw error, yaw right

U pitch error, pitch up

R roll error, roll right

If the computed value of R roll error is 100 degrees or greater in either direction, then the roll error display shall show an overflow indicator of "R>>" for a right fly-to roll error or "L>>" for a left fly-to roll error. When the value of R roll error returns to the normal display range of 99 degrees or less, the overflow indicator shall be replaced by the sign and value of roll error as defined above.

Update rate shall be 960 ms.

These parameters shall not be displayed post BFS ENGAGE.

- (3) The "Δ AZ" background nomenclature shall not appear on the display format and digital readout of the heading error with respect to the HAC tangent point (Δ AZ) in degrees display shall not be supported by BFS.
- (4) AIL and RUD values will not be displayed when BFS is in the pre-engaged state.
- (5) Upon entry to MM304 a phugoid bank scale shall be displayed with no indicator. After Guidance has entered phase 2 (ISLECT > 1) and relative velocity (REL_VEL_MAG, MSID V95L0151C) is less than an I-LOAD value (V_TEST, MSID V97U7066C), an indicator shall be displayed above the phugoid bank scale. The indicator shall consist of a down pointing triangle, the position of which on the scale is calculated by the entry DIP based on roll error (see Paragraph B.4.150.5 for details of this calculation).
- (6) Item 1 (BIAS) shall be provided to allow the crew to enter a bias to the entry DIP reference drag. The data entry field shall be initialized to zero upon entry to MM304, and thereafter shall display the latest entered bias value. "D REF" shall be displayed below BIAS, but its data field shall be blank upon entry to MM304 and remain blank until after Guidance has entered phase 2 (ISLECT > 1), and relative velocity (REL_VEL_MAG, MSID V95L0151C) is less than an I-LOAD value (V_TEST, MSID V97U7066C). The "D REF" data field shall then show a digital readout of biased reference drag calculated by the entry DIP.
- (7) The low-energy item entry (Item 3) and status character string ("LO ENRGY") requirements shall not appear on the display format and shall not be supported by BFS.
- (8) Item 4 and the symbols for two alternate landing sites shall not appear on the display format and shall not be supported by BFS.

4.2.1.3 Entry Trajectory 1 Keyboard Processing Addendum

- A. Low-Energy Item Entry. Destinations for this signal are ENT GUID (4.8), ENTRY TRAJ 1-5 (6.15-6.18, 6.40) and TLM.
- B. Alternate Symbols Enable/Inhibit Item Entry. Item 4 shall be a toggle function. Each execution of Item 4 shall cause the discrete ALT_SYMBOLS_CMD to toggle ON or OFF to control display of the alternate site symbols. ALT_SYMBOLS_CMD shall be initialized upon entry to MM 304 to OFF. Destinations for this signal are ENTRY TRAJ 1-5 (6.15-6.18, 6.40)

4.2.1.4 Entry Trajectory 1 CRT Processing Addendum

All necessary inputs for dynamic symbols on this display are provided by the principal function, Entry Display Processing (CPDS Level B, GN&C 4.150). Detail requirements of the function are in Appendix B.4.150 of the D&C FSSR.

Position data beyond its upper limit indicates that valid data for this parameter are not available at this update cycle (e.g., a command alpha at the preentry guidance submode). Dynamic symbols located on the alpha scale and drag scale are flashed when the corresponding flash flag is set.

The table below presents the stand alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word "STAT" being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT display processing Table 4.2.1-2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the "M" PSI is displayed (for Commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)
Blank (default)	↓ M ∅
1	↓ ↑ M ∅
2	↑ M ∅
3	↓ ∅
4	↑ ∅
5	↓ ? ∅
6	↓ ↑ ∅
7	M ∅
8	↓ ? M ∅
9	? M ∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.2.1-2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. Flash Flag for Drag Symbols. If the discrete (V94X1241X) is set, display the Actual Drag Symbol (0C) flashing on the CRT field. If the discrete is reset, display the symbol without flashing.
- If the discrete (V94X1240X) is set, display the Reference Drag Symbol (1F) flashing on the CRT field. If the discrete is reset, display the symbol without flashing.
- B. Flash Flag for Alpha Symbols. If the discrete (V94X1242X) is set, display the Actual Alpha Symbol (0B) flashing on the CRT field. If the discrete is reset display the symbol without flashing.
- If the discrete (V94X1246X) is set, display the commanded Alpha Symbol (1E) flashing on the CRT field. If the discrete is reset display the symbol without flashing.
- C. For roll reference and roll command, plus is represented by R (right) and minus is represented by L (left).
- D. Orbiter Symbol. Orbiter Symbol (0F) is rotated 270° from its nominal orientation and displayed in color 56.
- E. Aileron/Rudder Trim Directional Symbol. For aileron trim, “+” is represented by “R” (RIGHT), “-” is represented by “L” (LEFT). For rudder trim, trim must be multiplied by a scale factor of -1 prior to replacing the + sign by R (right) and the - sign by L (left). The source for these items is AEROJET DAP (4.36).
- F. Flash Flag for PHUGOID Bank Symbol. If the discrete (V94X1251X) is set, display the PHUGOID Bank symbol (06) flashing. If the discrete is reset, display the symbol without flashing.
- G. Flash Flag for Shuttle Symbol and PHUGOID Bank Vector. If the discrete (V94X1238X) is set, display the Shuttle symbol and the PHUGOID Bank vector (X=170 to 490, Y=80) flashing. If the discrete is reset, display the symbol and vector without flashing.
- H. Guidance, Actual Trailer and Guidance Trailer Symbols. The following symbols are used respectively for Guidance, Actual Trailer and Guidance trailer symbols: 1A, 06 and 07.
- I. NY and NY Trim. For these parameters “+” is represented by R (RIGHT) and “-” is represented by L (LEFT).
- J. DELTA AZ. The heading error with respect to the HAC tangent point received from ENT UPP (4.23) in radians shall be converted to degrees and displayed as ±XX.X (PFS ONLY).
- K. PTI INDICATOR. The PTI INDICATOR (V90X3220X) is set whenever: PTI_WINDOW (V90X2401X) OR PTI_ACT_D (V90X3249X) is set AND S_TAL (V90X8658X) and S_AOA (V90X8636X) are both reset. The PTI INDICATOR is reset otherwise.

The PTI INDICATOR will flash whenever PTI_WINDOW is set and PTI_ACT_D is reset and will not flash otherwise.

- L. LO ENERGY Status Indicator. The low-energy status indicator character string (“LO ENRGY”) shall be displayed at normal intensity when the discrete ICNTAL (V90X1198X – Low-Energy Logic Engage Discrete) from entry guidance (PF 4.8) is set to the “OFF” state and shall be displayed double overbright when ICNTAL is set to the “ON” state.
- M. Low-Energy Item Entry. The low-energy item entry “ENA” or “INH” character string to be displayed shall be determined from the state of the discrete ILEFLG (V93X0080X – Low-Energy Item Entry) from either entry guidance (PF 4.8) or the keyboard (PF 6.15, 6.16, 6.17, 6.18 or 6.40). The low-energy item entry shall be displayed as “INH” when ILEFLG is set to the “OFF” state and shall be displayed as “ENA” when ILEFLG is set to the “ON” state.
- N. Alternate Site Symbols. If the discrete (ALT_SYMBOLS_CMD) (V94X6684X) is set (ON), display the symbol for alternate landing site 1 (alternate character set symbol 14) in color 29, and the symbol for alternate landing site 2 (alternate character set symbol 15) in color 47. If the discrete is reset (OFF), do not display the symbols for alternate landing sites 1 and 2.

Note: The Entry DIP sets the corresponding alternate site symbol off-display if ALT_SITE_INDEX (I) = 0, I = 1, 2.

4.2.1.5 Entry Trajectory 1 CRT Display Background Requirements, Design-Dependent

Table 4.2.1–3 contains the Entry Trajectory 1 CRT Display Background Requirements, Design-Dependent.

4.2.1.6 Entry Trajectory 1 CRT Display Background Requirements, Mission-Dependent

Table 4.2.1–7 contains the Entry Trajectory 1 Mission-Dependent I-Load Parameters.

Design dependent location of dynamic symbols:

ACTUAL DRAG, left pointing triangle (symbol, 0C) centered @ X=98 REFERENCE Drag, left pointing arrow (symbol, 1F) centered @ X=98 ACTUAL ALPHA, right pointing triangle (symbol, 0B) centered @ X=82 CMD ALPHA, right pointing arrow (symbol, 1E) centered @ X=82 PHUGOID BANK, down pointing triangle (symbol, 06) centered @ Y=71

Note: X,Y position data for design dependent data are with respect to an origin at the upper left corner of CRT.

NOTES: 1. Maximum number of mission dependent constants are as follows:

- (a) 12 solid lines
- (b) 14 dashed lines
- (c) 17 character strings

4.2.1.7 Entry Trajectory 1 Figure/Table References

Figure 4.2.1–1 Entry Trajectory 1 Display (PFS) Generic

Figure 4.2.1–2 Entry Trajectory 1 Display (BFS) Generic

Table 4.2.1-1	Keyboard Processing Table
Table 4.2.1-2	CRT Display Processing Table
Table 4.2.1-3	CRT Display Processing Background Requirements
Table 4.2.1-4	Mission Design Background Constants N/A
Table 4.2.1-5	Input Functional Parameters
Table 4.2.1-6	Output Functional Parameters
Table 4.2.1-7	I-Loads
Table 4.2.1-8	K-Loads
Table 4.2.1-9	Constants

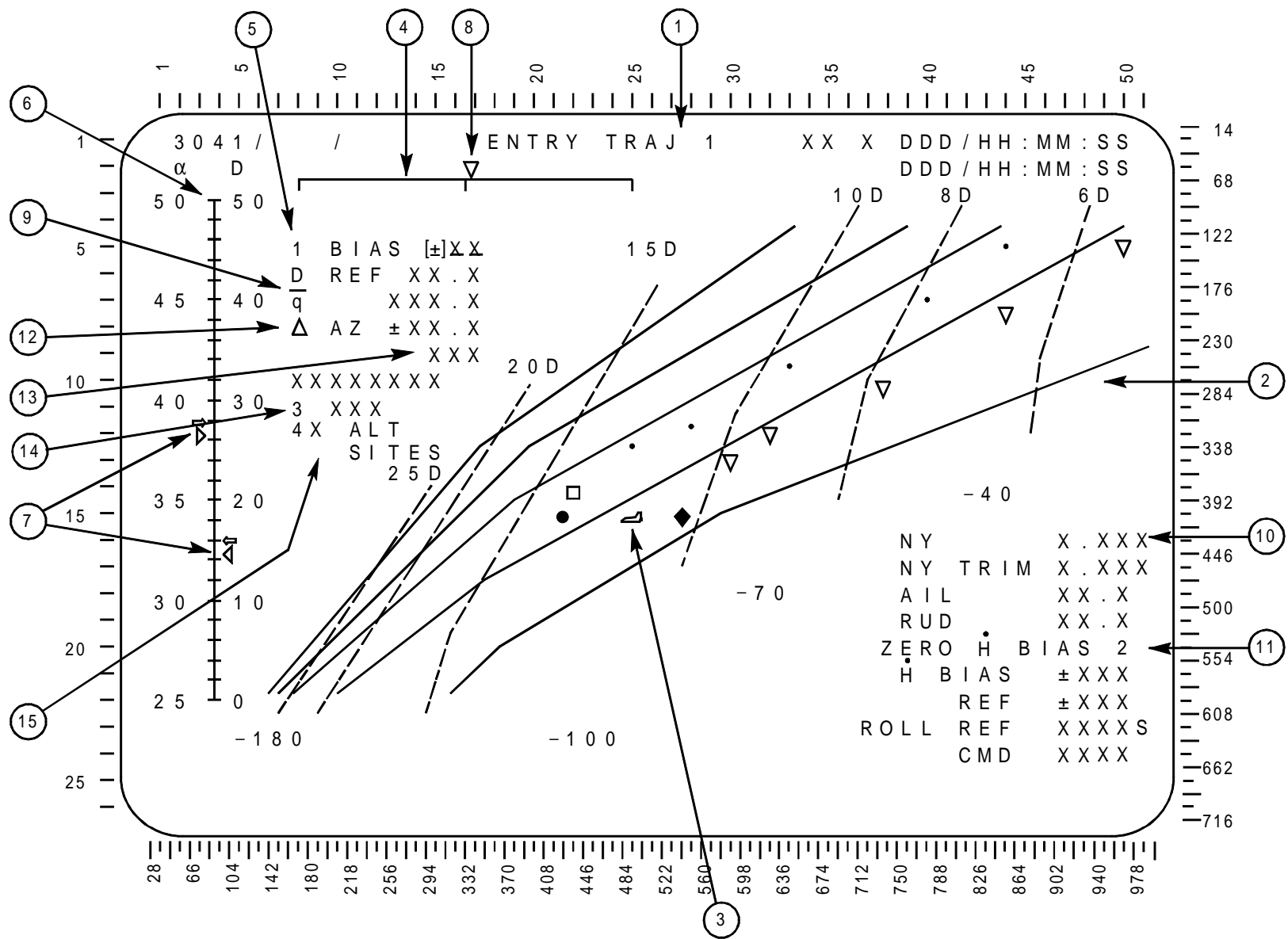


FIGURE 4.2.1-1. Entry Trajectory 1 Display (PFS) Generic

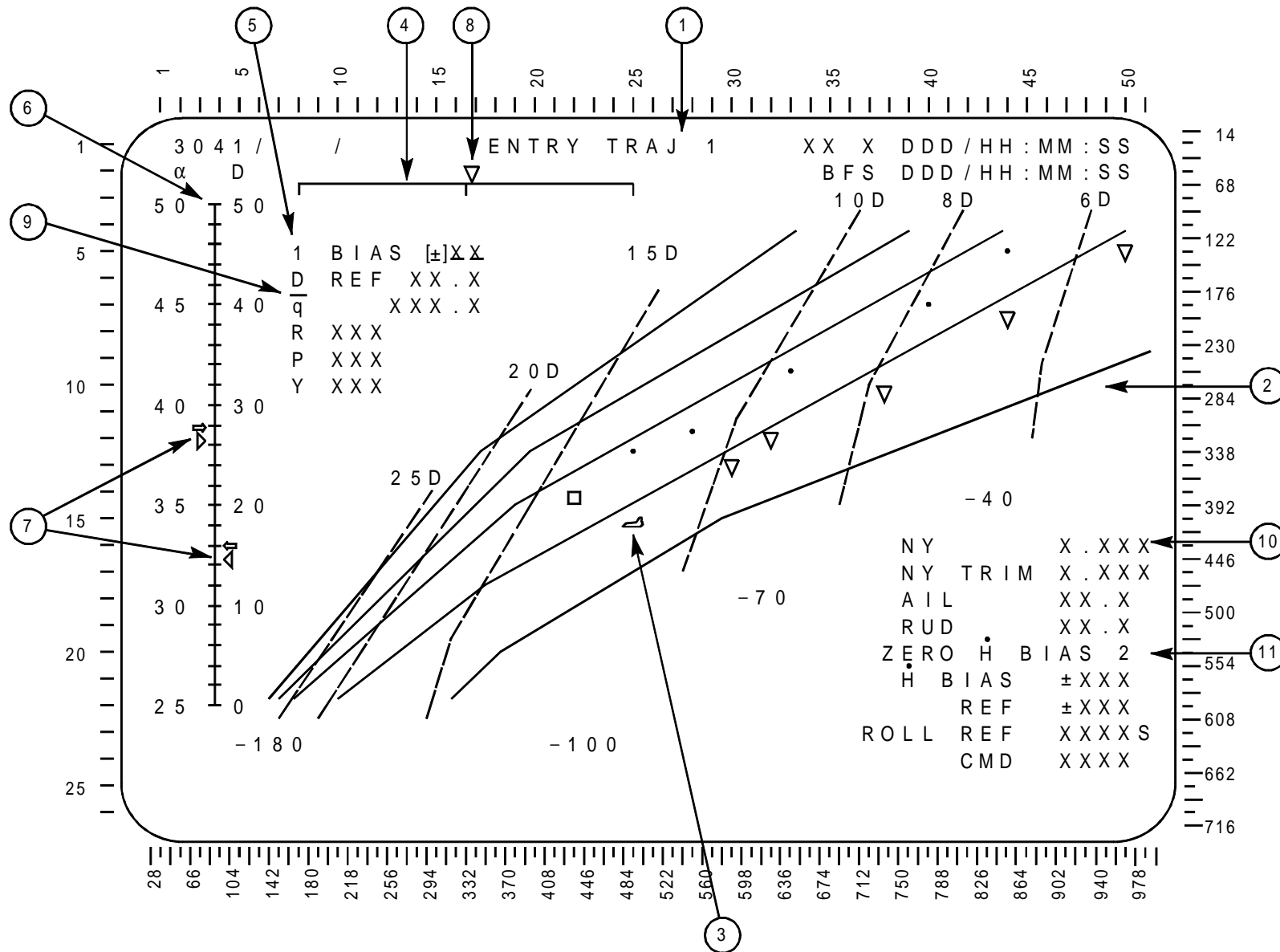


FIGURE 4.2.1-2. Entry Trajectory 1 Display (BFS) Generic

Table 4.2.1-1.ENTRY TRAJECTORY 1 (PFS/BFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination		Nomenclature	C R T
								MIN	MAX		PFS	BFS		
001	1 BIAS	V93R5203C	3.0	DEC	FPS2	X	1	-10.00	+10.00		4.150	DOP 2	DRAG REF BIAS	X
002	ZERO H-DOT BIAS 2	V93X5201X	0.0	CTRL			2				4.8	ENT G	ZERO H-DOT BIAS CMD	X
003	3 XXX (ENA/INH)	V93X0080X	0.0	CTRL			3			A	4.8	N/S	LOW-ENERGY ITEM ENTRY	X
004	4X ALT SITES	V94X6684X	0.0	CTRL			4			B	6.15 - 6.18, 6.40	N/S	ALTERNATE SYMBOLS ENA/INH CMD	X

Table 4.2.1-2.ENTRY TRAJECTORY 1 (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source		Nomenclature	C R T	
			X	Y		CHAR	BILEVEL														TYPE	PFS			BFS
							1	0																	
001	(OPS)	V93X0040X	2	1		5.0		CHAR													UI	N/S	OPS FUNCTION PAGE	X	
002	(OPS)	V93X0040X	2	1		5.0		CHAR														N/S	MI	OPS FUNCTION PAGE	X
003	(SPEC)	V93X0042X	7	1		4.0		CHAR														UI	MI	SPEC FUNCTION PAGE	X
004	(DISP)	V93X0044X	10	1		4.0		DEC														UI	MI	DISPLAY FUNCTION PAGE	X
005	(UL)	V92X5032X	34	1		2.0	UL	BLVL						X								UI	MI	UPLINK ACTIVITY IND	X
006	(GPC)	V93X0048X	36	1		2.0		DEC														UI	N/S	GPC DRIVER	X
007	(GPC)	V93X0048X	36	1		2.0		DEC														N/S	MI	GPC DRIVER	X
008	(MT)	V91W1990C	39	1		12.0		CHAR	DHMS													FCOS	BOS	MISSION ELAPSED TIME	X
009	(CRT TIMER)	V91W1987C	39	2		12.0		CHAR	DHMS													FCOS	BOS	DISPLAY CRT TIMER,GNC	X
010	1 BIAS	V93R5203C	15	5		3.0		DEC	FPS2							X						KYBD	KYBD	DRAG REF BIAS	X
011	D REF	V94A1252C	13	6		5.1		DEC													4.150	DOP 2	BIASED REF DRAG	X	
012	QBAR	V95P3011C	12	7		6.1		DEC	PSF												4.39	ADTA	GN&C DYNAMIC PRESSURE	X	
013	XXX	V90X3220X	15	9		3.0	PTI	BLVL			X	X	X								K	4.150	N/S	PTI IND	X
014	DELTA AZ	V95H0172C	13	8		5.1		DEC	DEG												J	ENTUPP	N/S	HEADING ERR WRT HAC TANGENT POINT	X
015	XXXXXXXXX LO ENRGY	V90X1198X	8	10		8.0		CHAR				X									L	4.8	N/S	LOW-ENERGY LOGIC ENGAGE DISCRETE	X
016	3 XXX (ENA/INH)	V93X0080X	10	11		3.0	ENA	INH	BLVL												M	KYBD, 4.8	N/S	LOW-ENERGY ITEM ENTRY	X
017	NY	V90A5361C	47	16		5.3		DEC	G												I	SF	SF	SELECTED AA LATERAL ACCEL	X
018	NY TRIM	V90H1669C	47	17		5.3		DEC	G												I	4.36	D DAP	LATERAL ACCEL TRIM	X
019	AIL	V90H1629C	47	18		4.1		DEC	DEG												E	4.36	D DAP	AILERON TRIM	X
020	RUD	V90H1668C	47	19		4.1		DEC	DEG												E	4.36	D DAP	RUDDER TRIM	X
021	H-DOT BIAS	V90R1133C	47	21		4.0		DEC	FPS													4.8	ENT GD	ALTITUDE RATE FEEDBACK CORRECTION	X
022	H-DOT REF	V90R1199C	47	22		4.0		DEC	FPS													4.8	ENT GD	NOM VALUE OF ALT RATE REF	X
023	ROLL REF	V90H1142C	47	23		4.0		DEC	DEG												C	4.8	ENT GD	REF ROLL ANGLE	X
024	ROLL CMD	V90H1044C	47	24		4.0		DEC	DEG												C	4.8	ENT GD	COMMANDED ROLL ANGLE	X
025	ROLL REF (S)	V94X1253X	51	23		1.0		STAT				X									3	4.150	DOP 2	REF ROLL STATUS	X

Table 4.2.1-2.ENTRY TRAJECTORY 1 (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S I T Y	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source		Nomenclature	C R T	
			X	Y		CHAR	BILEVEL														TYPE	PFS			BFS
							1	0																	
026	(Y ACTUAL DRAG)	V94U1230C			*							X	X		A					A	4.150	DOP 2	Y COORD OF DRAG ACC SYMBOL	X	
027	(Y REF DRAG)	V94U1231C			*							X	X		B					A	4.150	DOP 2	Y COORD OF DRAG REFERENCE SYMBOL	X	
028	(Y ACTUAL ALPHA)	V94U1235C			*							X	X		F					B	4.150	DOP 2	Y COORD OF ALPHA SYMBOL	X	
029	(Y CMD ALPHA)	V94U1236C			*							X	X		B					B	4.150	DOP 2	Y COORD OF COMMANDED ALPHA SYMBOL	X	
030	(CURRENT Y POS)	V94U1203C										X	X		B						4.150	DOP 2	Y COORD OF SHUTTLE PROFILE	X	
031	(CURRENT X POS)	V94U1201C			*							X	X		B				D G	4.150	DOP 2	X COORD OF SHUTTLE PROFILE	X		
032	(X PHUGOID BANK)	V94U1250C			*							X	X		F				F	4.150	DOP 2	X-COORD OF PHUGOID BANK SYMBOL	X		
033	(SQUARE Y POS)	V94U1245C										X	X		B						4.150	DOP 2	Y COORD OF GUIDANCE SYMBOL	X	
034	(SQUARE X POS)	V94U1202C			*							X	X		B				H	4.150	DOP 2	X COORD OF GUIDANCE SYMBOL	X		
035	(Y ACT 1 TRAILER)	V94U1222C										X	X		B						4.150	DOP 2	Y COORD SHUTTLE TRAILER (1)	X	
036	(X ACT 1 TRAILER)	V94U1205C			*							X	X		B				H	4.150	DOP 2	X COORD SHUTTLE TRAILER (1)	X		
037	(X GD 1 TRAILER)	V94U1213C			*							X	X		B				H	4.150	DOP 2	X COORD GUIDANCE TRAILER (1)	X		
038	(Y ACT 2 TRAILER)	V94U1223C										X	X		B						4.150	DOP 2	Y COORD SHUTTLE TRAILER (2)	X	
039	(X ACT 2 TRAILER)	V94U1206C			*							X	X		B				H	4.150	DOP 2	X COORD SHUTTLE TRAILER (2)	X		
040	(X GD 2 TRAILER)	V94U1214C			*							X	X		B				H	4.150	DOP 2	X COORD GUIDANCE TRAILER (2)	X		
041	(Y ACT 3 TRAILER)	V94U1224C										X	X		B						4.150	DOP 2	Y COORD SHUTTLE TRAILER (3)	X	
042	(X ACT 3 TRAILER)	V94U1207C			*							X	X		B				H	4.150	DOP 2	X COORD SHUTTLE TRAILER (3)	X		
043	(X GD 3 TRAILER)	V94U1215C			*							X	X		B				H	4.150	DOP 2	X COORD GUIDANCE TRAILER (3)	X		
044	(Y ACT 4 TRAILER)	V94U1225C										X	X		B						4.150	DOP 2	Y COORD SHUTTLE TRAILER (4)	X	
045	(X ACT 4 TRAILER)	V94U1208C			*							X	X		B				H	4.150	DOP 2	X COORD SHUTTLE TRAILER (4)	X		

Table 4.2.1-2.ENTRY TRAJECTORY 1 (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format				U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S I T Y	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S	Add Ref	Source		Nomenclature	C R T	
			X	Y		CHAR	BILEVEL		TYPE													PFS	BFS			
							1	0																		
046	(X GD 4 TRAILER)	V94U1216C			*							X	X			B					H	4.150	DOP 2	X COORD GUIDANCE TRAILER (4)	X	
047	(Y ACT 5 TRAILER)	V94U1226C										X	X			B						4.150	DOP 2	Y COORD SHUTTLE TRAILER (5)	X	
048	(X ACT 5 TRAILER)	V94U1209C			*							X	X			B					H	4.150	DOP 2	X COORD SHUTTLE TRAILER (5)	X	
049	(X GD 5 TRAILER)	V94U1217C			*							X	X			B					H	4.150	DOP 2	X COORD GUIDANCE TRAILER (5)	X	
050	(Y ACT 6 TRAILER)	V94U1227C										X	X			B						4.150	DOP 2	Y COORD SHUTTLE TRAILER (6)	X	
051	(X ACT 6 TRAILER)	V94U1210C			*							X	X			B					H	4.150	DOP 2	X COORD SHUTTLE TRAILER (6)	X	
052	(X GD 6 TRAILER)	V94U1218C			*							X	X			B					H	4.150	DOP 2	X COORD GUIDANCE TRAILER (6)	X	
053	(MSG LINE)	V93X0050X	1	25		44.0										G						UI	N/S		MESSAGE LINE	X
054	(MSG LINE)	V93X0050X	2	25		46.0										G						N/S	MI		MESSAGE LINE	X
055	(BUFFER MSG)	V93X0054X	45	25		4.0										G						UI	N/S		BUFFER MESSAGE INDICATOR	X
056	(BUFFER MSG)	V93X0054X	48	25		4.0										G						N/S	MI		BUFFER MESSAGE INDICATOR	X
057	(SPL)	V93X0056X	2	26		49.0										G						UI	MI		SCRATCH PAD LINE	X
058	(CURRENT Y POS ALT SITE 1)	V94H5635C										X	X	X		B					N	4.150	N/S		Y COORD SHUTTLE SYMBOL ALT SITE 1	X
059	(CURRENT X POS ALT SITE 1)	V94H5634C										X	X	X		B					N	4.150	N/S		X COORD SHUTTLE SYMBOL ALT SITE 1	X
060	(CURRENT Y POS ALT SITE 2)	V94H6499C										X	X	X		B					N	4.150	N/S		Y COORD SHUTTLE SYMBOL ALT SITE 2	X
061	(CURRENT X POS ALT SITE 2)	V94H6498C										X	X	X		B					N	4.150	N/S		X COORD SHUTTLE SYMBOL ALT SITE 2	X
062	4X ALT SITES	V94X6684X	9	12	1.0	*																KYBD	N/S		ALTERNATE SYMBOLS ENA/INH CMD	X
200	(BFS)	V98X0015X	35	2		3.0							X			G						N/S	MI		BFS IDENTIFIER BFS	X
201	(R)	V98U0017C	8	8		1.0																N/S	MI		ADI ROLL ERROR LABEL	X
202	(P)	V98U0018C	8	9		1.0																N/S	MI		ADI PITCH ERROR LABEL	X
203	(Y)	V98U0019C	8	10		1.0																N/S	MI		ADI YAW ERROR LABEL	X
204	R	V90H2234C	9	8		3.0										A	R					N/S	D DAP		BODY ROLL ATTITUDE ERROR	X
205	P	V90H2233C	9	9		3.0										A	U					N/S	D DAP		BODY PITCH ATTITUDE ERROR	X
206	Y	V90H2235C	9	10		3.0										A	R					N/S	D DAP		BODY YAW ATTITUDE ERROR	X

Table 4.2.1-3. ENTRY TRAJECTORY 1 CRT DISPLAY PROCESSING BACKGROUND REQUIREMENTS, DESIGN-DEPENDENT				
VECTORS				
VECTOR ID	ORIGIN		TERMINAL	
	X(AU)	Y(AU)	X(AU)	Y(AU)
Alpha and Drag Scale	90	589	90	89
Phugoid Bank Scale	170	80	490	80
CHARACTER STRINGS				
CHARACTER ID	ORIGIN			
	X(AU)	Y(AU)		
Symbol 2D (minus)	90	589		
Symbol 2D (minus)	90	569		
Symbol 2D (minus)	90	549		
Symbol 2D (minus)	90	529		
Symbol 2D (minus)	90	509		
Symbol 2D (minus)	90	489		
Symbol 2D (minus)	90	469		
Symbol 2D (minus)	90	449		
Symbol 2D (minus)	90	429		
Symbol 2D (minus)	90	409		
Symbol 2D (minus)	90	389		
Symbol 2D (minus)	90	369		
Symbol 2D (minus)	90	349		
Symbol 2D (minus)	90	329		
Symbol 2D (minus)	90	309		
Symbol 2D (minus)	90	289		
Symbol 2D (minus)	90	269		
Symbol 2D (minus)	90	249		
Symbol 2D (minus)	90	229		
Symbol 2D (minus)	90	209		
Symbol 2D (minus)	90	189		
Symbol 2D (minus)	90	169		

Table 4.2.1-3.ENTRY TRAJECTORY 1 CRT DISPLAY PROCESSING BACKGROUND REQUIREMENTS, DESIGN-DEPENDENT		
CHARACTER STRINGS		
CHARACTER ID	ORIGIN	
	X(AU)	Y(AU)
Symbol 2D (minus)	90	149
Symbol 2D (minus)	90	129
Symbol 2D (minus)	90	109
Symbol 2D (minus)	90	89
Symbol 18 (Tick)	170	89
Symbol 18 (Tick)	330	89
Symbol 18 (Tick)	490	89
50	113	89
40	113	189
30	113	289
20	113	389
10	113	489
0	113	589
D	113	55
α	56	55

TABLE 4.2.1-5. INPUT FUNCTIONAL PARAMETERS FOR ENTRY TRAJECTORY 1 DISPLAY (G6.15)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
ACC_ALPHA_FLG	V94X1242X	ALPHA SYMBOL FLASH FLAG	ENT DIP					
ACC_ALPHA_Y	V94U1235C	Y COORD OF ALPHA SYMBOL	ENT DIP	AU	VAR			
ACC_VERT	V95A0170CB	VERTICAL ACCEL IN TOPODETTIC COORD	ENT UPP	FT/S2				
ALT_SYMBOLS_CMD	V94X6684X	ALTERNATE SYMBOLS ENA/INH CMD	ENTRY TRAJ1		BD		93090E	
BANK_FLAG	V94X1238X	BANK ANGLE FLASH FLAG	ENT DIP				92522D	
BIAS_ITEM	V93R5203CA	DRAG REF BIAS	ENTRY TRAJ1	FT/S2				
COM_ALPHA_FLG	V94X1246X	ALPHA CMD FLASH FLAG	ENT DIP					
COM_ALPHA_Y	V94U1236C	Y COORD OF COMMANDED ALPHA SYMBOL	ENT DIP	AU	VAR			
DATRIM	V90H1629CA	AILERON TRIM	AEROJET DAP	DEG				
DLRDOT	V90R1133C	ALTITUDE RATE FEEDBACK CORRECTION	ENT GUID	FT/S	SPL		93017G	*
DRAG_ACC_FLAG	V94X1241X	DRAG TRIANGLE FLASH FLAG	ENT DIP					
DRAG_ACC_Y	V94U1230C	Y COORD OF DRAG ACC SYMBOL	ENT DIP	AU	VAR			
DRAG_REF_FLAG	V94X1240X	REFERENCE DRAG FLASH FLAG	ENT DIP					
DRAG_REF_Y	V94U1231C	Y COORD OF DRAG REFERENCE SYMBOL	ENT DIP	AU	VAR			
DRTI	V90H1669CA	LATERAL ACCEL TRIM	AEROJET DAP					
DRTRIM	V90H1668CA	RUDDER TRIM	AEROJET DAP	DEG				
D_REF	V94A1252C	BIASED REF DRAG	ENT DIP		VAR			
GUID_TRAILER(X,1)	V94U1213C	X COORD GUIDANCE TRAILER (1)	ENT DIP	AU	VAR			
GUID_TRAILER(X,2)	V94U1214C	X COORD GUIDANCE TRAILER (2)	ENT DIP	AU	VAR			
GUID_TRAILER(X,3)	V94U1215C	X COORD GUIDANCE TRAILER (3)	ENT DIP	AU	VAR			
GUID_TRAILER(X,4)	V94U1216C	X COORD GUIDANCE TRAILER (4)	ENT DIP	AU	VAR			
GUID_TRAILER(X,5)	V94U1217C	X COORD GUIDANCE TRAILER (5)	ENT DIP	AU	VAR			
GUID_TRAILER(X,6)	V94U1218C	X COORD GUIDANCE TRAILER (6)	ENT DIP	AU	VAR			
GUID_X	V94U1202C	X COORD OF GUIDANCE SYMBOL	ENT DIP	AU	VAR			
GUID_Y	V94U1245C	Y COORD OF GUIDANCE SYMBOL	ENT DIP	AU	VAR			
ICNTAL	V90X1198X	LOW-ENERGY LOGIC ENGAGE DISCRETE	ENT GUID		BD		93017G	*
ILEFLG	V93X0080X	LOW-ENERGY ITEM ENTRY	ENT GUID		BD		93017G	*
ILEFLG	V93X0080XA	LOW-ENERGY ITEM ENTRY	ENTRY TRAJ1		BD		93017G	*
NY	V90A5361C	SELECTED AA LATERAL ACCEL	SF	G	SPL		93017G	*
PTI_IND	V90X3220XC	PTI INDICATOR	ENT DIP		BD		79994C	
QBAR/QBAR_AD	V95P3011C	GN&C DYNAMIC PRESSURE	ADTA SOP	LBF/FT2	SPL		93017G	*
RDTRF	V90R1199C	NOM VALUE OF ALT RATE REF	ENT GUID	FT/S	SPL		93017G	*
REF_ROL_STAT	V94X1253X	REF ROLL STATUS	ENT DIP		BD			
ROLLC(1)	V90H1044CC	COMMANDED ROLL ANGLE	ENT GUID	DEG			93017G	*
ROLLC(3)	V90H1142C	REF ROLL ANGLE	ENT GUID	DEG			93017G	*
SHUTTLE_X	V94U1201C	X COORD OF SHUTTLE PROFILE	ENT DIP	AU	VAR			

TABLE 4.2.1-5. INPUT FUNCTIONAL PARAMETERS FOR ENTRY TRAJECTORY 1 DISPLAY (G6.15)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
SHUTTLE_X_ALT(1)	V94H5634C	X COORD SHUTTLE SYMBOL ALT SITE 1	ENT DIP	AU	VAR		93090E	
SHUTTLE_X_ALT(2)	V94H6498C	X COORD SHUTTLE SYMBOL ALT SITE 2	ENT DIP	AU	VAR		93090E	
SHUTTLE_Y	V94U1203C	Y COORD OF SHUTTLE PROFILE	ENT DIP	AU	VAR			
SHUTTLE_Y_ALT(1)	V94H5635C	Y COORD SHUTTLE SYMBOL ALT SITE 1	ENT DIP	AU	VAR		93090E	
SHUTTLE_Y_ALT(2)	V94H6499C	Y COORD SHUTTLE SYMBOL ALT SITE 2	ENT DIP	AU	VAR		93090E	
TRAILER(X,1)	V94U1205C	X COORD SHUTTLE TRAILER (1)	ENT DIP	AU	VAR			
TRAILER(X,2)	V94U1206C	X COORD SHUTTLE TRAILER (2)	ENT DIP	AU	VAR			
TRAILER(X,3)	V94U1207C	X COORD SHUTTLE TRAILER (3)	ENT DIP	AU	VAR			
TRAILER(X,4)	V94U1208C	X COORD SHUTTLE TRAILER (4)	ENT DIP	AU	VAR			
TRAILER(X,5)	V94U1209C	X COORD SHUTTLE TRAILER (5)	ENT DIP	AU	VAR			
TRAILER(X,6)	V94U1210C	X COORD SHUTTLE TRAILER (6)	ENT DIP	AU	VAR			
TRAILER(Y,1)	V94U1222C	Y COORD SHUTTLE TRAILER (1)	ENT DIP	AU	VAR			
TRAILER(Y,2)	V94U1223C	Y COORD SHUTTLE TRAILER (2)	ENT DIP	AU	VAR			
TRAILER(Y,3)	V94U1224C	Y COORD SHUTTLE TRAILER (3)	ENT DIP	AU	VAR			
TRAILER(Y,4)	V94U1225C	Y COORD SHUTTLE TRAILER (4)	ENT DIP	AU	VAR			
TRAILER(Y,5)	V94U1226C	Y COORD SHUTTLE TRAILER (5)	ENT DIP	AU	VAR			
TRAILER(Y,6)	V94U1227C	Y COORD SHUTTLE TRAILER (6)	ENT DIP	AU	VAR			
X_PHUGOID_BK	V94U1250C	X COORD OF PHUGOID BANK SYMBOL	ENT DIP		VAR			
X_PHUGOID_FLAG	V94X1251X	PHUGOID BANK SYMBOL FLASH FLAG	ENT DIP					

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.1-6. OUTPUT FUNCTIONAL PARAMETERS FROM ENTRY TRAJECTORY 1 DISPLAY (G6.15)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ALT_SYMBOLS_CMD	V94X6684X	ALTERNATE SYMBOLS ENA/INH CMD	ENTRY TRAJ1 ENTRY TRAJ2 ENTRY TRAJ3 ENTRY TRAJ4 ENTRY TRAJ5		BD		93090E	
BIAS_ITEM	V93R5203CA	DRAG REF BIAS	ENT DIP ENTRY TRAJ1 ENTRY TRAJ2 ENTRY TRAJ3 ENTRY TRAJ4 ENTRY TRAJ5	FT/S2				
DLRDTZ	V93X5201XA	ZERO H DOT BIAS CMD	ENT GUID					
ILEFLG	V93X0080XA	LOW-ENERGY ITEM ENTRY	DL FMT 23/1 ENT GUID ENTRY TRAJ1 ENTRY TRAJ2 ENTRY TRAJ3 ENTRY TRAJ4 ENTRY TRAJ5		BD		93017G	*
	V99M1854PA	LANDING CONFIGURATION	DL FMT 23/1				93017G	*

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
(HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

TABLE 4.2.1-7. ENTRY TRAJECTORY 1 DISPLAY (G6.15) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
E1_CHAR_STRING(01,1)	V97U7474C	ND	CH		M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(01,2)	V97U7475C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(01,3)	V97U7476C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(02,1)	V97U7477C	ND	CH		M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(02,2)	V97U7478C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(02,3)	V97U7479C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(03,1)	V97U7480C	ND	CH		M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(03,2)	V97U7481C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(03,3)	V97U7482C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(04,1)	V97U7483C	ND	CH		M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(04,2)	V97U7484C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(04,3)	V97U7485C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(05,1)	V97U7486C	ND	CH		M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(05,2)	V97U7487C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(05,3)	V97U7488C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(06,1)	V97U7489C	ND	CH		M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(06,2)	V97U7490C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(06,3)	V97U7491C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(07,1)	V97U7492C	ND	CH		M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(07,2)	V97U7493C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(07,3)	V97U7494C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(08,1)	V97U7495C	ND	CH		M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(08,2)	V97U7496C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(08,3)	V97U7497C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(09,1)	V97U7498C	ND	CH		M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(09,2)	V97U7499C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(09,3)	V97U7500C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(10,1)	V97U7501C	ND	CH		M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(10,2)	V97U7502C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(10,3)	V97U7503C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(11,1)	V97U7504C	ND	CH		M	C	G6.15	00	XS1	DC0599	
E1_CHAR_STRING(11,2)	V97U7505C	AU	F	S	M	C	G6.15	00	ZFG	90593A	
E1_CHAR_STRING(11,3)	V97U7506C	AU	F	S	M	C	G6.15	00	ZFG	90593A	
E1_CHAR_STRING(12,1)	V97U8615C	ND	CH		M	C	G6.15	00	XS1	DC0599	
E1_CHAR_STRING(12,2)	V97U8616C	AU	F	S	M	C	G6.15	00	ZFG	90593A	
E1_CHAR_STRING(12,3)	V97U8617C	AU	F	S	M	C	G6.15	00	ZFG	90593A	
E1_CHAR_STRING(13,1)	V97U8618C	ND	CH		M	C	G6.15	00	XS1	DC0599	
E1_CHAR_STRING(13,2)	V97U8619C	AU	F	S	M	C	G6.15	00	ZFG	90593A	
E1_CHAR_STRING(13,3)	V97U8620C	AU	F	S	M	C	G6.15	00	ZFG	90593A	
E1_CHAR_STRING(14,1)	V97U8621C	ND	CH		M	C	G6.15	00	XS1	DC0599	
E1_CHAR_STRING(14,2)	V97U8622C	AU	F	S	M	C	G6.15	00	ZFG	90593A	
E1_CHAR_STRING(14,3)	V97U8623C	AU	F	S	M	C	G6.15	00	ZFG	90593A	
E1_CHAR_STRING(15,1)	V97U8624C	ND	CH		M	C	G6.15	00	XS1	DC0599	
E1_CHAR_STRING(15,2)	V97U8625C	AU	F	S	M	C	G6.15	00	ZFG	90593A	
E1_CHAR_STRING(15,3)	V97U8626C	AU	F	S	M	C	G6.15	00	ZFG	90593A	
E1_CHAR_STRING(16,1)	V97U8627C	ND	CH		M	C	G6.15	00	XS1	DC0599	
E1_CHAR_STRING(16,2)	V97U8628C	AU	F	S	M	C	G6.15	00	ZFG	90593A	

TABLE 4.2.1-7. ENTRY TRAJECTORY 1 DISPLAY (G6.15) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
E1_CHAR_STRING(16,3)	V97U8629C	AU	F	S	M	C	G6.15	00	ZFG	90593A	
E1_CHAR_STRING(17,1)	V97U8630C	ND	SY		M	X	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(17,2)	V97U8631C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_CHAR_STRING(17,3)	V97U8632C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(01,1)	V97U7507C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(01,2)	V97U7508C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(01,3)	V97U7509C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(01,4)	V97U7510C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(02,1)	V97U7511C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(02,2)	V97U7512C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(02,3)	V97U7513C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(02,4)	V97U7514C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(03,1)	V97U7515C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(03,2)	V97U7516C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(03,3)	V97U7517C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(03,4)	V97U7518C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(04,1)	V97U7519C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(04,2)	V97U7520C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(04,3)	V97U7521C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(04,4)	V97U7522C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(05,1)	V97U7523C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(05,2)	V97U7524C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(05,3)	V97U7525C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(05,4)	V97U7526C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(06,1)	V97U7527C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(06,2)	V97U7528C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(06,3)	V97U7529C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(06,4)	V97U7530C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(07,1)	V97U7531C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(07,2)	V97U7532C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(07,3)	V97U7533C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(07,4)	V97U7534C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(08,1)	V97U7535C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(08,2)	V97U7536C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(08,3)	V97U7537C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(08,4)	V97U7538C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(09,1)	V97U7539C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(09,2)	V97U7540C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(09,3)	V97U7541C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(09,4)	V97U7542C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(10,1)	V97U7543C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(10,2)	V97U7544C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(10,3)	V97U7545C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(10,4)	V97U7546C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(11,1)	V97U7547C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(11,2)	V97U7548C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(11,3)	V97U7549C	AU	F	S	M	C	G6.15	00	ET1	DC0599	

TABLE 4.2.1-7. ENTRY TRAJECTORY 1 DISPLAY (G6.15) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
E1_DASH_LINE(11,4)	V97U7550C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(12,1)	V97U7551C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(12,2)	V97U7552C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(12,3)	V97U7553C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(12,4)	V97U7554C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(13,1)	V97U7555C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(13,2)	V97U7556C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(13,3)	V97U7557C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(13,4)	V97U7558C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(14,1)	V97U7559C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(14,2)	V97U7560C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(14,3)	V97U7561C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_DASH_LINE(14,4)	V97U7562C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(01,1)	V97U7595C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(01,2)	V97U7596C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(01,3)	V97U7597C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(01,4)	V97U7598C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(02,1)	V97U7599C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(02,2)	V97U7600C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(02,3)	V97U7601C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(02,4)	V97U7602C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(03,1)	V97U7603C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(03,2)	V97U7604C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(03,3)	V97U7605C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(03,4)	V97U7606C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(04,1)	V97U7607C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(04,2)	V97U7608C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(04,3)	V97U7609C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(04,4)	V97U7610C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(05,1)	V97U7611C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(05,2)	V97U7612C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(05,3)	V97U7613C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(05,4)	V97U7614C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(06,1)	V97U7615C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(06,2)	V97U7616C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(06,3)	V97U7617C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(06,4)	V97U7618C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(07,1)	V97U7619C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(07,2)	V97U7620C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(07,3)	V97U7621C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(07,4)	V97U7622C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(08,1)	V97U7623C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(08,2)	V97U7624C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(08,3)	V97U7625C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(08,4)	V97U7626C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(09,1)	V97U7627C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(09,2)	V97U7628C	AU	F	S	M	C	G6.15	00	ET1	DC0599	

TABLE 4.2.1-7. ENTRY TRAJECTORY 1 DISPLAY (G6.15) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
E1_SOLID_LINE(09,3)	V97U7629C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(09,4)	V97U7630C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(10,1)	V97U7631C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(10,2)	V97U7632C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(10,3)	V97U7633C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(10,4)	V97U7634C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(11,1)	V97U7635C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(11,2)	V97U7636C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(11,3)	V97U7637C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(11,4)	V97U7638C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(12,1)	V97U7639C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(12,2)	V97U7640C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(12,3)	V97U7641C	AU	F	S	M	C	G6.15	00	ET1	DC0599	
E1_SOLID_LINE(12,4)	V97U7642C	AU	F	S	M	C	G6.15	00	ET1	DC0599	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

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TABLE 4.2.1-8. ENTRY TRAJECTORY 1 DISPLAY (G6.15) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.1-9. ENTRY TRAJECTORY 1 DISPLAY (G6.15) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.2 ENTRY TRAJECTORY 2 (PFS/BFS)

TITLE: ENTRY TRAJ 2

TYPE: OPS/3041

AVAILABILITY: OPS 3, PFS/BFS

4.2.2.1 Purpose, Operation, and Organization

Figures 4.2.2-1 and 4.2.2-2 present the display formats of ENTRY TRAJ 2 for the PFS and BFS, respectively.

Reference section 4.2.1.1 for a definition of the requirements.

TABLE 4.2.2-1. ENTRY TRAJECTORY 2 KEYBOARD PROCESSING

Identical to Table 4.2.1-1

4.2.2.2 Entry Trajectory 2 Keyboard Processing Addendum

Identical to Section 4.2.1.3

TABLE 4.2.2-2. ENTRY TRAJECTORY 2 CRT DISPLAY PROCESSING

Identical to Table 4.2.1-2

4.2.2.3 Entry Trajectory 2 CRT Display Processing Addendum

See Table 4.2.1-2 and Section 4.2.1.4. The definition of CRT display processing for Entry Trajectory 2 is identical to the requirements for Entry Trajectory 1.

4.2.2.4 Entry Trajectory 2 CRT Display Background Requirements, Design-Dependent

Design-dependent background requirements are identical to the Trajectory 1 requirements of Table 4.2.1-3.

4.2.2.5 Entry Trajectory 2 CRT Display Background Requirements, Mission-Dependent

Table 4.2.2-7 contains the Entry Trajectory 2 Mission-Dependent I-Load Parameters.

- NOTES:
1. Maximum number of mission dependent constants are as follows:
 - (a) 9 solid lines
 - (b) 6 dashed lines
 - (c) 15 character strings

4.2.2.6 Entry Trajectory 2 Figure/Table References

Figure 4.2.2-1	Entry Trajectory 2 Display (PFS) Generic
Figure 4.2.2-2	Entry Trajectory 2 Display (BFS) Generic
Table 4.2.2-1	Keyboard Processing Table – Same as Table 4.2.1-1
Table 4.2.2-2	CRT Display Processing Table – Same as Table 4.2.1-2
Table 4.2.2-3	CRT Display Processing Background Requirements – Same as Table 4.2.1-3
Table 4.2.2-4	Mission Design Background Constants N/A
Table 4.2.2-5	Input Functional Parameters
Table 4.2.2-6	Output Functional Parameters
Table 4.2.2-7	I-Loads
Table 4.2.2-8	K-Loads
Table 4.2.2-9	Constants

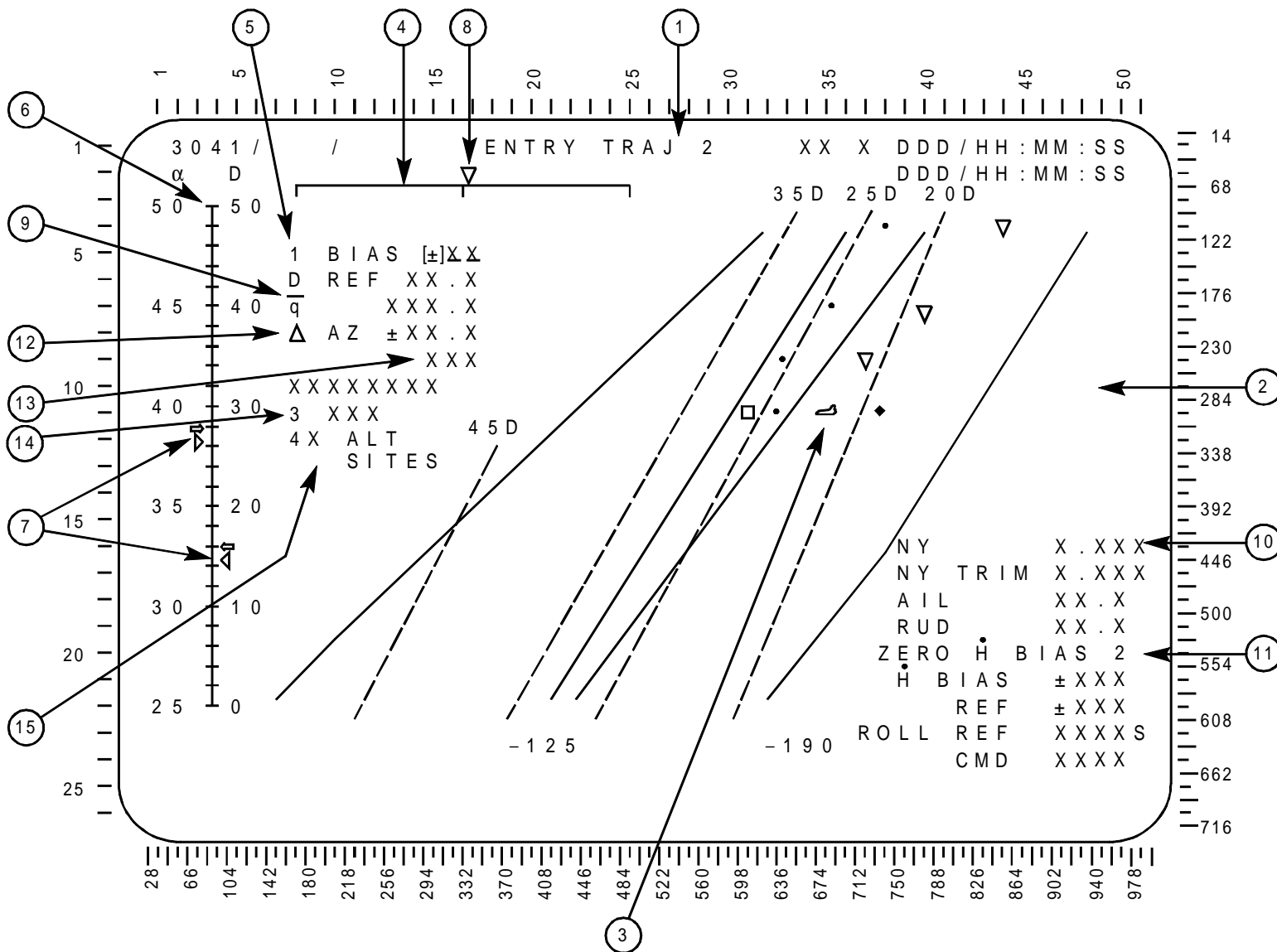


FIGURE 4.2.2-1. Entry Trajectory 2 Display (PFS) Generic

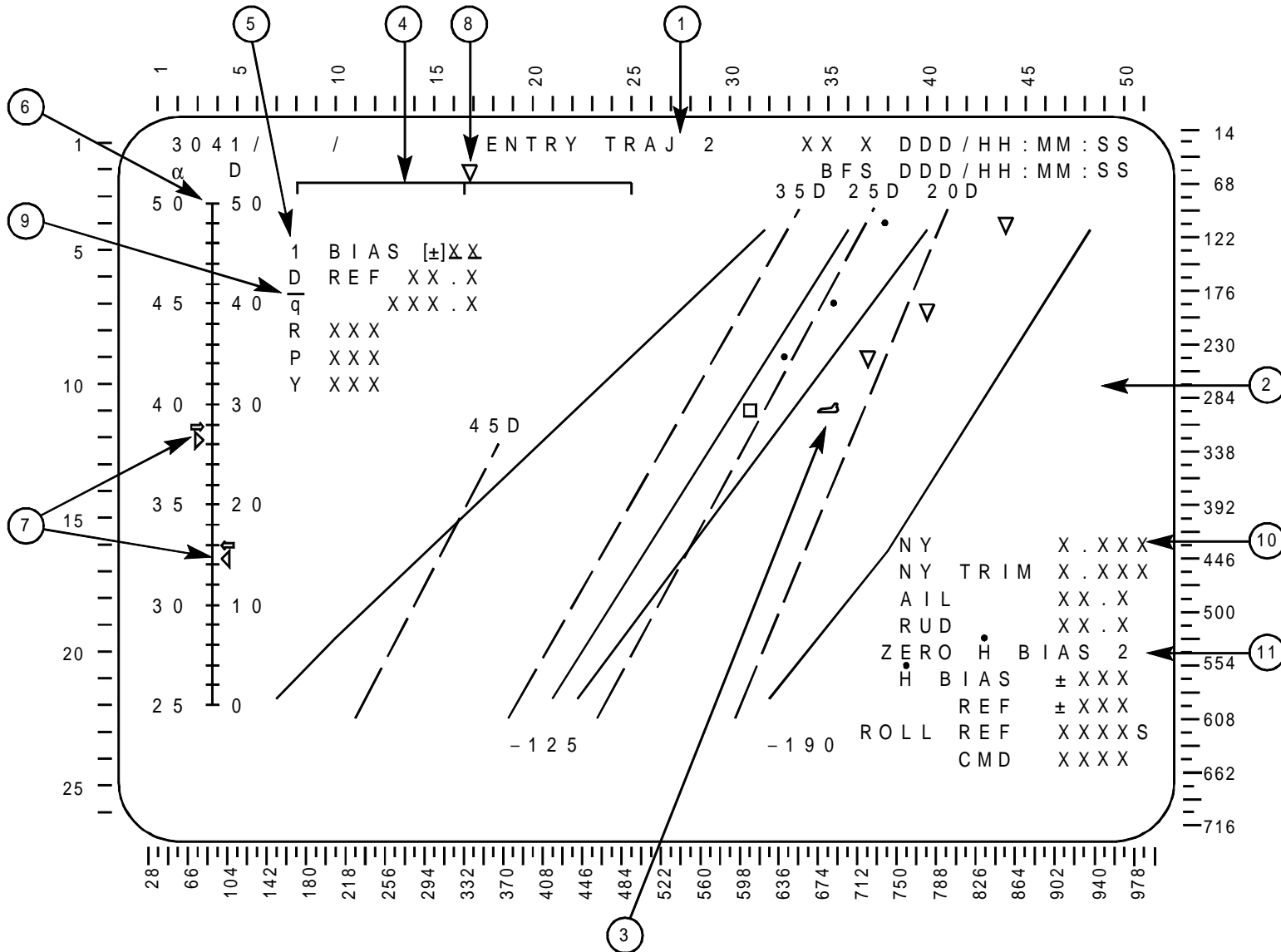


FIGURE 4.2.2-2. Entry Trajectory 2 Display (BFS) Generic

TABLE 4.2.2-5. INPUT FUNCTIONAL PARAMETERS FOR ENTRY TRAJECTORY 2 DISPLAY (G6.16)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
ACC_ALPHA_FLAG	V94X1242X	ALPHA SYMBOL FLASH FLAG	ENT DIP					
ACC_ALPHA_Y	V94U1235C	Y COORD OF ALPHA SYMBOL	ENT DIP	AU	VAR			
ACC_VERT	V95A0170CB	VERTICAL ACCEL IN TOPODETTIC COORD	ENT UPP	FT/S2				
ALT_SYMBOLS_CMD	V94X6684X	ALTERNATE SYMBOLS ENA/INH CMD	ENTRY TRAJ1		BD		93090E	
ALT_SYMBOLS_CMD	V94X6684XA	ALTERNATE SYMBOLS ENA/INH CMD	ENTRY TRAJ2		BD		93090E	
BANK_FLAG	V94X1238X	BANK ANGLE FLASH FLAG	ENT DIP				92522D	
BIAS_ITEM	V93R5203CA	DRAG REF BIAS	ENTRY TRAJ1	FT/S2				
BIAS_ITEM	V93R5203CB	DRAG REF BIAS	ENTRY TRAJ2	FT/S2				
COM_ALPHA_FLAG	V94X1246X	ALPHA CMD FLASH FLAG	ENT DIP					
COM_ALPHA_Y	V94U1236C	Y COORD OF COMMANDED ALPHA SYMBOL	ENT DIP	AU	VAR			
DATRIM	V90H1629CA	AILERON TRIM	AEROJET DAP	DEG				
DLRDOT	V90R1133C	ALTITUDE RATE FEEDBACK CORRECTION	ENT GUID	FT/S	SPL		93017G	*
DRAG_ACC_FLAG	V94X1241X	DRAG TRIANGLE FLASH FLAG	ENT DIP					
DRAG_ACC_Y	V94U1230C	Y COORD OF DRAG ACC SYMBOL	ENT DIP	AU	VAR			
DRAG_REF_FLAG	V94X1240X	REFERENCE DRAG FLASH FLAG	ENT DIP					
DRAG_REF_Y	V94U1231C	Y COORD OF DRAG REFERENCE SYMBOL	ENT DIP	AU	VAR			
DRTI	V90H1669CA	LATERAL ACCEL TRIM	AEROJET DAP					
DRTRIM	V90H1668CA	RUDDER TRIM	AEROJET DAP	DEG				
D_REF	V94A1252C	BIASED REF DRAG	ENT DIP		VAR			
GUID_TRAILER(X,1)	V94U1213C	X COORD GUIDANCE TRAILER (1)	ENT DIP	AU	VAR			
GUID_TRAILER(X,2)	V94U1214C	X COORD GUIDANCE TRAILER (2)	ENT DIP	AU	VAR			
GUID_TRAILER(X,3)	V94U1215C	X COORD GUIDANCE TRAILER (3)	ENT DIP	AU	VAR			
GUID_TRAILER(X,4)	V94U1216C	X COORD GUIDANCE TRAILER (4)	ENT DIP	AU	VAR			
GUID_TRAILER(X,5)	V94U1217C	X COORD GUIDANCE TRAILER (5)	ENT DIP	AU	VAR			
GUID_TRAILER(X,6)	V94U1218C	X COORD GUIDANCE TRAILER (6)	ENT DIP	AU	VAR			
GUID_X	V94U1202C	X COORD OF GUIDANCE SYMBOL	ENT DIP	AU	VAR			
GUID_Y	V94U1245C	Y COORD OF GUIDANCE SYMBOL	ENT DIP	AU	VAR			
ICNTAL	V90X1198X	LOW-ENERGY LOGIC ENGAGE DISCRETE	ENT GUID		BD		93017G	*
ILEFLG	V93X0080X	LOW-ENERGY ITEM ENTRY	ENT GUID		BD		93017G	*
ILEFLG	V93X0080XA	LOW-ENERGY ITEM ENTRY	ENTRY TRAJ1		BD		93017G	*
ILEFLG	V93X0080XB	LOW-ENERGY ITEM ENTRY	ENTRY TRAJ2		BD		93017G	*
NY	V90A5361C	SELECTED AA LATERAL ACCEL	SF	G	SPL		93017G	*
PTI_IND	V90X3220XC	PTI INDICATOR	ENT DIP		BD		79994C	
QBAR/QBAR_AD	V95P3011C	GN&C DYNAMIC PRESSURE	ADTA SOP	LBF/FT2	SPL		93017G	*
RDTRF	V90R1199C	NOM VALUE OF ALT RATE REF	ENT GUID	FT/S	SPL		93017G	*
REF_ROL_STAT	V94X1253X	REF ROLL STATUS	ENT DIP		BD			

TABLE 4.2.2-5. INPUT FUNCTIONAL PARAMETERS FOR ENTRY TRAJECTORY 2 DISPLAY (G6.16)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ROLLC(1)	V90H1044CC	COMMANDED ROLL ANGLE	ENT GUID	DEG			93017G	*
ROLLC(3)	V90H1142C	REF ROLL ANGLE	ENT GUID	DEG	SPL		93017G	*
SHUTTLE_X	V94U1201C	X COORD OF SHUTTLE PROFILE	ENT DIP	AU	VAR			
SHUTTLE_X_ALT(1)	V94H5634C	X COORD SHUTTLE SYMBOL ALT SITE 1	ENT DIP	AU	VAR		93090E	
SHUTTLE_X_ALT(2)	V94H6498C	X COORD SHUTTLE SYMBOL ALT SITE 2	ENT DIP	AU	VAR		93090E	
SHUTTLE_Y	V94U1203C	Y COORD OF SHUTTLE PROFILE	ENT DIP	AU	VAR			
SHUTTLE_Y_ALT(1)	V94H5635C	Y COORD SHUTTLE SYMBOL ALT SITE 1	ENT DIP	AU	VAR		93090E	
SHUTTLE_Y_ALT(2)	V94H6499C	Y COORD SHUTTLE SYMBOL ALT SITE 2	ENT DIP	AU	VAR		93090E	
TRAILER(X,1)	V94U1205C	X COORD SHUTTLE TRAILER (1)	ENT DIP	AU	VAR			
TRAILER(X,2)	V94U1206C	X COORD SHUTTLE TRAILER (2)	ENT DIP	AU	VAR			
TRAILER(X,3)	V94U1207C	X COORD SHUTTLE TRAILER (3)	ENT DIP	AU	VAR			
TRAILER(X,4)	V94U1208C	X COORD SHUTTLE TRAILER (4)	ENT DIP	AU	VAR			
TRAILER(X,5)	V94U1209C	X COORD SHUTTLE TRAILER (5)	ENT DIP	AU	VAR			
TRAILER(X,6)	V94U1210C	X COORD SHUTTLE TRAILER (6)	ENT DIP	AU	VAR			
TRAILER(Y,1)	V94U1222C	Y COORD SHUTTLE TRAILER (1)	ENT DIP	AU	VAR			
TRAILER(Y,2)	V94U1223C	Y COORD SHUTTLE TRAILER (2)	ENT DIP	AU	VAR			
TRAILER(Y,3)	V94U1224C	Y COORD SHUTTLE TRAILER (3)	ENT DIP	AU	VAR			
TRAILER(Y,4)	V94U1225C	Y COORD SHUTTLE TRAILER (4)	ENT DIP	AU	VAR			
TRAILER(Y,5)	V94U1226C	Y COORD SHUTTLE TRAILER (5)	ENT DIP	AU	VAR			
TRAILER(Y,6)	V94U1227C	Y COORD SHUTTLE TRAILER (6)	ENT DIP	AU	VAR			
X_PHUGOID_BK	V94U1250C	X COORD OF PHUGOID BANK SYMBOL	ENT DIP		VAR			
X_PHUGOID_FLAG	V94X1251X	PHUGOID BANK SYMBOL FLASH FLAG	ENT DIP					

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.2-6. OUTPUT FUNCTIONAL PARAMETERS FROM ENTRY TRAJECTORY 2 DISPLAY (G6.16)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ALT_SYMBOLS_CMD	V94X6684XA	ALTERNATE SYMBOLS ENA/INH CMD	ENTRY TRAJ2 ENTRY TRAJ3 ENTRY TRAJ4 ENTRY TRAJ5		BD		93090E	
BIAS_ITEM	V93R5203CB	DRAG REF BIAS	ENT DIP ENTRY TRAJ2 ENTRY TRAJ3 ENTRY TRAJ4 ENTRY TRAJ5	FT/S2				
DLRDTZ	V93X5201XB	ZERO H DOT BIAS CMD	ENT GUID					
ILEFLG	V93X0080XB	LOW-ENERGY ITEM ENTRY	DL FMT 23/1 ENT GUID ENTRY TRAJ2 ENTRY TRAJ3 ENTRY TRAJ4 ENTRY TRAJ5		BD		93017G	*
	V99M1854PB	LANDING CONFIGURATION	DL FMT 23/1				93017G	*

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
 (HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec

TABLE 4.2.2-7. ENTRY TRAJECTORY 2 DISPLAY (G6.16) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
E2_CHAR_STRING(01,1)	V97U7643C	ND	CH		M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(01,2)	V97U7644C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(01,3)	V97U7645C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(02,1)	V97U7646C	ND	CH		M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(02,2)	V97U7647C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(02,3)	V97U7648C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(03,1)	V97U7649C	ND	CH		M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(03,2)	V97U7650C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(03,3)	V97U7651C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(04,1)	V97U7652C	ND	CH		M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(04,2)	V97U7653C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(04,3)	V97U7654C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(05,1)	V97U7655C	ND	CH		M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(05,2)	V97U7656C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(05,3)	V97U7657C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(06,1)	V97U7658C	ND	CH		M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(06,2)	V97U7659C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(06,3)	V97U7660C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(07,1)	V97U7661C	ND	CH		M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(07,2)	V97U7662C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(07,3)	V97U7663C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(08,1)	V97U7664C	ND	CH		M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(08,2)	V97U7665C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(08,3)	V97U7666C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(09,1)	V97U7667C	ND	CH		M	C	G6.16	00	XS1	DC0599	
E2_CHAR_STRING(09,2)	V97U7668C	AU	F	S	M	C	G6.16	00	ZFG	90593A	
E2_CHAR_STRING(09,3)	V97U7669C	AU	F	S	M	C	G6.16	00	ZFG	90593A	
E2_CHAR_STRING(10,1)	V97U7670C	ND	CH		M	C	G6.16	00	XS1	DC0599	
E2_CHAR_STRING(10,2)	V97U7671C	AU	F	S	M	C	G6.16	00	ZFG	90593A	
E2_CHAR_STRING(10,3)	V97U7672C	AU	F	S	M	C	G6.16	00	ZFG	90593A	
E2_CHAR_STRING(11,1)	V97U8447C	ND	CH		M	C	G6.16	00	XS1	DC0599	
E2_CHAR_STRING(11,2)	V97U8448C	AU	F	S	M	C	G6.16	00	ZFG	90593A	
E2_CHAR_STRING(11,3)	V97U8449C	AU	F	S	M	C	G6.16	00	ZFG	90593A	
E2_CHAR_STRING(12,1)	V97U8450C	ND	CH		M	C	G6.16	00	XS1	DC0599	
E2_CHAR_STRING(12,2)	V97U8451C	AU	F	S	M	C	G6.16	00	ZFG	90593A	
E2_CHAR_STRING(12,3)	V97U8452C	AU	F	S	M	C	G6.16	00	ZFG	90593A	
E2_CHAR_STRING(13,1)	V97U8438C	ND	CH		M	C	G6.16	00	XS1	DC0599	
E2_CHAR_STRING(13,2)	V97U8439C	AU	F	S	M	C	G6.16	00	ZFG	90593A	
E2_CHAR_STRING(13,3)	V97U8440C	AU	F	S	M	C	G6.16	00	ZFG	90593A	
E2_CHAR_STRING(14,1)	V97U8441C	ND	CH		M	C	G6.16	00	XS1	DC0599	
E2_CHAR_STRING(14,2)	V97U8442C	AU	F	S	M	C	G6.16	00	ZFG	90593A	
E2_CHAR_STRING(14,3)	V97U8443C	AU	F	S	M	C	G6.16	00	ZFG	90593A	
E2_CHAR_STRING(15,1)	V97U8444C	ND	CH		M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(15,2)	V97U8445C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_CHAR_STRING(15,3)	V97U8446C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(01,1)	V97U7673C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(01,2)	V97U7674C	AU	F	S	M	C	G6.16	00	ET2	DC0599	

TABLE 4.2.2-7. ENTRY TRAJECTORY 2 DISPLAY (G6.16) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
E2_DASH_LINE(01,3)	V97U7675C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(01,4)	V97U7676C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(02,1)	V97U7677C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(02,2)	V97U7678C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(02,3)	V97U7679C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(02,4)	V97U7680C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(03,1)	V97U7681C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(03,2)	V97U7682C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(03,3)	V97U7683C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(03,4)	V97U7684C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(04,1)	V97U7685C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(04,2)	V97U7686C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(04,3)	V97U7687C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(04,4)	V97U7688C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(05,1)	V97U7689C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(05,2)	V97U7690C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(05,3)	V97U7691C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(05,4)	V97U7692C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(06,1)	V97U7693C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(06,2)	V97U7694C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(06,3)	V97U7695C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_DASH_LINE(06,4)	V97U7696C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(01,1)	V97U7709C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(01,2)	V97U7710C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(01,3)	V97U7711C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(01,4)	V97U7712C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(02,1)	V97U7713C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(02,2)	V97U7714C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(02,3)	V97U7715C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(02,4)	V97U7716C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(03,1)	V97U7717C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(03,2)	V97U7718C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(03,3)	V97U7719C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(03,4)	V97U7720C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(04,1)	V97U7721C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(04,2)	V97U7722C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(04,3)	V97U7723C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(04,4)	V97U7724C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(05,1)	V97U7725C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(05,2)	V97U7726C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(05,3)	V97U7727C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(05,4)	V97U7728C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(06,1)	V97U7729C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(06,2)	V97U7730C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(06,3)	V97U7731C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(06,4)	V97U7732C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(07,1)	V97U7733C	AU	F	S	M	C	G6.16	00	ET2	DC0599	

TABLE 4.2.2-7. ENTRY TRAJECTORY 2 DISPLAY (G6.16) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
E2_SOLID_LINE(07,2)	V97U7734C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(07,3)	V97U7735C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(07,4)	V97U7736C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(08,1)	V97U7737C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(08,2)	V97U7738C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(08,3)	V97U7739C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(08,4)	V97U7740C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(09,1)	V97U7741C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(09,2)	V97U7742C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(09,3)	V97U7743C	AU	F	S	M	C	G6.16	00	ET2	DC0599	
E2_SOLID_LINE(09,4)	V97U7744C	AU	F	S	M	C	G6.16	00	ET2	DC0599	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.2-8. ENTRY TRAJECTORY 2 DISPLAY (G6.16) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.2-9. ENTRY TRAJECTORY 2 DISPLAY (G6.16) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.3 ENTRY TRAJECTORY 3 (PFS/BFS)

TITLE: ENTRY TRAJ 3

TYPE: OPS/3041

AVAILABILITY: OPS 3, PFS/BFS

4.2.3.1 Purpose, Operation, and Organization

Figures 4.2.3-1 and 4.2.3-2 present the display formats of ENTRY TRAJ 3 for the PFS and BFS, respectively.

Reference section 4.2.1.1 for a definition of the requirements.

TABLE 4.2.3-1 ENTRY TRAJECTORY 3 KEYBOARD PROCESSING

Identical to Table 4.2.1-1

4.2.3.2 Entry Trajectory 3 Keyboard Processing Addendum

Identical to Section 4.2.1.3

TABLE 4.2.3-2 ENTRY TRAJECTORY 3 CRT DISPLAY PROCESSING

Identical to Table 4.2.1-2

4.2.3.3 Entry Trajectory 3 CRT Display Processing Addendum

See Table 4.2.1-2 and Section 4.2.1.4. The definition of CRT display processing for Entry Trajectory 3 is identical to the requirements for Entry Trajectory 1.

4.2.3.4 Entry Trajectory 3 CRT Display Background Requirements, Design-Dependent

Design-dependent background requirements are identical to the Trajectory 1 requirements of Table 4.2.1-3.

4.2.3.5 Entry Trajectory 3 CRT Display Background Requirements, Mission-Dependent

Table 4.2.3-7 Contains the Entry Trajectory 3 Mission-Dependent I-Load Parameters.

- NOTES:
1. Maximum number of mission dependent constants are as follows:
 - (a) 9 solid lines
 - (b) 3 dashed lines
 - (c) 13 character strings

4.2.3.6 Entry Trajectory 3 Figure/Table References

Figure 4.2.3-1	Entry Trajectory 3 Display (PFS) Generic
Figure 4.2.3-2	Entry Trajectory 3 Display (BFS) Generic
Table 4.2.3-1	Keyboard Processing Table – Same as Table 4.2.1-1
Table 4.2.3-2	CRT Display Processing Table – Same as Table 4.2.1-2
Table 4.2.3-3	CRT Display Processing Background Requirements – Same as Table 4.2.1-3
Table 4.2.3-4	Mission Design Background Constants N/A
Table 4.2.3-5	Input Functional Parameters
Table 4.2.3-6	Output Functional Parameters
Table 4.2.3-7	I-Loads
Table 4.2.3-8	K-Loads
Table 4.2.3-9	Constants

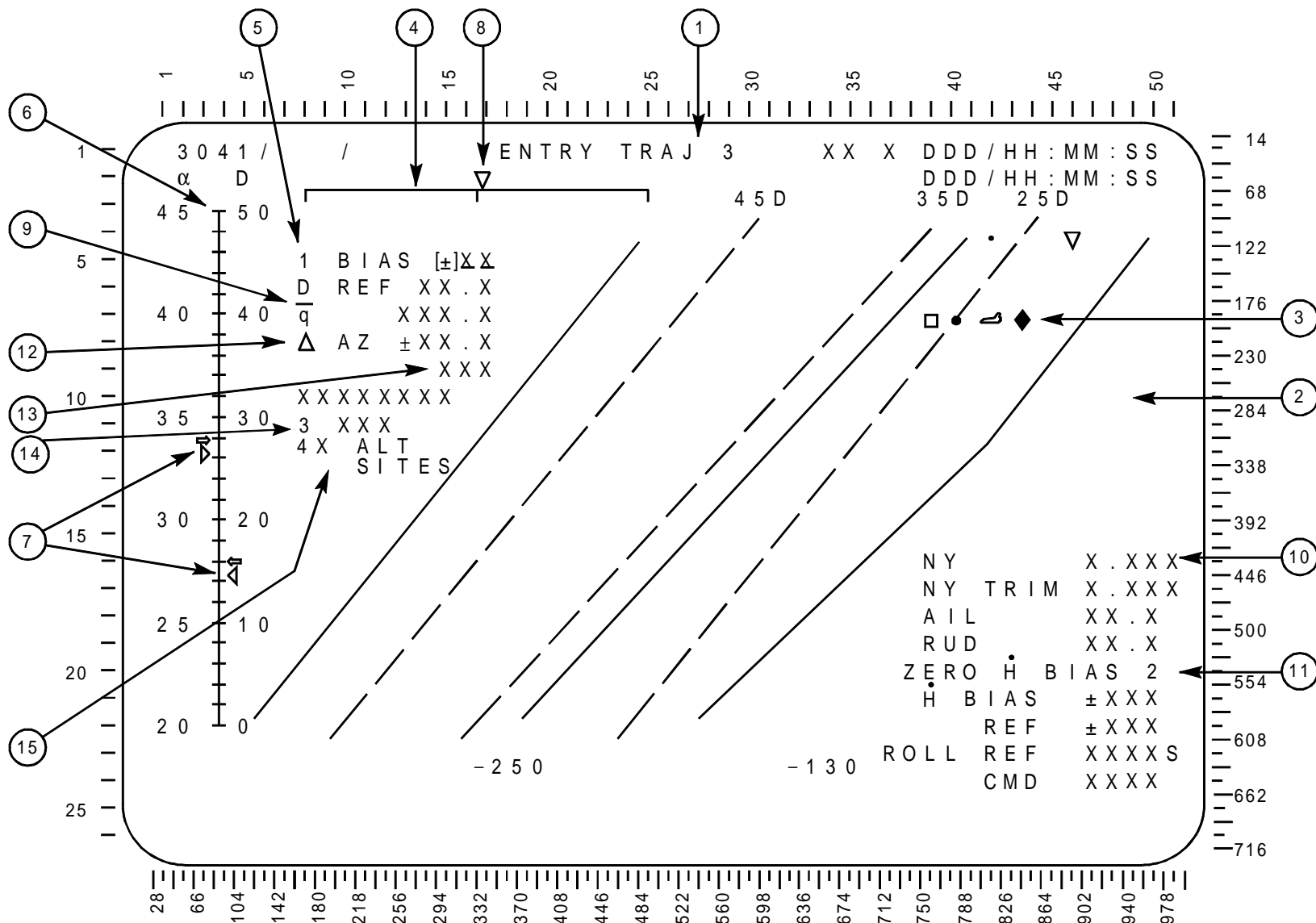


FIGURE 4.2.3-1. Entry Trajectory 3 Display (PFS) Generic

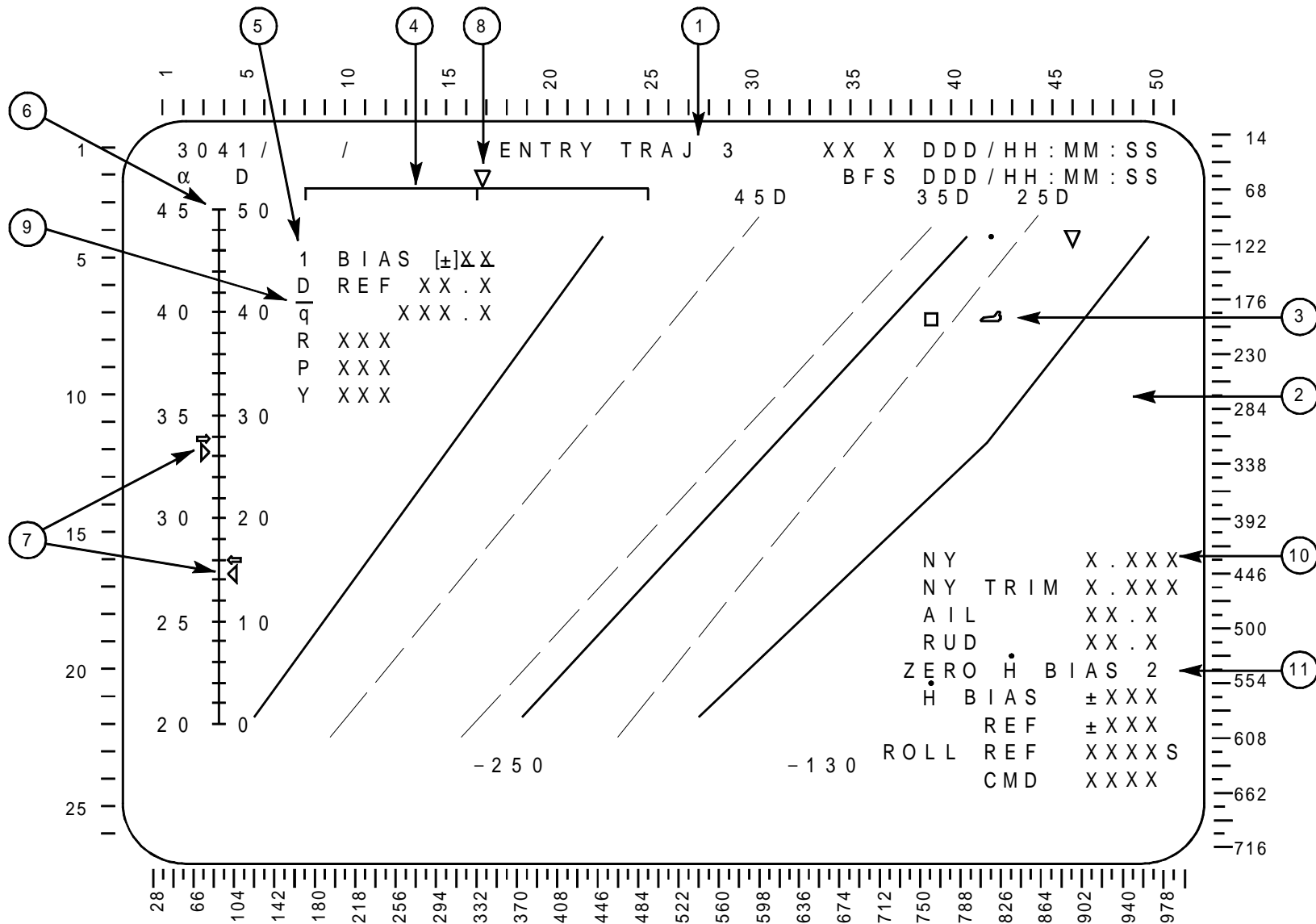


FIGURE 4.2.3-2. Entry Trajectory 3 Display (BFS) Generic

TABLE 4.2.3-5. INPUT FUNCTIONAL PARAMETERS FOR ENTRY TRAJECTORY 3 DISPLAY (G6.17)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
ACC_ALPHA_FLAG	V94X1242X	ALPHA SYMBOL FLASH FLAG	ENT DIP					
ACC_ALPHA_Y	V94U1235C	Y COORD OF ALPHA SYMBOL	ENT DIP	AU	VAR			
ACC_VERT	V95A0170CB	VERTICAL ACCEL IN TOPODETTIC COORD	ENT UPP	FT/S2				
ALT_SYMBOLS_CMD	V94X6684X	ALTERNATE SYMBOLS ENA/INH CMD	ENTRY TRAJ1		BD		93090E	
ALT_SYMBOLS_CMD	V94X6684XA	ALTERNATE SYMBOLS ENA/INH CMD	ENTRY TRAJ2		BD		93090E	
ALT_SYMBOLS_CMD	V94X6684XB	ALTERNATE SYMBOLS ENA/INH CMD	ENTRY TRAJ3		BD		93090E	
BANK_FLAG	V94X1238X	BANK ANGLE FLASH FLAG	ENT DIP				92522D	
BIAS_ITEM	V93R5203CA	DRAG REF BIAS	ENTRY TRAJ1	FT/S2				
BIAS_ITEM	V93R5203CB	DRAG REF BIAS	ENTRY TRAJ2	FT/S2				
BIAS_ITEM	V93R5203CC	DRAG REF BIAS	ENTRY TRAJ3	FT/S2				
COM_ALPHA_FLAG	V94X1246X	ALPHA CMD FLASH FLAG	ENT DIP					
COM_ALPHA_Y	V94U1236C	Y COORD OF COMMANDED ALPHA SYMBOL	ENT DIP	AU	VAR			
DATRIM	V90H1629CA	AILERON TRIM	AEROJET DAP	DEG				
DLRDOT	V90R1133C	ALTITUDE RATE FEEDBACK CORRECTION	ENT GUID	FT/S	SPL		93017G	*
DRAG_ACC_FLAG	V94X1241X	DRAG TRIANGLE FLASH FLAG	ENT DIP					
DRAG_ACC_Y	V94U1230C	Y COORD OF DRAG ACC SYMBOL	ENT DIP	AU	VAR			
DRAG_REF_FLAG	V94X1240X	REFERENCE DRAG FLASH FLAG	ENT DIP					
DRAG_REF_Y	V94U1231C	Y COORD OF DRAG REFERENCE SYMBOL	ENT DIP	AU	VAR			
DRTI	V90H1669CA	LATERAL ACCEL TRIM	AEROJET DAP					
DRTRIM	V90H1668CA	RUDDER TRIM	AEROJET DAP	DEG				
D_REF	V94A1252C	BIASED REF DRAG	ENT DIP		VAR			
GUID_TRAILER(X,1)	V94U1213C	X COORD GUIDANCE TRAILER (1)	ENT DIP	AU	VAR			
GUID_TRAILER(X,2)	V94U1214C	X COORD GUIDANCE TRAILER (2)	ENT DIP	AU	VAR			
GUID_TRAILER(X,3)	V94U1215C	X COORD GUIDANCE TRAILER (3)	ENT DIP	AU	VAR			
GUID_TRAILER(X,4)	V94U1216C	X COORD GUIDANCE TRAILER (4)	ENT DIP	AU	VAR			
GUID_TRAILER(X,5)	V94U1217C	X COORD GUIDANCE TRAILER (5)	ENT DIP	AU	VAR			
GUID_TRAILER(X,6)	V94U1218C	X COORD GUIDANCE TRAILER (6)	ENT DIP	AU	VAR			
GUID_X	V94U1202C	X COORD OF GUIDANCE SYMBOL	ENT DIP	AU	VAR			
GUID_Y	V94U1245C	Y COORD OF GUIDANCE SYMBOL	ENT DIP	AU	VAR			
ICNTAL	V90X1198X	LOW-ENERGY LOGIC ENGAGE DISCRETE	ENT GUID		BD		93017G	*
ILEFLG	V93X0080X	LOW-ENERGY ITEM ENTRY	ENT GUID		BD		93017G	*
ILEFLG	V93X0080XA	LOW-ENERGY ITEM ENTRY	ENTRY TRAJ1		BD		93017G	*
ILEFLG	V93X0080XB	LOW-ENERGY ITEM ENTRY	ENTRY TRAJ2		BD		93017G	*
ILEFLG	V93X0080XC	LOW-ENERGY ITEM ENTRY	ENTRY TRAJ3		BD		93017G	*
NY	V90A5361C	SELECTED AA LATERAL ACCEL	SF	G	SPL		93017G	*
PTI_IND	V90X3220XC	PTI INDICATOR	ENT DIP		BD		79994C	

TABLE 4.2.3-5. INPUT FUNCTIONAL PARAMETERS FOR ENTRY TRAJECTORY 3 DISPLAY (G6.17)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
QBAR/QBAR_AD	V95P3011C	GN&C DYNAMIC PRESSURE	ADTA SOP	LBF/FT2	SPL		93017G	*
RDTRF	V90R1199C	NOM VALUE OF ALT RATE REF	ENT GUID	FT/S	SPL		93017G	*
REF_ROL_STAT	V94X1253X	REF ROLL STATUS	ENT DIP		BD			
ROLLC(1)	V90H1044CC	COMMANDED ROLL ANGLE	ENT GUID	DEG			93017G	*
ROLLC(3)	V90H1142C	REF ROLL ANGLE	ENT GUID	DEG	SPL		93017G	*
SHUTTLE_X	V94U1201C	X COORD OF SHUTTLE PROFILE	ENT DIP	AU	VAR			
SHUTTLE_X_ALT(1)	V94H5634C	X COORD SHUTTLE SYMBOL ALT SITE 1	ENT DIP	AU	VAR		93090E	
SHUTTLE_X_ALT(2)	V94H6498C	X COORD SHUTTLE SYMBOL ALT SITE 2	ENT DIP	AU	VAR		93090E	
SHUTTLE_Y	V94U1203C	Y COORD OF SHUTTLE PROFILE	ENT DIP	AU	VAR			
SHUTTLE_Y_ALT(1)	V94H5635C	Y COORD SHUTTLE SYMBOL ALT SITE 1	ENT DIP	AU	VAR		93090E	
SHUTTLE_Y_ALT(2)	V94H6499C	Y COORD SHUTTLE SYMBOL ALT SITE 2	ENT DIP	AU	VAR		93090E	
TRAILER(X,1)	V94U1205C	X COORD SHUTTLE TRAILER (1)	ENT DIP	AU	VAR			
TRAILER(X,2)	V94U1206C	X COORD SHUTTLE TRAILER (2)	ENT DIP	AU	VAR			
TRAILER(X,3)	V94U1207C	X COORD SHUTTLE TRAILER (3)	ENT DIP	AU	VAR			
TRAILER(X,4)	V94U1208C	X COORD SHUTTLE TRAILER (4)	ENT DIP	AU	VAR			
TRAILER(X,5)	V94U1209C	X COORD SHUTTLE TRAILER (5)	ENT DIP	AU	VAR			
TRAILER(X,6)	V94U1210C	X COORD SHUTTLE TRAILER (6)	ENT DIP	AU	VAR			
TRAILER(Y,1)	V94U1222C	Y COORD SHUTTLE TRAILER (1)	ENT DIP	AU	VAR			
TRAILER(Y,2)	V94U1223C	Y COORD SHUTTLE TRAILER (2)	ENT DIP	AU	VAR			
TRAILER(Y,3)	V94U1224C	Y COORD SHUTTLE TRAILER (3)	ENT DIP	AU	VAR			
TRAILER(Y,4)	V94U1225C	Y COORD SHUTTLE TRAILER (4)	ENT DIP	AU	VAR			
TRAILER(Y,5)	V94U1226C	Y COORD SHUTTLE TRAILER (5)	ENT DIP	AU	VAR			
TRAILER(Y,6)	V94U1227C	Y COORD SHUTTLE TRAILER (6)	ENT DIP	AU	VAR			
X_PHUGOID_BK	V94U1250C	X COORD OF PHUGOID BANK SYMBOL	ENT DIP		VAR			
X_PHUGOID_FLAG	V94X1251X	PHUGOID BANK SYMBOL FLASH FLAG	ENT DIP					

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.3-6. OUTPUT FUNCTIONAL PARAMETERS FROM ENTRY TRAJECTORY 3 DISPLAY (G6.17)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ALT_SYMBOLS_CMD	V94X6684XB	ALTERNATE SYMBOLS ENA/INH CMD	ENTRY TRAJ3 ENTRY TRAJ4 ENTRY TRAJ5		BD		93090E	
BIAS_ITEM	V93R5203CC	DRAG REF BIAS	ENT DIP ENTRY TRAJ3 ENTRY TRAJ4 ENTRY TRAJ5	FT/S2				
DLRDTZ	V93X5201XC	ZERO H DOT BIAS CMD	ENT GUID					
ILEFLG	V93X0080XC	LOW-ENERGY ITEM ENTRY	DL FMT 23/1 ENT GUID ENTRY TRAJ3 ENTRY TRAJ4 ENTRY TRAJ5		BD		93017G	*
	V99M1854PC	LANDING CONFIGURATION	DL FMT 23/1				93017G	*

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
(HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

TABLE 4.2.3-7. ENTRY TRAJECTORY 3 DISPLAY (G6.17) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
E3_CHAR_STRING(01,1)	V97U7757C	ND	CH		M	C	G6.17	00	ET3	DC0599	
E3_CHAR_STRING(01,2)	V97U7758C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_CHAR_STRING(01,3)	V97U7759C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_CHAR_STRING(02,1)	V97U7760C	ND	CH		M	C	G6.17	00	ET3	DC0599	
E3_CHAR_STRING(02,2)	V97U7761C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_CHAR_STRING(02,3)	V97U7762C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_CHAR_STRING(03,1)	V97U7763C	ND	CH		M	C	G6.17	00	ET3	DC0599	
E3_CHAR_STRING(03,2)	V97U7764C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_CHAR_STRING(03,3)	V97U7765C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_CHAR_STRING(04,1)	V97U7766C	ND	CH		M	C	G6.17	00	ET3	DC0599	
E3_CHAR_STRING(04,2)	V97U7767C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_CHAR_STRING(04,3)	V97U7768C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_CHAR_STRING(05,1)	V97U7769C	ND	CH		M	C	G6.17	00	ET3	DC0599	
E3_CHAR_STRING(05,2)	V97U7770C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_CHAR_STRING(05,3)	V97U7771C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_CHAR_STRING(06,1)	V97U7772C	ND	CH		M	C	G6.17	00	ET3	DC0599	
E3_CHAR_STRING(06,2)	V97U7773C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_CHAR_STRING(06,3)	V97U7774C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_CHAR_STRING(07,1)	V97U7775C	ND	CH		M	C	G6.17	00	XS1	DC0599	
E3_CHAR_STRING(07,2)	V97U7776C	AU	F	S	M	C	G6.17	00	ZFG	90593A	
E3_CHAR_STRING(07,3)	V97U7777C	AU	F	S	M	C	G6.17	00	ZFG	90593A	
E3_CHAR_STRING(08,1)	V97U7778C	ND	CH		M	C	G6.17	00	XS1	DC0599	
E3_CHAR_STRING(08,2)	V97U7779C	AU	F	S	M	C	G6.17	00	ZFG	90593A	
E3_CHAR_STRING(08,3)	V97U7780C	AU	F	S	M	C	G6.17	00	ZFG	90593A	
E3_CHAR_STRING(09,1)	V97U8654C	ND	CH		M	C	G6.17	00	XS1	DC0599	
E3_CHAR_STRING(09,2)	V97U8655C	AU	F	S	M	C	G6.17	00	ZFG	90593A	
E3_CHAR_STRING(09,3)	V97U8656C	AU	F	S	M	C	G6.17	00	ZFG	90593A	
E3_CHAR_STRING(10,1)	V97U8657C	ND	CH		M	C	G6.17	00	XS1	DC0599	
E3_CHAR_STRING(10,2)	V97U8658C	AU	F	S	M	C	G6.17	00	ZFG	90593A	
E3_CHAR_STRING(10,3)	V97U8659C	AU	F	S	M	C	G6.17	00	ZFG	90593A	
E3_CHAR_STRING(11,1)	V97U8660C	ND	CH		M	C	G6.17	00	XS1	DC0599	
E3_CHAR_STRING(11,2)	V97U8661C	AU	F	S	M	C	G6.17	00	ZFG	90593A	
E3_CHAR_STRING(11,3)	V97U8662C	AU	F	S	M	C	G6.17	00	ZFG	90593A	
E3_CHAR_STRING(12,1)	V97U8663C	ND	CH		M	C	G6.17	00	XS1	DC0599	
E3_CHAR_STRING(12,2)	V97U8664C	AU	F	S	M	C	G6.17	00	ZFG	90593A	
E3_CHAR_STRING(12,3)	V97U8665C	AU	F	S	M	C	G6.17	00	ZFG	90593A	
E3_CHAR_STRING(13,1)	V97U8666C	ND	CH		M	C	G6.17	00	ET3	DC0599	
E3_CHAR_STRING(13,2)	V97U8667C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_CHAR_STRING(13,3)	V97U8668C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_DASH_LINE(01,1)	V97U7781C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_DASH_LINE(01,2)	V97U7782C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_DASH_LINE(01,3)	V97U7783C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_DASH_LINE(01,4)	V97U7784C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_DASH_LINE(02,1)	V97U7785C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_DASH_LINE(02,2)	V97U7786C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_DASH_LINE(02,3)	V97U7787C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_DASH_LINE(02,4)	V97U7788C	AU	F	S	M	C	G6.17	00	ET3	DC0599	

TABLE 4.2.3-7. ENTRY TRAJECTORY 3 DISPLAY (G6.17) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
E3_DASH_LINE(03,1)	V97U7789C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_DASH_LINE(03,2)	V97U7790C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_DASH_LINE(03,3)	V97U7791C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_DASH_LINE(03,4)	V97U7792C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(01,1)	V97U7793C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(01,2)	V97U7794C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(01,3)	V97U7795C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(01,4)	V97U7796C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(02,1)	V97U7797C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(02,2)	V97U7798C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(02,3)	V97U7799C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(02,4)	V97U7800C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(03,1)	V97U7801C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(03,2)	V97U7802C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(03,3)	V97U7803C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(03,4)	V97U7804C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(04,1)	V97U7805C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(04,2)	V97U7806C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(04,3)	V97U7807C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(04,4)	V97U7808C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(05,1)	V97U7809C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(05,2)	V97U7810C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(05,3)	V97U7811C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(05,4)	V97U7812C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(06,1)	V97U7813C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(06,2)	V97U7814C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(06,3)	V97U7815C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(06,4)	V97U7816C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(07,1)	V97U7817C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(07,2)	V97U7818C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(07,3)	V97U7819C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(07,4)	V97U7820C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(08,1)	V97U7821C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(08,2)	V97U7822C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(08,3)	V97U7823C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(08,4)	V97U7824C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(09,1)	V97U7825C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(09,2)	V97U7826C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(09,3)	V97U7827C	AU	F	S	M	C	G6.17	00	ET3	DC0599	
E3_SOLID_LINE(09,4)	V97U7828C	AU	F	S	M	C	G6.17	00	ET3	DC0599	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

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TABLE 4.2.3-8. ENTRY TRAJECTORY 3 DISPLAY (G6.17) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.3-9. ENTRY TRAJECTORY 3 DISPLAY (G6.17) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.4 ENTRY TRAJECTORY 4 (PFS/BFS)

TITLE: ENTRY TRAJ 4

TYPE: OPS/3041

AVAILABILITY: OPS 3, PFS/BFS

4.2.4.1 Purpose, Operation, and Organization

Figures 4.2.4–1 and 4.2.4–2 present the display formats of ENTRY TRAJ 4 for the PFS and BFS, respectively.

Reference section 4.2.1.1 for a definition of the requirements.

TABLE 4.2.4–1 ENTRY TRAJECTORY 4 KEYBOARD PROCESSING

Identical to Table 4.2.1–1

4.2.4.2 Entry Trajectory 4 Keyboard Processing Addendum

Identical to Section 4.2.1.3

TABLE 4.2.4–2 ENTRY TRAJECTORY 4 CRT DISPLAY PROCESSING

Identical to Table 4.2.1–2.

4.2.4.3 Entry Trajectory 4 CRT Display Processing Addendum

See Table 4.2.1–2 and Section 4.2.1.4. The definition of CRT display processing for Entry Trajectory 4 is identical to the requirements for Entry Trajectory 1.

4.2.4.4 Entry Trajectory 4 CRT Display Background Requirements, Design-Dependent

Design-dependent background requirements are identical to the Trajectory 1 requirements of Table 4.2.1–3.

4.2.4.5 Entry Trajectory 4 CRT Display Background Requirements, Mission-Dependent

Table 4.2.4–7 contains the Entry Trajectory 4 Mission-Dependent I-Load Parameters.

- NOTES:
1. Maximum number of mission dependent constants are as follows:
 - (a) 9 solid lines
 - (b) 10 dashed lines
 - (c) 13 character strings

4.2.4.6 Entry Trajectory 4 Figure/Table References

Figure 4.2.4-1	Entry Trajectory 4 Display (PFS) Generic
Figure 4.2.4-2	Entry Trajectory 4 Display (BFS) Generic
Table 4.2.4-1	Keyboard Processing Table – Same as Table 4.2.1-1
Table 4.2.4-2	CRT Display Processing Table – Same as Table 4.2.1-2
Table 4.2.4-3	CRT Display Processing Background Requirements – Same as Table 4.2.1-3
Table 4.2.4-4	Mission Design Background Constants N/A
Table 4.2.4-5	Input Functional Parameters
Table 4.2.4-6	Output Functional Parameters
Table 4.2.4-7	I-Loads
Table 4.2.4-8	K-Loads
Table 4.2.4-9	Constants

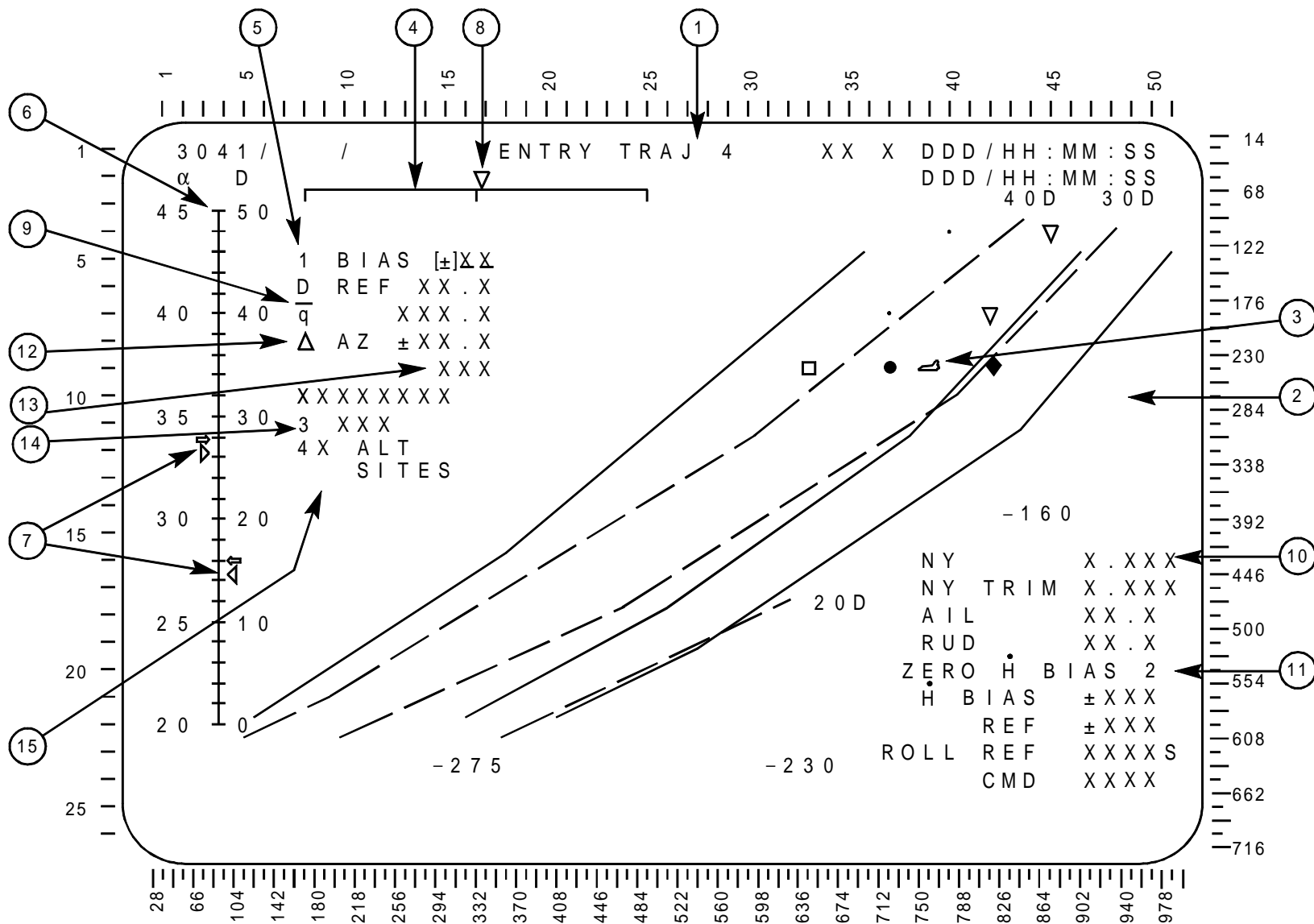


FIGURE 4.2.4-1. Entry Trajectory 4 Display (PFS) Generic

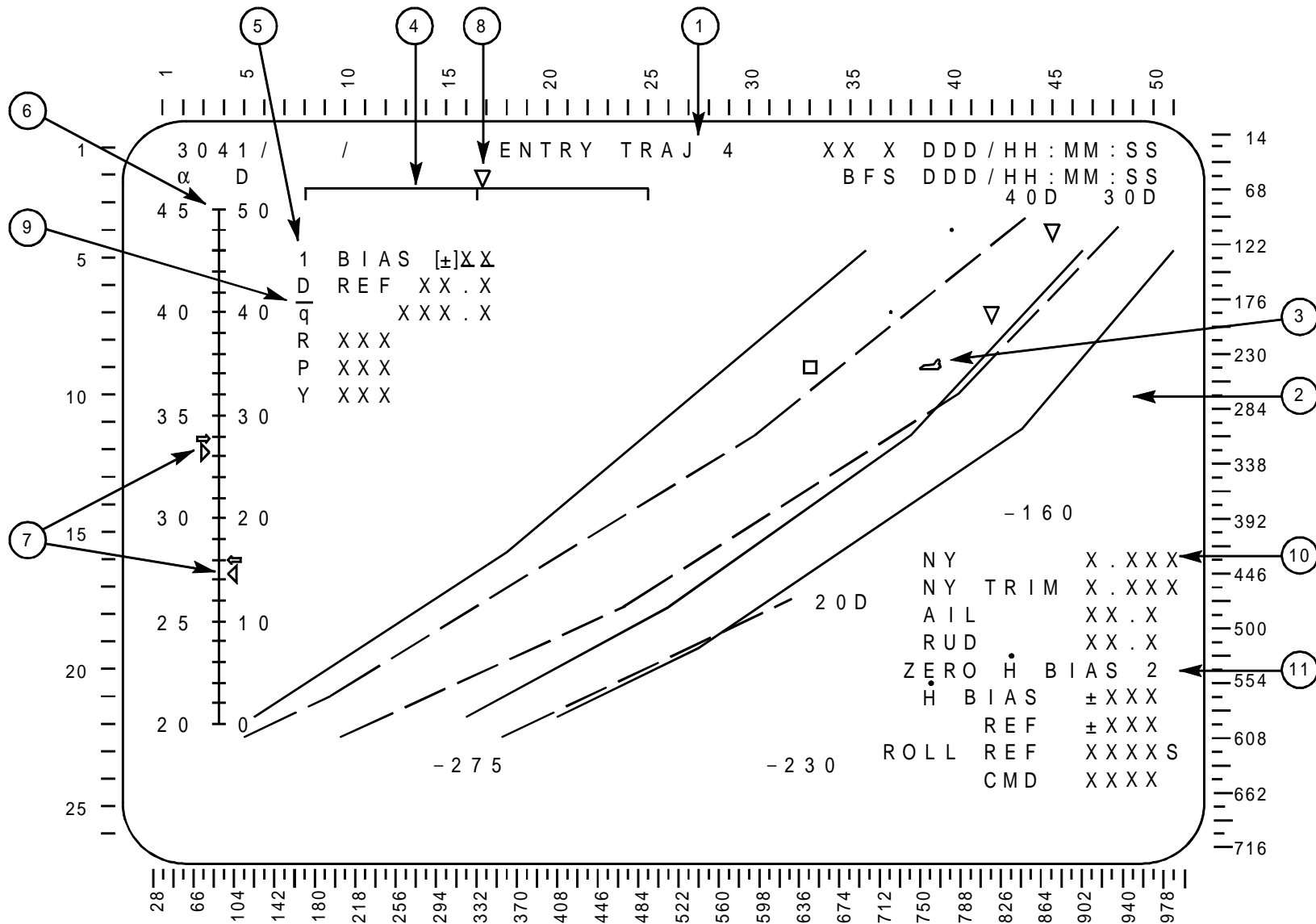


FIGURE 4.2.4-2. Entry Trajectory 4 Display (BFS) Generic

TABLE 4.2.4-5. INPUT FUNCTIONAL PARAMETERS FOR ENTRY TRAJECTORY 4 DISPLAY (G6.18)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
ACC_ALPHA_FLAG	V94X1242X	ALPHA SYMBOL FLASH FLAG	ENT DIP					
ACC_ALPHA_Y	V94U1235C	Y COORD OF ALPHA SYMBOL	ENT DIP	AU	VAR			
ACC_VERT	V95A0170CB	VERTICAL ACCEL IN TOPODETTIC COORD	ENT UPP	FT/S2				
ALT_SYMBOLS_CMD	V94X6684X	ALTERNATE SYMBOLS ENA/INH CMD	ENTRY TRAJ1		BD		93090E	
ALT_SYMBOLS_CMD	V94X6684XA	ALTERNATE SYMBOLS ENA/INH CMD	ENTRY TRAJ2		BD		93090E	
ALT_SYMBOLS_CMD	V94X6684XB	ALTERNATE SYMBOLS ENA/INH CMD	ENTRY TRAJ3		BD		93090E	
ALT_SYMBOLS_CMD	V94X6684XC	ALTERNATE SYMBOLS ENA/INH CMD	ENTRY TRAJ4		BD		93090E	
BANK_FLAG	V94X1238X	BANK ANGLE FLASH FLAG	ENT DIP				92522D	
BIAS_ITEM	V93R5203CA	DRAG REF BIAS	ENTRY TRAJ1	FT/S2				
BIAS_ITEM	V93R5203CB	DRAG REF BIAS	ENTRY TRAJ2	FT/S2				
BIAS_ITEM	V93R5203CC	DRAG REF BIAS	ENTRY TRAJ3	FT/S2				
BIAS_ITEM	V93R5203CD	DRAG REF BIAS	ENTRY TRAJ4	FT/S2				
COM_ALPHA_FLAG	V94X1246X	ALPHA CMD FLASH FLAG	ENT DIP					
COM_ALPHA_Y	V94U1236C	Y COORD OF COMMANDED ALPHA SYMBOL	ENT DIP	AU	VAR			
DATRIM	V90H1629CA	AILERON TRIM	AEROJET DAP	DEG				
DLRDOT	V90R1133C	ALTITUDE RATE FEEDBACK CORRECTION	ENT GUID	FT/S	SPL		93017G	*
DRAG_ACC_FLAG	V94X1241X	DRAG TRIANGLE FLASH FLAG	ENT DIP					
DRAG_ACC_Y	V94U1230C	Y COORD OF DRAG ACC SYMBOL	ENT DIP	AU	VAR			
DRAG_REF_FLAG	V94X1240X	REFERENCE DRAG FLASH FLAG	ENT DIP					
DRAG_REF_Y	V94U1231C	Y COORD OF DRAG REFERENCE SYMBOL	ENT DIP	AU	VAR			
DRTI	V90H1669CA	LATERAL ACCEL TRIM	AEROJET DAP					
DRTRIM	V90H1668CA	RUDDER TRIM	AEROJET DAP	DEG				
D_REF	V94A1252C	BIASED REF DRAG	ENT DIP		VAR			
GUID_TRAILER(X,1)	V94U1213C	X COORD GUIDANCE TRAILER (1)	ENT DIP	AU	VAR			
GUID_TRAILER(X,2)	V94U1214C	X COORD GUIDANCE TRAILER (2)	ENT DIP	AU	VAR			
GUID_TRAILER(X,3)	V94U1215C	X COORD GUIDANCE TRAILER (3)	ENT DIP	AU	VAR			
GUID_TRAILER(X,4)	V94U1216C	X COORD GUIDANCE TRAILER (4)	ENT DIP	AU	VAR			
GUID_TRAILER(X,5)	V94U1217C	X COORD GUIDANCE TRAILER (5)	ENT DIP	AU	VAR			
GUID_TRAILER(X,6)	V94U1218C	X COORD GUIDANCE TRAILER (6)	ENT DIP	AU	VAR			
GUID_X	V94U1202C	X COORD OF GUIDANCE SYMBOL	ENT DIP	AU	VAR			
GUID_Y	V94U1245C	Y COORD OF GUIDANCE SYMBOL	ENT DIP	AU	VAR			
ICNTAL	V90X1198X	LOW-ENERGY LOGIC ENGAGE DISCRETE	ENT GUID		BD		93017G	*
ILEFLG	V93X0080X	LOW-ENERGY ITEM ENTRY	ENT GUID		BD		93017G	*
ILEFLG	V93X0080XA	LOW-ENERGY ITEM ENTRY	ENTRY TRAJ1		BD		93017G	*
ILEFLG	V93X0080XB	LOW-ENERGY ITEM ENTRY	ENTRY TRAJ2		BD		93017G	*
ILEFLG	V93X0080XC	LOW-ENERGY ITEM ENTRY	ENTRY TRAJ3		BD		93017G	*

TABLE 4.2.4-5. INPUT FUNCTIONAL PARAMETERS FOR ENTRY TRAJECTORY 4 DISPLAY (G6.18)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ILEFLG	V93X0080XD	LOW-ENERGY ITEM ENTRY	ENTRY TRAJ4				93017G	*
NY	V90A5361C	SELECTED AA LATERAL ACCEL	SF	G	SPL		93017G	*
PTI_IND	V90X3220XC	PTI INDICATOR	ENT DIP		BD		79994C	
QBAR/QBAR_AD	V95P3011C	GN&C DYNAMIC PRESSURE	ADTA SOP	LBF/FT2	SPL		93017G	*
RDTRF	V90R1199C	NOM VALUE OF ALT RATE REF	ENT GUID	FT/S	SPL		93017G	*
REF_ROL_STAT	V94X1253X	REF ROLL STATUS	ENT DIP		BD			
ROLLC(1)	V90H1044CC	COMMANDED ROLL ANGLE	ENT GUID	DEG			93017G	*
ROLLC(3)	V90H1142C	REF ROLL ANGLE	ENT GUID	DEG	SPL		93017G	*
SHUTTLE_X	V94U1201C	X COORD OF SHUTTLE PROFILE	ENT DIP	AU	VAR			
SHUTTLE_X_ALT(1)	V94H5634C	X COORD SHUTTLE SYMBOL ALT SITE 1	ENT DIP	AU	VAR		93090E	
SHUTTLE_X_ALT(2)	V94H6498C	X COORD SHUTTLE SYMBOL ALT SITE 2	ENT DIP	AU	VAR		93090E	
SHUTTLE_Y	V94U1203C	Y COORD OF SHUTTLE PROFILE	ENT DIP	AU	VAR			
SHUTTLE_Y_ALT(1)	V94H5635C	Y COORD SHUTTLE SYMBOL ALT SITE 1	ENT DIP	AU	VAR		93090E	
SHUTTLE_Y_ALT(2)	V94H6499C	Y COORD SHUTTLE SYMBOL ALT SITE 2	ENT DIP	AU	VAR		93090E	
TRAILER(X,1)	V94U1205C	X COORD SHUTTLE TRAILER (1)	ENT DIP	AU	VAR			
TRAILER(X,2)	V94U1206C	X COORD SHUTTLE TRAILER (2)	ENT DIP	AU	VAR			
TRAILER(X,3)	V94U1207C	X COORD SHUTTLE TRAILER (3)	ENT DIP	AU	VAR			
TRAILER(X,4)	V94U1208C	X COORD SHUTTLE TRAILER (4)	ENT DIP	AU	VAR			
TRAILER(X,5)	V94U1209C	X COORD SHUTTLE TRAILER (5)	ENT DIP	AU	VAR			
TRAILER(X,6)	V94U1210C	X COORD SHUTTLE TRAILER (6)	ENT DIP	AU	VAR			
TRAILER(Y,1)	V94U1222C	Y COORD SHUTTLE TRAILER (1)	ENT DIP	AU	VAR			
TRAILER(Y,2)	V94U1223C	Y COORD SHUTTLE TRAILER (2)	ENT DIP	AU	VAR			
TRAILER(Y,3)	V94U1224C	Y COORD SHUTTLE TRAILER (3)	ENT DIP	AU	VAR			
TRAILER(Y,4)	V94U1225C	Y COORD SHUTTLE TRAILER (4)	ENT DIP	AU	VAR			
TRAILER(Y,5)	V94U1226C	Y COORD SHUTTLE TRAILER (5)	ENT DIP	AU	VAR			
TRAILER(Y,6)	V94U1227C	Y COORD SHUTTLE TRAILER (6)	ENT DIP	AU	VAR			
X_PHUGOID_BK	V94U1250C	X COORD OF PHUGOID BANK SYMBOL	ENT DIP		VAR			
X_PHUGOID_FLAG	V94X1251X	PHUGOID BANK SYMBOL FLASH FLAG	ENT DIP					

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.4-6. OUTPUT FUNCTIONAL PARAMETERS FROM ENTRY TRAJECTORY 4 DISPLAY (G6.18)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ALT_SYMBOLS_CMD	V94X6684XC	ALTERNATE SYMBOLS ENA/INH CMD	ENTRY TRAJ4 ENTRY TRAJ5		BD		93090E	
BIAS_ITEM	V93R5203CD	DRAG REF BIAS	ENT DIP ENTRY TRAJ4 ENTRY TRAJ5	FT/S2				
DLRDTZ	V93X5201XD	ZERO H DOT BIAS CMD	ENT GUID					
ILEFLG	V93X0080XD	LOW-ENERGY ITEM ENTRY	DL FMT 23/1 ENT GUID ENTRY TRAJ4 ENTRY TRAJ5				93017G	*
	V99M1854PD	LANDING CONFIGURATION	DL FMT 23/1				93017G	*

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
(HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

TABLE 4.2.4-7. ENTRY TRAJECTORY 4 DISPLAY (G6.18) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
E4_CHAR_STRING(01,1)	V97U7829C	ND	CH		M	C	G6.18	00	ET4	DC2213	
E4_CHAR_STRING(01,2)	V97U7830C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_CHAR_STRING(01,3)	V97U7831C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_CHAR_STRING(02,1)	V97U7832C	ND	CH		M	C	G6.18	00	ET4	DC2213	
E4_CHAR_STRING(02,2)	V97U7833C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_CHAR_STRING(02,3)	V97U7834C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_CHAR_STRING(03,1)	V97U7835C	ND	CH		M	C	G6.18	00	ET4	DC2213	
E4_CHAR_STRING(03,2)	V97U7836C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_CHAR_STRING(03,3)	V97U7837C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_CHAR_STRING(04,1)	V97U7838C	ND	CH		M	C	G6.18	00	ET4	DC2213	
E4_CHAR_STRING(04,2)	V97U7839C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_CHAR_STRING(04,3)	V97U7840C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_CHAR_STRING(05,1)	V97U7841C	ND	CH		M	C	G6.18	00	ET4	DC2213	
E4_CHAR_STRING(05,2)	V97U7842C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_CHAR_STRING(05,3)	V97U7843C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_CHAR_STRING(06,1)	V97U7844C	ND	CH		M	C	G6.18	00	ET4	DC2213	
E4_CHAR_STRING(06,2)	V97U7845C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_CHAR_STRING(06,3)	V97U7846C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_CHAR_STRING(07,1)	V97U8633C	ND	CH		M	C	G6.18	00	XS1	DC0599	
E4_CHAR_STRING(07,2)	V97U8634C	AU	F	S	M	C	G6.18	00	ZFG	90593A	
E4_CHAR_STRING(07,3)	V97U8635C	AU	F	S	M	C	G6.18	00	ZFG	90593A	
E4_CHAR_STRING(08,1)	V97U8636C	ND	CH		M	C	G6.18	00	XS1	DC0599	
E4_CHAR_STRING(08,2)	V97U8637C	AU	F	S	M	C	G6.18	00	ZFG	90593A	
E4_CHAR_STRING(08,3)	V97U8638C	AU	F	S	M	C	G6.18	00	ZFG	90593A	
E4_CHAR_STRING(09,1)	V97U8639C	ND	CH		M	C	G6.18	00	XS1	DC0599	
E4_CHAR_STRING(09,2)	V97U8640C	AU	F	S	M	C	G6.18	00	ZFG	90593A	
E4_CHAR_STRING(09,3)	V97U8641C	AU	F	S	M	C	G6.18	00	ZFG	90593A	
E4_CHAR_STRING(10,1)	V97U8642C	ND	CH		M	C	G6.18	00	XS1	DC0599	
E4_CHAR_STRING(10,2)	V97U8643C	AU	F	S	M	C	G6.18	00	ZFG	90593A	
E4_CHAR_STRING(10,3)	V97U8644C	AU	F	S	M	C	G6.18	00	ZFG	90593A	
E4_CHAR_STRING(11,1)	V97U8645C	ND	CH		M	C	G6.18	00	XS1	DC0599	
E4_CHAR_STRING(11,2)	V97U8646C	AU	F	S	M	C	G6.18	00	ZFG	90593A	
E4_CHAR_STRING(11,3)	V97U8647C	AU	F	S	M	C	G6.18	00	ZFG	90593A	
E4_CHAR_STRING(12,1)	V97U8648C	ND	CH		M	C	G6.18	00	XS1	DC0599	
E4_CHAR_STRING(12,2)	V97U8649C	AU	F	S	M	C	G6.18	00	ZFG	90593A	
E4_CHAR_STRING(12,3)	V97U8650C	AU	F	S	M	C	G6.18	00	ZFG	90593A	
E4_CHAR_STRING(13,1)	V97U8651C	ND	SY		M	X	G6.18	00	ET4	DC2213	
E4_CHAR_STRING(13,2)	V97U8652C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_CHAR_STRING(13,3)	V97U8653C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(01,1)	V97U7847C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(01,2)	V97U7848C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(01,3)	V97U7849C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(01,4)	V97U7850C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(02,1)	V97U7851C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(02,2)	V97U7852C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(02,3)	V97U7853C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(02,4)	V97U7854C	AU	F	S	M	C	G6.18	00	ET4	DC2213	

TABLE 4.2.4-7. ENTRY TRAJECTORY 4 DISPLAY (G6.18) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
E4_DASH_LINE(03,1)	V97U7855C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(03,2)	V97U7856C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(03,3)	V97U7857C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(03,4)	V97U7858C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(04,1)	V97U7859C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(04,2)	V97U7860C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(04,3)	V97U7861C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(04,4)	V97U7862C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(05,1)	V97U7863C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(05,2)	V97U7864C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(05,3)	V97U7865C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(05,4)	V97U7866C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(06,1)	V97U7867C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(06,2)	V97U7868C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(06,3)	V97U7869C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(06,4)	V97U7870C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(07,1)	V97U7871C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(07,2)	V97U7872C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(07,3)	V97U7873C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(07,4)	V97U7874C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(08,1)	V97U7875C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(08,2)	V97U7876C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(08,3)	V97U7877C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(08,4)	V97U7878C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(09,1)	V97U7879C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(09,2)	V97U7880C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(09,3)	V97U7881C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(09,4)	V97U7882C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(10,1)	V97U7883C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(10,2)	V97U7884C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(10,3)	V97U7885C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_DASH_LINE(10,4)	V97U7886C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(01,1)	V97U7887C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(01,2)	V97U7888C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(01,3)	V97U7889C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(01,4)	V97U7890C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(02,1)	V97U7891C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(02,2)	V97U7892C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(02,3)	V97U7893C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(02,4)	V97U7894C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(03,1)	V97U7895C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(03,2)	V97U7896C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(03,3)	V97U7897C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(03,4)	V97U7898C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(04,1)	V97U7899C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(04,2)	V97U7900C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(04,3)	V97U7901C	AU	F	S	M	C	G6.18	00	ET4	DC2213	

TABLE 4.2.4-7. ENTRY TRAJECTORY 4 DISPLAY (G6.18) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
E4_SOLID_LINE(04,4)	V97U7902C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(05,1)	V97U7903C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(05,2)	V97U7904C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(05,3)	V97U7905C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(05,4)	V97U7906C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(06,1)	V97U7907C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(06,2)	V97U7908C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(06,3)	V97U7909C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(06,4)	V97U7910C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(07,1)	V97U7911C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(07,2)	V97U7912C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(07,3)	V97U7913C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(07,4)	V97U7914C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(08,1)	V97U7915C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(08,2)	V97U7916C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(08,3)	V97U7917C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(08,4)	V97U7918C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(09,1)	V97U7919C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(09,2)	V97U7920C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(09,3)	V97U7921C	AU	F	S	M	C	G6.18	00	ET4	DC2213	
E4_SOLID_LINE(09,4)	V97U7922C	AU	F	S	M	C	G6.18	00	ET4	DC2213	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.4-8. ENTRY TRAJECTORY 4 DISPLAY (G6.18) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.4-9. ENTRY TRAJECTORY 4 DISPLAY (G6.18) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.5 ENTRY TRAJECTORY 5 (PFS/BFS)

TITLE: ENTRY TRAJ 5

TYPE: OPS/3041

AVAILABILITY: OPS 3, PFS/BFS

4.2.5.1 Purpose, Operation, and Organization

Figures 4.2.5-1 and 4.2.5-2 present the display formats of ENTRY TRAJ 5 for the PFS and BFS, respectively.

Reference section 4.2.1.1 for a definition of the requirements.

TABLE 4.2.5-1 ENTRY TRAJECTORY 5 KEYBOARD PROCESSING

Identical to Table 4.2.1-1

4.2.5.2 Entry Trajectory 5 Keyboard Processing Addendum

Identical to Section 4.2.1.3

TABLE 4.2.5-2 ENTRY TRAJECTORY 5 CRT DISPLAY PROCESSING

Identical to Table 4.2.1-2

4.2.5.3 Entry Trajectory 5 CRT Display Processing Addendum

See Table 4.2.1-2 and Section 4.2.1.4. The definition of CRT display processing for Entry Trajectory 5 is identical to the requirements for Entry Trajectory 1.

4.2.5.4 Entry Trajectory 5 CRT Display Background Requirements, Design-Dependent

Design-dependent background requirements are identical to the Trajectory 1 requirements of Table 4.2.1-3.

4.2.5.5 Entry Trajectory 5 CRT Display Background Requirements, Mission-Dependent

Table 4.2.5-7 contains the Entry Trajectory 5 Mission-Dependent I-Load parameters.

- NOTES:
1. Maximum number of mission dependent constants are as follows:
 - (a) 14 solid lines
 - (b) 10 dashed lines
 - (c) 14 character strings

4.2.5.6 Entry Trajectory 5 Figure/Table References

Figure 4.2.5-1	Entry Trajectory 5 Display (PFS) Generic
Figure 4.2.5-2	Entry Trajectory 5 Display (BFS) Generic
Table 4.2.5-1	Keyboard Processing Table – Same as Table 4.2.1-1
Table 4.2.5-2	CRT Display Processing Table – Same as Table 4.2.1-2
Table 4.2.5-3	CRT Display Processing Background Requirements – Same as Table 4.2.1-3
Table 4.2.5-4	Mission Design Background Constants N/A
Table 4.2.5-5	Input Functional Parameters
Table 4.2.5-6	Output Functional Parameters
Table 4.2.5-7	I-Loads
Table 4.2.5-8	K-Loads
Table 4.2.5-9	Constants

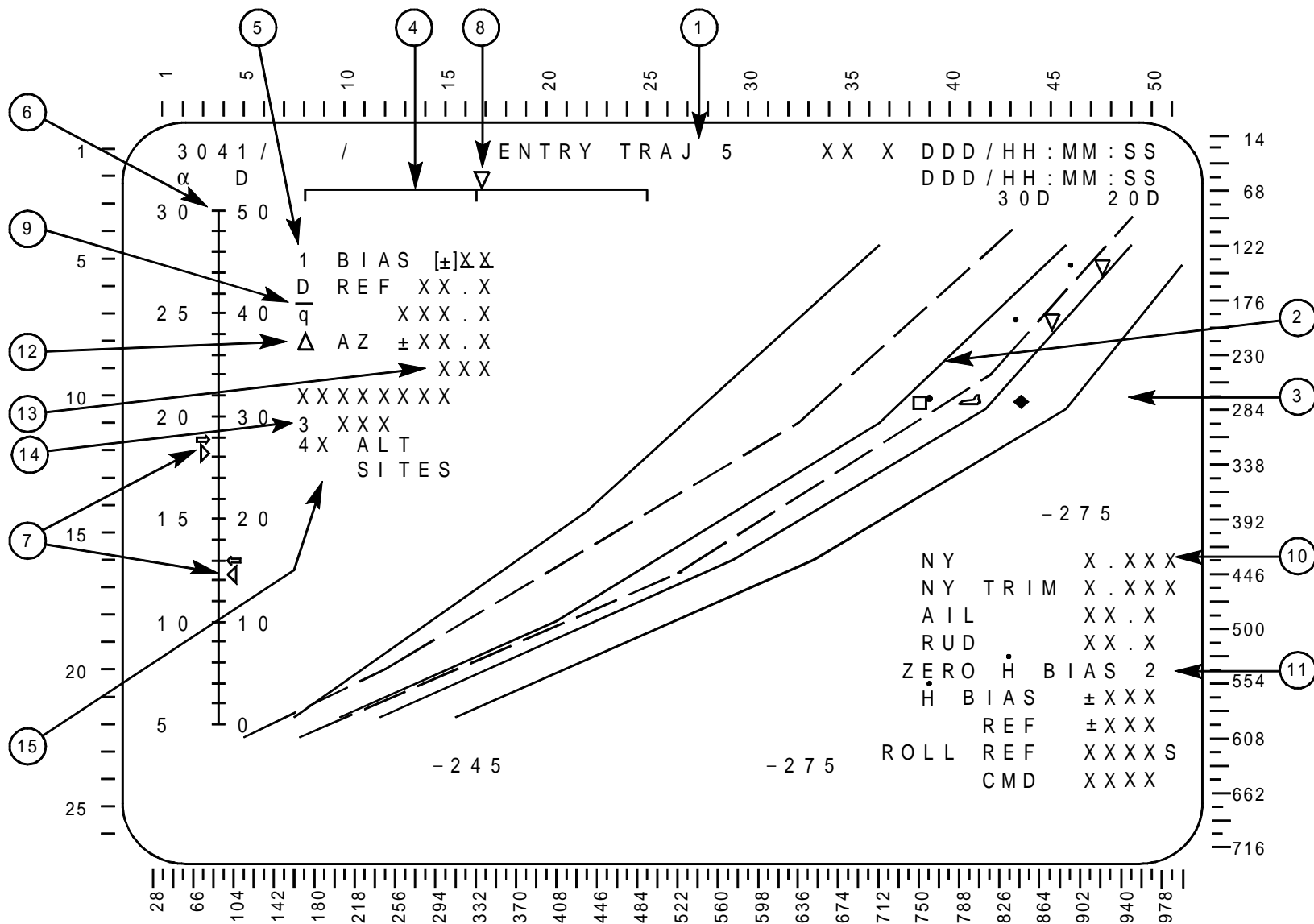


FIGURE 4.2.5-1. Entry Trajectory 5 Display (PFS) Generic

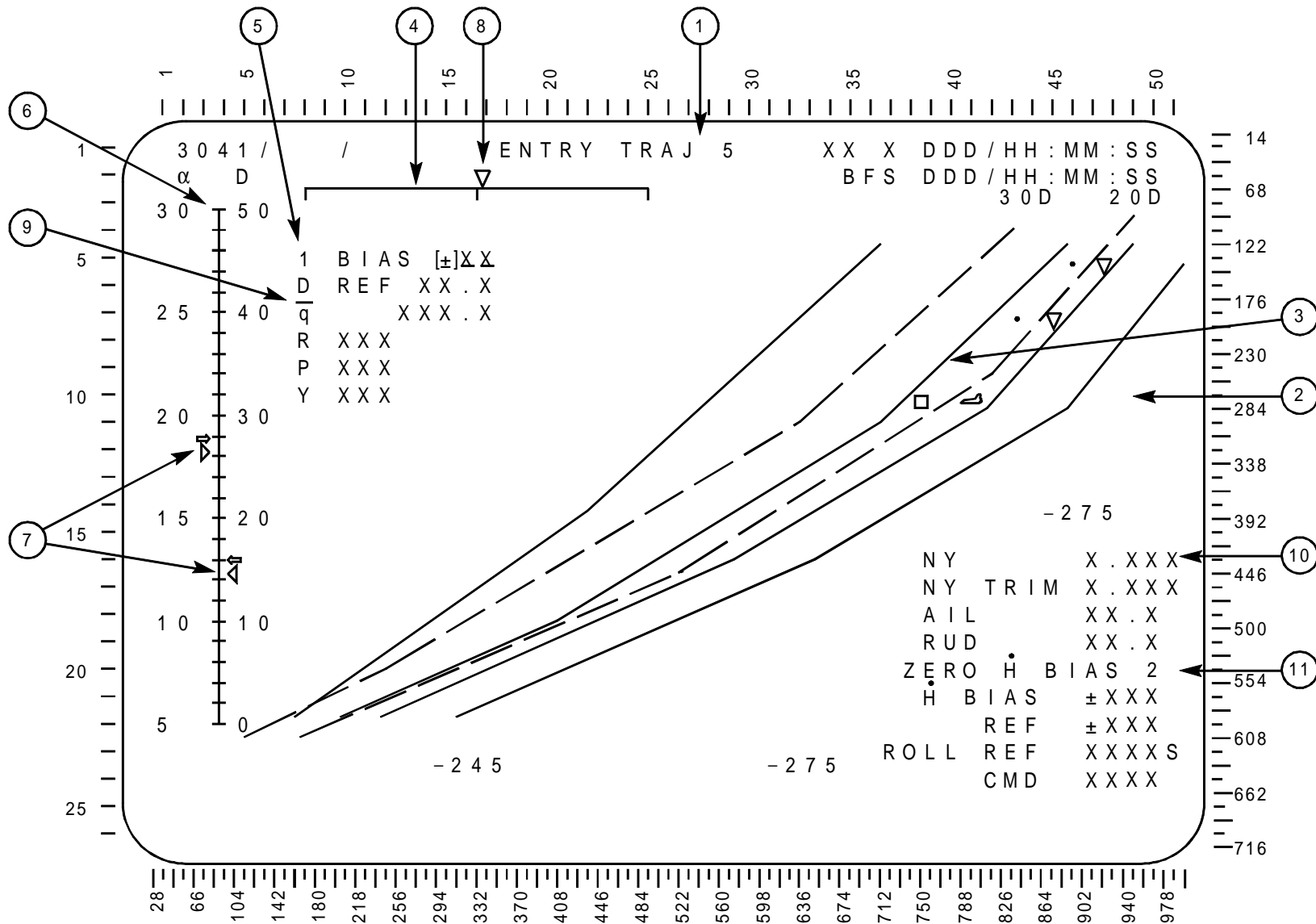


FIGURE 4.2.5-2. Entry Trajectory 5 Display (BFS) Generic

TABLE 4.2.5-5. INPUT FUNCTIONAL PARAMETERS FOR ENTRY TRAJECTORY 5 DISPLAY (G6.40)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
ACC_ALPHA_FLAG	V94X1242X	ALPHA SYMBOL FLASH FLAG	ENT DIP					
ACC_ALPHA_Y	V94U1235C	Y COORD OF ALPHA SYMBOL	ENT DIP	AU	VAR			
ACC_VERT	V95A0170CB	VERTICAL ACCEL IN TOPODETTIC COORD	ENT UPP	FT/S2				
ALT_SYMBOLS_CMD	V94X6684X	ALTERNATE SYMBOLS ENA/INH CMD	ENTRY TRAJ1		BD		93090E	
ALT_SYMBOLS_CMD	V94X6684XA	ALTERNATE SYMBOLS ENA/INH CMD	ENTRY TRAJ2		BD		93090E	
ALT_SYMBOLS_CMD	V94X6684XB	ALTERNATE SYMBOLS ENA/INH CMD	ENTRY TRAJ3		BD		93090E	
ALT_SYMBOLS_CMD	V94X6684XC	ALTERNATE SYMBOLS ENA/INH CMD	ENTRY TRAJ4		BD		93090E	
ALT_SYMBOLS_CMD	V94X6684XD	ALTERNATE SYMBOLS ENA/INH CMD	ENTRY TRAJ5		BD		93090E	
BANK_FLAG	V94X1238X	BANK ANGLE FLASH FLAG	ENT DIP				92522D	
BIAS_ITEM	V93R5203CA	DRAG REF BIAS	ENTRY TRAJ1	FT/S2				
BIAS_ITEM	V93R5203CB	DRAG REF BIAS	ENTRY TRAJ2	FT/S2				
BIAS_ITEM	V93R5203CC	DRAG REF BIAS	ENTRY TRAJ3	FT/S2				
BIAS_ITEM	V93R5203CD	DRAG REF BIAS	ENTRY TRAJ4	FT/S2				
BIAS_ITEM	V93R5203CE	DRAG REF BIAS	ENTRY TRAJ5	FT/S2				
COM_ALPHA_FLAG	V94X1246X	ALPHA CMD FLASH FLAG	ENT DIP					
COM_ALPHA_Y	V94U1236C	Y COORD OF COMMANDED ALPHA SYMBOL	ENT DIP	AU	VAR			
DATRIM	V90H1629CA	AILERON TRIM	AEROJET DAP	DEG				
DLRDOT	V90R1133C	ALTITUDE RATE FEEDBACK CORRECTION	ENT GUID	FT/S	SPL		93017G	*
DRAG_ACC_FLAG	V94X1241X	DRAG TRIANGLE FLASH FLAG	ENT DIP					
DRAG_ACC_Y	V94U1230C	Y COORD OF DRAG ACC SYMBOL	ENT DIP	AU	VAR			
DRAG_REF_FLAG	V94X1240X	REFERENCE DRAG FLASH FLAG	ENT DIP					
DRAG_REF_Y	V94U1231C	Y COORD OF DRAG REFERENCE SYMBOL	ENT DIP	AU	VAR			
DRTI	V90H1669CA	LATERAL ACCEL TRIM	AEROJET DAP					
DRTRIM	V90H1668CA	RUDDER TRIM	AEROJET DAP	DEG				
D_REF	V94A1252C	BIASED REF DRAG	ENT DIP		VAR			
GUID_TRAILER(X,1)	V94U1213C	X COORD GUIDANCE TRAILER (1)	ENT DIP	AU	VAR			
GUID_TRAILER(X,2)	V94U1214C	X COORD GUIDANCE TRAILER (2)	ENT DIP	AU	VAR			
GUID_TRAILER(X,3)	V94U1215C	X COORD GUIDANCE TRAILER (3)	ENT DIP	AU	VAR			
GUID_TRAILER(X,4)	V94U1216C	X COORD GUIDANCE TRAILER (4)	ENT DIP	AU	VAR			
GUID_TRAILER(X,5)	V94U1217C	X COORD GUIDANCE TRAILER (5)	ENT DIP	AU	VAR			
GUID_TRAILER(X,6)	V94U1218C	X COORD GUIDANCE TRAILER (6)	ENT DIP	AU	VAR			
GUID_X	V94U1202C	X COORD OF GUIDANCE SYMBOL	ENT DIP	AU	VAR			
GUID_Y	V94U1245C	Y COORD OF GUIDANCE SYMBOL	ENT DIP	AU	VAR			
ICNTAL	V90X1198X	LOW-ENERGY LOGIC ENGAGE DISCRETE	ENT GUID		BD		93017G	*
ILEFLG	V93X0080X	LOW-ENERGY ITEM ENTRY	ENT GUID		BD		93017G	*
ILEFLG	V93X0080XA	LOW-ENERGY ITEM ENTRY	ENTRY TRAJ1		BD		93017G	*

TABLE 4.2.5-5. INPUT FUNCTIONAL PARAMETERS FOR ENTRY TRAJECTORY 5 DISPLAY (G6.40)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ILEFLG	V93X0080XB	LOW-ENERGY ITEM ENTRY	ENTRY TRAJ2		BD		93017G	*
ILEFLG	V93X0080XC	LOW-ENERGY ITEM ENTRY	ENTRY TRAJ3		BD		93017G	*
ILEFLG	V93X0080XD	LOW-ENERGY ITEM ENTRY	ENTRY TRAJ4				93017G	*
ILEFLG	V93X0080XE	LOW-ENERGY ITEM ENTRY	ENTRY TRAJ5		BD		93017G	*
NY	V90A5361C	SELECTED AA LATERAL ACCEL	SF	G	SPL		93017G	*
PTI_IND	V90X3220XC	PTI INDICATOR	ENT DIP		BD		79994C	
QBAR/QBAR_AD	V95P3011C	GN&C DYNAMIC PRESSURE	ADTA SOP	LBF/FT2	SPL		93017G	*
RDTRF	V90R1199C	NOM VALUE OF ALT RATE REF	ENT GUID	FT/S	SPL		93017G	*
REF_ROL_STAT	V94X1253X	REF ROLL STATUS	ENT DIP		BD			
ROLLC(1)	V90H1044CC	COMMANDED ROLL ANGLE	ENT GUID	DEG			93017G	*
ROLLC(3)	V90H1142C	REF ROLL ANGLE	ENT GUID	DEG	SPL		93017G	*
SHUTTLE_X	V94U1201C	X COORD OF SHUTTLE PROFILE	ENT DIP	AU	VAR			
SHUTTLE_X_ALT(1)	V94H5634C	X COORD SHUTTLE SYMBOL ALT SITE 1	ENT DIP	AU	VAR		93090E	
SHUTTLE_X_ALT(2)	V94H6498C	X COORD SHUTTLE SYMBOL ALT SITE 2	ENT DIP	AU	VAR		93090E	
SHUTTLE_Y	V94U1203C	Y COORD OF SHUTTLE PROFILE	ENT DIP	AU	VAR			
SHUTTLE_Y_ALT(1)	V94H5635C	Y COORD SHUTTLE SYMBOL ALT SITE 1	ENT DIP	AU	VAR		93090E	
SHUTTLE_Y_ALT(2)	V94H6499C	Y COORD SHUTTLE SYMBOL ALT SITE 2	ENT DIP	AU	VAR		93090E	
TRAILER(X,1)	V94U1205C	X COORD SHUTTLE TRAILER (1)	ENT DIP	AU	VAR			
TRAILER(X,2)	V94U1206C	X COORD SHUTTLE TRAILER (2)	ENT DIP	AU	VAR			
TRAILER(X,3)	V94U1207C	X COORD SHUTTLE TRAILER (3)	ENT DIP	AU	VAR			
TRAILER(X,4)	V94U1208C	X COORD SHUTTLE TRAILER (4)	ENT DIP	AU	VAR			
TRAILER(X,5)	V94U1209C	X COORD SHUTTLE TRAILER (5)	ENT DIP	AU	VAR			
TRAILER(X,6)	V94U1210C	X COORD SHUTTLE TRAILER (6)	ENT DIP	AU	VAR			
TRAILER(Y,1)	V94U1222C	Y COORD SHUTTLE TRAILER (1)	ENT DIP	AU	VAR			
TRAILER(Y,2)	V94U1223C	Y COORD SHUTTLE TRAILER (2)	ENT DIP	AU	VAR			
TRAILER(Y,3)	V94U1224C	Y COORD SHUTTLE TRAILER (3)	ENT DIP	AU	VAR			
TRAILER(Y,4)	V94U1225C	Y COORD SHUTTLE TRAILER (4)	ENT DIP	AU	VAR			
TRAILER(Y,5)	V94U1226C	Y COORD SHUTTLE TRAILER (5)	ENT DIP	AU	VAR			
TRAILER(Y,6)	V94U1227C	Y COORD SHUTTLE TRAILER (6)	ENT DIP	AU	VAR			
X_PHUGOID_BK	V94U1250C	X COORD OF PHUGOID BANK SYMBOL	ENT DIP		VAR			
X_PHUGOID_FLAG	V94X1251X	PHUGOID BANK SYMBOL FLASH FLAG	ENT DIP					

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.5-6. OUTPUT FUNCTIONAL PARAMETERS FROM ENTRY TRAJECTORY 5 DISPLAY (G6.40)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ALT_SYMBOLS_CMD	V94X6684XD	ALTERNATE SYMBOLS ENA/INH CMD	ENTRY TRAJ5		BD		93090E	
BIAS_ITEM	V93R5203CE	DRAG REF BIAS	ENT DIP	FT/S2				
DLRDTZ	V93X5201XE	ZERO H DOT BIAS CMD	ENTRY TRAJ5					
ILEFLG	V93X0080XE	LOW-ENERGY ITEM ENTRY	ENT GUID		BD		93017G	*
	V99M1854PE	LANDING CONFIGURATION	DL FMT 23/1				93017G	*

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
 (HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec

TABLE 4.2.5-7. ENTRY TRAJECTORY 5 DISPLAY (G6.40) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
E5_CHAR_STRING(01,1)	V97U7923C	ND	SY		M	X	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(01,2)	V97U7924C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(01,3)	V97U7925C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(02,1)	V97U7926C	ND	CH		M	C	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(02,2)	V97U7927C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(02,3)	V97U7928C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(03,1)	V97U7929C	ND	CH		M	C	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(03,2)	V97U7930C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(03,3)	V97U7931C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(04,1)	V97U7932C	ND	SY		M	X	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(04,2)	V97U7933C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(04,3)	V97U7934C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(05,1)	V97U7935C	ND	CH		M	C	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(05,2)	V97U7936C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(05,3)	V97U7937C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(06,1)	V97U7938C	ND	CH		M	C	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(06,2)	V97U7939C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(06,3)	V97U7940C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(07,1)	V97U7941C	ND	CH		M	C	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(07,2)	V97U7942C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(07,3)	V97U7943C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(08,1)	V97U7944C	ND	CH		M	C	G6.40	00	XS1	DC0599	
E5_CHAR_STRING(08,2)	V97U7945C	AU	F	S	M	C	G6.40	00	ZFG	90593A	
E5_CHAR_STRING(08,3)	V97U7946C	AU	F	S	M	C	G6.40	00	ZFG	90593A	
E5_CHAR_STRING(09,1)	V97U8469C	ND	CH		M	C	G6.40	00	XS1	DC0599	
E5_CHAR_STRING(09,2)	V97U8470C	AU	F	S	M	C	G6.40	00	ZFG	90593A	
E5_CHAR_STRING(09,3)	V97U8471C	AU	F	S	M	C	G6.40	00	ZFG	90593A	
E5_CHAR_STRING(10,1)	V97U8472C	ND	CH		M	C	G6.40	00	XS1	DC0599	
E5_CHAR_STRING(10,2)	V97U8473C	AU	F	S	M	C	G6.40	00	ZFG	90593A	
E5_CHAR_STRING(10,3)	V97U8474C	AU	F	S	M	C	G6.40	00	ZFG	90593A	
E5_CHAR_STRING(11,1)	V97U8475C	ND	CH		M	C	G6.40	00	XS1	DC0599	
E5_CHAR_STRING(11,2)	V97U8476C	AU	F	S	M	C	G6.40	00	ZFG	90593A	
E5_CHAR_STRING(11,3)	V97U8683C	AU	F	S	M	C	G6.40	00	ZFG	90593A	
E5_CHAR_STRING(12,1)	V97U8684C	ND	CH		M	C	G6.40	00	XS1	DC0599	
E5_CHAR_STRING(12,2)	V97U8685C	AU	F	S	M	C	G6.40	00	ZFG	90593A	
E5_CHAR_STRING(12,3)	V97U8686C	AU	F	S	M	C	G6.40	00	ZFG	90593A	
E5_CHAR_STRING(13,1)	V97U8609C	ND	CH		M	C	G6.40	00	XS1	DC0599	
E5_CHAR_STRING(13,2)	V97U8610C	AU	F	S	M	C	G6.40	00	ZFG	90593A	
E5_CHAR_STRING(13,3)	V97U8611C	AU	F	S	M	C	G6.40	00	ZFG	90593A	
E5_CHAR_STRING(14,1)	V97U8612C	ND	SY		M	X	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(14,2)	V97U8613C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_CHAR_STRING(14,3)	V97U8614C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(01,1)	V97U7947C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(01,2)	V97U7948C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(01,3)	V97U7949C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(01,4)	V97U7950C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(02,1)	V97U7951C	AU	F	S	M	C	G6.40	00	ET5	DC0599	

TABLE 4.2.5-7. ENTRY TRAJECTORY 5 DISPLAY (G6.40) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
E5_DASH_LINE(02,2)	V97U7952C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(02,3)	V97U7953C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(02,4)	V97U7954C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(03,1)	V97U7955C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(03,2)	V97U7956C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(03,3)	V97U7957C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(03,4)	V97U7958C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(04,1)	V97U7959C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(04,2)	V97U7960C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(04,3)	V97U7961C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(04,4)	V97U7962C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(05,1)	V97U7963C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(05,2)	V97U7964C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(05,3)	V97U7965C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(05,4)	V97U7966C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(06,1)	V97U7967C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(06,2)	V97U7968C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(06,3)	V97U7969C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(06,4)	V97U7970C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(07,1)	V97U7971C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(07,2)	V97U7972C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(07,3)	V97U7973C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(07,4)	V97U7974C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(08,1)	V97U7975C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(08,2)	V97U7976C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(08,3)	V97U7977C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(08,4)	V97U7978C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(09,1)	V97U7979C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(09,2)	V97U7980C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(09,3)	V97U7981C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(09,4)	V97U7982C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(10,1)	V97U7983C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(10,2)	V97U7984C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(10,3)	V97U7985C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_DASH_LINE(10,4)	V97U7986C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(01,1)	V97U7987C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(01,2)	V97U7988C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(01,3)	V97U7989C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(01,4)	V97U7990C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(02,1)	V97U7991C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(02,2)	V97U7992C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(02,3)	V97U7993C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(02,4)	V97U7994C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(03,1)	V97U7995C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(03,2)	V97U7996C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(03,3)	V97U7997C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(03,4)	V97U7998C	AU	F	S	M	C	G6.40	00	ET5	DC0599	

TABLE 4.2.5-7. ENTRY TRAJECTORY 5 DISPLAY (G6.40) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
E5_SOLID_LINE(04,1)	V97U7999C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(04,2)	V97U8000C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(04,3)	V97U8001C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(04,4)	V97U8002C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(05,1)	V97U8003C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(05,2)	V97U8004C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(05,3)	V97U8005C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(05,4)	V97U8006C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(06,1)	V97U8007C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(06,2)	V97U8008C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(06,3)	V97U8009C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(06,4)	V97U8010C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(07,1)	V97U8011C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(07,2)	V97U8012C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(07,3)	V97U8013C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(07,4)	V97U8014C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(08,1)	V97U8015C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(08,2)	V97U8016C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(08,3)	V97U8017C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(08,4)	V97U8018C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(09,1)	V97U8019C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(09,2)	V97U8020C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(09,3)	V97U8021C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(09,4)	V97U8022C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(10,1)	V97U8023C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(10,2)	V97U8024C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(10,3)	V97U8025C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(10,4)	V97U8026C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(11,1)	V97U8027C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(11,2)	V97U8028C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(11,3)	V97U8029C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(11,4)	V97U8030C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(12,1)	V97U8031C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(12,2)	V97U8032C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(12,3)	V97U8033C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(12,4)	V97U8034C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(13,1)	V97U8035C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(13,2)	V97U8036C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(13,3)	V97U8037C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(13,4)	V97U8038C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(14,1)	V97U8039C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(14,2)	V97U8040C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(14,3)	V97U8041C	AU	F	S	M	C	G6.40	00	ET5	DC0599	
E5_SOLID_LINE(14,4)	V97U8042C	AU	F	S	M	C	G6.40	00	ET5	DC0599	

TABLE 4.2.5-7. ENTRY TRAJECTORY 5 DISPLAY (G6.40) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
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NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

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TABLE 4.2.5-8. ENTRY TRAJECTORY 5 DISPLAY (G6.40) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.5-9. ENTRY TRAJECTORY 5 DISPLAY (G6.40) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.6 VERTICAL SITUATION 1 (PFS/BFS)

TITLE: VERT SIT 1

TYPE: OPS/3051, 6021 and 6031

AVAILABILITY: OPS 3, 6, PFS/BFS

4.2.6.1 Purpose, Operation, and Organization

This display (Figure 4.2.6-1) provides vehicle longitudinal information to the crew during the TAEM region and the first portions of the gliding phase of an RTLS abort. The display plots vehicle altitude versus predicted range-to-go to WP2 via WP1. The current vehicle altitude dissipation rate is indicated by the rotation of the Shuttle symbol. The vehicle energy state and TAEM guidance energy limits are displayed on a vertical tape scale.

This display is called up when: the crew performs an OPS 305 PRO, or an OPS 602 PRO, or automatically at TAEM interface in OPS 3 or ET separation during the RTLS abort phase.

- (1) The dashed lines in the upper left corner of the display is an Alpha transition profile which is used only in MM602. It is plotted as a function of alpha and MACH number. An orbiter symbol at a fixed orientation indicates the current alpha/mach state. The solid line under the dashed line represents an alpha/mach lower limit that should not be exceeded. Whenever the value of alpha is above or below the upper or lower alpha limit respectively, the orbiter symbol will be displayed flashing. The alpha limits are I-loaded.
- (2) This display monitors vehicle altitude down to 30,000 feet. Three background lines are provided. The outermost lines represent wings level flight with no winds present. The leftmost line (labeled 300) is for flight at the maximum dynamic pressure, full speed brakes applied. This results in a maximum altitude dissipation rate. The effect of vehicle weight is included in this line. The rightmost line (labeled 200) represents flight at maximum L/D. The middle line is the attempting-to-fly guidance profile. The associated reference equivalent airspeeds in knots are defined on this profile.
- (3) The actual speed brake position from SB PFB SOP (4.48) is displayed in percent. The commanded speed brake position from guidance is displayed in percent.
- (4) Current vehicle energy state, the nominal energy state and the guidance energy limits are dynamically displayed on a vertical tape (E/W) scale. The tape is scaled as a function of the S-TURN and MEP profiles. The current energy state symbol is a left pointing triangle. This symbol will flash according to a flag set in the Display Interface Processor (DIP). If the energy is greater than the S-TURN energy or less than the MEP energy, the flag will be set and the symbol flashed. Otherwise the symbol will not flash. The nominal energy state and the energy limits are tick marked. The OTT downmode energy state is displayed with a left pointing arrow. When the range to the runway is less than an I-loaded limit, the display of OTT downmode energy symbol (1F, ←) will be blanked.
- (5) Current Shuttle pitch attitude (θ) is dynamically displayed on the left side of the vertical tape scale when the relative velocity is below an I-loaded limit. Otherwise the pitch attitude symbol is not displayed. The scaling is defined by the pitch profiles associated with flight at a dynamic pressure of 300 psf and with flight at maximum L/D. The pitch attitude symbol is a right pointing triangle.

- (6) Digital readouts of lateral acceleration (NY) in g's, lateral acceleration trim (NY TRIM) in g's and aileron (AIL) and rudder (RUD) trim in degrees are displayed.
- (7) During RTLS, the text "NZ" is displayed overbright whenever Guidance is in the constant NZ phase, otherwise the text field is blanked.
- (8) In the PFS only, a pull out normal acceleration (NZ) value is calculated in GRTLS TAEM GUID (4.204) and displayed in g's (OPS 6 only). Once computed in MM602, the pull out NZ will continue to be displayed cyclically in MM603 on the Vert Sit 2 Display.
- (9) In the PFS only, the character string "BAILOUT" is displayed double overbright and flashing to indicate that the TAEM Guidance Abort Bailout Mode has been armed, but not engaged. When both Pitch and Bank axes of the FCS have been moded to AUTO with the Bailout Mode armed, the character string "BAILOUT" is displayed double overbright and not flashing indicating that the Bailout Mode has been engaged. Otherwise, the character string is blanked.
- (10) In PFS only, the ECAL (East Coast Abort Landing) item entry (ITEM 1) provides the crew with the capability to enable/inhibit contingency abort OPS 6 entry ECAL guidance. The item entry shall be initialized to the I-load ECAL_INIT (V99U6517C - ECAL LOGIC INIT DISCRETE) and can be updated once in MM602 with the flag ECAL (V93X0255XA - ECAL LOGIC ENA/ INH DISCRETE) from GRTLS TAEM Guidance (4.204). Execution of ITEM 1 shall alternately inhibit and enable the entry ECAL guidance as indicated by displaying the character string "INH" or "ENA" as appropriate. Execution of ITEM 1 during an intact abort (in MM602 or MM603 and GLIDE_RTLS_INHIBIT (V90X2090X) = OFF) or while in OPS3 shall result in an "ILLEGAL ENTRY" message.

Note: The item number "1" (Symbol 31) shall only appear on the display format in OPS6.

The ECAL status character string "ECAL/BDA" will be displayed in OPS 6. The ECAL status character string "ECAL/BDA", as well as the ITEM 1 "INH" or "ENA" shall be blanked during OPS 3 when ECAL logic is not possible. The reason for the string "ECAL/BDA" is that the aborts to Bermuda for due east missions will utilize this logic also. It shall be initialized at normal brightness intensity if the ECAL guidance is not active and shall be displayed double overbright if ECAL guidance is active. Subsequent enabling or disabling of the ECAL guidance (via crew input - ITEM 1, or guidance) shall be indicated by displaying the "ECAL/BDA" character string in the appropriate manner (normal intensity = inactive, double overbright = active).

4.2.6.2 BFS Supplemental Requirements

- (1) Data shown over a stippled background on the display format signifies background nomenclature and data fields supported and driven only by BFS.
- (2) Prior to BFS ENGAGE the ADI errors in roll, pitch and yaw computed by BFS software shall be displayed for comparison with the PASS driven ADI error needles. These parameters and their text labels shall be dynamically driven. Signs of the error values shall be driven U, D, L, R to indicate fly-to errors, e.g., the action required to null these errors is:

R yaw error,	yaw right	L	yaw error,	yaw left
U pitch error,	pitch up	D	pitch error,	pitch down
R roll error,	roll right	L	roll error,	roll left

If the computed value of R roll error is 100 degrees or greater in either direction, then the roll error display shall show an overflow indicator of “R>>” for a right fly-to roll error or “L>>” for a left fly-to roll error. When the value of R roll error returns to the normal display range of 99 degrees or less, the overflow indicator shall be replaced by the sign and value of roll error as defined above.

When not in a NZ command subphase (i. e., ALF_MODE = 1), the pitch error field shall display the ADI pitch error in integer degrees as described above. When in a NZ command subphase (i. e., ALF_MODE = 0), the pitch error field shall display G error as calculated by GN&C to one decimal place. The U and D signs of the error values shall be driven in both cases, as described above.

Update rate shall be 960 ms.

These parameters shall not be displayed post BFS ENGAGE.

- (3) The computation of the MACH-ALPHA indicator in the BFS VERTICAL SITUATION DISPLAY OUTPUT Processor (DOP 3) is to be performed at a processing rate of once every 320 msec.
- (4) The speedbrake command shall be blank after the end of TAEM, since Guidance is terminated at this point.
- (5) AIL and RUD values will not be displayed when BFS is in the pre-engaged state.
- (6) The background nomenclature shall not appear on the display format and digital readout of the pull out normal acceleration (TGT NZ) shall not be supported by BFS.
- (7) The Abort Bailout Mode character string Arm Indicator shall not be supported by BFS.
- (8) The ECAL item entry control (Item “1”), Item “1” symbol and status character strings “ECAL/BDA”, “ENA” and “INH” requirements shall not appear on the BFS display format and the functions shall not be supported by BFS.

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Table 4.2.6-1. VERT SIT1 (PFS/BFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination		Nomenclature	C R T
								MIN	MAX		PFS	BFS		
001	X (1)	V93X0255X	0.0	CTRL			1			A	4.204, CRT	N/S	ECAL LOGIC ENA/INH DISCRETE	X

4.2.6.3 Vertical Situation 1 Keyboard Processing Addendum

- A. ECAL Item Entry Control. Execution of Item 1 during an intact abort (in MM602 or MM603 and GLIDE_RTLS_INHIBIT (V90X2090X) = OFF) or while in OPS 3 shall result in a Class 5 “ILLEGAL ENTRY” CRT message. Destinations for this signal are GRTLS TAEM GUID (4.204) and CRT (6.19).

4.2.6.4 Vertical Situation 1 CRT Display Processing Addendum

All necessary inputs for dynamic symbols on this display are provided by the Vertical Situation Display Interface Processing (DIP) given in Appendix B.4.154 of this book.

- A. The rotation angle and display position of these Orbiter symbols are defined by the contents of these measurements. The Orbiter symbol (0F) is used and displayed as specified by dynamic data.
- B. If the discrete V94X1311X is set, display the symbol (0C, left pointing triangle) flashing on the CRT position defined by signals ESYMCEN (Table 4.2.6–3) and V94H1308C.
- C. Display the symbol (2D, minus), on the CRT position defined by signals ENOMX (Table 4.2.6–3) and V94H1307C.
- D. Display the symbol (7D, underscore) on the CRT position defined by signals ELIMX (Table 4.2.6–3) and V94H1309C or V94H1310C.
- E. Display the symbol (0B, right pointing triangle) on the CRT position defined by signals TSYMCEN (Table 4.2.6–3) and V94H1312C.
- F. Display the orbiter symbol (0F) at Y position defined by V94U1341C with X position defined by V94U1340C and with a constant rotation angle of 270°. Whenever the SHUTTLE_ALPHA_FLAG discrete signal (V94X1315X) is set, the Orbiter symbol shall flash until the discrete is reset.
- G. The source of these signals are Aerojet DAP (4.36) or GRTLS DAP (4.227).
- H. For these parameters, “+” is represented by R (right) and “-” is represented by L (left). For the rudder trim, the trim must be multiplied by a scale factor of minus 1, before R or L is substituted for the sum.
- I. The RTXT “NZ” will be displayed whenever V90J1117C is set to 5 (PFS). BFS will display “NZ” overbright whenever ISLECT_GUID (V90J1138C) is set to 11, otherwise it will be blank.
- J. Display the symbol (1F, left pointing arrow) on the CRT position defined by signals EMOH (Table 4.2.6–3) and V90U1232C (E/W Ref for OHALRT).
- K. The Pull Out NZ Command data field shall be blank during OPS 3.
- L. Bailout Arm Indicator. When the BAILOUT ARM FLAG (V90X1141X) is set ON, the character string “BAILOUT” shall be displayed double overbright. If either the BAILOUT PITCH FLAG (V90X1145X) or the BAILOUT BANK FLAG (V90X1147X) are FALSE, the “BAILOUT” character string shall be displayed flashing, otherwise the “BAILOUT” character string shall be displayed not flashing. Sources for the BAILOUT ARM, BAILOUT PITCH

AND BAILOUT BANK FLAG discrettes are TAEM GUID (4.9) and GRTLS TAEM GUID (4.204).

- M. Body Pitch Attitude Error (BFS). The following logic table defines the “FORMAT CHAR” and “UNITS” to be displayed for the BODY PITCH ATTITUDE ERROR (V90H2233C).

ALF_MODE (STATE)	FORMAT CHAR	UNITS
1	3.0	DEG
0	4.1	G

- N. ECAL Status Indicator Character String. The ECAL status indicator character string “ECAL/BDA” shall be displayed at normal intensity when the discrete ECAL (V93X0255X - ECAL LOGIC ENA/INH DISCRETE) from RTLS TAEM GUID (4.204) or keyboard (6.19) is set to FALSE (OFF) and shall be displayed at double overbright intensity when the ECAL discrete is set to TRUE (ON).
- O. ECAL Item Entry Character String. The ECAL item entry “ENA” or “INH” character string to be displayed shall be initialized to the I-Load ECAL_INIT (V99U6517C - ECAL LOGIC INIT DISCRETE) and shall subsequently be determined from the state of the discrete ECAL (V93X0255X - ECAL LOGIC ENA/INH DISCRETE) from either RTLS TAEM GUID (4.204) or keyboard (6.19). The ECAL item entry character string shall be displayed as “INH” when the ECAL discrete is set to FALSE (OFF) and shall be displayed as “ENA” when ECAL is set to TRUE (ON).
- P. Blanking of Item 1 Label and Associated ECAL Character Strings. When this display is being viewed in OPS G3 (V90X8649X - OPS 3 IND = ON), the ECAL status indicator character string “ECAL/BDA”, item number “1” (symbol 31), and ECAL “ENA” or “INH” character string shall be blanked.

- NOTES: 1. Maximum number of mission dependent constants are as follows:
- (a) 10 solid lines
 - (b) 2 dashed lines
 - (c) 7 character strings

4.2.6.5 Vertical Situation 1 Figure/Table References

Figure 4.2.6-1	Vertical Situation 1 Display (PFS/BFS) Generic
Figure 4.2.6-2	Vertical Situation 1 Display – GRTLS (PFS) Generic
Table 4.2.6-1	Keyboard Processing Table
Table 4.2.6-2	CRT Display Processing Table
Table 4.2.6-3	CRT Display Processing Background Requirements
Table 4.2.6-4	Mission Design Background Constants N/A
Table 4.2.6-5	Input Functional Parameters
Table 4.2.6-6	Output Functional Parameters
Table 4.2.6-7	I-Loads
Table 4.2.6-8	K-Loads
Table 4.2.6-9	Constants

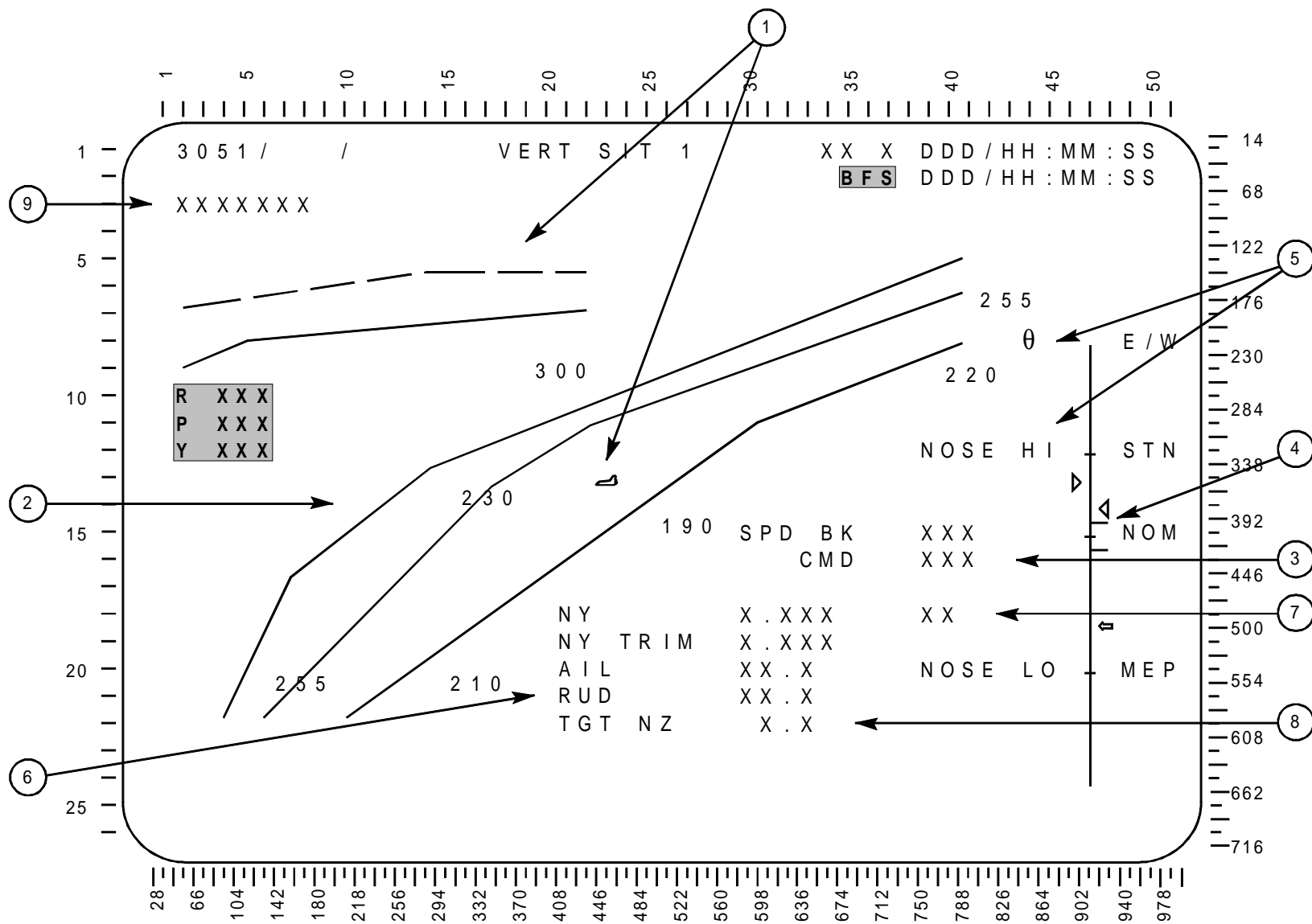


FIGURE 4.2.6-1. Vertical Situation 1 Display (PFS/BFS) Generic

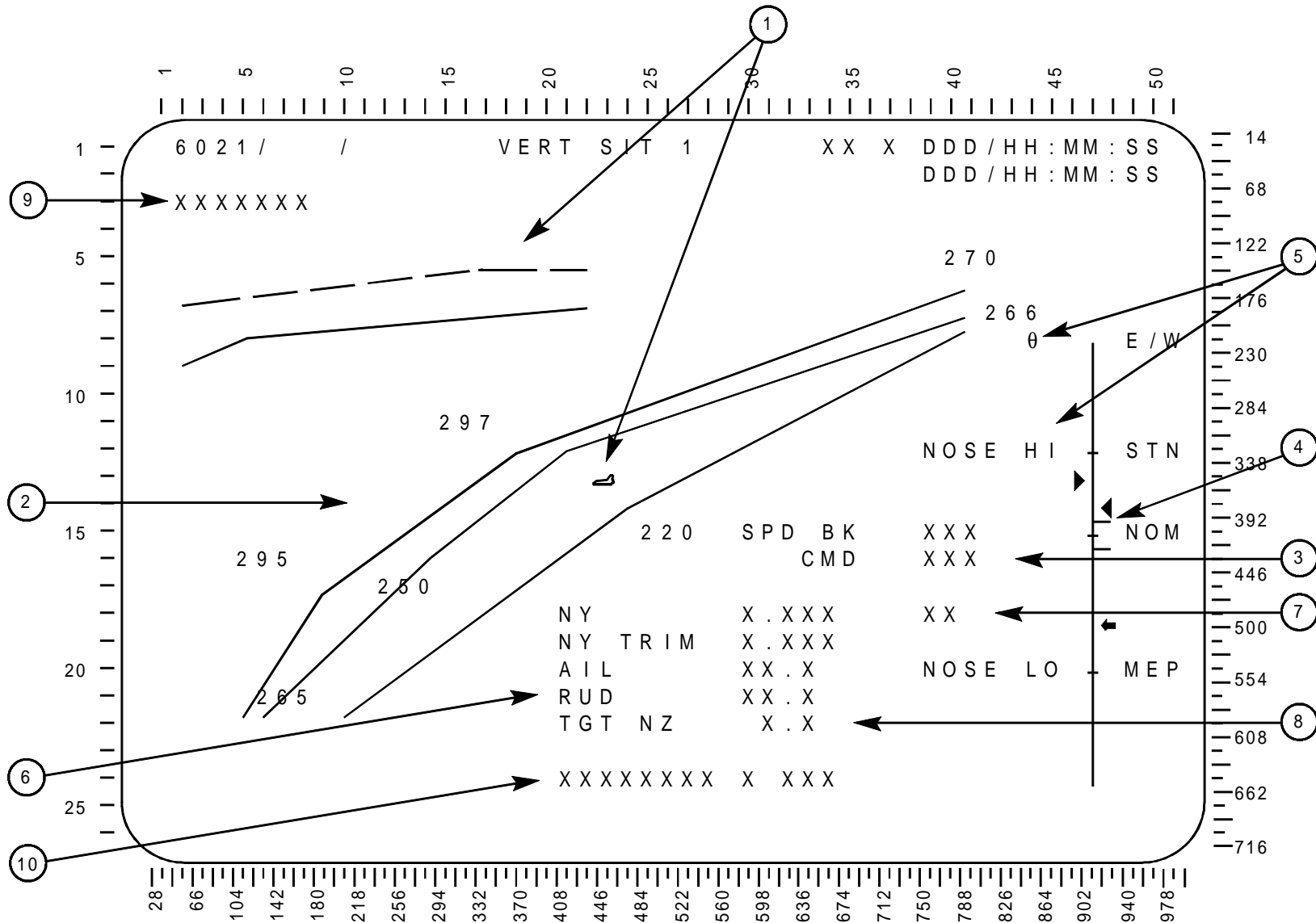


FIGURE 4.2.6-2. Vertical Situation 1 Display - GRTLs (PFS) Generic

Table 4.2.6-2. VERT SIT 1 (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S	Add Ref	Source		Nomenclature	C R T		
			X	Y		CHAR	BILEVEL														TYPE	PFS			BFS	
							1	0																		
001	(OPS)	V93X0040X	2	1		5.0															UI	N/S	OPS FUNCTION PAGE	X		
002	(OPS)	V93X0040X	2	1		5.0																N/S	MI	OPS FUNCTION PAGE	X	
003	(SPEC)	V93X0042X	7	1		4.0																UI	MI	SPEC FUNCTION PAGE	X	
004	(DISP)	V93X0044X	10	1		4.0																UI	MI	DISPLAY FUNCTION PAGE	X	
005	(UL)	V92X5032X	34	1		2.0	UL							X	G							UI	MI	UPLINK ACTIVITY IND	X	
006	(GPC)	V93X0048X	36	1		2.0																UI	N/S	GPC DRIVER	X	
007	(GPC)	V93X0048X	36	1		2.0																N/S	MI	GPC DRIVER	X	
008	(MT)	V91W1990C	39	1		12.0			DHMS													FCOS	BOS	MISSION ELAPSED TIME	X	
009	(CRT TIMER)	V91W1987C	39	2		12.0			DHMS													FCOS	BOS	DISPLAY CRT TIMER,GNC	X	
010	SPDBRK	V95H8250C	38	15		4.0			PCT													4.48	SBPFB	PERCENTAGE OF MAX SPEEDBRAKE POS	X	
011	SPD BRK CMD	V94U1300C	38	16		4.0			PCT													4.154	DOP 3	SPEEDBRAKE COMMAND- VERT SIT	X	
012	NY	V90A5361C	30	18		5.3			G													H	4.71	SF	SELECTED AA LATERAL ACCEL	X
013	NY TRIM	V90H1669C	30	19		5.3			G													G H	4.36	D DAP	LATERAL ACCEL TRIM	X
014	AIL	V90H1629C	30	20		4.1			DEG													G H	4.36	D DAP	AILERON TRIM	X
015	RUD	V90H1668C	30	21		4.1			DEG													G H	4.36	D DAP	RUDDER TRIM	X
016	(Y CURRENT ALPHA)	V94U1341C										X	X	X	F							F	4.154	DOP 3	Y COORD OF ALPHA-MACH	X
017	(X CURRENT ALPHA)	V94U1340C			*							X	X	X	F							F	4.154	DOP 3	X COORD OF ALPHA-MACH	X
018	(ORBITER Y POS)	V94H1303C										X	X		A							A	4.154	DOP 3	Y-POSITION OF SHUTTLE SYMBOL	X
019	(ORBITER X POS)	V94H1302C										X	X		A							A	4.154	DOP 3	X-POSITION OF SHUTTLE SYMBOL	X
020	(ORBITER ROT. ANG)	V94H1305C			*				DEG						A							A	4.154	DOP 3	SHUTTLE SYMBOL ROTATION ANGLE	X
021	(CUR ENERGY Y POS)	V94H1308C			*							X	X		A							B	4.154	DOP 3	Y-COORD OF CURRENT ENERGY SYMBOL	X
022	(NOM ENERGY Y POS)	V94H1307C			*							X	X		A							C	4.154	DOP 3	Y-COORD OF NOMINAL ENERGY SYMBOL	X
023	(MAX ENER LIM Y POS)	V94H1309C			*							X	X		A							D	4.154	DOP 3	Y-COORD OF UPPER ENERGY LIMIT	X
024	(MIN ENER LIM Y POS)	V94H1310C			*							X	X		A							D	4.154	DOP 3	Y-COORD OF LOWER ENERGY LIMIT	X
025	(THETA Y POS)	V94H1312C			*							X	X	X	A							E	4.154	DOP 3	Y-COORD OF THETA SYMBOL	X

Table 4.2.6-2. VERT SIT 1 (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S	Add Ref	Source		Nomenclature	C R T	
			X	Y		CHAR	BILEVEL														TYPE	PFS			BFS
							1	0																	
026	(EMOH Y POS)	V94U1313C																		J	4.154		Y-COORD OF OTT DOWNMODE ENERGY SYM	X	
027	(R)	V98U0017C	2	10		1.0															N/S	MI	ADI ROLL ERROR LABEL BFS	X	
028	(P)	V98U0018C	2	11		1.0															N/S	MI	ADI PITCH ERROR LABEL BFS	X	
029	(Y)	V98U0019C	2	12		1.0															N/S	MI	ADI YAW ERROR LABEL BFS	X	
030	R	V90H2234C	4	10		3.0			DEG						A	R					N/S	D DAP	BODY ROLL ATTITUDE ERROR	X	
031	P	V90H2233C	4	11		VAR			DEC	VAR					A	U				M	N/S	D DAP	BODY PITCH ATTITUDE ERROR	X	
032	Y	V90H2235C	4	12		3.0			DEC	DEG					A	R					N/S	D DAP	BODY YAW ATTITUDE ERROR	X	
033	XX(NZ)	V90J1117C	39	18		2.0			RTXT											I	4.204	GUID	TAEM GUIDANCE PHASE INDICATOR	X	
034	TGT NZ	V90U1224C	30	22		4.1			DEC	G		X			A					K	4.204	N/S	GUID NZ PULL OUT CMD		
035	XXXXXXX (BAILOUT)	V90X1141X	2	3		7.0			CHAR				X	X	A					L	4.9	N/S	BAILOUT ARM FLAG		
036	XXXXXXXX (ECAL/BDA)	ADDENDUM	21	24		8.0			CHAR				X	X						N,P	KYBD	N/S	ECAL STATUS INDICATOR	X	
037	X (1 : SYMBOL 31)	ADDENDUM	30	24	1	1.0			CHAR						X					P	6.19	N/S	ITEM 1 SYMBOL	X	
038	XXX (ENA or INH)	V93X0255X	32	24		3.0	ENA	INH	BLVL						X					O,P	KYBD	N/S	ECAL LOGIC ENA/INH DISCRETE	X	
039	(MSG LINE)	V93X0050X	1	25		44.0			CHAR						G						UI	N/S	MESSAGE LINE	X	
040	(MSG LINE)	V93X0050X	2	25		46.0			CHAR						G						N/S	MI	MESSAGE LINE	X	
041	(BUFFER MSG)	V93X0054X	45	25		4.0			CHAR						G						UI	N/S	BUFFER MESSAGE INDICATOR	X	
042	(BUFFER MSG)	V93X0054X	48	25		4.0			CHAR						G						N/S	MI	BUFFER MESSAGE INDICATOR	X	
043	(SPL)	V93X0056X	2	26		49.0			CHAR						G						UI	MI	SCRATCH PAD LINE	X	
044	(BFS)	V98X0015X	35	2		3.0			CHAR				X		G						N/S	MI	BFS IDENTIFIER BFS	X	

Table 4.2.6-3. VERTICAL SITUATION 1 DISPLAY PROCESSING BACKGROUND REQUIREMENTS, DESIGN-DEPENDENT				
VECTORS				
VECTOR ID	ORIGIN (AU)		TERMINAL (AU)	
	X	Y	X	Y
E/W/Theta Scale	911	219	911	658
CHARACTER STRINGS				
Character Strings	X(AU)		Y(AU)	
STN	949		325	
NOM	949		406	
MEP	949		541	
NOSE HI	759		325	
NOSE LO	759		541	
q	854		217	
E/W	949		217	
Minus sign (symbol, 2D) used for TICK MARKS on E/W/ θ scale and is located @ X=911, Y=328 & 548				
Design dependent location of dynamic symbols: Left pointing triangle (symbol, 0C) @ X=917 (ESYMCEN) Underscore (symbol, 7D) @ X=923 (ELIMX) Minus sign (symbol, 2D) @ x=919 (ENOMX) Right pointing triangle (symbol, 0B) @ X=905 (TSYMCEN) Left pointing arrow (symbol 1F) @ X=917 (EMOH)				
NOTE: X, Y position data for design dependent parameters are with respect to the upper left corner of the CRT.				

TABLE 4.2.6-5. INPUT FUNCTIONAL PARAMETERS FOR VERTICAL SITUATION 1 DISPLAY (G6.19)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
BAILOUT_ARM	V90X1141XA	BAILOUT ARM FLAG	TAEM GUID				89250B	
BAILOUT_ARM	V90X1141XB	BAILOUT ARM FLAG	GRTLS TAEM GUID				89250B	
BAILOUT_BANK	V90X1147XA	BAILOUT BANK FLAG	TAEM GUID				89250B	
BAILOUT_BANK	V90X1147XB	BAILOUT BANK FLAG	GRTLS TAEM GUID				89250B	
BAILOUT_PITCH	V90X1145XA	BAILOUT PITCH FLAG	TAEM GUID				89250B	
BAILOUT_PITCH	V90X1145XB	BAILOUT PITCH FLAG	GRTLS TAEM GUID				89250B	
DATRIM	V90H1629CA	AILERON TRIM	AEROJET DAP	DEG				
DATRIM	V90H1629CB	AILERON TRIM	GRTLS DAP	DEG				
DGRNZT	V90U1224C	GUID NZ PULL OUT CMD	GRTLS TAEM GUID	G			92522D	
DISP_ALT_DIS_ANGLE	V94H1305C	SHUTTLE SYMBOL ROTATION ANGLE	VERT SIT DIP	DEG	VAR			
DRTI	V90H1669CA	LATERAL ACCEL TRIM	AEROJET DAP					
DRTI	V90H1669CB	LATERAL ACCEL TRIM	GRTLS DAP					
DRTRIM	V90H1668CA	RUDDER TRIM	AEROJET DAP	DEG				
DRTRIM	V90H1668CB	RUDDER TRIM	GRTLS DAP	DEG				
DSBFBP	V95H8250C	PERCENTAGE OF MAX SPEEDBRAKE POS	SB PFB SOP	PCT	BSS			
ECAL	V93X0255XA	ECAL LOGIC ENA/INH DISCRETE	GRTLS TAEM GUID		BD		93017G	*
ECAL	V93X0255XB	ECAL LOGIC ENA/INH DISCRETE	VERT SIT1 DISP		BD		93090E	
EMOH_ENER_Y	V94U1313C	Y-COORD OF OTT DOWNMODE ENERGY SYM	VERT SIT DIP	AU	VAR		93090E	
ENER_LL_Y	V94H1310C	Y-COORD OF LOWER ENERGY LIMIT	VERT SIT DIP	AU	VAR		93090E	
ENER_UL_Y	V94H1309C	Y-COORD OF UPPER ENERGY LIMIT	VERT SIT DIP	AU	VAR		93090E	
GLIDE_RTLS_INHIBIT	V90X2090XA	RTLS CONTINGENCY FLAG	PW RTLS GUID		BD		93017G	*
GLIDE_RTLS_INHIBIT	V90X2090XB	RTLS CONTINGENCY FLAG	MSC		BD		93090E	
GLIDE_RTLS_INHIBIT	V90X2090XC	RTLS CONTINGENCY FLAG	PW CONT GUID		BD		93017G	*
GLIDE_RTLS_INHIBIT	V90X2090XD	RTLS CONTINGENCY FLAG	CONT 3E/O GUID		BD		93017G	*
GLIDE_RTLS_INHIBIT	V90X2090XE	RTLS CONTINGENCY FLAG	GRTLS TAEM GUID		BD		93017G	*
IPHASE	V90J1117CB	TAEM GUIDANCE PHASE INDICATOR	GRTLS TAEM GUID	ND			93017G	*
MM_CODE_602/MM_602	V90X8174X	MAJOR MODE 602 FLAG	MSC				92355B	
MM_CODE_603/MM_603	V90X8122X	MAJOR MODE 603 FLAG	MSC				92355B	
NOM_ENERGY_Y	V94H1307C	Y-COORD OF NOMINAL ENERGY SYMBOL	VERT SIT DIP	AU	VAR		93090E	
NY	V90A5361C	SELECTED AA LATERAL ACCEL	SF	G	SPL		93017G	*
OPS3_INDICATOR	V90X8649X	OPS 3 IND	MSC		BD		93023D	
SHUTTLE_ALPHA_FLAG	V94X1315X	SHUTTLE ALPHA FLASH FLAG	VERT SIT DIP					
SHUTTLE_ENER_FLAG	V94X1311X	SHUTTLE ENERGY FLASH FLAG	VERT SIT DIP				93090E	
SHUTTLE_ENER_Y	V94H1308C	Y-COORD OF CURRENT ENERGY SYMBOL	VERT SIT DIP	AU	VAR		93090E	
SHUTTLE_THETA_FLAG	V94X1314X	SHUTTLE THETA FLASH FLAG	VERT SIT DIP					
THETA_Y	V94H1312C	Y-COORD OF THETA SYMBOL	VERT SIT DIP	AU	VAR			

TABLE 4.2.6-5. INPUT FUNCTIONAL PARAMETERS FOR VERTICAL SITUATION 1 DISPLAY (G6.19)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
VSHUTTLE_X	V94H1302C	X-POSITION OF SHUTTLE SYMBOL	VERT SIT DIP	AU	VAR			
VSHUTTLE_Y	V94H1303C	Y-POSITION OF SHUTTLE SYMBOL	VERT SIT DIP	AU	VAR			
VS_SBC	V94U1300C	SPEEDBRAKE COMMAND-VERT SIT	VERT SIT DIP	PCT	VAR			
	V94U1340C	X-COORD OF ALPHA-MACH	VERT SIT DIP		VAR			
	V94U1341C	Y-COORD OF ALPHA-MACH	VERT SIT DIP		VAR			
	V94X0101X	ILLEGAL ENTRY MSG(VERT SIT 1)	UI		BD		90724D	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

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TABLE 4.2.6-6. OUTPUT FUNCTIONAL PARAMETERS FROM VERTICAL SITUATION 1 DISPLAY (G6.19)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ECAL	V93X0255XB	ECAL LOGIC ENA/INH DISCRETE	ENT BRG SPEC GRTLS TAEM GUID TLM VERT SIT1 DISP		BD		93090E	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
(HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

TABLE 4.2.6-7. VERTICAL SITUATION 1 DISPLAY (G6.19) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
ECAL_INIT	V99U6517C	ND	D		M	P	G4.204 G6.19	00	GEC	90724D	
V1_CHAR_STRING(01,1)	V97U8224C	ND	CH		M	X	G6.19	01	VR1	DC0599	
V1_CHAR_STRING(01,2)	V97U8225C	AU	F	S	M	X	G6.19	03	VE1		
V1_CHAR_STRING(01,3)	V97U8226C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
V1_CHAR_STRING(02,1)	V97U8227C	ND	CH		M	X	G6.19	03	VE1		
V1_CHAR_STRING(02,2)	V97U8228C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
V1_CHAR_STRING(02,3)	V97U8229C	AU	F	S	M	X	G6.19	03	VE1		
V1_CHAR_STRING(03,1)	V97U8230C	ND	CH		M	X	G6.19	01	VR1	DC0599	
V1_CHAR_STRING(03,2)	V97U8231C	AU	F	S	M	X	G6.19	03	VE1		
V1_CHAR_STRING(03,3)	V97U8232C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
V1_CHAR_STRING(04,1)	V97U8233C	ND	CH		M	X	G6.19	03	VE1		
V1_CHAR_STRING(04,2)	V97U8234C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
V1_CHAR_STRING(04,3)	V97U8235C	AU	F	S	M	X	G6.19	03	VE1		
V1_CHAR_STRING(05,1)	V97U8236C	ND	CH		M	X	G6.19	01	VR1	DC0599	
V1_CHAR_STRING(05,2)	V97U8237C	AU	F	S	M	X	G6.19	03	VE1		
V1_CHAR_STRING(05,3)	V97U8238C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
V1_CHAR_STRING(06,1)	V97U8239C	ND	CH		M	X	G6.19	03	VE1		
V1_CHAR_STRING(06,2)	V97U8240C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
V1_CHAR_STRING(06,3)	V97U8241C	AU	F	S	M	X	G6.19	03	VE1		
V1_CHAR_STRING(07,1)	V97U8242C	ND	CH		M	X	G6.19	01	VR1	DC0599	
V1_CHAR_STRING(07,2)	V97U8243C	AU	F	S	M	X	G6.19	03	VE1		
V1_CHAR_STRING(07,3)	V97U8244C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
V1_DASHED_LINE(01,1)	V96U8147C	AU	F	S	M	C	G6.19	03	VE1		
V1_DASHED_LINE(01,2)	V96U8148C	AU	F	S	M	C	G6.19	00	VSA	DC0599	
V1_DASHED_LINE(01,3)	V96U8149C	AU	F	S	M	C	G6.19	00	VSA	DC0599	

TABLE 4.2.6-7. VERTICAL SITUATION 1 DISPLAY (G6.19) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
V1_DASHED_LINE(01,4)	V96U8150C	AU	F	S	M	C	G6.19	00	VSA	DC0599	
V1_DASHED_LINE(02,1)	V96U8151C	AU	F	S	M	C	G6.19	00	VSA	DC0599	
V1_DASHED_LINE(02,2)	V96U8152C	AU	F	S	M	C	G6.19	00	VSA	DC0599	
V1_DASHED_LINE(02,3)	V96U8153C	AU	F	S	M	C	G6.19	00	VSA	DC0599	
V1_DASHED_LINE(02,4)	V96U8154C	AU	F	S	M	C	G6.19	00	VSA	DC0599	
V1_SOLID_LINE(01,1)	V97U8260C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(01,2)	V97U8261C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(01,3)	V97U8262C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(01,4)	V97U8263C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(02,1)	V97U8264C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(02,2)	V97U8265C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(02,3)	V97U8266C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(02,4)	V97U8267C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(03,1)	V97U8268C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(03,2)	V97U8269C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(03,3)	V97U8270C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(03,4)	V97U8271C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(04,1)	V97U8292C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(04,2)	V97U8293C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(04,3)	V97U8294C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(04,4)	V97U8295C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(05,1)	V97U8288C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(05,2)	V97U8289C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(05,3)	V97U8290C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(05,4)	V97U8291C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(06,1)	V97U8284C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		

TABLE 4.2.6-7. VERTICAL SITUATION 1 DISPLAY (G6.19) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
V1_SOLID_LINE(06,2)	V97U8285C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(06,3)	V97U8286C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(06,4)	V97U8287C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(07,1)	V97U8300C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(07,2)	V97U8301C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(07,3)	V97U8302C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(07,4)	V97U8303C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(08,1)	V97U8296C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(08,2)	V97U8297C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(08,3)	V97U8298C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(08,4)	V97U8299C	AU	F	S	M	X	G6.19	01	VR1	DC0599	
								03	VE1		
V1_SOLID_LINE(09,1)	V96U8143C	AU	F	S	M	X	G6.19	00	VSA	DC0599	
V1_SOLID_LINE(09,2)	V96U8144C	AU	F	S	M	X	G6.19	00	VSA	DC0599	
V1_SOLID_LINE(09,3)	V96U8145C	AU	F	S	M	X	G6.19	00	VSA	DC0599	
V1_SOLID_LINE(09,4)	V96U8146C	AU	F	S	M	X	G6.19	00	VSA	DC0599	
V1_SOLID_LINE(10,1)	V96U8705C	AU	F	S	M	X	G6.19	00	VSA	DC0599	
V1_SOLID_LINE(10,2)	V96U8706C	AU	F	S	M	X	G6.19	00	VSA	DC0599	
V1_SOLID_LINE(10,3)	V96U8707C	AU	F	S	M	X	G6.19	00	VSA	DC0599	
V1_SOLID_LINE(10,4)	V96U8708C	AU	F	S	M	X	G6.19	00	VSA	DC0599	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.6-8. VERTICAL SITUATION 1 DISPLAY (G6.19) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.6-9. VERTICAL SITUATION 1 DISPLAY (G6.19) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.7 VERTICAL SITUATION 2 (PFS/BFS)

TITLE: VERT SIT 2

TYPE: OPS/3051 OR 6031

AVAILABILITY: OPS 3, 6, PFS/BFS

4.2.7.1 Purpose, Operation, and Organization

This display (Figure 4.2.7-1) provides vehicle longitudinal information to the crew during the TAEM region. The display plots vehicle altitude versus predicted range-to-go to WP2 via WP1. The current vehicle altitude dissipation rate is indicated by the rotation of the Shuttle symbol. The vehicle energy state and TAEM guidance energy limits are displayed on a vertical tape scale.

This display is called up when the vehicle is below the VERT SIT 1 display range.

1. The display monitors vehicle altitude from 30,000 feet to the nominal autoland interface point. Three background lines are provided. These are the same as for the VSD 1.
2. The actual speed brake position from SB PFB SOP and the commanded speed brake position from guidance are displayed in percent.
3. The current vehicle energy state, the nominal energy state and the guidance energy limits are dynamically displayed on a vertical tape scale. The tape is scaled as a function of the S-TURN and MEP profiles. The current energy state symbol is a left pointing triangle. This symbol will flash according to a flag set in the DIP. If the energy is greater than the S-TURN energy or less than the MEP energy, the flag will be set and the symbol flashed. Otherwise the symbol will not flash. The nominal energy state and the energy limits are tick marked. The OTT downmode energy state is displayed with a left pointing arrow. When the range to the runway is less than an I-loaded limit, the display of OTT downmode energy symbol (1F, ←) will be blanked.
4. The current Shuttle pitch attitude (θ) is dynamically displayed on the left side of the vertical tape scale. The scaling is defined by the pitch profiles associated with flight at a dynamic pressure of 300 psf and with flight at maximum L/D (Lift/Drag). The pitch attitude symbol is a right pointing triangle.
5. The RTXT "A/L" (Approach/Land) shall be displayed flashing when the TAEM guidance termination flag is set.
6. Digital readouts of lateral acceleration trim (NY) in g's, lateral acceleration trim (NY TRIM) in g's, aileron (AIL) and rudder (RUD) trims in degrees are displayed.
7. In the PFS only, a pull out normal acceleration (NZ) value is calculated in GRTLS TAEM GUID (4.204) and displayed in g's (OPS 6 only). The pull out NZ is computed once in MM602 and will be displayed cyclically in MM602 and MM603 on the VERT SIT 1 and 2 displays.
8. In the PFS only, the character string "BAILOUT" is displayed double overbright and flashing to indicate that the TAEM Guidance Abort Bailout Mode has been armed, but not engaged. When both Pitch and Bank axes of the FCS have been moded to AUTO with the Bailout Mode

armed, the character string “BAILOUT” is displayed double overbright and not flashing indicating that the Bailout Mode has been engaged. Otherwise, the character string is blanked.

4.2.7.2 BFS Supplemental Requirements

1. Data shown over a stippled background on the display format signifies background nomenclature and data fields supported and driven only by BFS.
2. Prior to BFS ENGAGE the ADI errors in roll, pitch and yaw computed by BFS software shall be displayed for comparison with the PASS driven ADI error needles. These parameters and their text labels shall be dynamically driven. Signs of the error values shall be driven U, D, L, R to indicate fly-to errors, e.g., the action required to null these errors is:

R yaw error, yaw right	L yaw error, yaw left
U pitch error, pitch up	D pitch error, pitch down
R roll error, roll right	L roll error, roll left

If the computed value of R roll error is 100 degrees or greater in either direction, then the roll error display shall show an overflow indicator of “R>>” for a right fly-to roll error or “L>>” for a left fly-to roll error. When the value of R roll error returns to the normal display range of 99 degrees or less, the overflow indicator shall be replaced by the sign and value of roll error as defined above.

When not in a NZ command subphase (i. e., ALF_MODE = 1), the pitch error field shall display the ADI pitch error in integer degrees as described above. When in a NZ command subphase (i. e., ALF_MODE = 0), the pitch error field shall display G error as calculated by GN&C to one decimal place. The U and D signs of the error values shall be driven in both cases, as described above.

Update rate shall be 960 ms.

These parameters shall not be displayed post BFS ENGAGE.

3. Display of the RTXT “A/L” (Auto/Land) denoting the end of TAEM guidance is not supported and the field shall be blank.
4. The speedbrake command shall be blank after the end of TAEM, since Guidance is terminated at this point.
5. AIL and RUD values will not be displayed when BFS is in the pre-engaged state..
6. The background nomenclature shall not appear on the display format and digital readout of the pull out normal acceleration (TGT NZ) shall not be supported by BFS.
7. The Abort Bailout Mode character string Arm Indicator shall not be supported by BFS.
8. BFS shall not display the static heading “ACCEL” shown on Figure 4.2.7-1.

TABLE 4.2.7-1. VERTICAL SITUATION 2 KEYBOARD PROCESSING

Not applicable.

4.2.7.3 Vertical Situation 2 Keyboard Processing Addendum

Not applicable.

4.2.7.4 Vertical Situation 2 CRT Display Processing Addendum

The description of the CRT display processing for Vertical Situation 2 is identical to the description for Vertical Situation 1 (Section 4.2.6.4) with the following exceptions:

- ADDENDUM PARAGRAPHS F and I are not applicable to the Vertical Situation 2 CRT Display Processing Addendum.
- J. The sources of this signal are TAEM GUID (4.9) and GRTLS TAEM GUID (4.204).
- K. Display the symbol (1F, left pointing arrow) on the CRT position defined by signals EMOH (Table 4.2.6-3) and V90U1232C (E/W REF for OHALRT).
- L. The Pull Out NZ Command data field shall be blank during OPS 3.
- M. Bailout Arm Indicator. When the BAILOUT ARM FLAG (V90X1141X) is set ON, the character string "BAILOUT" shall be displayed double overbright. If either the BAILOUT PITCH FLAG (V90X1145X) or the BAILOUT BANK FLAG (V90X1147X) are FALSE, the "BAILOUT" character string shall be displayed flashing, otherwise the "BAILOUT" character string shall be displayed not flashing. Sources for the BAILOUT ARM, BAILOUT PITCH AND BAILOUT BANK FLAG discretes are TAEM GUID (4.9) and GRTLS TAEM GUID (4.204).
- N. Body Pitch Attitude Error (BFS). The following logic table defines the "FORMAT CHAR" and "UNITS" to be displayed for the BODY PITCH ATTITUDE ERROR (V90H2233C).

ALF_MODE (STATE)	FORMAT CHAR	UNITS
1	3.0	DEG
0	4.1	G

TABLE 4.2.7-3. VERTICAL SITUATION 2 CRT DISPLAY BACKGROUND REQUIREMENTS, DESIGN-DEPENDENT

It is identical to Table 4.2.6-3.

- NOTES:
1. Maximum number of mission dependent constants are as follows:
 - (a) 6 solid lines
 - (b) 0 dashed lines
 - (c) 7 character strings

4.2.7.5 Vertical Situation 2 Figure/Table References

Figure 4.2.7-1	Vertical Situation 2 Display (PFS/BFS) Generic
Figure 4.2.7-2	Vertical Situation 2 Display – GRTLS (PFS) Generic
Table 4.2.7-1	Keyboard Processing Table N/A
Table 4.2.7-2	CRT Display Processing Table
Table 4.2.7-3	CRT Display Processing Background Requirements – Same as Table 4.2.6-3
Table 4.2.7-4	Mission Design Background Constants N/A
Table 4.2.7-5	Input Functional Parameters
Table 4.2.7-6	Output Functional Parameters
Table 4.2.7-7	I-Loads
Table 4.2.7-8	K-Loads
Table 4.2.7-9	Constants

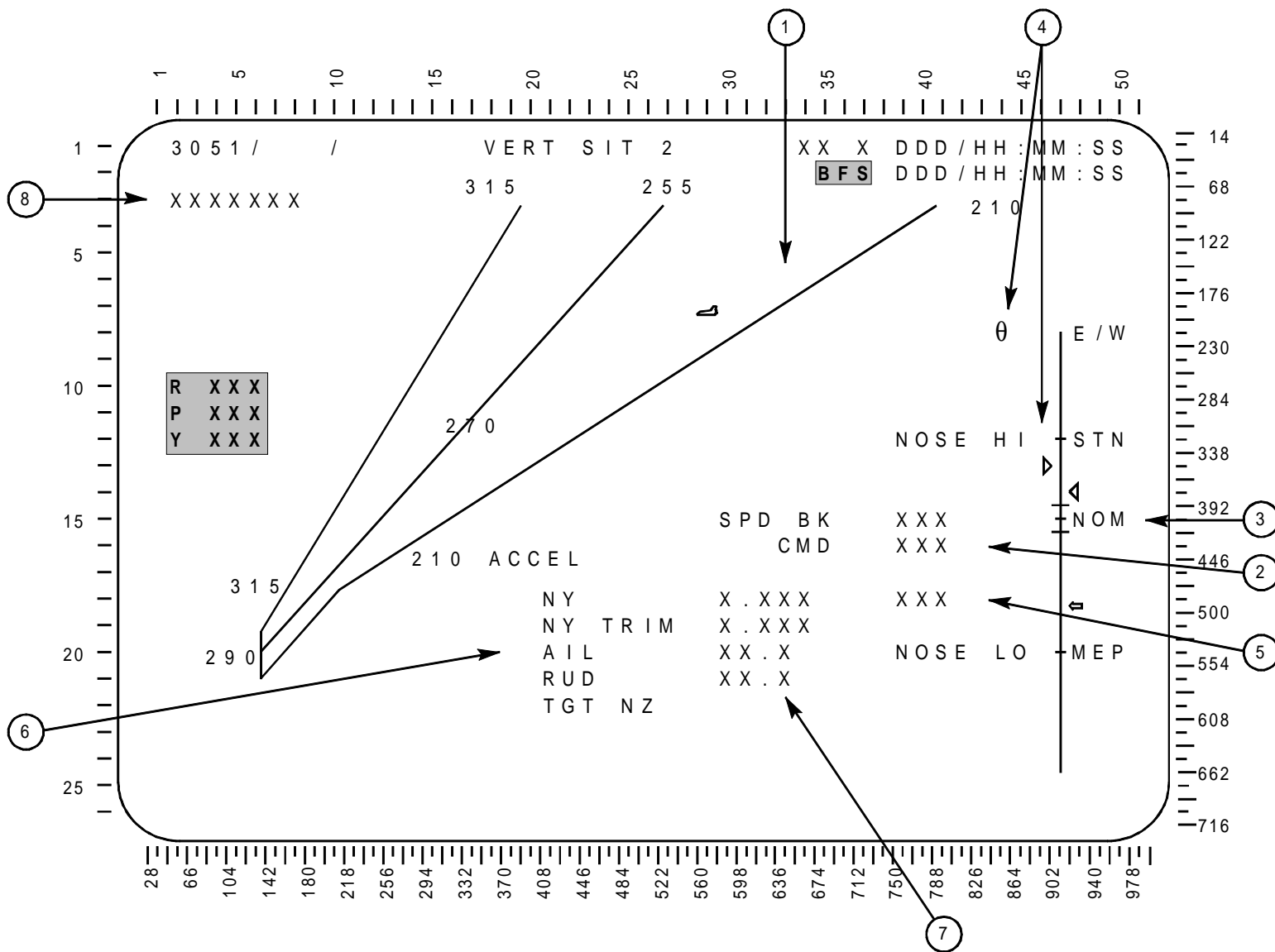


FIGURE 4.2.7-1. Vertical Situation 2 Display (PFS/BFS) Generic

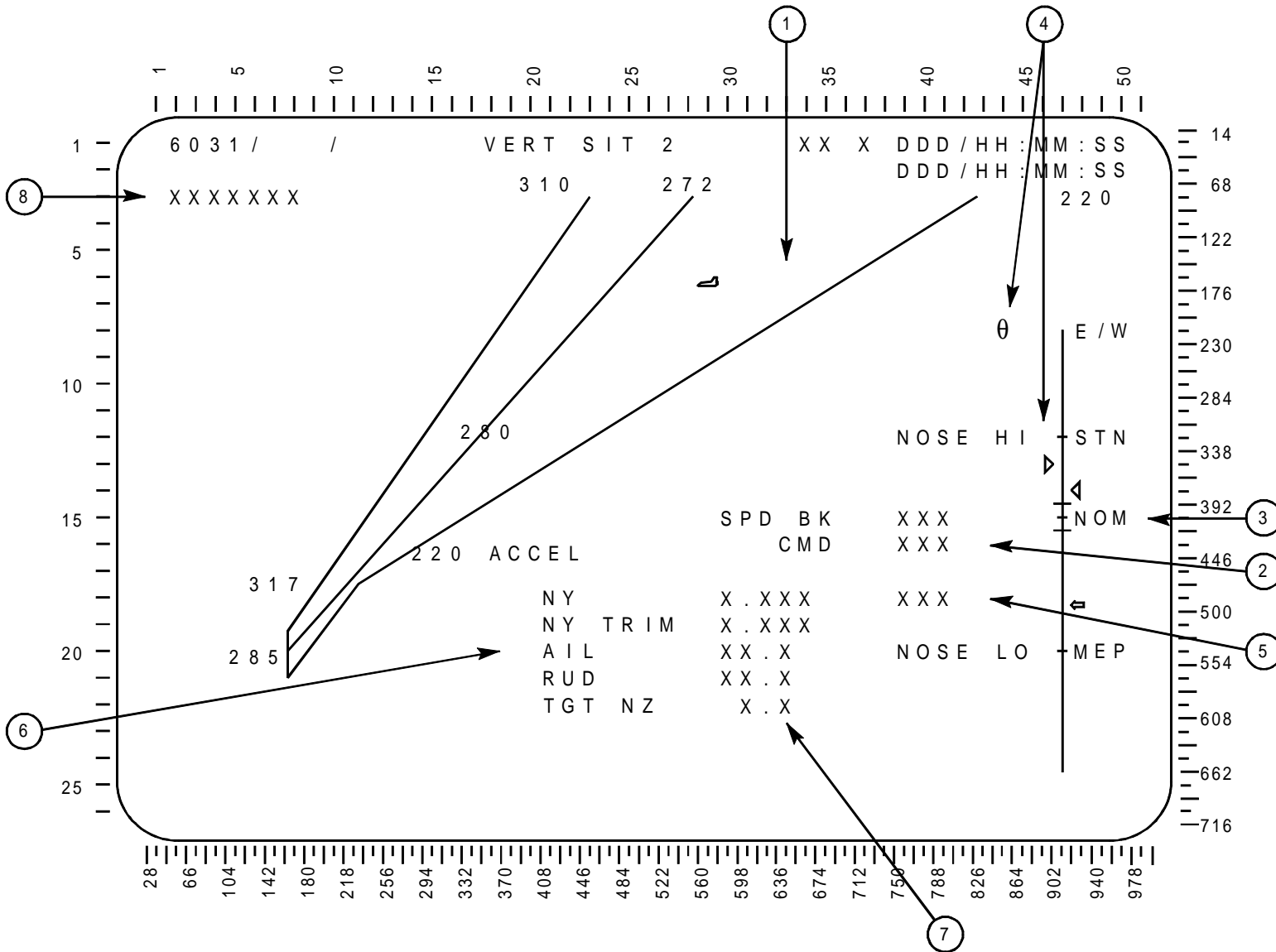


FIGURE 4.2.7-2. Vertical Situation 2 Display - GRTLS (PFS) Generic

Table 4.2.7-2. VERT SIT 2 (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S	Add Ref	Source		Nomenclature	C R T		
			X	Y		CHAR	BILEVEL														TYPE	PFS			BFS	
							1	0																		
001	(OPS)	V93X0040X	2	1		5.0															UI	N/S	OPS FUNCTION PAGE	X		
002	(OPS)	V93X0040X	2	1		5.0															N/S	MI	OPS FUNCTION PAGE	X		
003	(SPEC)	V93X0042X	7	1		4.0															UI	MI	SPEC FUNCTION PAGE	X		
004	(DISP)	V93X0044X	10	1		4.0															UI	MI	DISPLAY FUNCTION PAGE	X		
005	(UL)	V92X5032X	34	1		2.0	UL							X							UI	MI	UPLINK ACTIVITY IND	X		
006	(GPC)	V93X0048X	36	1		2.0															UI	N/S	GPC DRIVER	X		
007	(GPC)	V93X0048X	36	1		2.0															N/S	MI	GPC DRIVER	X		
008	(MT)	V91W1990C	39	1		12.0															FCOS	BOS	MISSION ELAPSED TIME	X		
009	(CRT TIMER)	V91W1987C	39	2		12.0															FCOS	BOS	DISPLAY CRT TIMER,GNC	X		
010	SPDBRK	V95H8250C	38	15		4.0															4.48	SBPFB	PERCENTAGE OF MAX SPEEDBRAKE POS	X		
011	SPD BRK CMD	V94U1300C	38	16		4.0															4.154	DOP 3	SPEEDBRAKE COMMAND- VERT SIT	X		
012	XXX (A/L)	V90X1108X	39	18		3.0	A/L							X							J	4.9	N/S	TAEM GUIDANCE TERMINATION FLAG	X	
013	NY	V90A5361C	30	18		5.3									A	R					H	4.71	S F	SELECTED AA LATERAL ACCEL	X	
014	NY TRIM	V90H1669C	30	19		5.3									A	R					G H	4.36	D DAP	LATERAL ACCEL TRIM	X	
015	AIL	V90H1629C	30	20		4.1									A	R					G H	4.36	D DAP	AILERON TRIM	X	
016	RUD	V90H1668C	30	21		4.1									A	R					G H	4.36	D DAP	RUDDER TRIM	X	
017	(ORBITER Y POS)	V94H1303C										X	X		A						A	4.154	DOP 3	Y-POSITION OF SHUTTLE SYMBOL	X	
018	(ORBITER X POS)	V94H1302C										X	X		A						A	4.154	DOP 3	X-POSITION OF SHUTTLE SYMBOL	X	
019	(ORBITER ROT. ANG)	V94H1305C			*										A						A	4.154	DOP 3	SHUTTLE SYMBOL ROTATION ANGLE	X	
020	(CUR ENERGY Y POS)	V94H1308C			*							X	X		A						B	4.154	DOP 3	Y-COORD OF CURRENT ENERGY SYMBOL	X	
021	(NOM ENERGY Y POS)	V94H1307C			*							X	X		A						C	4.154	DOP 3	Y-COORD OF NOMINAL ENERGY SYMBOL	X	
022	(MAX ENER LIM Y POS)	V94H1309C			*							X	X		A						D	4.154	DOP 3	Y-COORD OF UPPER ENERGY LIMIT	X	
023	(MIN ENER LIM Y POS)	V94H1310C			*							X	X		A						D	4.154	DOP 3	Y-COORD OF LOWER ENERGY LIMIT	X	
024	(THETA Y POS)	V94H1312C			*							X	X	X	A						E	4.154	DOP 3	Y-COORD OF THETA SYMBOL	X	
025	(EMOH Y POS)	V94U1313C																			K	4.154		Y-COORD OF OTT DOWNMODE ENERGY SYM	X	
026	(R)	V98U0017C	2	10		1.0																N/S	MI	ADI ROLL ERROR LABEL	BFS	X
027	(P)	V98U0018C	2	11		1.0																N/S	MI	ADI PITCH ERROR LABEL	BFS	X
028	(Y)	V98U0019C	2	12		1.0																N/S	MI	ADI YAW ERROR LABEL	BFS	X
029	R	V90H2234C	4	10		3.0									A	R						N/S	D DAP	BODY ROLL ATTITUDE ERROR	X	
030	P	V90H2233C	4	11		VAR									A	U					N	N/S	D DAP	BODY PITCH ATTITUDE ERROR	X	

Table 4.2.7-2. VERT SIT 2 (PFS/BFS) CRT DISPLAY PROCESSING																										
Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	STATUS	BLANK	SIZE	INTENS	FLASH	RATE	SIGN	LEADER	BRANCH	DOWNL	Add Ref	Source		Nomenclature	CRT		
			X	Y		CHAR	BILEVEL														TYPE	PFS			BFS	
							1	0																		
031	Y	V90H2235C	4	12		3.0			DEC	DEG					A	R				L	N/S	D DAP	BODY YAW ATTITUDE ERROR	X		
032	TGT NZ	V90U1224C	30	22		4.1		DEC			X				A								4.204	N/S	GUID NZ PULL OUT CMD	
033	XXXXXXX (BAILOUT)	V90X1141X	2	3		7.0		CHAR				X	X		A								4.9	N/S	BAILOUT ARM FLAG	
034	(MSG LINE)	V93X0050X	1	25		44.0		CHAR						A							UI	N/S	MESSAGE LINE	X		
035	(MSG LINE)	V93X0050X	2	25		46.0		CHAR						G							N/S	MI	MESSAGE LINE	X		
036	(BUFFER MSG)	V93X0054X	45	25		4.0		CHAR						G							UI	N/S	BUFFER MESSAGE INDICATOR	X		
037	(BUFFER MSG)	V93X0054X	48	25		4.0		CHAR						G							N/S	MI	BUFFER MESSAGE INDICATOR	X		
038	(SPL)	V93X0056X	2	26		49.0		CHAR						G							UI	MI	SCRATCH PAD LINE	X		

TABLE 4.2.7-5. INPUT FUNCTIONAL PARAMETERS FOR VERTICAL SITUATION 2 DISPLAY (G6.20)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
BAILOUT_ARM	V90X1141XA	BAILOUT ARM FLAG	TAEM GUID				89250B	
BAILOUT_ARM	V90X1141XB	BAILOUT ARM FLAG	GRTLS TAEM GUID				89250B	
BAILOUT_BANK	V90X1147XA	BAILOUT BANK FLAG	TAEM GUID				89250B	
BAILOUT_BANK	V90X1147XB	BAILOUT BANK FLAG	GRTLS TAEM GUID				89250B	
BAILOUT_PITCH	V90X1145XA	BAILOUT PITCH FLAG	TAEM GUID				89250B	
BAILOUT_PITCH	V90X1145XB	BAILOUT PITCH FLAG	GRTLS TAEM GUID				89250B	
DATRIM	V90H1629CA	AILERON TRIM	AEROJET DAP	DEG				
DATRIM	V90H1629CB	AILERON TRIM	GRTLS DAP	DEG				
DGRNZT	V90U1224C	GUID NZ PULL OUT CMD	GRTLS TAEM GUID	G			92522D	
DISP_ALT_DIS_ANGLE	V94H1305C	SHUTTLE SYMBOL ROTATION ANGLE	VERT SIT DIP	DEG	VAR			
DRTI	V90H1669CA	LATERAL ACCEL TRIM	AEROJET DAP					
DRTI	V90H1669CB	LATERAL ACCEL TRIM	GRTLS DAP					
DRTRIM	V90H1668CA	RUDDER TRIM	AEROJET DAP	DEG				
DRTRIM	V90H1668CB	RUDDER TRIM	GRTLS DAP	DEG				
DSBFBP	V95H8250C	PERCENTAGE OF MAX SPEEDBRAKE POS	SB PFB SOP	PCT	BSS			
EMOH_ENER_Y	V94U1313C	Y-COORD OF OTT DOWNMODE ENERGY SYM	VERT SIT DIP	AU	VAR		93090E	
ENER_LL_Y	V94H1310C	Y-COORD OF LOWER ENERGY LIMIT	VERT SIT DIP	AU	VAR		93090E	
ENER_UL_Y	V94H1309C	Y-COORD OF UPPER ENERGY LIMIT	VERT SIT DIP	AU	VAR		93090E	
NOM_ENERGY_Y	V94H1307C	Y-COORD OF NOMINAL ENERGY SYMBOL	VERT SIT DIP	AU	VAR		93090E	
NY	V90A5361C	SELECTED AA LATERAL ACCEL	SF	G	SPL		93017G	*
SHUTTLE_ENER_FLAG	V94X1311X	SHUTTLE ENERGY FLASH FLAG	VERT SIT DIP				93090E	
SHUTTLE_ENER_Y	V94H1308C	Y-COORD OF CURRENT ENERGY SYMBOL	VERT SIT DIP	AU	VAR		93090E	
SHUTTLE_THETA_FLAG	V94X1314X	SHUTTLE THETA FLASH FLAG	VERT SIT DIP					
TG_END	V90X1108XA	TAEM GUIDANCE TERMINATION FLAG	TAEM GUID				93017G	*
TG_END	V90X1108XB	TAEM GUIDANCE TERMINATION FLAG	GRTLS TAEM GUID				92355B	
THETA_Y	V94H1312C	Y-COORD OF THETA SYMBOL	VERT SIT DIP	AU	VAR			
VSHUTTLE_X	V94H1302C	X-POSITION OF SHUTTLE SYMBOL	VERT SIT DIP	AU	VAR			
VSHUTTLE_Y	V94H1303C	Y-POSITION OF SHUTTLE SYMBOL	VERT SIT DIP	AU	VAR			
VS_SBC	V94U1300C	SPEEDBRAKE COMMAND-VERT SIT	VERT SIT DIP	PCT	VAR			

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.7-6. OUTPUT FUNCTIONAL PARAMETERS FROM VERTICAL SITUATION 2 DISPLAY (G6.20)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
(HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec

TABLE 4.2.7-7. VERTICAL SITUATION 2 DISPLAY (G6.20) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
V2_CHAR_STRING(01,1)	V97U8304C	ND	CH		M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_CHAR_STRING(01,2)	V97U8305C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_CHAR_STRING(01,3)	V97U8306C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_CHAR_STRING(02,1)	V97U8307C	ND	CH		M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_CHAR_STRING(02,2)	V97U8308C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_CHAR_STRING(02,3)	V97U8309C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_CHAR_STRING(03,1)	V97U8310C	ND	CH		M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_CHAR_STRING(03,2)	V97U8311C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_CHAR_STRING(03,3)	V97U8312C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_CHAR_STRING(04,1)	V97U8313C	ND	CH		M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_CHAR_STRING(04,2)	V97U8314C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_CHAR_STRING(04,3)	V97U8315C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_CHAR_STRING(05,1)	V97U8316C	ND	CH		M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_CHAR_STRING(05,2)	V97U8317C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_CHAR_STRING(05,3)	V97U8318C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_CHAR_STRING(06,1)	V97U8319C	ND	CH		M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_CHAR_STRING(06,2)	V97U8320C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_CHAR_STRING(06,3)	V97U8321C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_CHAR_STRING(07,1)	V97U8377C	ND	CH		M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_CHAR_STRING(07,2)	V97U8378C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_CHAR_STRING(07,3)	V97U8379C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(01,1)	V97U8326C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(01,2)	V97U8327C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		

TABLE 4.2.7-7. VERTICAL SITUATION 2 DISPLAY (G6.20) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
V2_SOLID_LINE(01,3)	V97U8328C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(01,4)	V97U8329C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(02,1)	V97U8330C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(02,2)	V97U8331C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(02,3)	V97U8332C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(02,4)	V97U8333C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(03,1)	V97U8334C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(03,2)	V97U8335C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(03,3)	V97U8336C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(03,4)	V97U8337C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(04,1)	V97U8338C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(04,2)	V97U8339C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(04,3)	V97U8340C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(04,4)	V97U8341C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(05,1)	V97U8342C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(05,2)	V97U8343C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(05,3)	V97U8344C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(05,4)	V97U8345C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(06,1)	V97U8361C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(06,2)	V97U8362C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(06,3)	V97U8363C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		
V2_SOLID_LINE(06,4)	V97U8364C	AU	F	S	M	X	G6.20	01	VR2	DC0599	
								03	VE2		

TABLE 4.2.7-7. VERTICAL SITUATION 2 DISPLAY (G6.20) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
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NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

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TABLE 4.2.7-8. VERTICAL SITUATION 2 DISPLAY (G6.20) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.7-9. VERTICAL SITUATION 2 DISPLAY (G6.20) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.8 RM ORBIT (PFS)

TITLE: RM ORBIT

TYPE: SPEC/025

AVAILABILITY: OPS 2

4.2.8.1 Purpose, Operation, and Organization

This display provides the crew with a means to monitor and control the selection filters for the translation and rotation hand controllers (THC and RHC) and to inhibit/enable Switch Redundancy Management (SW RM) processing. This display is called up by its SPEC number.

The left-hand side of the CRT display contains the data necessary to monitor and perform the RM Function for the left, forward and aft THC's. The right-hand side of the CRT display contains the data necessary to monitor and perform the RM function for the three RHC's; Left, Right, Aft. The control item for inhibiting/enabling SW RM is located on the lower right.

- (1) The triply redundant transducer data for each THC are displayed under the headings, TX, TY, and TZ, corresponding to the commanded translations in the respective controller axes. A plus (+) or a minus (-) character will be displayed indicating the sensed THC command. A blank indicates no sensed THC command for the transducer.

Because of the physical orientation (rotated 90° clockwise from original planned installation), the AFT THC causes crew commands to be displayed as follows:

AFT THC COMMANDS	CONTROLLER AXIS (CRT DISPLAY)		
	TX	TY	TZ
PUSH	±		
PULL			
DOWN		±	
UP			
STBD			±
PORT			

Software transformations assure that crew commands are correctly input to the flight control system; only data displayed on the CRT display are affected.

- (2) The triply redundant transducer data for each RHC are displayed under the headings R, P, and Y, corresponding to the roll, pitch, and yaw rotational commands, respectively. The displayed data represent the sensed controller commands, scaled in percent of full deflection (0 to 99). Leading character indicators (L/R/U/D) are provided for the individual RHC axes to show the direction of the sensed command.

- (3) For each THC and RHC a status indicator is driven with each of the displayed quantities. An “M” is displayed in the status field to indicate missing data. Failure of a THC data component causes RM to remove the failed component from the selection filter. A down arrow (↓) is displayed in the status field for the failed component(s). Failure of any RHC data component causes RM to deselect the entire RHC transducer string.

An asterisk (*) is displayed in the deselect (DES) column in the corresponding row of the faulty component and a down arrow (↓) is displayed in the status field for each component of that RHC string. If the crew manually deselects a THC or RHC by executing the DES item(s), the asterisk (*) is displayed in the “DES” column and a down arrow (↓) is displayed in the status field for each component of that THC or RHC transducer string (i.e., all components are removed from the selection filter and the FAIL BITS are not affected). A manual reselection places all components of a THC or RHC back into the selection filter and resets any previous failures. A question mark (?) will be output in the status indicator field for parameters involved in a second failure dilemma where RM cannot isolate the failed component.

- (4) Specific item numbers in the DES column provide the crew with manual control of the RM selection filters. Repeatedly executing an item alternately results in selection and deselection. An asterisk(*) next to the item number signifies deselection.
- (5) Selection filter (SF) processing will be initialized in its current state. The SF state is maintained across any OPS transition or if another SPEC is called.
- (6) A flip-flop item entry control provides the crew with the capability to manually inhibit or enable GN&C Switch Redundancy Management (SW RM INH). An asterisk (*) is displayed after the item number to indicate when the inhibit is in force. The first time the display is called the SW RM item will be enabled (i.e., no asterisk) and thereafter will reflect crew input.

4.2.8.2 RM Orbit Keyboard Processing Addendum

- A. Deselect Signals. All THC deselect signals are sent to GN&C SW RM (4.180), GAX (4.110), CRT (6.45), RM CONTROLLERS (V5.1.6), RM ORBIT SPEC (5.19) and TLM. All RHC deselect signals are sent to RHC FDIR (4.87), GAX (4.110), CRT (6.45), RM CONTROLLERS (V5.1.6), RM ORBIT SPEC (5.19) and TLM.

4.2.8.3 RM Orbit CRT Display Processing Addendum

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word “STAT” being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT Display Processing Table 4.2.8-2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the “M” PSI is displayed (for commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)			
Blank (default)	↓		M	∅
1	↓	↑	M	∅
2		↑	M	∅
3	↓			∅
4		↑		∅
5	↓		?	∅
6	↓	↑		∅
7			M	∅
8	↓		?	M ∅
9			?	M ∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.2.8–2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. RHC Directional Symbols. The symbols that shall replace plus, minus, and zero are defined as follows:

Output Symbols

Sign of Command Feedback	RHC Pitch Command	RHC Roll and Yaw Command
+	U	R
0	(blank)	(blank)
-	D	L

U is pull on RHC
D is push on RHC
L is left turn on RHC
R is right turn on RHC

- B. THC Deselect Status. For each THC unit, the deselect signal is set or reset only by crew entry. If it is reset an asterisk(*) will be driven after the DES item number.

If the THC unit is deselected by item entry, in addition to driving an asterisk(*) after the item number, a down arrow (↓) will be driven in the TX, TY and TZ status columns. These status signals are generated in the RM ORBIT SPEC (5.19).

If a component(s) of a THC is (are) failed by RM (GN&C Switch Processor), it may be reset by deselecting and then reselecting the THC unit (i.e., two item entries are required to reset the component fail status).

- C. RHC Deselect Status. For each RHC unit, the deselect command for driving the asterisk(*) after the DES item number can be reset (i.e., "0" state of the signal) by either crew execution of deselect item number or when RM (RHC FDIR) declares a failed unit.

When the RHC unit is deselected, in addition to driving an asterisk(*) after the item number, a down arrow will be driven in the R, P, and Y status columns. When deselection has occurred, the crew can reselect by executing the deselect item number. This will remove the asterisk(*) after the deselect item number, remove the down arrows (↓) and return the unit to the selection filter processing which resets the fail status bit, until a component is again declared failed by the status word or the crew deselects again.

- D. Deselect Sources. All of the THC and RHC deselect commands may be initialized from the RM Controller display (V5.1.6).

4.2.8.4 RM Orbit Figure/Table References

Figure 4.2.8-1	RM Orbit Display (PFS)
Table 4.2.8-1	Keyboard Processing Table
Table 4.2.8-2	CRT Display Processing Table
Table 4.2.8-3	CRT Display Processing Background Requirements N/A
Table 4.2.8-4	Mission Design Background Constants N/A
Table 4.2.8-5	Input Functional Parameters
Table 4.2.8-6	Output Functional Parameters
Table 4.2.8-7	I-Loads
Table 4.2.8-8	K-Loads
Table 4.2.8-9	Constants

Table 4.2.8-1.RM ORBIT (PFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
001	THC L1 DES 1	V93X4207X	0.0	CTRL			1			A	GN&C SW RM	FWD THC X,Y,Z OUT DES A	X
002	THC L2 DES 2	V93X4208X	0.0	CTRL			2			A	GN&C SW RM	FWD THC X,Y,Z OUT DES B	X
003	THC L3 DES 3	V93X4209X	0.0	CTRL			3			A	GN&C SW RM	FWD THC X,Y,Z OUT DES C	X
004	THC A1 DES 4	V93X4237X	0.0	CTRL			4			A	GN&C SW RM	AFT THC X,Y,Z OUT DES A	X
005	THC A2 DES 5	V93X4238X	0.0	CTRL			5			A	GN&C SW RM	AFT THC X,Y,Z OUT DES B	X
006	THC A3 DES 6	V93X4239X	0.0	CTRL			6			A	GN&C SW RM	AFT THC X,Y,Z OUT DES C	X
007*	RHC L1 DES 7	V93X4201X	0.0	CTRL			7			A	RHC FDIR	LH RHC 1 DES CMD	X
008*	RHC L2 DES 8	V93X4203X	0.0	CTRL			8			A	RHC FDIR	LH RHC 2 DES CMD	X
009*	RHC L3 DES 9	V93X4205X	0.0	CTRL			9			A	RHC FDIR	LH RHC 3 DES CMD	X
010*	RHC R1 DES 10	V93X4231X	0.0	CTRL			10			A	RHC FDIR	RH RHC 1 DES CMD	X
011*	RHC R2 DES 11	V93X4233X	0.0	CTRL			11			A	RHC FDIR	RH RHC 2 DES CMD	X
012*	RHC R3 DES 12	V93X4235X	0.0	CTRL			12			A	RHC FDIR	RH RHC 3 DES CMD	X
013*	RHC A1 DES 13	V93X4296X	0.0	CTRL			13			A	RHC FDIR	AFT RHC 1 DES CMD	X
014*	RHC A2 DES 14	V93X4297X	0.0	CTRL			14			A	RHC FDIR	AFT RHC 2 DES CMD	X
015*	RHC A3 DES 15	V93X4298X	0.0	CTRL			15			A	RHC FDIR	AFT RHC 3 DES CMD	X
016	SW RM INH 16	V93X4257X	0.0	CTRL			16				GN&C SW RM, CRT	SWITCH RM INHIBIT	X

Table 4.2.8-2.RM ORBIT (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T		
			X	Y		CHAR	BILEVEL																	TYPE	
							1	0																	
041	THC A3 TY (-)	V72K1481X	11	15		1.0	-		BLVL															X	
042	THC A3 TZ (+)	V72K1485X	14	15		1.0	+		BLVL																X
043	THC A3 TZ (-)	V72K1486X	14	15		1.0	-		BLVL																X
044	THC L1 TX (S)	V95J7729C	9	9		1.0			STAT											8	RM ORBIT	FWD THC X CHANNEL 1 STATUS		X	
045	THC L1 TY (S)	V95J7730C	12	9		1.0			STAT											8	RM ORBIT	FWD THC Y CHANNEL 1 STATUS		X	
046	THC L1 TZ (S)	V95J7731C	15	9		1.0			STAT											8	RM ORBIT	FWD THC Z CHANNEL 1 STATUS		X	
047	THC L2 TX (S)	V95J7732C	9	10		1.0			STAT											8	RM ORBIT	FWD THC X CHANNEL 2 STATUS		X	
048	THC L2 TY (S)	V95J7733C	12	10		1.0			STAT											8	RM ORBIT	FWD THC Y CHANNEL 2 STATUS		X	
049	THC L2 TZ (S)	V95J7734C	15	10		1.0			STAT											8	RM ORBIT	FWD THC Z CHANNEL 2 STATUS		X	
050	THC L3 TX (S)	V95J7735C	9	11		1.0			STAT											8	RM ORBIT	FWD THC X CHANNEL 3 STATUS		X	
051	THC L3 TY (S)	V95J7736C	12	11		1.0			STAT											8	RM ORBIT	FWD THC Y CHANNEL 3 STATUS		X	
052	THC L3 TZ (S)	V95J7737C	15	11		1.0			STAT											8	RM ORBIT	FWD THC Z CHANNEL 3 STATUS		X	
053	THC A1 TX (S)	V95J7738C	9	13		1.0			STAT											8	RM ORBIT	AFT THC X CHANNEL 1 STATUS		X	
054	THC A1 TY (S)	V95J7739C	12	13		1.0			STAT											8	RM ORBIT	AFT THC Y CHANNEL 1 STATUS		X	
055	THC A1 TZ (S)	V95J7740C	15	13		1.0			STAT											8	RM ORBIT	AFT THC Z CHANNEL 1 STATUS		X	
056	THC A2 TX (S)	V95J7741C	9	14		1.0			STAT											8	RM ORBIT	AFT THC X CHANNEL 2 STATUS		X	
057	THC A2 TY (S)	V95J7742C	12	14		1.0			STAT											8	RM ORBIT	AFT THC Y CHANNEL 2 STATUS		X	
058	THC A2 TZ (S)	V95J7743C	15	14		1.0			STAT											8	RM ORBIT	AFT THC Z CHANNEL 2 STATUS		X	
059	THC A3 TX (S)	V95J7744C	9	15		1.0			STAT											8	RM ORBIT	AFT THC X CHANNEL 3 STATUS		X	
060	THC A3 TY (S)	V95J7745C	12	15		1.0			STAT											8	RM ORBIT	AFT THC Y CHANNEL 3 STATUS		X	
061	THC A3 TZ (S)	V95J7746C	15	15		1.0			STAT											8	RM ORBIT	AFT THC Z CHANNEL 3 STATUS		X	
062	THC L1 DES 1	V93X4207X	19	9		1.0		*	BLVL											B D	KYBD	FWD THC X,Y,Z OUT DES A		X	
063	THC L2 DES 2	V93X4208X	19	10		1.0		*	BLVL											B D	KYBD	FWD THC X,Y,Z OUT DES B		X	
064	THC L3 DES 3	V93X4209X	19	11		1.0		*	BLVL											B D	KYBD	FWD THC X,Y,Z OUT DES C		X	
065	THC A1 DES 4	V93X4237X	19	13		1.0		*	BLVL											B D	KYBD	AFT THC X,Y,Z OUT DES A		X	
066	THC A2 DES 5	V93X4238X	19	14		1.0		*	BLVL											B D	KYBD	AFT THC X,Y,Z OUT DES B		X	
067	THC A3 DES 6	V93X4239X	19	15		1.0		*	BLVL											B D	KYBD	AFT THC X,Y,Z OUT DES C		X	
068	RHC L1 R	V95H7705C	28	9		3.0			DEC	PCT										A	RM ORBIT	LH RHC 1 ROLL CMD		X	
069	RHC L1 P	V95H7702C	33	9		3.0			DEC	PCT										A	RM ORBIT	LH RHC 1 PITCH CMD		X	
070	RHC L1 Y	V95H7712C	38	9		3.0			DEC	PCT										A	RM ORBIT	LH RHC 1 YAW CMD		X	
071	RHC L2 R	V95H7706C	28	10		3.0			DEC	PCT										A	RM ORBIT	LH RHC 2 ROLL CMD		X	
072	RHC L2 P	V95H7703C	33	10		3.0			DEC	PCT										A	RM ORBIT	LH RHC 2 PITCH CMD		X	
073	RHC L2 Y	V95H7713C	38	10		3.0			DEC	PCT										A	RM ORBIT	LH RHC 2 YAW CMD		X	
074	RHC L3 R	V95H7707C	28	11		3.0			DEC	PCT										A	RM ORBIT	LH RHC 3 ROLL CMD		X	
075	RHC L3 P	V95H7704C	33	11		3.0			DEC	PCT										A	RM ORBIT	LH RHC 3 PITCH CMD		X	
076	RHC L3 Y	V95H7714C	38	11		3.0			DEC	PCT										A	RM ORBIT	LH RHC 3 YAW CMD		X	
077	RHC R1 R	V95H7686C	28	13		3.0			DEC	PCT										A	RM ORBIT	RH RHC 1 ROLL CMD		X	
078	RHC R1 P	V95H7683C	33	13		3.0			DEC	PCT										A	RM ORBIT	RH RHC 1 PITCH CMD		X	
079	RHC R1 Y	V95H7715C	38	13		3.0			DEC	PCT										A	RM ORBIT	RH RHC 1 YAW CMD		X	
080	RHC R2 R	V95H7687C	28	14		3.0			DEC	PCT										A	RM ORBIT	RH RHC 2 ROLL CMD		X	

Table 4.2.8-2.RM ORBIT (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T		
			X	Y		CHAR	BILEVEL																	TYPE	
							1	0																	
081	RHC R2 P	V95H7684C	33	14		3.0			DEC	PCT											A	RM ORBIT	RH RHC 2 PITCH CMD	X	
082	RHC R2 Y	V95H7716C	38	14		3.0			DEC	PCT												A	RM ORBIT	RH RHC 2 YAW CMD	X
083	RHC R3 R	V95H7688C	28	15		3.0			DEC	PCT												A	RM ORBIT	RH RHC 3 ROLL CMD	X
084	RHC R3 P	V95H7685C	33	15		3.0			DEC	PCT												A	RM ORBIT	RH RHC 3 PITCH CMD	X
085	RHC R3 Y	V95H7717C	38	15		3.0			DEC	PCT												A	RM ORBIT	RH RHC 3 YAW CMD	X
086	RHC A1 R	V95H7725C	28	17		3.0			DEC	PCT												A	RM ORBIT	AFT RHC 1 ROLL CMD	X
087	RHC A1 P	V95H7719C	33	17		3.0			DEC	PCT												A	RM ORBIT	AFT RHC 1 PITCH CMD	X
088	RHC A1 Y	V95H7722C	38	17		3.0			DEC	PCT												A	RM ORBIT	AFT RHC 1 YAW CMD	X
089	RHC A2 R	V95H7726C	28	18		3.0			DEC	PCT												A	RM ORBIT	AFT RHC 2 ROLL CMD	X
090	RHC A2 P	V95H7720C	33	18		3.0			DEC	PCT												A	RM ORBIT	AFT RHC 2 PITCH CMD	X
091	RHC A2 Y	V95H7723C	38	18		3.0			DEC	PCT												A	RM ORBIT	AFT RHC 2 YAW CMD	X
092	RHC A3 R	V95H7727C	28	19		3.0			DEC	PCT												A	RM ORBIT	AFT RHC 3 ROLL CMD	X
093	RHC A3 P	V95H7721C	33	19		3.0			DEC	PCT												A	RM ORBIT	AFT RHC 3 PITCH CMD	X
094	RHC A3 Y	V95H7724C	38	19		3.0			DEC	PCT												A	RM ORBIT	AFT RHC 3 YAW CMD	X
095	RHCL1 R (S)	V95J7747C	31	9		1.0			STAT													8	RM ORBIT	L RHC ROLL 1 STATUS	X
096	RHCL1 P (S)	V95J7750C	36	9		1.0			STAT													8	RM ORBIT	L RHC PITCH 1 STATUS	X
097	RHCL1 Y (S)	V95J7753C	41	9		1.0			STAT													8	RM ORBIT	L RHC YAW 1 STATUS	X
098	RHCL2 R (S)	V95J7748C	31	10		1.0			STAT													8	RM ORBIT	L RHC ROLL 2 STATUS	X
099	RHCL2 P (S)	V95J7751C	36	10		1.0			STAT													8	RM ORBIT	L RHC PITCH 2 STATUS	X
100	RHCL2 Y (S)	V95J7754C	41	10		1.0			STAT													8	RM ORBIT	L RHC YAW 2 STATUS	X
101	RHCL3 R (S)	V95J7749C	31	11		1.0			STAT													8	RM ORBIT	L RHC ROLL 3 STATUS	X
102	RHCL3 P (S)	V95J7752C	36	11		1.0			STAT													8	RM ORBIT	L RHC PITCH 3 STATUS	X
103	RHCL3 Y (S)	V95J7755C	41	11		1.0			STAT													8	RM ORBIT	L RHC YAW 3 STATUS	X
104	RHC R1 R (S)	V95J7756C	31	13		1.0			STAT													8	RM ORBIT	R RHC ROLL 1 STATUS	X
105	RHC R1 P (S)	V95J7759C	36	13		1.0			STAT													8	RM ORBIT	R RHC PITCH 1 STATUS	X
106	RHC R1 Y (S)	V95J7762C	41	13		1.0			STAT													8	RM ORBIT	R RHC YAW 1 STATUS	X
107	RHC R2 R (S)	V95J7757C	31	14		1.0			STAT													8	RM ORBIT	R RHC ROLL 2 STATUS	X
108	RHC R2 P (S)	V95J7760C	36	14		1.0			STAT													8	RM ORBIT	R RHC PITCH 2 STATUS	X
109	RHC R2 Y (S)	V95J7763C	41	14		1.0			STAT													8	RM ORBIT	R RHC YAW 2 STATUS	X
110	RHC R3 R (S)	V95J7758C	31	15		1.0			STAT													8	RM ORBIT	R RHC ROLL 3 STATUS	X
111	RHC R3 P (S)	V95J7761C	36	15		1.0			STAT													8	RM ORBIT	R RHC PITCH 3 STATUS	X
112	RHC R3 Y (S)	V95J7764C	41	15		1.0			STAT													8	RM ORBIT	R RHC YAW 3 STATUS	X
113	RHC A1 R (S)	V95J7765C	31	17		1.0			STAT													8	RM ORBIT	AFT RHC ROLL 1 STATUS	X
114	RHC A1 P (S)	V95J7768C	36	17		1.0			STAT													8	RM ORBIT	AFT RHC PITCH 1 STATUS	X
115	RHC A1 Y (S)	V95J7771C	41	17		1.0			STAT													8	RM ORBIT	AFT RHC YAW 1 STATUS	X
116	RHC A2 R (S)	V95J7766C	31	18		1.0			STAT													8	RM ORBIT	AFT RHC ROLL 2 STATUS	X
117	RHC A2 P (S)	V95J7769C	36	18		1.0			STAT													8	RM ORBIT	AFT RHC PITCH 2 STATUS	X
118	RHC A2 Y (S)	V95J7772C	41	18		1.0			STAT													8	RM ORBIT	AFT RHC YAW 2 STATUS	X
119	RHC A3 R (S)	V95J7767C	31	19		1.0			STAT													8	RM ORBIT	AFT RHC ROLL 3 STATUS	X
120	RHC A3 P (S)	V95J7770C	36	19		1.0			STAT													8	RM ORBIT	AFT RHC PITCH 3 STATUS	X
121	RHC A3 Y (S)	V95J7773C	41	19		1.0			STAT													8	RM ORBIT	AFT RHC YAW 3 STATUS	X
122*	RHC L1 DES 7	V93X4201X	45	9		1.0		*	BLVL													C D	KYBD	LH RHC 1 DES CMD	X
123*	RHC L2 DES 8	V93X4203X	45	10		1.0		*	BLVL													C D	KYBD	LH RHC 2 DES CMD	X
124*	RHC L3 DES 9	V93X4205X	45	11		1.0		*	BLVL													C D	KYBD	LH RHC 3 DES CMD	X
125*	RHC R1 DES 10	V93X4231X	45	13		1.0		*	BLVL													C D	KYBD	RH RHC 1 DES CMD	X

Table 4.2.8-2.RM ORBIT (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T		
			X	Y		CHAR	BILEVEL																	TYPE	
							1	0																	
126*	RHC R2 DES 11	V93X4233X	45	14		1.0		*	BLVL												C D	KYBD	RH RHC 2 DES CMD	X	
127*	RHC R3 DES 12	V93X4235X	45	15		1.0		*	BLVL													C D	KYBD	RH RHC 3 DES CMD	X
128*	RHC A1 DES 13	V93X4296X	45	17		1.0		*	BLVL													C D	KYBD	AFT RHC 1 DES CMD	X
129*	RHC A2 DES 14	V93X4297X	45	18		1.0		*	BLVL													C D	KYBD	AFT RHC 2 DES CMD	X
130*	RHC A3 DES 15	V93X4298X	45	19		1.0		*	BLVL													C D	KYBD	AFT RHC 3 DES CMD	X
131	SW RM INH 16	V93X4257X	36	24		1.0		*	BLVL														KYBD	SWITCH RM INHIBIT	X
132	(MSG LINE)	V93X0050X	1	25		44.0			CHAR														UI	MESSAGE LINE	X
133	(BUFFER MSG)	V93X0054X	45	25		4.0			CHAR														UI	BUFFER MESSAGE INDICATOR	X
134	(SPL)	V93X0056X	2	26		49.0			CHAR														UI	SCRATCH PAD LINE	X

TABLE 4.2.8-5. INPUT FUNCTIONAL PARAMETERS FOR REDUNDANCY MGMT/ORBIT DISPLAY (REF 5.19 SPEC.) (G6.45)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
	V72K1315X	FWD THC POS X OUTPUT-A	THC FWD		BD		93017G	*
	V72K1316X	FWD THC NEG X OUTPUT-A	THC FWD		BD		93017G	*
	V72K1320X	FWD THC POS Y OUTPUT-A	THC FWD		BD		93017G	*
	V72K1321X	FWD THC NEG Y OUTPUT-A	THC FWD		BD		93017G	*
	V72K1325X	FWD THC POS Z OUTPUT-A	THC FWD		BD		93017G	*
	V72K1326X	FWD THC NEG Z OUTPUT-A	THC FWD		BD		93017G	*
	V72K1335X	FWD THC POS X OUTPUT-B	THC FWD		BD		93017G	*
	V72K1336X	FWD THC NEG X OUTPUT-B	THC FWD		BD		93017G	*
	V72K1340X	FWD THC POS Y OUTPUT-B	THC FWD		BD		93017G	*
	V72K1341X	FWD THC NEG Y OUTPUT-B	THC FWD		BD		93017G	*
	V72K1345X	FWD THC POS Z OUTPUT-B	THC FWD		BD		93017G	*
	V72K1346X	FWD THC NEG Z OUTPUT-B	THC FWD		BD		93017G	*
	V72K1355X	FWD THC POS X OUTPUT-C	THC FWD		BD		93017G	*
	V72K1356X	FWD THC NEG X OUTPUT-C	THC FWD		BD		93017G	*
	V72K1360X	FWD THC POS Y OUTPUT-C	THC FWD		BD		93017G	*
	V72K1361X	FWD THC NEG Y OUTPUT-C	THC FWD		BD		93017G	*
	V72K1365X	FWD THC POS Z OUTPUT-C	THC FWD		BD		93017G	*
	V72K1366X	FWD THC NEG Z OUTPUT-C	THC FWD		BD		93017G	*
	V72K1435X	AFT THC POS X OUTPUT-A	THC AFT		BD		93017G	*
	V72K1436X	AFT THC NEG X OUTPUT-A	THC AFT		BD		93017G	*
	V72K1440X	AFT THC POS Y OUTPUT-A	THC AFT		BD		93017G	*
	V72K1441X	AFT THC NEG Y OUTPUT-A	THC AFT		BD		93017G	*
	V72K1445X	AFT THC POS Z OUTPUT-A	THC AFT		BD		93017G	*
	V72K1446X	AFT THC NEG Z OUTPUT-A	THC AFT		BD		93017G	*
	V72K1451X	AFT THC POS X OUTPUT-B	THC AFT		BD		93017G	*
	V72K1455X	AFT THC NEG X OUTPUT-B	THC AFT		BD		93017G	*
	V72K1460X	AFT THC POS Y OUTPUT-B	THC AFT		BD		93017G	*
	V72K1461X	AFT THC NEG Y OUTPUT-B	THC AFT		BD		93017G	*
	V72K1465X	AFT THC POS Z OUTPUT-B	THC AFT		BD		93017G	*
	V72K1466X	AFT THC NEG Z OUTPUT-B	THC AFT		BD		93017G	*
	V72K1475X	AFT THC POS X OUTPUT-C	THC AFT		BD		93017G	*
	V72K1476X	AFT THC NEG X OUTPUT-C	THC AFT		BD		93017G	*
	V72K1480X	AFT THC POS Y OUTPUT-C	THC AFT		BD		93017G	*
	V72K1481X	AFT THC NEG Y OUTPUT-C	THC AFT		BD		93017G	*
	V72K1485X	AFT THC POS Z OUTPUT-C	THC AFT		BD		93017G	*
	V72K1486X	AFT THC NEG Z OUTPUT-C	THC AFT		BD		93017G	*

TABLE 4.2.8-5. INPUT FUNCTIONAL PARAMETERS FOR REDUNDANCY MGMT/ORBIT DISPLAY (REF 5.19 SPEC.) (G6.45)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
V93X4201XA	LH RHC 1	DES CMD	RM ORB DISP				93017G	*
V93X4201XB	LH RHC 1	DES CMD	RM/CNTLR DISP				93017G	*
V93X4203XA	LH RHC 2	DES CMD	RM ORB DISP				93017G	*
V93X4203XB	LH RHC 2	DES CMD	RM/CNTLR DISP				93017G	*
V93X4205XA	LH RHC 3	DES CMD	RM ORB DISP				93017G	*
V93X4205XB	LH RHC 3	DES CMD	RM/CNTLR DISP				93017G	*
V93X4207XA	FWD THC X,Y,Z	OUT DES A	RM ORB DISP				93017G	*
V93X4207XB	FWD THC X,Y,Z	OUT DES A	RM/CNTLR DISP				93017G	*
V93X4208XA	FWD THC X,Y,Z	OUT DES B	RM ORB DISP				93017G	*
V93X4208XB	FWD THC X,Y,Z	OUT DES B	RM/CNTLR DISP				93017G	*
V93X4209XA	FWD THC X,Y,Z	OUT DES C	RM ORB DISP				93017G	*
V93X4209XB	FWD THC X,Y,Z	OUT DES C	RM/CNTLR DISP				93017G	*
V93X4231XA	RH RHC 1	DES CMD	RM ORB DISP				93017G	*
V93X4231XB	RH RHC 1	DES CMD	RM/CNTLR DISP				93017G	*
V93X4233XA	RH RHC 2	DES CMD	RM ORB DISP				93017G	*
V93X4233XB	RH RHC 2	DES CMD	RM/CNTLR DISP				93017G	*
V93X4235XA	RH RHC 3	DES CMD	RM ORB DISP				93017G	*
V93X4235XB	RH RHC 3	DES CMD	RM/CNTLR DISP				93017G	*
V93X4237XA	AFT THC X,Y,Z	OUT DES A	RM ORB DISP				93017G	*
V93X4237XB	AFT THC X,Y,Z	OUT DES A	RM/CNTLR DISP				93017G	*
V93X4238XA	AFT THC X,Y,Z	OUT DES B	RM ORB DISP				93017G	*
V93X4238XB	AFT THC X,Y,Z	OUT DES B	RM/CNTLR DISP				93017G	*
V93X4239XA	AFT THC X,Y,Z	OUT DES C	RM ORB DISP				93017G	*
V93X4239XB	AFT THC X,Y,Z	OUT DES C	RM/CNTLR DISP				93017G	*
V93X4257X	SWITCH	RM INHIBIT	RM ORB DISP		BD			
V93X4296XA	AFT RHC 1	DES CMD	RM ORB DISP				93017G	*
V93X4296XB	AFT RHC 1	DES CMD	RM/CNTLR DISP				93017G	*
V93X4297XA	AFT RHC 2	DES CMD	RM ORB DISP				93017G	*
V93X4297XB	AFT RHC 2	DES CMD	RM/CNTLR DISP				93017G	*
V93X4298XA	AFT RHC 3	DES CMD	RM ORB DISP				93017G	*
V93X4298XB	AFT RHC 3	DES CMD	RM/CNTLR DISP				93017G	*
V95H7683C	RH RHC 1	PITCH CMD	RM ORB DIP	PCT	BSS			
V95H7684C	RH RHC 2	PITCH CMD	RM ORB DIP	PCT	BSS			
V95H7685C	RH RHC 3	PITCH CMD	RM ORB DIP	PCT	BSS			
V95H7686C	RH RHC 1	ROLL CMD	RM ORB DIP	PCT	BSS			
V95H7687C	RH RHC 2	ROLL CMD	RM ORB DIP	PCT	BSS			
V95H7688C	RH RHC 3	ROLL CMD	RM ORB DIP	PCT	BSS			
V95H7702C	LH RHC 1	PITCH CMD	RM ORB DIP	PCT	BSS			
V95H7703C	LH RHC 2	PITCH CMD	RM ORB DIP	PCT	BSS			
V95H7704C	LH RHC 3	PITCH CMD	RM ORB DIP	PCT	BSS			
V95H7705C	LH RHC 1	ROLL CMD	RM ORB DIP	PCT	BSS			
V95H7706C	LH RHC 2	ROLL CMD	RM ORB DIP	PCT	BSS			
V95H7707C	LH RHC 3	ROLL CMD	RM ORB DIP	PCT	VAR			
V95H7712C	LH RHC 1	YAW CMD	RM ORB DIP	PCT	BSS			
V95H7713C	LH RHC 2	YAW CMD	RM ORB DIP	PCT	BSS			
V95H7714C	LH RHC 3	YAW CMD	RM ORB DIP	PCT	BSS			

TABLE 4.2.8-5. INPUT FUNCTIONAL PARAMETERS FOR REDUNDANCY MGMT/ORBIT DISPLAY (REF 5.19 SPEC.) (G6.45)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V95H7715C	RH RHC 1 YAW CMD	RM ORB DIP	PCT	BSS			
	V95H7716C	RH RHC 2 YAW CMD	RM ORB DIP	PCT	BSS			
	V95H7717C	RH RHC 3 YAW CMD	RM ORB DIP	PCT	BSS			
	V95H7719C	AFT RHC 1 PITCH CMD	RM ORB DIP	PCT	BSS			
	V95H7720C	AFT RHC 2 PITCH CMD	RM ORB DIP	PCT	BSS			
	V95H7721C	AFT RHC 3 PITCH CMD	RM ORB DIP	PCT	BSS			
	V95H7722C	AFT RHC 1 YAW CMD	RM ORB DIP	PCT	BSS			
	V95H7723C	AFT RHC 2 YAW CMD	RM ORB DIP	PCT	BSS			
	V95H7724C	AFT RHC 3 YAW CMD	RM ORB DIP	PCT	BSS			
	V95H7725C	AFT RHC 1 ROLL CMD	RM ORB DIP	PCT	BSS			
	V95H7726C	AFT RHC 2 ROLL CMD	RM ORB DIP	PCT	BSS			
	V95H7727C	AFT RHC 3 ROLL CMD	RM ORB DIP	PCT	BSS			
	V95J7729C	FWD THC X CHANNEL 1 STATUS	RM ORB DIP		VAR			
	V95J7730C	FWD THC Y CHANNEL 1 STATUS	RM ORB DIP		VAR			
	V95J7731C	FWD THC Z CHANNEL 1 STATUS	RM ORB DIP		VAR			
	V95J7732C	FWD THC X CHANNEL 2 STATUS	RM ORB DIP		VAR			
	V95J7733C	FWD THC Y CHANNEL 2 STATUS	RM ORB DIP		VAR			
	V95J7734C	FWD THC Z CHANNEL 2 STATUS	RM ORB DIP		VAR			
	V95J7735C	FWD THC X CHANNEL 3 STATUS	RM ORB DIP		VAR			
	V95J7736C	FWD THC Y CHANNEL 3 STATUS	RM ORB DIP		VAR			
	V95J7737C	FWD THC Z CHANNEL 3 STATUS	RM ORB DIP		VAR			
	V95J7738C	AFT THC X CHANNEL 1 STATUS	RM ORB DIP		VAR			
	V95J7739C	AFT THC Y CHANNEL 1 STATUS	RM ORB DIP		VAR			
	V95J7740C	AFT THC Z CHANNEL 1 STATUS	RM ORB DIP		VAR			
	V95J7741C	AFT THC X CHANNEL 2 STATUS	RM ORB DIP		VAR			
	V95J7742C	AFT THC Y CHANNEL 2 STATUS	RM ORB DIP		VAR			
	V95J7743C	AFT THC Z CHANNEL 2 STATUS	RM ORB DIP		VAR			
	V95J7744C	AFT THC X CHANNEL 3 STATUS	RM ORB DIP		VAR			
	V95J7745C	AFT THC Y CHANNEL 3 STATUS	RM ORB DIP		VAR			
	V95J7746C	AFT THC Z CHANNEL 3 STATUS	RM ORB DIP		VAR			
	V95J7747C	L RHC ROLL 1 STATUS	RM ORB DIP		VAR			
	V95J7748C	L RHC ROLL 2 STATUS	RM ORB DIP		VAR			
	V95J7749C	L RHC ROLL 3 STATUS	RM ORB DIP		VAR			
	V95J7750C	L RHC PITCH 1 STATUS	RM ORB DIP		VAR			
	V95J7751C	L RHC PITCH 2 STATUS	RM ORB DIP		VAR			
	V95J7752C	L RHC PITCH 3 STATUS	RM ORB DIP		VAR			
	V95J7753C	L RHC YAW 1 STATUS	RM ORB DIP		VAR			
	V95J7754C	L RHC YAW 2 STATUS	RM ORB DIP		VAR			
	V95J7755C	L RHC YAW 3 STATUS	RM ORB DIP		VAR			
	V95J7756C	R RHC ROLL 1 STATUS	RM ORB DIP		VAR			
	V95J7757C	R RHC ROLL 2 STATUS	RM ORB DIP		VAR			
	V95J7758C	R RHC ROLL 3 STATUS	RM ORB DIP		VAR			
	V95J7759C	R RHC PITCH 1 STATUS	RM ORB DIP		VAR			
	V95J7760C	R RHC PITCH 2 STATUS	RM ORB DIP		VAR			
	V95J7761C	R RHC PITCH 3 STATUS	RM ORB DIP		VAR			
	V95J7762C	R RHC YAW 1 STATUS	RM ORB DIP		VAR			

TABLE 4.2.8-5. INPUT FUNCTIONAL PARAMETERS FOR REDUNDANCY MGMT/ORBIT DISPLAY (REF 5.19 SPEC.) (G6.45)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V95J7763C	R RHC YAW 2 STATUS	RM ORB DIP		VAR			
	V95J7764C	R RHC YAW 3 STATUS	RM ORB DIP		VAR			
	V95J7765C	AFT RHC ROLL 1 STATUS	RM ORB DIP		VAR			
	V95J7766C	AFT RHC ROLL 2 STATUS	RM ORB DIP		VAR			
	V95J7767C	AFT RHC ROLL 3 STATUS	RM ORB DIP		VAR			
	V95J7768C	AFT RHC PITCH 1 STATUS	RM ORB DIP		VAR			
	V95J7769C	AFT RHC PITCH 2 STATUS	RM ORB DIP		VAR			
	V95J7770C	AFT RHC PITCH 3 STATUS	RM ORB DIP		VAR			
	V95J7771C	AFT RHC YAW 1 STATUS	RM ORB DIP		VAR			
	V95J7772C	AFT RHC YAW 2 STATUS	RM ORB DIP		VAR			
	V95J7773C	AFT RHC YAW 3 STATUS	RM ORB DIP		VAR			

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.8-6. OUTPUT FUNCTIONAL PARAMETERS FROM REDUNDANCY MGMT/ORBIT DISPLAY (REF 5.19 SPEC.) (G6.45)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90M2848PA	CGRB_STATUS_2\$(12;)	DL FMT 22/A				93017G	*
			DL FMT 32/A					
	V90M2850PA	CGRB_STATUS_2\$(15;)	DL FMT 22/B				93017G	*
			DL FMT 32/A					
	V90M2989PA	CGRB_STATUS_2\$(18;)	DL FMT 22/A				93017G	*
			DL FMT 32/A					
	V93M0505PA	CGZB_THC_ASTER	DL FMT 22/1				93017G	*
			DL FMT 32/A					
	V93X4201XA	LH RHC 1 DES CMD	DL FMT 22/B				93017G	*
			DL FMT 32/A					
			GAX					
			RHC FDIR					
			RM ORB DIP					
			RM ORB DISP					
			RM/CNTLR DISP					
	V93X4203XA	LH RHC 2 DES CMD	DL FMT 22/B				93017G	*
			DL FMT 32/A					
			GAX					
			RHC FDIR					
			RM ORB DIP					
			RM ORB DISP					
			RM/CNTLR DISP					
	V93X4205XA	LH RHC 3 DES CMD	DL FMT 22/B				93017G	*
			DL FMT 32/A					
			GAX					
			RHC FDIR					
			RM ORB DIP					
			RM ORB DISP					
			RM/CNTLR DISP					
	V93X4207XA	FWD THC X,Y,Z OUT DES A	DL FMT 22/1				93017G	*
			DL FMT 32/A					
			GAX					
			GN&C SW RM					
			RM ORB DIP					
			RM ORB DISP					
			RM/CNTLR DISP					
	V93X4208XA	FWD THC X,Y,Z OUT DES B	DL FMT 22/1				93017G	*
			DL FMT 32/A					
			GAX					
			GN&C SW RM					
			RM ORB DIP					
			RM ORB DISP					
			RM/CNTLR DISP					

TABLE 4.2.8-6. OUTPUT FUNCTIONAL PARAMETERS FROM REDUNDANCY MGMT/ORBIT DISPLAY (REF 5.19 SPEC.) (G6.45)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V93X4209XA	FWD THC X,Y,Z OUT DES C	DL FMT 22/1 DL FMT 32/A GAX GN&C SW RM RM ORB DIP RM ORB DISP RM/CNTRLR DISP				93017G	*
	V93X4231XA	RH RHC 1 DES CMD	DL FMT 22/A DL FMT 32/A GAX RHC FDIR RM ORB DIP RM ORB DISP RM/CNTRLR DISP				93017G	*
	V93X4233XA	RH RHC 2 DES CMD	DL FMT 22/A DL FMT 32/A GAX RHC FDIR RM ORB DIP RM ORB DISP RM/CNTRLR DISP				93017G	*
	V93X4235XA	RH RHC 3 DES CMD	DL FMT 22/A DL FMT 32/A GAX RHC FDIR RM ORB DIP RM ORB DISP RM/CNTRLR DISP				93017G	*
	V93X4237XA	AFT THC X,Y,Z OUT DES A	DL FMT 22/1 DL FMT 32/A GAX GN&C SW RM RM ORB DIP RM ORB DISP RM/CNTRLR DISP				93017G	*
	V93X4238XA	AFT THC X,Y,Z OUT DES B	DL FMT 22/1 DL FMT 32/A GAX GN&C SW RM RM ORB DIP RM ORB DISP RM/CNTRLR DISP				93017G	*

TABLE 4.2.8-6. OUTPUT FUNCTIONAL PARAMETERS FROM REDUNDANCY MGMT/ORBIT DISPLAY (REF 5.19 SPEC.) (G6.45)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V93X4239XA	AFT THC X,Y,Z OUT DES C	DL FMT 22/1 DL FMT 32/A GAX GN&C SW RM RM ORB DIP RM ORB DISP RM/CNTLR DISP				93017G	*
	V93X4257X	SWITCH RM INHIBIT	GN&C SW RM RM ORB DISP		BD			
	V93X4296XA	AFT RHC 1 DES CMD	DL FMT 22/A DL FMT 32/A GAX RHC FDIR RM ORB DIP RM ORB DISP RM/CNTLR DISP				93017G	*
	V93X4297XA	AFT RHC 2 DES CMD	DL FMT 22/A DL FMT 32/A GAX RHC FDIR RM ORB DIP RM ORB DISP RM/CNTLR DISP				93017G	*
	V93X4298XA	AFT RHC 3 DES CMD	DL FMT 22/A DL FMT 32/A GAX RHC FDIR RM ORB DIP RM ORB DISP RM/CNTLR DISP				93017G	*

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
 (HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec

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TABLE 4.2.8-7. REDUNDANCY MGMT/ORBIT DISPLAY (REF 5.19 SPEC.) (G6.45) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.8-8. REDUNDANCY MGMT/ORBIT DISPLAY (REF 5.19 SPEC.) (G6.45) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.8-9. REDUNDANCY MGMT/ORBIT DISPLAY (REF 5.19 SPEC.) (G6.45) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.9 HORIZONTAL SITUATION (PFS)

TITLE: HORIZ SIT

TYPE: SPEC/050

AVAILABILITY: OPS 1, 3, 6

4.2.9.1 Purpose, Operation, and Organization

This display provides Orbiter position and heading information with respect to the ground plane. The HORIZ SIT display format requirements are presented for either 0 or 1 GPS receiver installed in Figure 4.2.9-1 through Figure 4.2.9-4. These figures show the following conditions: Time to HAC Intercept scale shown for right HAC; Time to HAC Intercept scale shown for left HAC; Crosstrack Error scale shown for the vehicle outside the right HAC; Crosstrack Error scale shown for the vehicle outside the left HAC. Figure 4.2.9-5 shows the following condition for three GPS receivers installed: Time to HAC Intercept scale shown for right HAC. Changes in Figure 4.2.9-5 for three GPS receivers installed also apply to the following conditions (but are not shown in a Figure): Time to HAC Intercept scale shown for left HAC; Crosstrack Error scale shown for vehicle outside the right HAC; Crosstrack Error scale shown for vehicle outside the left HAC for the configuration.

Background information for the HORIZ SIT display format varies depending on the number of GPS receivers installed on the vehicle. Common background labels and vectors remain on the display independent of the number of GPS receivers installed. Additional background information is added depending upon whether no or a single GPS receiver is installed (i.e., three TACANs are installed, shown in Figures 4.2.9-1 to 4.2.9-4), or three GPS receivers are installed (shown in Figure 4.2.9-5). The same additional background is added to the display for a one GPS receiver installed configuration and for a no GPS receivers installed configuration. The chart below lists the appropriate tables for all PASS GPC Horizontal Situation Display background requirements.

The PASS GPC, using MEDS virtual displays, requests display of the overall background information. Display background characters and vectors shown in the PFS Horizontal Situation Display figures are for information only, since the specific background labels and vectors are positioned and generated by the MEDS IDP.

Title	Table Number
HORIZONTAL SITUATION (PFS) CRT DISPLAY PROCESSING BACKGROUND REQUIREMENTS: DESIGN DEPENDENT*	Table 4.2.9-3
HORIZONTAL SITUATION (PFS) CRT DISPLAY PROCESSING BACKGROUND REQUIREMENTS – COMMON FOR ALL CONFIGURATIONS*	Table 4.2.9-3A
HORIZONTAL SITUATION (PFS) CRT DISPLAY PROCESSING BACKGROUND REQUIREMENTS – UNIQUE FOR 0 OR 1 GPS RECEIVER INSTALLED	Table 4.2.9-3B
HORIZONTAL SITUATION (PFS) CRT DISPLAY PROCESSING BACKGROUND REQUIREMENTS – UNIQUE FOR 3 GPS RECEIVERS INSTALLED	Table 4.2.9-3C

* Applies to all configurations

The HORIZ SIT display format with the single string GPS requirements implemented shall be the same with no receivers installed on the Orbiter and with one receiver installed, the number of GPS receivers installed being indicated by the I-Load array parameter GPS_INSTALLED. The values of each of the three bits in the array GPS_INSTALLED indicates which LRU has been installed: 0 for not installed, 1 for installed. The HORIZ SIT display requirements presented in this FSSR, for the single string GPS configuration, assume LRU2 GPS receiver installation. Execution of the following Item Entries shall result in an “ILLEGAL ENTRY” message being generated depending on how many GPS Receivers are installed:

Number of GPS Receivers Installed	GPS_INSTALLED	Item Entries Give “ILLEGAL ENTRY”
0	0,0,0	42, 43, 44, 46, 47, 48, 49, 50, 51, 52
1	0,1,0	50, 51, 52
3	1,1,1	5, 19, 20, 21, 34, 35, 46

Installed receivers (plural) and installed receiver (singular) are used interchangeably in the following paragraphs and define requirements for the single GPS configuration. Where requirements for 3 GPS receivers installed are different from those for the single GPS configuration, the unique requirements for 3 GPS receivers installed are specified.

Data from the installed receivers and the “selected” GPS state will be displayed on the HORIZ SIT display. The Global Positioning System Status Display (see Section 4.2.36) contains a discussion of the “selected” GPS state.

Executing Item Entries which control the availability of a selected GPS state for guidance (Item Entries 47, 48 and 49) and which control the resetting of the navigation state with the selected GPS state (Item Entries 42, 43 and 44), will be subject to the control of an I-Load parameter, GPS_LOCKOUT. This parameter will permit or prohibit the execution of the Item Entries in those Operational Sequences where the display is active as follows: if the value of GPS_LOCKOUT is 0, 1 or 2, executing these Item Entries will result in an “ILLEGAL ENTRY” message being generated; if the value of GPS_LOCKOUT is 3 or greater, executing these Item Entries will be permitted in OPS 3, Major Mode 602, and Major Mode 603.

The following Tables describe the values of and use of GPS_LOCKOUT and what Item Entries are permitted on the Horizontal Situation Display for different I-Load values.

GPS_LOCKOUT DESCRIPTION AND USE

GPS_LOCKOUT VALUE	DESCRIPTION
0	<ul style="list-style-type: none"> No GPS receivers installed
1	<ul style="list-style-type: none"> GPS receivers installed Capability to use selected GPS state in the onboard system locked out
2	<ul style="list-style-type: none"> GPS receivers installed Use of selected GPS state in the onboard system allowed in OPS 2 and OPS 8
≥ 3	<ul style="list-style-type: none"> GPS receivers installed Use of selected GPS state in the onboard system allowed in OPS 2, OPS 8, OPS 3, Major Mode 602, and Major Mode 603.

LEGALITY OF HORIZ SIT DISPLAY ITEM ENTRIES
 WITH DEPENDENCY ON GPS_LOCKOUT

GPS_LOCKOUT VALUE	0	1	2	≥ 3
GPS_TO_NAV_AI (Items 42, 43), GPS_TO_NAV_FORCE (Item 44), and GPS_TO_GC_AIF (Items 47, 48, 49) Legality	I	I	I	3, 602, 603

- “T” indicates Item Entry results in an “ILLEGAL ENTRY” message being generated.
- A number indicates the OPS or Major Mode in which the Item Entry is available (NOT Illegal).

The following 32 notes correspond to the numbered labels of the figures.

- The position of the vehicle shall be represented by an Orbiter symbol. The HORIZ SIT display shall graphically display this fixed vehicle symbol and the following variable data: the runway and the right or left heading alignment cone. The display design is intended to create an out-the-window view for the crew, which can be visualized as the ground plane projection containing the Orbiter and the landing site in a coordinate system fixed to the vehicle. The HORIZ SIT scaling shall vary so that the landing site shall always be within the display for any reasonable geometry.

The HORIZ SIT shall also include three double overbright indicators which give the position of the Shuttle relative to the ground at 20, 40, and 60 seconds in the future. The effects of winds shall be included in the computation of these predictors.

- (2) Item 1 provides the capability to enable or inhibit Programmed Test Input (PTI) maneuvers in MM101, MM102, MM304, and MM305. Execution of item 1 in any other MM will result in an “ILLEGAL ENTRY” message.

The display is initialized with PTIs inhibited, indicated by “INH” displayed next to Item 1. Execution of item 1 enables the PTIs and displays “ENA” next to 1. Item 1 acts as a flip-flop, alternately enabling or inhibiting PTIs. The PTIs may also be inhibited manually by establishing the CSS mode in the DAP via the MAN PBIs on the DAP panel, or in OPS 3, by taking the RHC out of detent. In either case, item 1 is reset to the inhibit state and “INH” is displayed. The PTIs can then be reenabled only by reestablishing the AUTO mode in the DAP and executing item 1. The manual inhibits will terminate a PTI maneuver in progress.

The particular PTI maneuver to be performed is indicated by the PTI index, a number from 0 to 25, displayed below item 1. In OPS 1, the PTI index is initialized to zero indicating a structural PTI, the only type performed in OPS 1. In OPS 3 any one of 25 Aero PTIs may be performed. Consequently, the PTI INDEX will be fixed at 0 during OPS 1, and in OPS 3 will range from 1 to 25.

Once enabled, a specific PTI maneuver will be performed as soon as the PTI window (VREL in OPS 1; MACH or \bar{q} in OPS 3) for that PTI is entered, provided that the systems, guidance, and trajectory constraints are satisfied. In OPS 1 “PTI” will be displayed oversized and overbright below the PTI INDEX whenever the structural PTI maneuver is in progress. The data field will be blank otherwise. In OPS 3, whenever a PTI window is entered, “PTI” will be displayed oversized and overbright. If the PTI maneuver is inhibited automatically or manually, “PTI” will flash throughout the PTI window. While the maneuver is in progress “PTI” will not flash. “PTI” will be blanked and the PTI INDEX incremented when the maneuver is terminated. If no maneuver is performed, this will occur when the window is exited. The PTI INDICATOR will be blanked if a TAL or AOA abort has been declared.

- (3) Item 41 provides the capability to specify a landing area by entering an index from 1 – 45. Entry of an index other than 1 – 45 shall cause an illegal entry message to be displayed. Each landing area consists of 2 runways, (primary (PRI) and secondary (SEC)), 2 TACAN’s, and MSBLS where affected. Also, MECO targets are associated with each of the designated RTLS and TAL abort sites. The landing site index shall be displayed next to item 41 with the associated runway and TACAN channel data displayed next to items 3, 4 and 5. The display shall be initialized in MM101 with the Primary RTLS site. In OPS 1 or OPS 6, the text ‘RTLS’, ‘TAL’ or ‘CONT’ shall be displayed next to item 41 to indicate the availability of RTLS, TAL or 2 EO or 3 EO contingency abort site selection respectively. ‘RTLS’ shall be displayed throughout OPS 1 and OPS 6 until either a TAL or 2 EO or 3 EO contingency abort is declared. If a TAL abort is declared in OPS 1, ‘TAL’ shall be displayed until either a transition to OPS 3 occurs or a contingency abort is declared. If a 2 EO or 3 EO contingency abort is declared, ‘CONT’ shall be displayed throughout the remainder of OPS 1 and OPS 6.

While ‘RTLS’ is displayed next to item 41: Entry of a site index specifies both the Powered RTLS Guidance MECO targets and the landing site and can be used up until powered pitch-down in MM601. After powered pitch-down, item 41 can be used to change the RTLS landing site, however the MECO targets shall not change. An error message, ‘TARGET ERR RTLS’ shall be generated if the RTLS site index entered via item 41 has not been designated as a RTLS site. Prior to RTLS abort selection, an erroneous RTLS selection shall be rejected.

After RTLS abort selection, the error message shall be generated, and the erroneous target shall be honored by the display and NAV but not by Guidance.

When a TAL abort is declared, the data associated with items 41, 3, 4 and 5 shall automatically change to reflect the TAL site selected via item 40. While 'TAL' is displayed next to item 41: Entry of a TAL site index shall change both the TAL MECO targets and landing site and can be used up until fine countdown (MECO minus 10 sec). After fine countdown, item 41 can be used to change the TAL landing site; however, the MECO targets shall not change. Regardless of fine countdown, the error message 'TARGET ERR TAL' shall be generated if the site index entered via item 41 has not been designated as a TAL site. The erroneous target shall be honored by the display and NAV but not by Guidance.

When a 2 EO or 3 EO contingency abort is declared, the item 41 site index and the data associated with items 3, 4 and 5 shall remain the same. However while 'CONT' is displayed next to item 41: Any one of 45 landing areas may be selected and no TARGET ERR messages shall be generated. The MECO targets associated with the site selected via item 41, if any, shall be ignored by Powered Contingency Guidance.

In OPS 3, 'LAND' shall be displayed next to item 41 and any one of 45 landing areas may be selected. TARGET ERR messages shall not be generated in OPS 3.

In OPS 3 or MM603, item 41 is used to select any one of 45 landing areas by entering a numerical index (1 – 45). Entry of an index other than 1 – 45 shall cause an illegal entry message to be displayed. Each landing area consists of 2 runways, primary (PRI) and secondary (SEC), 2 TACANs and MSBLS where affected. The display is initialized in MM101 with the Primary RTLS site selected.

Items 3 & 4 provide the capability to select the primary or secondary runway once a landing area has been selected. Whenever a landing area is selected automatically or via item 41, the ID of the primary and secondary runways is displayed next to items 3 and 4 respectively and the primary runway is selected automatically. Thereafter, as long as a landing area remains selected, runway selection is controlled by items 3 & 4. Items 3 & 4 are mutually exclusive; execution of one will select its associate runway and deselect the other runway. The selected runway is indicated by an asterisk displayed next to the appropriate item.

Item 5 provides the capability to select one of the 2 TACAN's associated with the selected landing area. When a landing area is selected, automatically or via item 41, the primary TACAN is automatically selected. Subsequent executions of item 5 will alternately select the secondary and primary TACAN's. Where there are 0 or 1 GPS receivers installed (GPS_INSTALLED = (0, 0, 0) or (0, 1, 0)), the channel ID of the selected TACAN shall be displayed next to Item Entry 5, and TAC will be displayed. If there are 3 GPS receivers installed (GPS_INSTALLED = (1, 1, 1)), no information for TACAN channel ID or Item Entry 5 is displayed, and executing this Item Entry shall cause an "ILLEGAL ENTRY" message to be generated.

Items 41 and 3–4 of the HSD must be supported in all major modes of OPS 1, OPS 6, and OPS 3. Item 5 must be supported in all major modes of OPS 1, OPS 6, and OPS 3, only if 0 or 1 GPS receivers are installed (GPS_INSTALLED = (0, 0, 0) or (0, 1, 0)).

- (4) Item 6 (G&N) provides the capability to select which of two heading alignment cones (HAC) is to be used during ENTRY and RTLS. Text (OVHD or STRT) is displayed next to Item 6 to indicate whether the approach is to be overhead or straight in. In MM101 this item is initialized to OVHD and can be used to change to STRT. This is used by Powered RTLS guidance to setup the energy at RTLS MECO corresponding to the approach selected. Item 6 can be used only once in MM101; attempts to toggle from STRT to OVHD will have no effect. If OVHD must be reselected in MM101, it can be done by selecting a new landing area and then reselecting the original landing area using item 41. The approach selected in MM101 will be carried over into MM602. In MM304, Item 6 is initialized to OVHD. The item can be used to change from OVHD to STRT or from STRT to OVHD. In addition, indicators are provided for G&N and the left HSI to identify whether the left (L) or right (R) HAC is selected. These indicators are initialized in MM304, MM601 (G&N), and MM602 (HSI), and will be blank prior to that time. These indicators will respond to changes in the approach (OVHD to STRT or vice versa) based on vehicle position relative to the runway centerline. The response is determined by criteria internal to NAV (G&N) and AREA NAV (HSI).

Whenever OVHD is selected and the vehicle energy drops below the level required for an OVHD approach and the range to the runway and the required turn angle are within I-Loaded limits a class 3 alarm will be generated and the text OVHD will flash until a STRT approach is selected.

If a new landing area is selected (item 41) the approach will be reinitialized to OVHD. Item 6 is legal only in MM101, MM304, MM305, MM602 and MM603.

- (5) The HORIZ SIT display shall have an entry point indicator. Initially, the indicator shall be driven as nominal entry point (NEP). Execution of item 7 (XEP, where the "X" is dynamic) allows the crew to switch to the minimum entry point (MEP) or from MEP back to NEP.
- (6) A control shall be provided to redesignate a glideslope (GLD SLOPE) ground intercept point. The display is initialized with the nominal intercept point selected, indicated by "NOM" text being displayed next to item 8. Execution of item 8 (AIM) selects the intercept point closest to the runway for high head winds. This is indicated by "CLSE" text being displayed next to the item 8. Reexecuting item 8 reselects the nominal intercept point. It is possible to switch back and forth between the nominal and close intercept points until the TAEM/AUTOLAND interface. Switching the intercept point causes other appropriate values for TAEM geometry parameters to be used.
- (7) Item 9, the ALTM data field, shall provide the capability to input the landing field barometric altimeter setting corrected to mean sea level. The display is initialized the first time with this parameter set to 29.92 IN-HG, and thereafter shall reflect crew inputs.
- (8) Items 10 through 15 provide the capability to enter delta position and velocity components in runway coordinates. Only components requiring update need be entered, the remaining components being zeroed.
- (9) Item 16 (LOAD) provides the capability to execute a delta update to the navigated state of the Orbiter using the data entered in Items 10 through 15. Upon completion of the delta update by NAV, these items and their associated buffer shall be zeroed.

- (10) Item 18 (ΔT) provides the capability to update state vector downtrack errors by means of adding or subtracting a delta time in seconds. The update is performed after a time value is entered via Item 18 (ΔT) and verified, followed by the execution of control Item 16 (LOAD). The delta time display field is zeroed when the display is first called and will be rezeroed upon completion of a delta time update by Entry Navigation. Item 18 is legal in OPS 3 only. Executing this item in any other OPS will cause an "ILLEGAL ENTRY" message to be generated.
- (11) The RESID column contains the residual data value for each component of each data type that is being processed by the NAV filter. The residual is formed in navigation by subtracting the NAV estimate of the data from the selection filter output of the data. (It should be noted here that navigation uses the composite data output from the selection filter as inputs to the navigation filter so that no distinctions are made as to the LRU source of the data to the NAV filter. In the two-LRU cases, the LRU data are averaged so that the data cannot be distinguished as to LRU.) The residual value gives the crew an indication as to how well the data and the NAV estimate of the data agree. However, this data alone cannot identify whether the data or the NAV estimate of the data is in error. See discussion of a similar parameter for GPS in Note (24) when 1 GPS receiver is installed (GPS_INSTALLED = (0, 1, 0)), and in Note (28) when 3 GPS receivers are installed (GPS_INSTALLED = (1, 1, 1)).
- (12) The RATIO column contains the edit ratio computed in navigation as the ratio of the data residual to the maximum allowable residual. If this ratio is less than one, the residual edit test performed by navigation on the data is passed, and the data is subsequently used to update the state vector. If the data fails the residual edit test, the ratio will be displayed as a number equal to or larger than one and will not be used to update the state vector. Thus, the edit ratio and the ratio parameter status indicators give the crew an indication of whether a particular data type is being incorporated into the state vector. The residuals and edit ratios are computed by navigation for each NAV cycle and are available for display. When data is not being processed by the NAV filter, the residual and ratio data fields for that parameter shall be blanked. A parameter status indicator column to the right of the RATIO will contain a down arrow when the parameter has failed the update edit test. The down arrow will disappear when the edit test is passed by a predefined percentage of "Good" data. The parameters defining percentage of "Good" data are I-loaded. See discussion of a similar parameter for GPS in Note (24) when 1 GPS receiver is installed (GPS_INSTALLED = (0, 1, 0)), and in Note (28) when 3 GPS receivers are installed (GPS_INSTALLED = (1, 1, 1)).
- (13) There are three command options: auto (AUT); inhibit (INH); and force (FOR), which the crew can exercise on five data types: TACAN (TAC AZ and RNG), drag altitude (DRAG H), baro altitude (ADTA H), GPS, and MLS to update navigation as shown below:

A / I / F	No GPS Receiver Installed		1 GPS Receiver Installed		3 GPS Receivers Installed	
	ILLEGAL ENTRY	Initialization Option	ILLEGAL ENTRY	Initialization Option	ILLEGAL ENTRY	Initialization Option
TACAN	No	INH	No	INH	Yes	INH
GPS-NAV	Yes	INH	No	INH	No	INH
GPS-G&C	Yes	INH	No	INH	No	INH
DRAG H	No	AUT	No	AUT	No	AUT
ADTA H	No	INH	No	INH	No	INH
MLS	Yes	AUT	Yes	AUT	No	AUT

Items 19, 22, and 25 allow navigation to automatically (AUT) select data to be used if it passes the edit test. Items 20, 23 and 26 (INH) preclude updating the state vector with the RM–selected data, but this data is used to generate the displayed residual and ratio values. Items 21, 24, and 27 (FOR) shall override the edit and force the data to be used to update the state vector if the data is being processed by the NAV filter. The baro altitude (ADTA H) Item Entries, Items 25, 26 and 27, also control the aiding of the installed GPS receivers with baro altitude data. If the baro altitude control option is auto (AUT) or force (FOR) (Item Entries 25 or 27), and if other requisite criteria are satisfied as defined in the GPS SOP, baro altitude aiding data will be sent to the installed GPS receivers by the GPS SOP. Items 19–21, 22–24, and 25–27 are mutually exclusive. An asterisk “*” appears next to any Item (19–27) that has been selected. The display will be initialized with Items 20 (INH), 22 (AUT) and 26 (INH) selected. See discussion of a similar parameter in Note (24) for GPS and in Note (29) for MLS.

Execution of Items 19, 20, and 21 when three GPS receivers are installed shall result in the generation of an “ILLEGAL ENTRY” message.

- (14) The TACAN channel of the ground station that TAC 1, 2, and 3 is locked onto or attempting to lock onto is displayed. TACAN azimuth and range shall be displayed for the TACANs in either absolute or delta values as selected by items 34 or 35, respectively. Items 34 and 35 are mutually exclusive and an “*” will be driven next to the item selected. The display shall be initialized with item 35 (DELTA) selected. A parameter status indicator column is provided for the azimuth and range of each TACAN. A blank in the column indicates normal operation. A down arrow “↓” will be displayed if the parameter is declared failed by RM. An “M” will be displayed if data is missing. A “?” will be displayed if a dilemma is declared by RM.

Items 34 and 35 will apply to both TACAN and GPS data for the single string GPS configuration. Similar GPS derived data from the installed receiver will be displayed. Discussion of the GPS display data is found in Note 26.

For 0 or 1 GPS receivers installed (GPS_INSTALLED = (0,0,0) or (0,1,0)), Items 31–33 provide the capability for each TACAN to be deselected or reselected for use by the Selection Filter. If a TACAN is deselected this will prevent RM from using range and azimuth as inputs to the Selection Filter. Deselection will be indicated by an asterisk adjacent to the DES item number and down arrows in the range and azimuth parameter status indicator columns. When RM declares either range or azimuth failed on an LRU, a down arrow will be displayed in the parameter status indicator column. In order to reselect and use this parameter again, the LRU has to be deselected and then reselected. The word “TEST” will be displayed if a self test is being conducted to resolve a dilemma. The first time the display is called in OPS 1, all TACANS shall be initialized selected and shall thereafter reflect crew inputs. See Note (31) for use of Item 31 - 33 for 3 GPS receivers installed.

During Major Modes MM601, MM301, MM302, and MM303 the TACAN azimuth and range data and the associated parameter status indicators for TAC 1, 2 and 3 shall be blanked. When the DELTA values for TACAN data display has been selected and a TACAN channel selected is invalid, the azimuth and range data and associated parameter status indicators for that TACAN shall be blanked in Major Modes MM602, MM603, MM304, and MM305.

- (15) Items 28–30 provide control over the source of air data parameters to Guidance and Flight Control. Item 28 (AUT) provides auto transition from NAV derived air data to ADTA. Item 29 (INH) inhibits the ADTA data. Item 30 (FOR) forces the use of ADTA data. These items are mutually exclusive. The display will be initialized with Item 29 (INH) selected.
- (16) IMPLIED ITEM NUMBERS. Items 2, 17 (PASS/BFS SV XFER - appears only on BFS display), and 36, 37, 38, and 45 are implied, and are not legal for use on the PFS “HORIZ SIT” display. If any of these item numbers are executed, an operator error shall result, the input rejected and the “ILLEGAL ENTRY” CRT message shall be displayed.
- (17) Deleted.
- (18) The current value of Normal Acceleration (NZ) in g’s will be displayed adjacent to the orbiter symbol. The parameters displayed will be Total Load Factor in MM304 and NZ in MM305, MM602, and MM603. Whenever the normal acceleration exceeds an I-Loaded limit, the displayed acceleration data and the orbiter symbols will flash.
- (19) Item 39 S/B (SPEEDBRAKE) provides the capability to select one of three modes of speedbrake control logic (“NOM”, “SHORT” and “ELS”) during OPS 3 or OPS 6. Sequential Item 39 entries will cycle the display through these three modes. Item 39 shall be legal in OPS 3 and OPS 6 down to the transition to the Approach and Landing (A/L) guidance phase. Execution of Item 39 in OPS 1 or in OPS 3 or OPS 6 after transition to A/L guidance shall be rejected and a Class 5 “ILLEGAL ENTRY” CRT message output. The display shall be initialized to the nominal mode (NOM) upon transition to MM601 or MM301.
- (20) Item 40, TAL SITE, gives the crew the capability to select the TAL SITE in OPS 1. An index (TAL SITE SELECT CMD) from 1 – 45 entered via item 40 specifies the landing site for TAL including MECO targets and landing site runways, TACANS, and MSBLS data where applicable. The selected TAL site index is displayed next to item 40 until a TAL abort is declared, at which time the TAL site index is blanked, and the TAL site index, primary and secondary runways and primary TACAN channel are displayed next to items 41, 3, 4 and 5. Item 40 is legal in OPS 1 only, including after AOA or ATO abort selection. Execution of this

item in any other OPS or after an RTLS, TAL or 2 EO or 3 EO CONTINGENCY ABORT has been declared will cause an “ILLEGAL ENTRY” message to be generated. Item 40 is initialized with the primary TAL site selected (I-LOADED) and thereafter reflects crew inputs. Item 40 is blanked throughout OPS 3 and 6 and in OPS 1 after an RTLS, TAL or 2 EO or 3 EO CONTINGENCY ABORT has been declared. ATO and AOA scenarios do not blank Item 40. If Item 40 is not blanked, and the TAL site index entered via Item 40 has not been designated as a TAL site, an error message “TARGET ERR TAL” will be generated and the TAL site entry will be rejected.

- (21) The time to Heading Alignment Cone (HAC) intercept shall be represented by a moving, downward pointing triangle on a horizontal scale during the Acquisition phase (IPHASE = 1) or S-turn phase (IPHASE = 0) or the first I-Loaded seconds of Heading Alignment phase (IPHASE = 2) of TAEM or GRTLS TAEM Guidance. The scale shall be in terms of seconds to HAC intercept, computed based on current position and velocity. For a right turn onto the HAC, the triangle shall initially appear at the left end of the of the scale and shall move to the right end of the scale. For a left turn onto the HAC, the triangle shall initially appear at the right end of the of the scale and shall move to the left end of the scale. The triangle moving along the scale provides an anticipatory cue for the initial bank onto the HAC.

Once the Heading Alignment phase (IPHASE = 2) has begun and an I-Loaded time delay expired, the definition of the scale changes from time to HAC intercept to radial distance from the HAC. Distance from the HAC (radial error) shall be represented by a “nose North” shuttle symbol moving along the horizontal scale. This symbol represents the location of the orbiter with respect to the spiral HAC and is not a “fly-to” indicator. Note that if the Horizontal Situation Display becomes active during the Heading Alignment phase, the horizontal scale will be initialized to display time to HAC intercept. After the I-Loaded time delay has expired, the time to HAC intercept display will be replaced with the radial error display.

Once the Prefinal phase (IPHASE = 3) has begun, the definition of the scale changes from radial error to y position in runway coordinates. During the prefinal phase, A/L GUID, or GRTLS A/L GUID, distance from the runway centerline (y position) shall be represented by a “nose North” shuttle symbol moving along the horizontal scale. This symbol represents the location of the orbiter with respect to the runway centerline and is not a “fly-to” indicator.

Note, Time to HAC intercept, Radial Error, and y position display elements shall only be displayed while {TAEM GUID or GRTLS TAEM GUID with IPHASE < 4 or A/L GUID or GRTLS A/L GUID is active} and altitude is greater than an I-Load (H_BLANK) per section B5.7 HORIZ SIT SPEC of Volume III.

- (22) The altitude error computed by guidance (altitude error with respect to a spiral HAC) shall be displayed on a vertical scale while {TAEM GUID or GRTLS TAEM GUID with IPHASE < 4 or A/L GUID or GRTLS A/L GUID guidance is active} and altitude is greater than an I-Load (H_BLANK) per section B5.7 HORIZ SIT SPEC of Volume III. The altitude error with respect to a spiral HAC shall be represented by a left pointing arrow and shall be a “fly-to” indicator.
- (23) The figure of merit (FOM) is presented differently for 1 GPS receiver installed as compared to 3 GPS receivers installed. For 1 GPS receiver installed (GPS_INSTALLED = (0, 1, 0)), the FOM from GPS receiver 2 is displayed directly below the FOM label. The FOM reflects the receiver’s estimate of its position error based on parameters internal to the receiver: receiver

filter covariance matrix, ephemeris versus almanac usage, time of last receiver clock update, GPS Selective Availability state and ionospheric correction parameters. The FOM is an integer from 1 to 9 which represents the range of estimated error.

FOM	Estimated error (meters)
1	$e \leq 25$
2	$25 < e \leq 50$
3	$50 < e \leq 75$
4	$75 < e \leq 100$
5	$100 < e \leq 200$
6	$200 < e \leq 500$
7	$500 < e \leq 1000$
8	$1000 < e \leq 5000$
9	$5000 < e$

For 3 GPS receivers installed (GPS_INSTALLED = (1, 1, 1)), the FOM (labeled 'P 1σ') is presented for each individual GPS receiver. The applications software will provide an integer from 0 to 9 which shall be converted to display a one sigma standard position error in feet as indicated below:

FOM Integer	Position error (P), one sigma (1σ) to be displayed (feet)
0	(blank)
1	75
2	175
3	250
4	325
5	650
6	1650
7	3275
8	16400
9	99999

The output position error derived from FOM is blanked if the FOM integer value is 0 (0 is an initialization value, not provided by hardware input).

These one sigma position errors were approximated by converting the maximum estimated error from meters to feet and then rounding to the closest multiple of 25 feet.

If the FOM has passed the I-Loaded tolerance test for an I-Loaded number of consecutive cycles, the appropriate parameter status indicator field next to the displayed position error shall be blank. Otherwise, a down arrow “↓” shall be displayed in double overbright in this field.

For three GPS receivers installed, the one sigma position error and its corresponding parameter status indicator will be blank: (1) in OPS 1 and MM601 when they are determined by the GPS SOP to be static; and (2) in OPS 3, MM602 and MM603 when GPS data is determined by the GPS RCVR State Proc to be invalid.

Item 46, displayed directly below the “RA” label for 1 GPS receiver installed (GPS_INSTALLED = (0, 1, 0)) but deleted from the HORIZ SIT Display for 3 GPS receivers installed (GPS_INSTALLED = (1, 1, 1)), provides the capability to enable or inhibit the use of radar altimeter data by the installed GPS receivers. An asterisk, “*”, shall be displayed next to the item number to indicate that sending of radar altimeter data to the installed receivers has been enabled while a blank means that sending of radar altimeter data to the installed receivers has been inhibited. The initial setting of the radar altimeter aiding capability is inhibited.

This Item Entry will be allowed or not allowed depending on the value of the ALT_RA_CUTOFF_HIGH I-Load. If the value of ALT_RA_CUTOFF_HIGH is less than or equal to 0, execution will not be permitted and an “ILLEGAL ENTRY” message will be generated. If the value of ALT_RA_CUTOFF_HIGH is greater than 0, execution of this item entry will be permitted in any OPS that the display is active.

If zero or three GPS receivers are installed on the vehicle, execution of Item Entry 46 shall be illegal and will result in an “ILLEGAL ENTRY” message being generated.

- (24) This note with regard to GPS RESID and RATIO is applicable for 1 GPS receiver installed (GPS_INSTALLED = (0, 1, 0)). See Note (28) for GPS RESID and RATIO when 3 GPS receivers are installed (GPS_INSTALLED = (1, 1, 1)). The GPS RESID, RATIO, and GPS to navigation AIF flags are displayed below the corresponding data for TACAN (see notes (11) through (13)). RESID (residual) is the magnitude in nautical miles of the vector difference between the navigation filter position and the “selected” GPS position. RATIO is the maximum residual ratio of either the UVW position vector residual ratio or the UVW velocity vector residual ratio of the selected GPS state. The calculation of UVW position and velocity residuals shall be in a coordinate system that is GNC Major Mode dependent. In GNC Major Modes 304, 305, 602, and 603, the UVW coordinate system shall be an earth relative coordinate system. For all other major modes where these residuals are computed, the UVW coordinate system shall be an inertial coordinate system. The GPS state residual, ratio, alpha character indicator, and ratio status indicator fields are blank if no selected GPS state is available, indicated by GPS_SV_SEL_AVAIL = OFF. The GPS state residual, ratio, alpha character indicator, and ratio status indicator fields will be blank in GN&C OPS 1 and Major Modes 601.

An alpha character in the first item of the ratio field will indicate which maximum residual ratio is being displayed, “P” for position and “V” for velocity. If the GPS receiver state processing principal function determines that no GPS state has passed the residual edit test (indicated by NUM_GPS_SEL = 0) on the latest navigation cycle, the residual and ratio data fields shall display the RATIO, RESID and the alpha character indicator for the selected GPS state from the previous state which has been propagated to current time in the GPS receiver state

processing principal function. The “P” or “V” alpha character indicator for this case will be displayed in double overbright.

For nominal operation, that is, good data from the installed receivers and no residual edit test override, the parameter status indicator field after the ratio data will be blank. A down arrow, “↓”, will be displayed if the residual edit test has failed, that is the displayed residual ratio is greater than 1. An up arrow, “↑”, will be displayed to indicate crew has overridden the software quality assessments and at least one receiver’s state is a candidate for the GPS state vector selection filter.

Items 42, 43, and 44 set the GPS to Navigation Auto/Inhibit command and the GPS to Navigation Force command. Executing Item 42 (GPS to Navigation Auto/Inhibit command is set to “AUTO” and MLS measurements not available) allows the navigation filter state(s) to be automatically reset/updated with the selected GPS state (when available). The automatic updates occur at one of two I-Load specified rates, depending on whether or not the orbiter is above an I-Loaded altitude for changing GPS update rates. Also, the automatic GPS updates to navigation will be terminated, even though the GPS to Navigation Auto/Inhibit command is in “AUTO”, if the selected GPS residual ratio edit flag is ON, the orbiter is at or below an I-Loaded lower limit altitude for automatic GPS updates, or the time since the selected GPS state was last updated with receiver data is greater than or equal to an I-loaded limit. Executing Item 43 (GPS to Navigation Auto/Inhibit command is set to “INHIBIT”) inhibits the resetting of the navigation filter state(s) with the selected GPS state. Items 42 and 43 are mutually exclusive.

Executing Item 44 (GPS to Navigation Force command is set to “FORCE”) forces the navigation filter state to be automatically reset/updated with the selected GPS state (when available) on the next navigation cycle, the “FORCE” command taking precedence over the setting of the GPS to Navigation Auto/Inhibit command on that cycle. While the FORCE command is being executed, the setting of the GPS to Navigation Auto/Inhibit command remains as set by the crew. The “FORCE” command is removed by navigation after the navigation reset is executed, so that the setting of the GPS to Navigation Auto/Inhibit command again controls the resetting of the navigation state with the selected GPS state on subsequent navigation cycles. Note that the “FORCE” is a one-time force.

An asterisk, “*”, next to the item number represents the selected setting. Note that only one setting will be indicated on a given navigation cycle. The indication is FORCE if the GPS to Navigation Force Command was selected. If the GPS to Navigation Force Command was not selected, the indication is either AUTO or INHIBIT, depending on the selection of the GPS to Navigation Auto/Inhibit Command.

The initial setting of the GPS to Navigation Auto/Inhibit command is “INHIBIT”. It will also be set to “INHIBIT” at OPS transitions. The initial setting of the GPS to Navigation Force command is “OFF” and it will be set to “OFF” at OPS transitions.

The GPS to navigation commands can also be set on SPEC 55 (Section 4.2.36), with the setting there also shown on the HORIZ SIT display.

For OPS 1 and Major Mode 601, execution of Item Entries 42, 43, and 44 will result in an “ILLEGAL ENTRY” message being generated. In addition, these Item Entries will be allowed or not allowed in a given Operational Sequence depending on the value of the GPS_LOCKOUT I-Load parameter. If the value of the GPS_LOCKOUT is 0, 1 or 2, execution of Items 42, 43,

and 44 will not be permitted in any OPS that this display is active and an “ILLEGAL ENTRY” message will be generated. If GPS_LOCKOUT has a value of 3 or greater, execution of these Item Entries will be permitted in OPS 3, Major Mode 602, and Major Mode 603.

- (25) Items 47, 48, and 49 set the GPS to Guidance and Control Auto/Inhibit/Force command (GPS_TO_GC_AIF). An asterisk, “*”, next to the item number set by the application software represents the selected setting. The three item entries are mutually exclusive and an asterisk, *, is indicated next to the appropriate setting in response to feedback to the command from the application software.

Selecting Item 47 (“AUTO”) commands the application software to automatically reset/update the user parameter (UPP) state vector with the selected GPS state every navigation cycle (when a selected state is available), rather than resetting the UPP state with the selected navigation filter state. Item 48 (“INHIBIT”) inhibits the application software from using the selected GPS state to reset the UPP state. Item 49 sets the command to “FORCE”. In this setting the command performs two functions in the application software: (1) it forces the GPS receiver states from all installed receivers, that are determined by the receiver to have good data (receiver data good is on), are not in a QA 4 dilemma, and are not deselected by the crew (Items 26, 27 and 28 of Section 4.2.36), to be processed by the GPS state selection filter (refer to section 4.2.36), forcing a selection of a GPS state; and (2) it forces the use of this selected state in resetting the UPP state for guidance. Unlike the GPS to Navigation Force command, which is a onetime force, the GPS to guidance and control “FORCE” condition remains active until either item 47 or item 48 is selected.

If Item 47 is executed (GPS_TO_GC_AIF = AUTO is selected) and no selected GPS state vector is available, indicated by GPS_SV_SEL_AVAIL = OFF, the application software will command a down arrow, “↓”, to be displayed in the parameter status indicator field after the AIF_G label. The down arrow will then be removed once a selected state becomes available. If Item 49 is executed (GPS_TO_GC_AIF = FORCE is selected) and no selected GPS state is available and all installed receivers are either deselected or indicate that their state data is not good (receiver data good is off), the application software will command a down arrow, “↓”, to be displayed in the parameter status indicator field after the AIF_G label. The down arrow will then be removed once the state of a receiver, which has not been deselected is indicated as good by the receiver, since the GPS_TO_GC_AIF = FORCE setting will force a selected state to be made available on that navigation cycle. The down arrow is also removed when Item 48 (GPS_TO_GC_AIF = INHIBIT is selected) is executed.

In preland, if TACAN is not in FORCE (for 1 GPS receiver installed) and GPS_TO_GC_AIF is in “AUTO”, MLS data is good, and a selected GPS state is available, the application software will command a down arrow in the parameter status indicator indicating to the crew that the processing of MSBLS measurements by the application software and using the MSBLS derived navigation state for guidance has precedence over the “automatic” use of the selected GPS state in providing the state for guidance. Locations of Item Entries 47, 48, and 49 and the parameter status indicator are also dependent based on if 1 GPS receiver installed or if 3 GPS receivers installed. For 1 GPS receiver installed, the items entries and parameter status indicator are on the right side of the display following the AIF_G label. For 3 GPS receivers installed, the item entries and the parameter status indicator are on the left side of the display (with A/I/F aligned with other sensors) following the label “G&C GPS”. If GPS_TO_GC_AIF is in “FORCE”, however, no down arrow will appear in the parameter status indicator field

following AIF_G label and the application software will use the selected GPS state (when available) for guidance.

If TACAN is in FORCE (for 1 GPS receiver installed), TACAN measurements will be processed and the setting of GPS_TO_GC_AIF controls the application software as described in Note 25 paragraphs 2 and 3 above.

See Note (29) for discussion of interaction between MLS A/I/F and GPS to G&C A/I/F when 3 GPS receivers are installed.

The GPS to Guidance and Control command will initially be set to "INHIBIT". It will also be set to "INHIBIT" at OPS transitions. The GPS to G&C command can also be set on SPEC 55 (Section 4.2.36), with the setting there also shown on the HORIZ SIT display.

For OPS 1 and Major Mode 601, execution of Item Entries 47, 48, and 49 will result in an "ILLEGAL ENTRY" message being generated. In OPS 3, Major Mode 602, and Major Mode 603, these Item Entries will be allowed or not allowed depending on the value of the GPS_LOCKOUT I-Load parameter. If the value of GPS_LOCKOUT is 0, 1 or 2, execution of Items 47, 48 and 49 will not be permitted and an "ILLEGAL ENTRY" message will be generated. If GPS_LOCKOUT has a value of 3 or greater, execution of these Item Entries will be permitted in OPS 3, Major Mode 602, and Major Mode 603. See Section 4.2.9.2, Keyboard Addendum paragraph V.

- (26) This note is applicable for 1 GPS receiver installed (GPS_INSTALLED = (0, 1, 0)). See Note (32) for slant range and azimuth when 3 GPS receivers are installed (GPS_INSTALLED = (1, 1, 1)). The slant range in nautical miles and azimuth in degrees to the auto selected TACAN station, shown in Item 5 of the HORIZ SIT Display, and the altitude above the landing site in thousands of feet are displayed using the GPS state estimate from the installed receivers (LRU2 for the single string case). The slant range and azimuth are displayed in either absolute or delta mode in the display fields, similar to the TACAN range and azimuth data (refer to note (14)). A single parameter status indicator is provided for the range, azimuth and altitude data to the right of the GPS label. A blank for the status indicator indicates nominal processing of state data from the receiver. If the receiver state is indicated as not good by the receiver (receiver data good is off) or the receiver state time is more than an I-Loaded period of time in the past than the user parameter state time, a down arrow, "↓", will be displayed in the parameter status indicator field and the data will be blanked. The range, azimuth, altitude and associated status indicator will be blank in OPS 1 and in major modes 301, 302, 303 and 601.
- (27) The character string "MLS" will be displayed double overbright if Microwave scanning beam Landing System data is being processed by the navigation filter, otherwise the character string is blanked. The character string is displayed only when at least both MSBLS range and azimuth data are processed. When the MLS AIF command is "FORCE", MSBLS measurements are processed independently by the navigation filter, based on their validity. However, the character string is blanked unless both MSBLS range and azimuth data are processed. See Note (29) for a discussion of when the MSBLS data is incorporated into the baseline navigation state and when the baseline navigation state is being sent to guidance.

- (28) This note is applicable for 3 GPS receivers installed (GPS_INSTALLED = (1, 1, 1)). See Note (24) for equivalent parameters when 1 GPS receiver is installed (GPS_INSTALLED = (0, 1, 0)). Note (24) also discusses GPS to NAV Auto/Inhibit command and GPS to NAV Force command for one or three GPS receivers installed.

The position RESID (residual) is the magnitude in nautical miles of the vector difference between the navigation filter position and the “selected” GPS position. The velocity RESID (residual) is the magnitude in feet/second of the vector difference between the navigation filter velocity and the “selected” GPS velocity. Position and Velocity RATIO are the residual ratio of the UVW position vector residual ratio and the UVW velocity residual ratio of the selected GPS state, respectively. The calculation of UVW position and velocity residuals shall be in a coordinate system that is GNC Major Mode dependent. In GNC Major Modes 304, 305, 602, and 603, the UVW coordinate system shall be an earth relative coordinate system. For all other major modes where these residuals are computed, the UVW coordinate system shall be an inertial coordinate system. The GPS state residual, ratio, alpha character indicator, and ratio status indicator fields are blank if no selected GPS state is available, indicated by GPS_SV_SEL_AVAIL = OFF. The GPS state residual, ratio, alpha character indicator, and ratio status indicator fields will be blank in GN&C OPS 1 and Major Mode 601.

If the GPS receiver state processing principal function determines that no GPS state has passed the residual edit test (indicated by NUM_GPS_SEL = 0) on the latest navigation cycle, the residual and ratio data fields shall display the RATIO and RESID, for the selected GPS state from the previous state which has been propagated to the current time in the GPS receiver state processing principal function. The “P” and “V” alpha character to the left of the RESID data field for this case will be displayed double overbright.

For nominal operation, that is, good data from the installed receivers and no residual edit test override, the parameter status indicator field after the ratio data will be blank. A down arrow, “↓”, will be displayed if the residual edit test has failed, that is the displayed residual ratio is greater than 1. An up arrow, “↑”, will be displayed to indicate the crew has overridden the software quality assessments and at least one receiver’s state is a candidate for the GPS state vector selection filter.

The following table provides a summary (when three GPS receivers are installed) of when the baseline navigation state is reset with the selected GPS state for conditions of the MLS A/I/F measurement processing command, the GPS to NAV A/I/F command, and the availability and validity of MLS data:

MLS Auto/Inhibit/Force Measurement Processing Command (MLS_AIF)	GPS to Navigation Auto/Inhibit/Force Command (GPS_TO_NAV_AIF)		
	FORCE	AUTO	INHIBIT
FORCE	NO*	NO*	NO*
AUTO	YES	NO** or YES*** †	NO
INHIBIT	YES	YES †	NO

* Does not depend on the validity of MLS data.

** Valid MLS data is available, or valid MLS data was available and has been subsequently lost for less than or equal to an I-Load specified period of time.

*** Valid MLS data was available and has been subsequently lost for more than an I-Load specified period of time.

† The selected GPS residual ratio edit flag is OFF, the orbiter is above the I-Loaded minimum altitude for automatic GPS updates, the time since the selected GPS state was last updated with receiver data is less than an I-loaded limit, and the time since the baseline navigation state was last set to the selected GPS state is greater than or equal to the minimum time allowed between GPS updates to navigation (determined by pre-mission defined I-Loads).

(29) This note is applicable for 3 GPS receivers installed (GPS_INSTALLED = (1, 1, 1)). Item 50 allows navigation to automatically (AUT) select data to be used if it passes the edit test for MSBLS sensors. Item 51 (INH) precludes updating the state vector with the MLS RM-selected data. Item 52 (FOR) overrides the edit and force the data to be used to update the state vector if the data is not being processed by the NAV filter.

Use of either the selected GPS state or the baseline navigation state to reset the user parameter propagator state (“G&C”) is determined by the following: the configuration of the MLS auto/inhibit/force measurement processing command, the configuration of the GPS to guidance and control auto/inhibit/force command, and the availability and validity of MLS data.

The MLS A/I/F measurement processing command is initialized to “AUTO” (for less than three GPS receivers installed, the MLS A/I/F command is always “AUTO”).

Setting the MLS A/I/F measurement command to “FORCE” forces the use of the baseline navigation state to reset the user parameter propagation function independent of the setting of the GPS to G&C A/I/F command and independent of the validity of MLS measurement data. Before the selected GPS state can be used to reset the user parameter state, the crew must take appropriate action to remove the MLS A/I/F command “FORCE” condition.

Setting the MLS A/I/F measurement processing command to “AUTO” allows the use of the baseline navigation state to reset the user parameter propagation function if the setting of the GPS to G&C A/I/F command is “AUTO” and the MLS measurement data was valid within an I-Load specified time interval. For MLS A/I/F measurement processing command set to “AUTO”, the GPS state can be forced to reset the user parameter propagation state by setting the GPS to G&C A/I/F command to “FORCE”.

With the MLS A/I/F measurement processing command set to “INHIBIT” and the GPS to G&C A/I/F command set to “AUTO”, the selected GPS state will be used to reset the user parameter propagator state.

Items 50, 51, and 52 are mutually exclusive. An asterisk “*” will appear next to the currently selected Item. The field next to the two unselected Items will be blank.

The following table provides a summary (when three GPS receivers are installed) of the source of the state for guidance and control for conditions of the MLS A/I/F measurement processing command, the GPS to G&C A/I/F command, and the availability and validity of MLS data:

MLS Auto/Inhibit/Force Measurement Processing Command (MLS_AIF)	GPS to Guidance and Control Auto/Inhibit/Force Command (GPS_TO_GC_AIF)		
	FORCE	AUTO	INHIBIT
FORCE	BL*	BL*	BL*
AUTO	GPS	BL** or GPS***	BL*
INHIBIT	GPS	GPS	BL*

BL equals baseline navigation state.

- * Does not depend on the validity of MLS data.
- ** Valid MLS data is available, or valid MLS data was available and has been subsequently lost for less than or equal to an I-Load specified period of time.
- *** Valid MLS data was available and has been subsequently lost for more than an I-Load specified period of time.

The following table provides a summary (when three GPS receivers are installed) of when the baseline navigation state is reset with the selected GPS state for conditions of the MLS A/I/F measurement processing command, the GPS to NAV A/I/F command, and the availability and validity of MLS data:

MLS Auto/Inhibit/Force Measurement Processing Command (MLS_AIF)	GPS to Navigation Auto/Inhibit/Force Command (GPS_TO_NAV_AIF)		
	FORCE	AUTO	INHIBIT
FORCE	NO*	NO*	NO*
AUTO	YES	NO** or YES*** †	NO*
INHIBIT	YES	YES †	NO*

* Does not depend on the validity of MLS data.

** Valid MLS data is available, or valid MLS data was available and has been subsequently lost for less than or equal to an I-Load specified period of time.

*** Valid MLS data was available and has been subsequently lost for more than an I-Load specified period of time.

† The selected GPS residual ratio edit flag is OFF, the orbiter is above the I-Loaded minimum altitude for automatic GPS updates, the time since the selected GPS state was last updated with receiver data is less than an I-loaded limit, and the time since the baseline navigation state was last set to the selected GPS state is greater than or equal to the minimum time allowed between GPS updates to navigation (determined by pre-mission defined I-Loads).

(30) This note is applicable for 3 GPS receivers installed (GPS_INSTALLED = (1, 1, 1)). The GPS 1, 2 and 3 column headers on the lower right hand side of the display identify the Item Entry and display parameters associated with each GPS receiver.

A parameter status field for each of the three receivers shall be displayed which will provide information on:

- Receiver state eligible for selection and actually selected (“*”). See the following paragraph for a summary of when a receiver state is eligible for selection.

- Receiver state eligible for selection, but not actually selected (“b”). This condition only exists when three receiver states are eligible for the selection filter.
- Receiver state not eligible for selection due to a QA 4 dilemma (“?”). This condition applies when the QA 4 dilemma is set and will override a down arrow due to all other conditions.
- Receiver state not eligible for selection, and no QA 4 dilemma exists (“↓”).
- Data is missing for a GPS receiver (“M”), reflecting the commfault.

A receiver state is eligible for selection if all of the following are true:

- the receiver data is valid (data good is on),
- the receiver has not been deselected by the crew,
- the receiver has not failed the QA 4 dilemma,
- and, one or more of the following are true:
 - the receiver has passed quality assessment checks (QA 1, QA 3, and QA 4),
 - the quality assessment check is overridden (QA 1, QA 3, and QA 4 checks are overridden by Item Entries 29, 30 and 31 (for GPS receivers 1, 2 and 3 respectively) on the GPS STATUS Display (see Section 4.2.36 of STS 83-0020V1, note 12)),
 - or, the GPS to G&C command is in “FORCE” (Item Entry 34 on the GPS STATUS Display (see Section 4.2.36 of STS 83-0020V1, note 18) or Item Entry 49 on the HORIZ SIT Display (see Section 4.2.9 of STS 83-0020V1, note 25)).

A GPS receiver status field is displayed to the right of the parameter status indicator field for each receiver. Possible status indications are described in the following table, and are shown in the order of precedence. In addition, if a receiver processor failure occurs, a CLASS 3 alarm will be annunciated by GAX. “RPF” and “M” will be displayed double overbright. All characters are displayed right justified.

Display	Message Description
NI	Receiver is not installed
M	Communication fault
BIT	Receiver Built-In-Test in progress
RPF	Receiver processor failure
BATT	GPS battery low
DGF	GPS data good failure
(blank)	Nominal operation - No GPS related anomaly

The earth fixed relative velocity in kilo feet per second shall be displayed for each GPS receiver in Major Modes 304, 305, 602 and 603. In all other major modes, the earth fixed relative velocity shall be blanked.

- (31) This note is applicable for 3 GPS receivers installed (GPS_INSTALLED = (1, 1, 1)). Item Entries 31, 32, and 33 provide the capability for each GPS receiver to be deselected or reselected (toggle) for use by the GPS selection filter. Deselection is indicated by an asterisk “*” adjacent to the DES item number. A blank next to a DES item number indicates that the associated receiver has not been deselected (either initial value or reselection). The asterisk settings for these items are driven by the GPS RCVR STATE PROC (4.21).

When 0 or 1 GPS receiver is installed, Items 31, 32, and 33 provide the capability for each TACAN to be deselected or reselected for use by the Selection Filter. See Note (14) for additional information.

Execution of Item Entries 31, 32, or 33 in GN&C OPS 1 or Major Mode 601 shall result in an “ILLEGAL ENTRY” message being generated. GPS receivers can also be deselected or reselected from GPS STATUS DISP (6.51) in GN&C OPS 2, 3, and 8, and in Major Modes 602 and 603. GPS receivers can also be deselected or reselected from REL NAV DISP (6.11) in GN&C OPS 2. Deselection or reselection will carry over OPS transitions in the GNC Major Function base.

- (32) This note is applicable for 3 GPS receivers installed (GPS_INSTALLED = (1, 1, 1)). The slant range in nautical miles, azimuth in degrees to the landing site threshold, and the altitude in kilofeet above the runway for the selected GPS state are shown.

Selected GPS state is determined by:

- At the three GPS level, use state for the selected GPS receiver (which is being used for guidance/NAV).
- At the two GPS level, the average of the two states for the available GPS receivers will be used.
- At the one GPS level, use the state for the one available GPS receiver.

This data will be blank in OPS 1 and in major modes 301, 302, 303 and 601.

4.2.9.2 Horizontal Situation Keyboard Processing Addendum

- A. Entry Point Switch Command. Destinations for this signal are TAEM GUID (4.9), GRTLS TAEM GUID (4.204), ENT AREA NAV (4.220) and ASC AREA NAV (4.237).
- B. TACAN A/I/F Edit Command. Destinations for this signal are ENT NAV (4.127), PRE-LAND NAV (4.144), RTLS NAV (4.205), and CRT (6.21). The TACAN AUT/INH/FOR Edit Command selection is defined by one signal (V93J4470C) with three states.

Signal State	Indicator to be Driven After
0	AUT (Auto Selected)
1	INH (Inhibited Selected)
2	FOR (Force Selected)

- C. Ground Intercept Designation Command. Destinations for this signal are GRTLS TAEM GUID (4.204), TAEM GUID (4.9), A/L GUID (4.10), ENT AREA NAV (4.220), GRTLS A/L GUID (4.234), ASC AREA NAV (4.237) and CRT (6.21).
- D. ADTA H A/I/F Edit Command. Destinations for this signal are ENT NAV (4.127), PRE-LAND NAV (4.144), RTLS NAV (4.205), and CRT (6.21). The ADTA H A/I/F Edit Command selection is defined by one signal (V93J4473C) with three states.

Signal State	Indicator to be Driven After
0	AUT (Auto Selected)
1	INH (Inhibited Selected)
2	FOR (Force Selected)

E. Navigation Update Commands.

1. When Item 16 (LOAD) is executed the following processing shall be performed;

IF the DO_DELTA_T_UPDATE FLAG = ON, the following processing will be performed in sequence:

- SET: R_GND = $\bar{R_FILT}$
 V_GND = $\bar{V_FILT}$
 T_GND = T_CURRENT_FILT + DELTA_T
- IF $|DELTA_T| \leq 1.0E-8$ THEN ZERO_DELTA_T_UPDATE = ON
- SCHEDULE: STATE VECTOR PREDICTION TASK
- RESET: DO_DELTA_T_UPDATE FLAG
- ELSE SET: DO_DELTA_UPDATE FLAG (V93X5030X) = ON

2. Destination for R_GND, V_GND and T_GND is ENT NAV (4.127).

- 3. Destinations for the DO_DELTA_UPDATE FLAG (V93X5030X) are ASCENT NAV (4.15), ENTRY NAV (4.127), PRE-LAND NAV (4.144) and RTLS NAV (4.205). Destination for the ZERO_DELTA_T_UPDATE flag (V93X1041X) is ENTRY NAV (4.127)

- F. DRAG H A/I/F Edit Command. Destinations for this signal are ENT NAV (4.127), RTLS NAV (4.205) and CRT (6.21). The DRAG H A/I/F Edit Command is defined by one signal (V93J5013C) which is defined by three states.

Signal State	Indicator to be Driven After
0	AUT (Auto Selected)
1	INH (Inhibited Selected)
2	FOR (Force Selected)

- G. TACAN and GPS ABS/DELTA Command. The destinations for this signal are RTLS UPP (4.20), ENTRY UPP (4.23), TAEM UPP (4.24), and A/L UPP (4.25). This discrete controls the mode in which TACAN and GPS range and azimuth data are displayed. The absolute (ABS) Item 34 and delta (DELTA) Item 35 controls are defined by one signal (V93X5015X) which has two states:

Discrete Signal State (V93X5015X)	Represents Control Item
1	Item 34 (ABS)
0	Item 35 (DELTA)

- H. TACAN Deselect Command. Destinations for this signal are GAX (4.110), TAC RM (4.77) and HORIZ SIT SPEC (5.7).
- I. DELTA T UPDATE. Entry of a DELTA T UPDATE (V93W5035C) value sets the DO_DELTA_T_UPDATE FLAG.
- J. PTI – EXEC Command. Destinations for this signal are SPTI Module (4.250) and MSC in OPS 1 and OPS 3. In addition, the signal destination is the PTI Module (4.248) in OPS 3.
- K. Deleted.
- L. R/L Cone Change CMD. Destinations for this signal are ENTRY UPP (4.23), TAEM UPP (4.24) and RTLS UPP (4.20).

M. OVHD/STRT IND Status:

Perform the following in MM101 only;

- Use the following logic to determine the state of the OVHD/STRT IND output:

ITEM 6 (STATE) R/L CONE CHG CMD (V93X4477X)	OVHD/STRT IND (V95X0154X) OUTPUT
0	1 (OVHD)
1	0 (STRT)

- Destination for the OVHD/STRT IND (V95X0154X) output is CRT (6.21) and TLM.

N. PTI INHIBIT. PTI_INHIBIT (V93X5227X) is initialized set (PTI's inhibited) and can be reset only by execution of item 1 provided the DAP is in the AUTO Mode. Once reset, PTI_INHIBIT will be set by execution of item 1 or by moding the DAP to CSS.

O. S/B Execution Logic.

When Item 39 SPEEDBRAKE CONTROL LOGIC SELECT (V93X4246X) is executed, the following process shall be performed;

- If I_SHORT_RW = 0, Then Set I_SHORT_RW = 1
- If I_SHORT_RW = 1, Then Set I_SHORT_RW = 2
- If I_SHORT_RW = 2, Then Set I_SHORT_RW = 0
- Destination for I_SHORT_RW (V93J0996C) is CRT (6.21), A/L GUID (4.10), GRTLS A/L GUID (4.234), and TLM.

P. XXXX SITE. Whenever item 41 is executed, the parameter NEW_AREA (V93J4396C) is set to 1. The parameter AREA_SEL (V93J4392C) is set to the valid entered value. If in OPS 1 or MM601, R/L CONE CHG CMD (V93X4477X) is set to zero, and OVHD/STRT IND (V95X0154X) is set to 1 (OVHD).

Q. TAL SITE SELECT CMD. Destinations for this signal are ENT SITE LOOKUP (4.124), ASC SITE LOOKUP (4.238) and CRT (6.21).

R. ADTA to G&C A/I/F Command. Destinations for this signal are ADTA SOP (4.39) and CRT (6.21). The ADTA to G&C A/I/F Command signal is defined by one signal (V93J5014C) which has three states.

Signal State	Indicator to be Driven After
0	AUT (Auto Selected)
1	INH (Inhibited Selected)
2	FOR (Force Selected)

- S. GPS to Guidance and Control Command (GPS_TO_GC_AIF). Destinations for this signal are ENTRY NAV (4.127), PRELAND NAV (4.144), and RTLS NAV (4.205). The GPS to guidance and control A/I/F command signal is defined by one signal for keyboard processing (V93J1200C) which has three states (the default setting shall be INHIBIT):

Signal State	Function Desired
V93J1200C / 0	AUT (Auto Selected)
V93J1200C / 1	INH (Inhibit Selected)
V93J1200C / 2	FOR (Force Selected)

- T. GPS to Navigation Auto/Inhibit/Force Commands. The GPS to Navigation Auto/Inhibit/Force commands consist of two signals: the GPS to Navigation Auto/Inhibit command, V93X1202X, and the GPS to Navigation Force command, V93X1201X. Destinations for these signals are ENTRY NAV (4.127), PRELAND NAV (4.144), and RTLS NAV (4.205). The states of these command signals are given below. Note that the GPS to Navigation Force command (V93X1201X) may be active (that is, set to “FORCE”) independent of the state of the GPS to Navigation Auto/Inhibit command.

The states for the GPS to Navigation Auto/Inhibit (GPS_TO_NAV_AI) command are as follows (the default setting shall be INHIBIT):

Signal / State	Function Desired
V93X1202X / OFF	AUT (Auto Selected)
V93X1202X / ON	INH (Inhibit Selected)

The states for the GPS to Navigation Force command (GPS_TO_NAV_FORCE) are as follows (the default setting shall be OFF, FORCE Deselected):

Signal / State	Function Desired
V93X1201X / OFF	(Force Deselected)
V93X1201X / ON	FOR (Force Selected)

- U. GPS Installed. If no GPS receivers are installed on the vehicle, indicated by GPS_INSTALLED = (OFF, OFF, OFF), execution of Item Entries 42, 43, 44, 46, 47, 48, and 49 shall be illegal and will result in an “ILLEGAL ENTRY” message being generated.
- V. GPS Lockout. Being able to set the states of the command signals GPS_TO_GC_AIF, GPS_TO_NAV_AI and GPS_TO_NAV_FORCE in a given Operational Sequence, shall depend on the value of the GPS_LOCKOUT I-Load parameter.

The following Tables show the legality requirements of these Item Entries on the Horizontal Situation Display for different values of the GPS_LOCKOUT I-Load parameter.

GPS_LOCKOUT DESCRIPTION AND USE:	
GPS_LOCKOUT VALUE	DESCRIPTION
0	<ul style="list-style-type: none"> • No GPS receivers installed
1	<ul style="list-style-type: none"> • GPS receivers installed • Capability to use selected GPS state in the onboard system locked out
2	<ul style="list-style-type: none"> • GPS receivers installed • Use of selected GPS state in the onboard system allowed in OPS 2 and OPS 8
≥ 3	<ul style="list-style-type: none"> • GPS receivers installed • Use of selected GPS state in the onboard system allowed in OPS 2 and OPS 8, OPS 3, Major Mode 602, and Major Mode 603.

LEGALITY OF HORIZ SIT DISPLAY ITEM ENTRIES WITH DEPENDENCY ON GPS_LOCKOUT				
• GPS_LOCKOUT VALUE	0	1	2	≥ 3
• GPS_LOCKOUT VALUE	0	1	2	≥ 3
<ul style="list-style-type: none"> • GPS_TO_NAV_AI (Items 42, 43) Legality • GPS_TO_NAV_FORCE (Items 44) Legality • GPS_TO_GC_AIF (Items 47, 48, 49) Legality 	I	I	I	3, 602, 603
<ul style="list-style-type: none"> • “I” indicates Item Entry results in an “ILLEGAL ENTRY” message being generated. • A number indicates the OPS or Major Mode in which the Item Entry is available (NOT Illegal). 				

- W. GPS Items in OPS 1/6. In OPS 1 and Major Mode 601, execution of Item Entries 42, 43, 44, 47, 48, and 49 shall be illegal and will result in an “ILLEGAL ENTRY” message being generated.
- X. GPS RA Aiding Lockout. When the value of the I-Load ALT_RA_CUTOFF_HIGH ≤ 0 , execution of Item 46 shall be illegal and will result in an “ILLEGAL ENTRY” message being generated. Applicable for 1 GPS receiver installed only. If three GPS receivers are installed on the vehicle, indicated by GPS_INSTALLED = (1, 1, 1), execution of Item Entry 46 shall be illegal and will result in an “ILLEGAL ENTRY” message being generated.
- Y. Items with this addendum paragraph reference shall be supported for the vehicle hardware configuration when three TACANs are installed (GPS_INSTALLED \neq (1, 1, 1)). Execution of these Items when three GPS receivers are installed (GPS_INSTALLED = (1, 1, 1)) shall result in the generation of an “ILLEGAL ENTRY” message.
- Z. Items with this addendum paragraph reference shall be supported differently for the vehicle hardware configuration depending on if three TACANs (GPS_INSTALLED \neq (1, 1, 1)) or three GPS receivers are installed (GPS_INSTALLED = (1, 1, 1)).

In GN&C OPS 1 and Major Mode 601, execution of Item Entries 31, 32, and 33 shall be illegal when three GPS receivers are installed (GPS_INSTALLED = (1, 1, 1)) and will result in an “ILLEGAL ENTRY” message being generated.

- AA. Items with this addendum paragraph reference shall be supported for the vehicle hardware configuration when three GPS receivers are installed (GPS_INSTALLED = (1, 1, 1)). Execution of these Items when three TACANs are installed (GPS_INSTALLED \neq (1, 1, 1)) shall result in the generation of an “ILLEGAL ENTRY” message.
- BB. MLS A/I/F Edit Command. Destinations for this signal are ENTRY NAV (4.127), PRELAND NAV (4.144), RTLS NAV (4.205), and CRT (6.21). The MLS AUT/INH/FOR Edit Command selection is defined by one signal for keyboard processing with three states (the default setting shall be AUTO).

Signal / State	Function Desired
V93J1629C / 0	AUT (Auto Selected)
V93J1629C / 1	INH (Inhibit Selected)
V93J1629C / 2	FOR (Force Selected)

4.2.9.3 Horizontal Situation CRT Display Processing Addendum.

Processing for dynamic symbols of this display is defined in Appendix B.5.7 (HSD specialist function DIP) of this FSSR.

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word “STAT” being inserted in the FORMAT TYPE column, and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT display processing Table 4.2.9-2. The numeric code, corresponding to one of those listed in the table,

indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the “M” PSI is displayed (for Commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)			
Blank (default)	↓		M	∅
1	↓	↑	M	∅
2		↑	M	∅
3	↓			∅
4		↑		∅
5	↓		?	∅
6	↓	↑		∅
7			M	∅
8	↓		?	M ∅
9			?	M ∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.2.9–2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. Heading Alignment Cone. Display a circle with the HAC RADIUS (V94H2048C) on the CRT defined by X and Y positions (V94H2010C and V94H2011C) and (V94H2020C and V94H2021C).
- B. Position Predictor Symbol. A circle with a radius of 5 AUs displayed double overbright is the symbol used for the 20, 40 and 60 second position predictors.
- C. Runway Vector and Runway Symbol. Display a line segment between the WP2 and HAC intersection using the preceding four raster counts. The circle with a radius of 5 AUs is displayed at WP2 X and Y location for the runway.
- D. (Deleted)
- E. The Item No. character string is displayed according to the table below:

OPS	ABORT MODE	TEXT
1	TAL (V90X8658X = 1) RTLS (V90X8637X = 1) CONT_2EO_START(V93X6681X = 1) CONT_3EO_START(V90X0909X = 1)	blank
	Otherwise	40 ∅ TAL ∅∅ SITE
ALL Other OPS	N/A	blank

- F. Navigation TACAN Data Sources. Navigation TACAN residual, ratio, and status are generated by ENT NAV (4.127), PRE-LAND NAV (4.144), and RTLS NAV (4.205), as applicable. The filter control option selection indicator datum is generated by KYBD.
- G. Nav Update Sources. Sources for these signals are ENT NAV (4.127), PRE-LAND NAV (4.144), RTLS NAV (4.205), ASC NAV (4.15), and KYBD as applicable.
- H. R/L CONE IND and L HSI L/R HAC IND – EACH SIGNAL (V95J0153C AND V90J0981C) has two states which determine the remote text to be displayed as follows:

Signal State	RTXT
+1	R
-1	L

- I. OVHD/STRT IND – This signal (V95X0154X) has two states which determine the remote text to be displayed as follows:

Signal State	RTXT
1	OVHD
0	STRT

The first time the display is called, this signal will be set to the “1” state. Whenever the TAEM GUID DOWNMODE FLAG (V90X1131X) is set and V95X0154X is equal to “1”, the remote text “OVHD” shall be flashed.

The sources for V95X0154X are: HSD (6.21) in MM101, ENTRY UPP (4.23) in MM304, TAEM UPP (4.24) in MM305, and RTLS UPP (4.20) in OPS 6.

The Sources for V90X1131X is TAEM GUID (4.9), and GRTLS TAEM GUID (4.204).

- J. R/L CONE IND (G&N) – The sources for this signal are ENTRY UPP (4.23) in MM304, TAEM UPP (4.24) in MM305 and RTLS UPP (4.20) in OPS 6.
- K. L HSI L/R HAC IND (NAV) – The sources for this signal are ENT AREA NAV (4.220) in OPS 3 and ASC AREA NAV (4.237) in OPS 6.

L. The XXXX SITE Character String is displayed according to the table below:

OPS	ABORT MODE	CHAR. STRING
1/6	CONT_2EO_START or CONT_3EO_START (V93X6681X=1) (V90X0909X = 1)	CONT
	TAL (V90X8658X=1) AND (V93X6681X=0) AND (V90X0909X = 0)	TAL
	OTHERWISE	RTL
3	N/A	LAND

M. The TAL SITE index (item 40) will be blanked under the following conditions:

- .OPS 3
- .OPS 6
- .OPS 1 if TAL ABORT DECLARED (V90X8658X=1) or
RTL ABORT DECLARED (V90X8637X=1) or
CONTINGENCY ABORT DECLARED (CONT_2EO_START (V93X6681X=1)
OR CONT_3EO_START (V90X0909X = 1))

N. Nav Filter Indicators – The indicator “*” for the TACAN, DRAG H, ADTA H, and ADTA to G&C AUT/INH/FOR filter control option selected is defined by the signals V93J4470C, V93J5013C, V93J4473C, and V93J5014C, respectively; each of which has three states as follows for determining where the indicator is to be driven:

Signal State	Indicator to be Driven After
0	AUT (Auto Selected)
1	INH (Inhibited Selected)
2	FOR (Force Selected)

The GPS to G&C A/I/F indicator, “*”, is defined by one signal for display processing (V94J1042C) which has three states shown below for determining when the indicators are to be driven. Sources for this signal are ENTRY NAV (4.127), PRELAND NAV (4.144), and RTL NAV (4.205).

The states for the GPS to G&C Auto/Inhibit/Force signal (GPS_AIF_RCVD) are defined as follows:

Signal / State	Indicator to be Driven After
V94J1042C / 0	AUT (Auto Selected)
V94J1042C / 1	INH (Inhibit Selected)
V94J1042C / 2	FOR (Force Selected)

The sources for the GPS TO G&C EXEC STATUS signal (V94X1041X), which drives the parameter status indicator field after the AIF_G label, are ENTRY NAV (4.127), PRELAND NAV (4.144), and RTLS NAV (4.205).

The GPS to Navigation A/I/F indicator, “*”, is defined by one signal for display processing (V90J3463C) which has three states shown below for determining when the indicators are to be driven. Sources for this signal are ENTRY NAV (4.127), PRELAND NAV (4.144), and RTLS NAV (4.205).

The states for the GPS to Navigation Auto/Inhibit/Force signal (GPS_TO_NAV_AIF) are defined as follows:

Signal / State	Indicator to be Driven After
V90J3463C / 0	AUT (Auto Selected)
V90J3463C / 1	INH (Inhibit Selected)
V90J3463C / 2	FOR (Force Selected)

The MLS A/I/F indicator asterisk, “*”, is defined by one signal for display processing (V93J1629C) which has three states shown below for determining when the indicators are to be driven. The source for this signal is KYBD.

Signal / State	Function Desired
V93J1629C / 0	AUT (Auto Selected)
V93J1629C / 1	INH (Inhibit Selected)
V93J1629C / 2	FOR (Force Selected)

- O. Drag H Data Source. Drag altitude residual and ratio and status data are generated by ENT NAV (4.127), and RTLS NAV (4.205), as applicable. The filter control option selection indicator datum is generated by KYBD.
- P. ADTA H Data Source. ADTA altitude residual and ratio and status data are generated by ENT NAV (4.127), PRE-LAND NAV (4.144), and RTLS NAV (4.205), as applicable. The filter control option selection indicator datum is generated by KYBD.
- Q. TACAN Data Sources. The sources for TACAN 1, 2, 3 azimuth and range, as well as the absolute/delta values selection indicator, data are RTLS UPP (4.20), ENTRY UPP (4.23), TAEM UPP (4.24), and A/L UPP (4.25) as applicable.
- R. TACAN Self Test. The word “TEST” will be displayed double overbright anytime the TACAN self test in progress discrete (V95X5006X) is set.

- S. TACAN DES Indicator TAC AZ and TAC RNG Parameter Status Indicators. For TAC1, TAC2 and TAC3 the deselect discrettes (V93X4411X, V93X4413X and V93X4415X, respectively) are set or reset only by item entry. Whenever a discrete is reset (i.e., "0" state of the discrete) an asterisk shall be driven after the DES item number of the appropriate TAC and shall be blanked when the discrete is set.

Whenever a TACAN is deselected, a down arrow shall be driven in the TAC AZ and TAC RNG parameter status indicator columns for the appropriate TAC. These status signals are generated in the HORIZ SIT SPEC (5.7).

If a TACAN AZ or RNG signal is failed by TACAN RM (4.77), it may be reset by deselecting and then reselecting the TACAN via the Item entry control.

- T. ΔT UPDATE. The Delta Time value entered via the keyboard is displayed until ENT NAV (4.127) has performed the state vector update and then is zeroed by ENT NAV. The sources for this signal are KYBD and ENT NAV (4.127).
- U. PTI INDICATOR. The PTI indicator (V90X3220X) is set whenever: PTI_WINDOW (V90X2401X) or PTI_ACT_D (V90X3249X) is set and S_TAL (V90X8658X) and S_AOA (V90X8636X) are both reset. The PTI indicator is reset, otherwise the PTI indicator will flash whenever PTI_WINDOW is set and PTI_ACT_D is reset, and will not flash otherwise.
- V. TACAN Data and Parameter Status Indicators Blanking. During MM601, MM301, MM302, and MM303 the TACAN azimuth and range data and associated parameter status indicators for TAC 1, TAC 2, and TAC 3 shall be blanked.

During MM602, MM603, MM304, and MM305 when the DELTA mode for TACAN data display is selected and a TACAN channel selected is invalid, the azimuth and range data fields and associated parameter status indicators for that TACAN shall be blanked.

- W. In MM304 set Displayed Normal Acceleration (V93A8201C) equal to LOAD_TOTAL (V95U0163CA) scaled in g's. The source of LOAD_TOTAL is ENTRY UPP (4.23). In MM305, MM602, and MM603 set (V93A8201C) equal to NZ (V90A5381C) scaled in g's. The source of NZ is Selection Filtering (4.71).
- X. Whenever HI_G (V94X4786X) is set, Displayed Normal Acceleration (V93A8201C) and the orbiter symbol are displayed flashing.
- Y. SPEEDBRAKE CONTROL LOGIC INDICATOR.

The following logic shall be used to determine the character string to be displayed.

I_SHORT_RW (V93J0996C) STATE	DISPLAY CHARACTER STRING
0	NOM
1	SHORT
2	ELS

Z. S/B INDICATOR INTENSITY

If I_SHORT_RW = 1, the character string “SHORT” shall be displayed double overbright.

If I_SHORT_RW = 2, the character string “ELS” shall be displayed double overbright.

AA. Time to HAC Intercept/Crosstrack Error Blank and Flash Requirements

The horizontal scale, time to HAC intercept ticks and time to HAC intercept labels shall be driven when DO_TGO_DISPLAY_ = ON. The time to HAC intercept symbol shall be initialized off the display until the location is computed in the HORIZ SIT SPEC. The time to HAC intercept ticks, labels and symbol shall blank when DO_TGO_DISPLAY = OFF.

The horizontal scale, crosstrack error ticks, crosstrack error (radial error) labels and symbol shall be driven when DO_RERRC_DISPLAY = ON. The crosstrack error (radial error) labels shall blank when DO_RERRC_DISPLAY is OFF.

The horizontal scale, crosstrack error ticks, crosstrack error (y position) labels and symbol shall be driven when DO_Y_DISPLAY = ON. The horizontal scale, crosstrack error ticks, crosstrack error (y position) labels, and symbol shall blank when DO_Y_DISPLAY is OFF.

The time to HAC intercept symbol 06 (Down Pointing Triangle) and the crosstrack error symbol 0E (Shuttle) shall flash to indicate an off scale condition (TGO_XTRACK_FLASH = ON).

Refer to Volume III section B5.7 HORIZ SIT SPEC for further detail.

BB. Altitude Error Blank and Flash Requirements

The vertical altitude error scale, ticks, labels, and symbol shall be driven while DO_HERROR_DISPLAY = ON. Note the altitude error labels shall change values when IPHASE = 3 as computed in HORIZ SIT SPEC. The vertical scale and associated display elements (symbol, ticks, and labels) shall blank when DO_HERROR_DISPLAY = OFF.

The altitude error symbol 1F (Left Pointing Arrow) shall flash to indicate an off scale condition (HERROR_FLASH = ON).

Refer to Volume III section B5.7 HORIZ SIT SPEC for further detail.

CC. GPS Range, Azimuth, Altitude Data. The sources for GPS absolute or delta derived range and azimuth to the auto selected TACAN station, and the altitude with respect to the landing site threshold and their associated parameter status indicator, are RTLS UPP (4.20), ENTRY UPP (4.23), TAEM UPP (4.24), and A/L UPP (4.25). The range, azimuth, and altitude data fields shall be blanked when GPS_RN_AZ_H_STAT (MSID V94X1046X) is equal to “↓” (DOWN ARROW). Also the range, azimuth, altitude, and status indicator data fields shall be blanked in OPS 1 and in major modes 301, 302, 303, and 601.

DD. MLS Data Incorporation Flag. The character string “MLS” is generated by HORIZ SIT display when MLS data is being processed by Navigation. This is indicated by the parameter PROCESSING_MLS = ON. It shall be displayed double overbright when the MLS derived navigation state is available for guidance and is blanked when the MLS derived navigation state is not available for guidance. Sources for the parameter are PRELAND NAV (4.144), and

RTLS NAV (4.205). See Note (29) for a discussion of when the MLS data is incorporated into the baseline navigation state and when the baseline navigation state is being sent to guidance.

- EE. GPS Data Blanking. The selected GPS state residual, ratio, alpha character indicator, and ratio parameter status indicator fields shall be blanked if no selected GPS state is available as indicated by GPS_SV_SEL_AVAIL = OFF.
- FF. GPS Residual Ratio Type. If the residual ratio being displayed is that of the selected state from a previous navigation cycle propagated to current navigation time, because no GPS state was selected on the current navigation cycle, indicated by NUM_GPS_SEL = 0, then the alpha character indicator after the GPS label will be displayed double overbright.
- GG. GPS Position and Velocity Labels Intensity. If the residual ratio being displayed is that of the selected state from a previous navigation cycle propagated to current navigation time, because no GPS state was selected on the current navigation cycle, indicated by NUM_GPS_SEL = 0, then the alpha character will be displayed double overbright. The character displayed on line 18 is a "P" (character 50) and on line 19 (character 56) is a "V".
- HH. Figure of Merit Position Error. The application software will provide an integer which shall be converted to display a one sigma standard error in feet as indicated below:

FOM Integer	Position error (P), one sigma (1 σ) to be displayed (feet)
0	(blank)
1	75
2	175
3	250
4	325
5	650
6	1650
7	3275
8	16400
9	99999

The output position error derived from FOM shall be blanked if the FOM integer value is 0 (0 is an initialization value, not provided by hardware input).

The sources for figure of merit position error are GPS SOP (4.17) in GN&C OPS 1 and Major Mode 601, and GPS RCVR STATE PROC (4.21) in GN&C OPS 3, Major Mode 602, and Major Mode 603.

- II. Selected GPS Azimuth, Range, and Altitude Data Blanking. For three GPS receivers installed, the selected GPS azimuth, range and altitude shall be blanked if no selected GPS state is available as indicated by GPS_SV_SEL_AVAIL = OFF. The data shall also be blanked in OPS 1 and Major Modes 301, 302, 303, and 601.

- JJ. GPS Receiver Status. The receiver status signal is set by the GPS SOP in response to GPS to GPC input data. The following table describes the receiver status conditions displayed for each GPS receiver. All character strings are displayed right justified.

GPS LRU 1 Receiver Status:

Signal/State	Display	Message Description
V94J0932C/0	NI	Receiver Not Installed
V94J0932C/1	M	LRU Communications Fault
V94J0932C/2	BIT	Receiver Built-In-Test in progress
V94J0932C/3	RPF	Receiver processor failure
V94J0932C/4	BATT	Low receiver Battery indication
V94J0932C/5	DGF	Data Good has Failed (Receiver DG is off)
V94J0932C/6	(blank)	No receiver anomaly

GPS LRU 2 Receiver Status:

Signal/State	Display	Message Description
V94J0933C/0	NI	Receiver Not Installed
V94J0933C/1	M	LRU Communications Fault
V94J0933C/2	BIT	Receiver Built-In-Test in progress
V94J0933C/3	RPF	Receiver processor failure
V94J0933C/4	BATT	Low receiver Battery indication
V94J0933C/5	DGF	Data Good has Failed (Receiver DG is off)
V94J0933C/6	(blank)	No receiver anomaly

GPS LRU 3 Receiver Status:

Signal/State	Display	Message Description
V94J0934C/0	NI	Receiver Not Installed
V94J0934C/1	M	LRU Communications Fault
V94J0934C/2	BIT	Receiver Built-In-Test in progress
V94J0934C/3	RPF	Receiver processor failure
V94J0934C/4	BATT	Low receiver Battery indication
V94J0934C/5	DGF	Data Good has Failed (Receiver DG is off)
V94J0934C/6	(blank)	No receiver anomaly

The “RPF” and “M” shall be displayed double overbright. The “RPF” condition will result in a CLASS 3 alarm annunciated by GAX.

KK. Earth Fixed Relative Velocity. The earth fixed relative velocity shall be displayed in Major Modes 304, 305, 602 and 603 and shall be blank in all other Major Modes. The sources for the earth fixed relative velocity are RTLS UPP (4.20), ENTRY UPP (4.23), TAEM UPP (4.24) and A/L UPP (4.25).

LL. Summary of GPS Receiver Status. Information shall be displayed to the crew indicating which GPS receivers are selected, candidates for selection, determined to fail the QA 4 dilemma, or currently commfaulted. Information is provided by two inputs per GPS receiver, SEL_RCVR (MSID’s V94X1037X, V94X1038X or V94X1039X) and GPS_DISP_FAIL_DIL (MSID’s V94J6090C, V94J6091C or V94J6092C).

If SEL_RCVR is on for the I th GPS receiver, then an asterisk, “*” is displayed.

If SEL_RCVR is off for the I th GPS receiver, then the parameter status indicator GPS_DISP_FAIL_DIL shall be displayed showing either a blank, “↓”, “?”, or “M”.

MM. CREW DES RCVR RCVD In GNC Major Function Base. The copy of crew deselect receiver command from GPS RCVR STATE PROC (4.21) is carried across OPS transitions to insure display information is always correct.

NN. GPS Figure of Merit. Sources for the displayed FOM are GPS SOP (4.17) in GN&C OPS 1 and Major Mode 601, and GPS RCVR STATE PROC (4.21) in GN&C OPS 3, Major Mode 602, and Major Mode 603.

OO. This field shall be blanked if FOM_GDOP_STATIC(1) (V94X6142X) equals ON while in GN&C OPS 1 or MM601.

PP. This field shall be blanked if FOM_GDOP_STATIC(2) (V94X6143X) equals ON while in GN&C OPS 1 or MM601.

QQ. This field shall be blanked if FOM_GDOP_STATIC(3) (V94X6144X) equals ON while in GN&C OPS 1 or MM601.

RR. This field shall be blanked if GPS_DG_SF(1) (V94X0986X) equals OFF while in GN&C OPS 3, MM602 or MM603.

SS. This field shall be blanked if GPS_DG_SF(2) (V94X0987X) equals OFF while in GN&C OPS 3, MM602 or MM603.

TT. This field shall be blanked if GPS_DG_SF(3) (V94X0988X) equals OFF while in GN&C OPS 3, MM602 or MM603.

UU. GPS Figure of Merit Status Indicator. Sources for the GPS FOM status indicator are GPS SOP(4.17) in GN&C OPS 1 and Major Mode 601, and GPS RCVR STATE PROC (4.21) in GN&C OPS 3, Major Mode 602, and Major Mode 603.

4.2.9.4 Horizontal Situation Figure/Table References

Figure 4.2.9-1	Horiz Sit Display (Time to HAC Intercept scale shown for right HAC) for 3 TACANS
Figure 4.2.9-2	Horiz Sit Display (Time to HAC Intercept scale shown for left HAC) for 3 TACANS
Figure 4.2.9-3	Horiz Sit Display (Crosstrack Error scale shown for vehicle outside right HAC) for 3 TACANS
Figure 4.2.9-4	Horiz Sit Display (Crosstrack Error scale shown for vehicle outside left HAC) for 3 TACANS
Figure 4.2.9-5	Horiz Sit Display (Time to HAC Intercept scale shown for right HAC) for 3 GPS Receivers
Table 4.2.9-1	Keyboard Processing Table
Table 4.2.9-2	CRT Display Processing Table
Table 4.2.9-2A	Horiz Sit (PFS) CRT Display Processing - Unique for 0 or 1 GPS Receiver Installed
Table 4.2.9-2B	Horiz Sit (PFS) CRT Display Processing - Unique for 3 GPS Receivers Installed
Table 4.2.9-3	CRT Display Processing Background Requirements
Table 4.2.9-3A	Horiz Sit (PFS) CRT Display Processing Background Requirements - Common for all Configurations
Table 4.2.9-3B	Horiz Sit (PFS) CRT Display Processing Background Requirements - Unique for 0 or 1 GPS Receiver Installed (3 TACANS)
Table 4.2.9-3C	Horiz Sit (PFS) CRT Display Processing Background Requirements - Unique for 3 GPS Receivers Installed
Table 4.2.9-4	Mission Design Background Constants (N/A)
Table 4.2.9-5	Input Functional Parameters

Table 4.2.9-6	Output Functional Parameters
Table 4.2.9-7	I-Loads
Table 4.2.9-8	K-Loads
Table 4.2.9-9	Constants

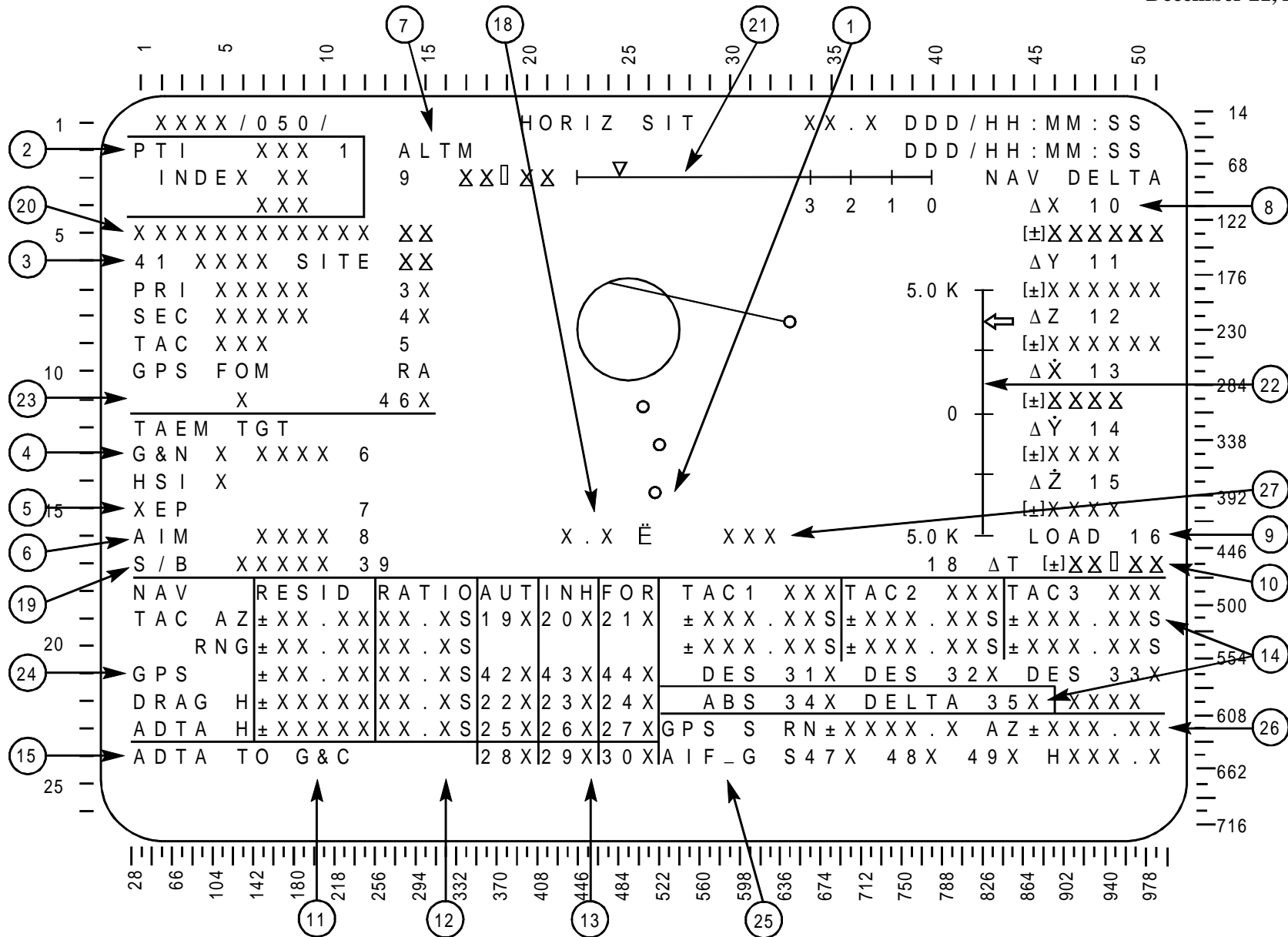
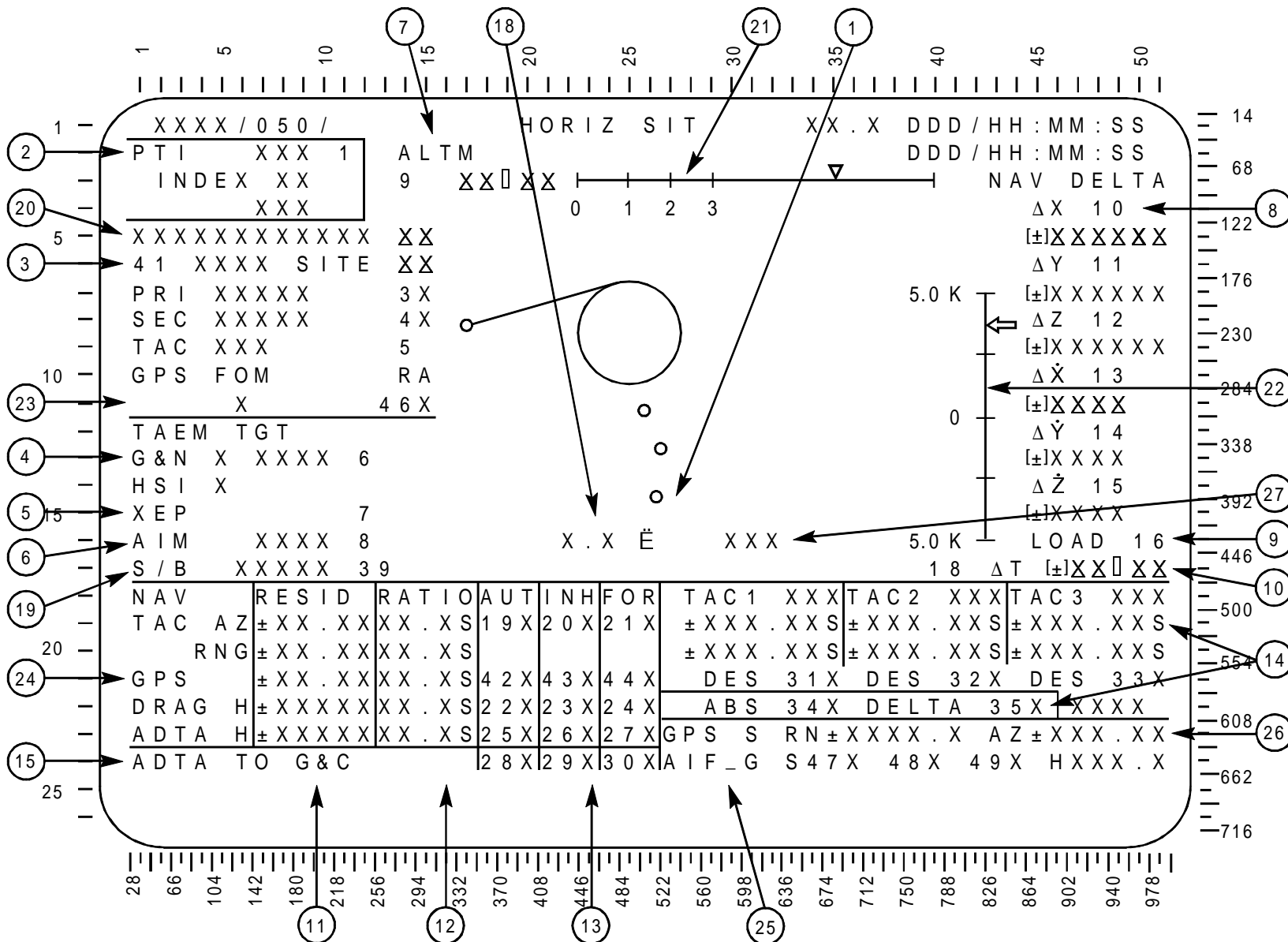
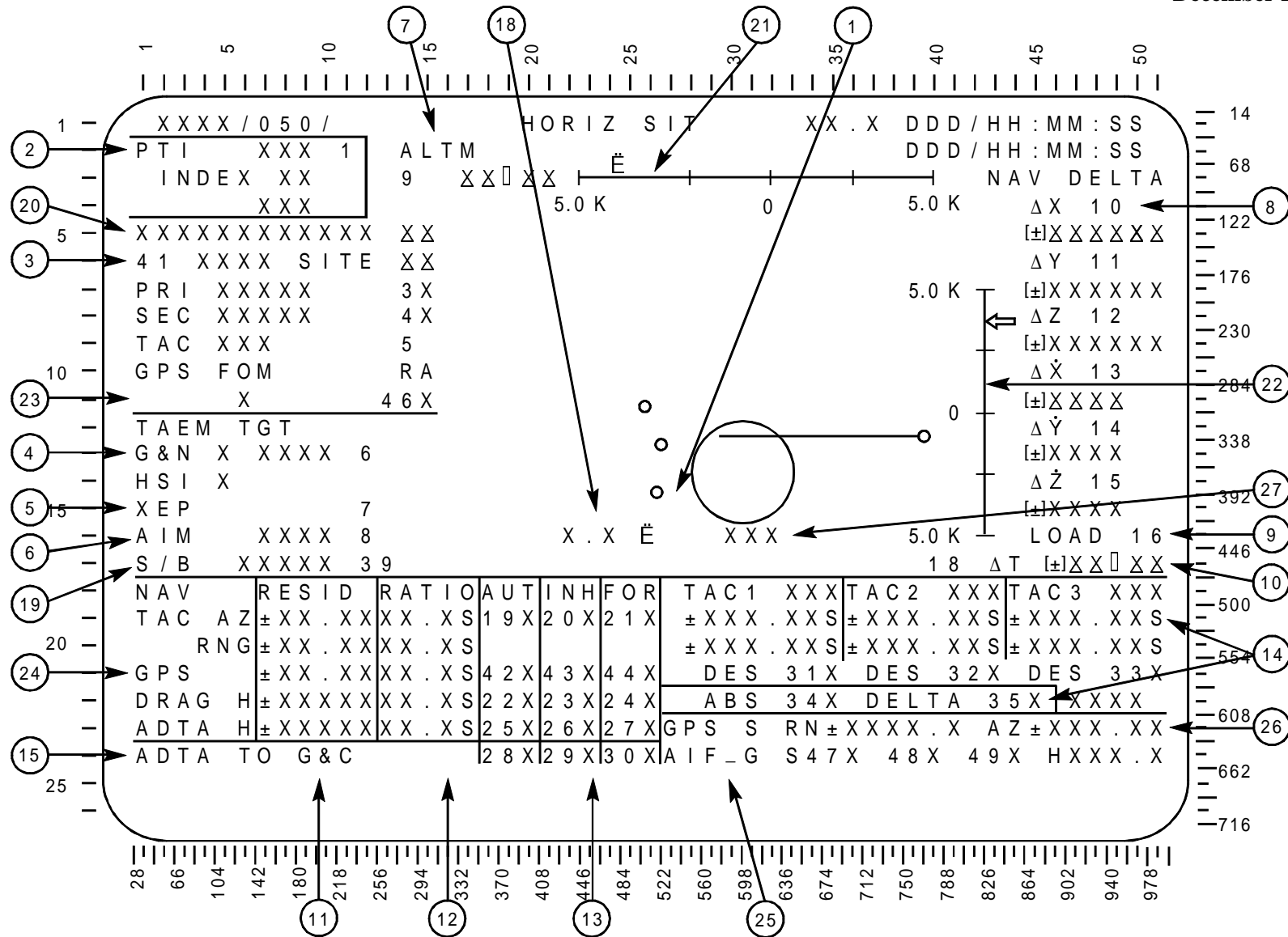


FIGURE 4.2.9-1. Horiz Sit Display (PFS) (Time to HAC Intercept scale shown for right HAC) for 3 TACANs



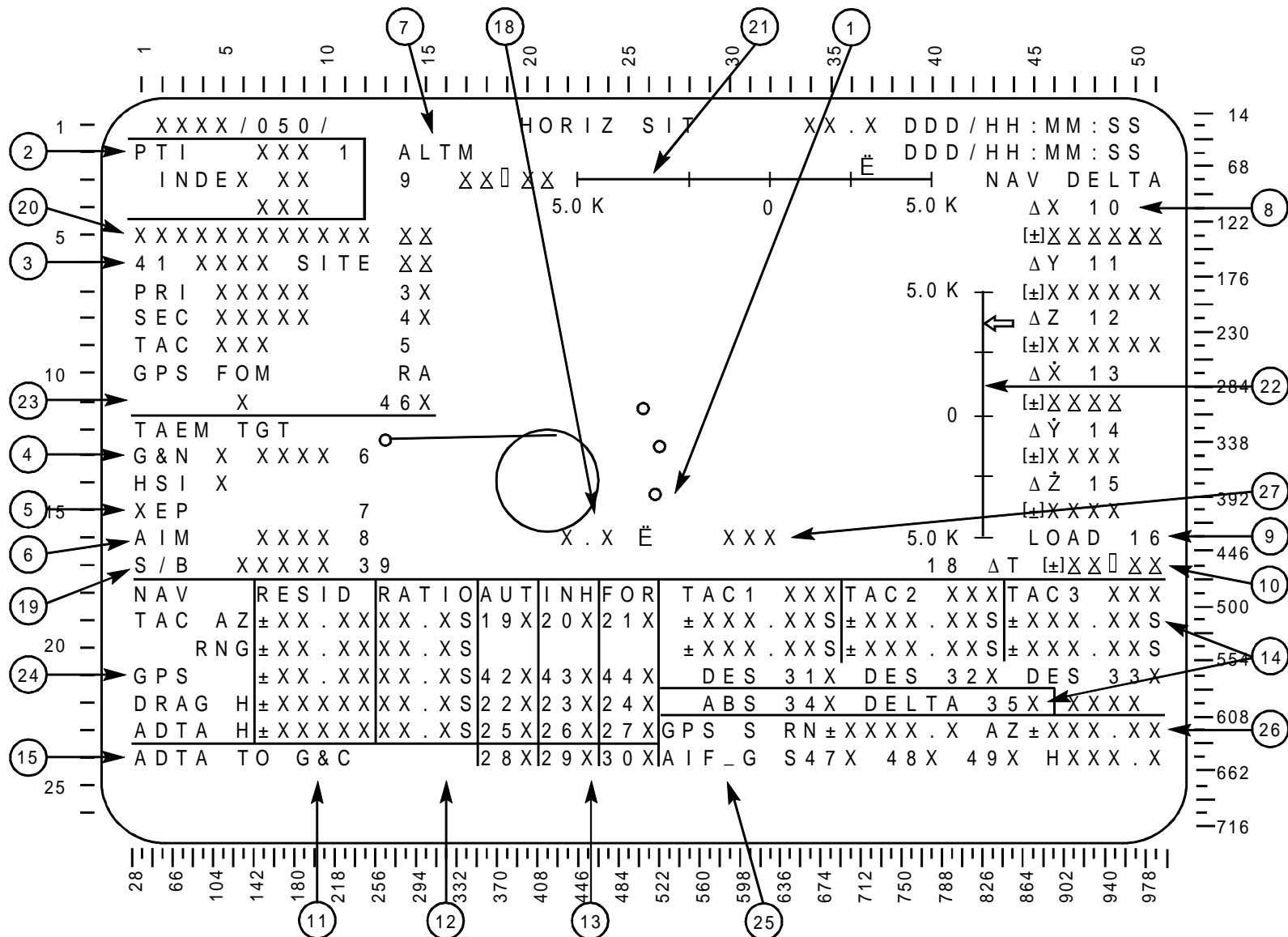
Note: Horizontal scale tickmark locations and labels and vertical scale labels are I-Loads

FIGURE 4.2.9-2. Horiz Sit Display (PFS) (Time to HAC Intercept scale shown for left HAC) for 3 TACANs



Note: Horizontal scale tickmark locations and labels and vertical scale labels are I-Loads

FIGURE 4.2.9-3. Horiz Sit Display (PFS) (Crosstrack Error scale shown for vehicle outside right HAC) for 3 TACANs



Note: Horizontal scale tickmark locations and labels and vertical scale labels are I-Loads

FIGURE 4.2.9-4. Horiz Sit Display (PFS) (Crosstrack Error scale shown for vehicle outside left HAC) for 3 TACANs

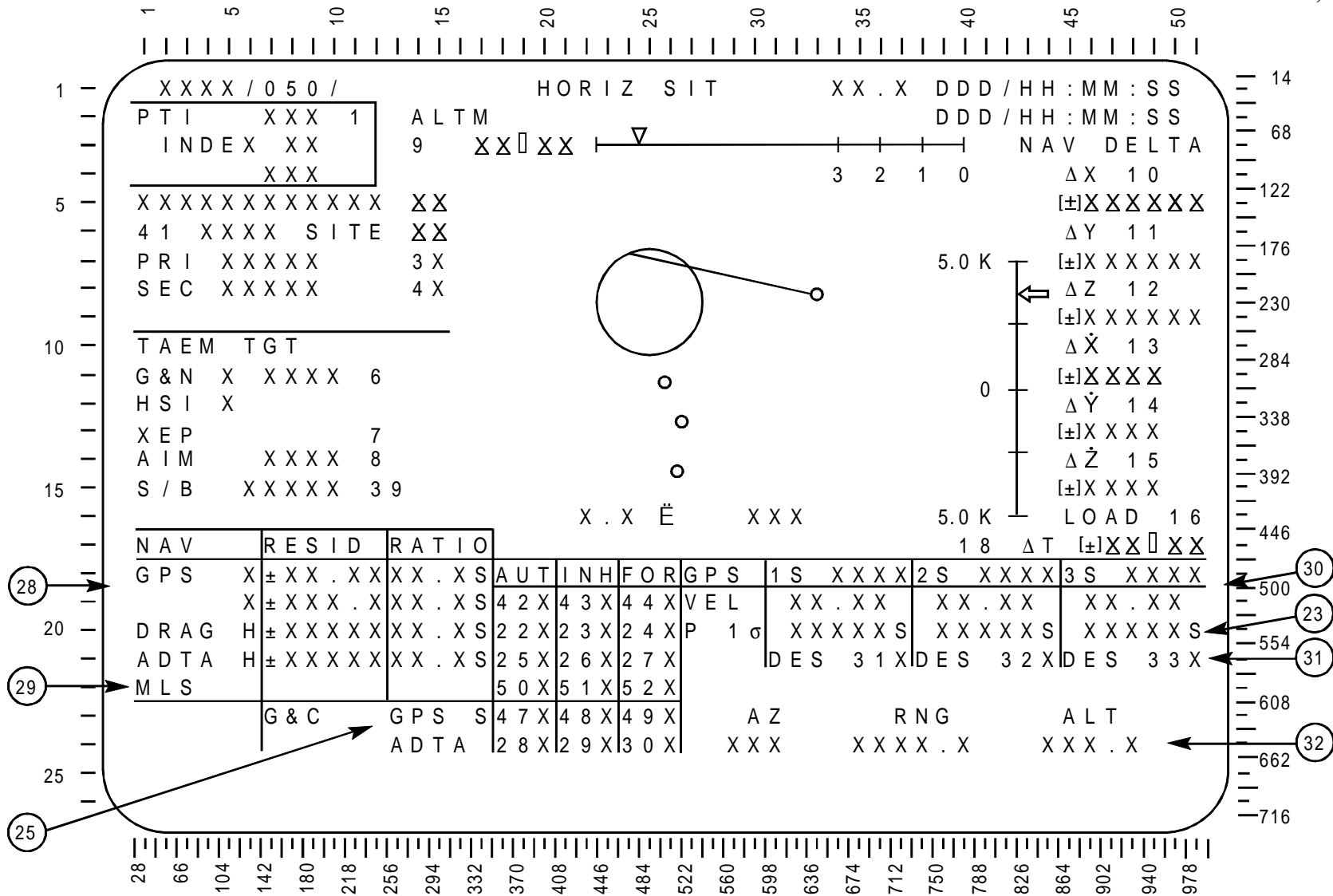


FIGURE 4.2.9-5. Horiz Sit Display (PFS) (Time to HAC Intercept scale shown for right HAC) for 3 GPS Receivers

Table 4.2.9-1.HORIZ SIT (PFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
001*	PTI 1	V93X5227X	0.0	CTRL			1			J, N	PTI, AJDP, CRT	INHIBIT PTI EXECUTION	X
002	40 TAL SITE XX	V93J4399C	3.0	DEC		X	40	1	45	Q	ADDENDUM	TAL SITE SELECT CMD	
003	41 SITE XX	V93J4396C	3.0	DEC		X	41	1	45	P	4.124, 4.238	NEW LANDING AREA SELECT CMD	
004	PRI 3	V93X4393X	0.0	CTRL		X	3				4.124, 4.238	PRIMARY RUNWAY SEL CMD	
005	SEC 4	V93X4394X	0.0	CTRL		X	4				4.124, 4.238	SECONDARY RUNWAY SEL CMD	
006	TAC 5	V93X4395X	0.0	CTRL		X	5			Y	4.124, 4.238	PRI/SEC TACAN SELECT CMD	
007	G&N X XXXX 6	V93X4477X	0.0	CTRL		X	6			L, M	UPP	R/L CONE CHG CMD	X
008	XEP 7	V93X4466X	0.0	CTRL		X	7			A	GUID, CRT	ENTRY POINT SWITCH CMD	X
009	AIM XXXX 8	V93X4476X	0.0	CTRL		X	8			C	GUID, CRT	HEAD WIND HI/LO CMD	X
010	ALTM 9	V93H5005C	6.2	DEC	INHG	X	9	27.00	35.00		4.39	ALT SET TO FLD PRESS CORR TO MSL	X
011	DELTA X 10	V93H5010C	7.0	DEC	FT		10	-999999	+999999	E	NAV	NAV UPDATE DELTA X POSITION	X
012	DELTA Y 11	V93H5011C	7.0	DEC	FT		11	-999999	+999999	E	NAV	NAV UPDATE DELTA Y POSITION	X
013	DELTA Z 12	V93H5012C	7.0	DEC	FT		12	-999999	+999999	E	NAV	NAV UPDATE DELTA Z POSITION	X
014	DELTA X-DOT 13	V93L5020C	5.0	DEC	FPS		13	-9999	+9999	E	NAV	NAV UPDATE DELTA X VELOCITY	X
015	DELTA Y-DOT 14	V93L5021C	5.0	DEC	FPS		14	-9999	+9999	E	NAV	NAV UPDATE DELTA Y VELOCITY	X
016	DELTA Z-DOT 15	V93L5022C	5.0	DEC	FPS		15	-9999	+9999	E	NAV	NAV UPDATE DELTA Z VELOCITY	X
017	LOAD 16	V93X5032X	0.0	CTRL			16			E	5.7	NAV UPDATE CMD	X
018	18 DELTA T	V93W5035C	6.2	DEC	SEC		18	-99.99	+99.99	I, E	CRT	DELTA T UPDATE	X
019	TAC AUT 19	V93J4470C	0.0	CTRL			19			B, Y	NAV, CRT	TAC A/I/F EDIT CMD	X
020*	TAC INH 20	V93J4470C	0.0	CTRL			20			B, Y	NAV, CRT	TAC A/I/F EDIT CMD	X
021*	TAC FOR 21	V93J4470C	0.0	CTRL			21			B, Y	NAV, CRT	TAC A/I/F EDIT CMD	X
022	DRAG H AUT 22	V93J5013C	0.0	CTRL			22			F	NAV, CRT	DRAG H A/I/F EDIT CMD	X
023*	DRAG H INH 23	V93J5013C	0.0	CTRL			23			F	NAV, CRT	DRAG H A/I/F EDIT CMD	X
024*	DRAG H FOR 24	V93J5013C	0.0	CTRL			24			F	NAV, CRT	DRAG H A/I/F EDIT CMD	X
025	ADTA H AUT 25	V93J4473C	0.0	CTRL			25			D	NAV, 4.17, CRT	ADTA A/I/F EDIT CMD	X
026*	ADTA H INH 26	V93J4473C	0.0	CTRL			26			D	NAV, 4.17, CRT	ADTA A/I/F EDIT CMD	X
027*	ADTA H FOR 27	V93J4473C	0.0	CTRL			27			D	NAV, 4.17, CRT	ADTA A/I/F EDIT CMD	X
028	ADTA TO G&C AUT 28	V93J5014C	0.0	CTRL			28			R	4.39, CRT	ADTA TO G&C A/I/F CMD	X
029*	ADTA TO G&C INH 29	V93J5014C	0.0	CTRL			29			R	4.39, CRT	ADTA TO G&C A/I/F CMD	X
030*	ADTA TO G&C FOR 30	V93J5014C	0.0	CTRL			30			R	4.39, CRT	ADTA TO G&C A/I/F CMD	X

Table 4.2.9-1.HORIZ SIT (PFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
031*	TAC 1 DES 31	V93X4411X	0.0	CTRL		X	31			H, Z	4.77	TACAN 1 DES CMD	X
032*	TAC 2 DES 32	V93X4413X	0.0	CTRL		X	32			H, Z	4.77	TACAN 2 DES CMD	X
033*	TAC 3 DES 33	V93X4415X	0.0	CTRL		X	33			H, Z	4.77	TACAN 3 DES CMD	X
034	ABS 34	V93X5015X	0.0	CTRL			34			G, Y	UPP	TACAN/GPS ABSOLUTE/DELTA DATA CMD	X
035*	DELTA 35	V93X5015X	0.0	CTRL			35			G, Y	UPP	TACAN/GPS ABSOLUTE/DELTA DATA CMD	X
036	S/B XXXXX 39	V93X4246X	0.0	CTRL			39			O	6.21	SPEEDBRAKE CONTROL LOGIC SELECT	
037*	GPS (TO NAV) AUT 42	V93X1202X	0.0	CTRL			42			T, U, V, W	NAV	GPS TO NAV AUTO/INHIBIT CMD	
038	GPS (TO NAV) INH 43	V93X1202X	0.0	CTRL			43			T, U, V, W	NAV	GPS TO NAV AUTO/INHIBIT CMD	
039*	GPS (TO NAV) FOR 44	V93X1201X	0.0	CTRL			44			T, U, V, W	NAV	GPS TO NAV FORCE CMD	
040*	GPS RA 46	V93X1204X	0.0	CTRL			46			U, X	4.17	GPS RCVR USE RA DATA AIDING CMD	
041	GPS (TO G&C) AUT 47	V93J1200C	0.0	CTRL			47			S, U, V, W	NAV	GPS TO G&C A/I/F CMD	
042*	GPS (TO G&C) INH 48	V93J1200C	0.0	CTRL			48			S, U, V, W	NAV	GPS TO G&C A/I/F CMD	
043*	GPS (TO G&C) FOR 49	V93J1200C	0.0	CTRL			49			S, U, V, W	NAV	GPS TO G&C A/I/F CMD	
044	GPS 1 DES 31	V93X1205X	0.0	CTRL		X	31			Z	4.17, 4.21, 4.110, 6.11, 6.51	DESELECT GPS 1 RCVR CMD	
045	GPS 2 DES 32	V93X1206X	0.0	CTRL		X	32			Z	4.17, 4.21, 4.110, 6.11, 6.51	DESELECT GPS 2 RCVR CMD	
046	GPS 3 DES 33	V93X1207X	0.0	CTRL		X	33			Z	4.17, 4.21, 4.110, 6.11, 6.51	DESELECT GPS 3 RCVR CMD	
047	MLS AUT 50	V93J1629C	0.0	CTRL			50			AA, BB	4.127, 4.144, 4.205, CRT	MLS A/I/F EDIT CMD	
048	MLS INH 51	V93J1629C	0.0	CTRL			51			AA, BB	4.127, 4.144, 4.205, CRT	MLS A/I/F EDIT CMD	
049	MLS FOR 52	V93J1629C	0.0	CTRL			52			AA, BB	4.127, 4.144, 4.205, CRT	MLS A/I/F EDIT CMD	

Table 4.2.9-2.HORIZ SIT (PFS) CRT DISPLAY PROCESSING - COMMON

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	S	B	S	I	F	R	S	L	B	D	Add Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
001	(OPS)	V93X0040X	2	1		5.0															UI	OPS FUNCTION PAGE	X	
002	(SPEC)	V93X0042X	7	1		4.0																UI	SPEC FUNCTION PAGE	X
003	(DISP)	V93X0044X	10	1		4.0																UI	DISPLAY FUNCTION PAGE	X
004	(UL)	V92X5032X	34	1		2.0	UL						X									UI	UPLINK ACTIVITY IND	X
005	(GPC)	V93X0048X	36	1		2.0																UI	GPC DRIVER	X
006	(MT)	V91W1990C	39	1		12.0			DHMS													FCOS	MISSION ELAPSED TIME	X
007	(CRT TIMER)	V91W1987C	39	2		12.0			DHMS													FCOS	DISPLAY CRT TIMER,GNC	X
008*	PTI XXX 1	V93X5227X	7	2		3.0	INH	ENA														KYBD, PTI, ADP	INHIBIT PTI EXECUTION	X
009	PTI INDEX	V90J2402C	7	3		3.0																AERODAP	NUMBER OF PTI TO EXECUTE	X
010	XXXXXXXXXXXX	ADDENDUM	1	5		12.0													E		6.21	ITEM 40 CHAR STRING		
011	40 TAL SITE XX	V93J4399C	13	5		3.0														M		KYBD	TAL SITE SELECT CMD	
012	41 SITE XX	V93J4392C	13	6		3.0					X											KYBD, 4.124, 4.238, 6.55, 6.56	SELECTED AREA	
013	41 XXXX SITE	ADDENDUM	4	6		4.0														L		6.21	LAND SITE CHAR STRING	
014	PRI XXXXX	V97U5681C	5	7		5.0																4.124, 4.238	RUNWAY NAME PRIME LANDING SITE	
015	SEC XXXXX	V97U5682C	5	8		5.0																4.124, 4.238	RUNWAY NAME SECONDARY LANDING SITE	
016	PRI_SEL 3 X	V93X4523X	15	7		1.0	*															4.124, 4.238	RUNWAY SELECTION INDICATOR	
017	SEC_SEL 4 X	V93X4523X	15	8		1.0		*														4.124, 4.238	RUNWAY SELECTION INDICATOR	
018*	PTI XXX	V90X3220X	7	4		3.0	PTI				X	X	X							U		5.7	PTI IND	X
019	ALTM 9	V93H5005C	16	3		6.2			INHG													KYBD	ALT SET TO FLD PRESS CORR TO MSL	X
020	DELTA X 10	V93H5010C	45	5		7.0			FT							X				G		NAV	NAV UPDATE DELTA X POSITION	X
021	DELTA Y 11	V93H5011C	45	7		7.0			FT								X			G		NAV	NAV UPDATE DELTA Y POSITION	X
022	DELTA Z 12	V93H5012C	45	9		7.0			FT								X			G		NAV	NAV UPDATE DELTA Z POSITION	X
023	DELTA X-DOT 13	V93L5020C	45	11		5.0			FPS								X			G		NAV	NAV UPDATE DELTA X VELOCITY	X
024	DELTA Y-DOT 14	V93L5021C	45	13		5.0			FPS								X			G		NAV	NAV UPDATE DELTA Y VELOCITY	X
025	DELTA Z-DOT 15	V93L5022C	45	15		5.0			FPS								X			G		NAV	NAV UPDATE DELTA Z VELOCITY	X
026	18 DELTA T	V93W5035C	46	17		6.2			SEC											T		NAV	DELTA T UPDATE	X
027	ADTA TO G&C AUT 28	V93J5014C	20	24		1.0														N		4.39, KYBD	ADTA TO GC A/I/F CMD	X
028*	ADTA TO G&C INH 29	V93J5014C	23	24		1.0														N		4.39, KYBD	ADTA TO GC A/I/F CMD	X
029*	ADTA TO G&C FOR 30	V93J5014C	26	24		1.0														N		4.39, KYBD	ADTA TO GC A/I/F CMD	X
030	(HAC X-POS)	V94H2050C																		A		5.7	GRAPHIC X-POS OF SELECTED HAC	X

Table 4.2.9-2.HORIZ SIT (PFS) CRT DISPLAY PROCESSING - COMMON

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	S	B	S	I	F	R	S	L	B	D	Add Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
031	(HAC Y-POS)	V94H2051C																		A	5.7	GRAPHIC Y-POS OF SELECTED HAC	X	
032	(HAC-RADIUS)	V94H2052C																		A	5.7	RADIUS OF SEL HAC	X	
033	(WP 2 X POS)	V94U2044C																		C	5.7	GRAPHIC X-POS OF WP2	X	
034	(WP 2 Y POS)	V94U2045C																		C	5.7	GRAPHIC Y-POS OF WP2	X	
035	(HAC X_CEPT X POS)	V94U2046C																		C	5.7	GRAPHIC X-POS OF HAC INTERSECTION	X	
036	(HAC X_CEPT Y POS)	V94U2047C																		C	5.7	GRAPHIC Y-POS OF HAC INTERSECTION	X	
037	(20-SEC PRED X POS)	V94H2030C										X								B	5.7	GRAPHIC X-POS OF 20-SEC PREDICTOR	X	
038	(20-SEC PRED Y POS)	V94H2031C										X								B	5.7	GRAPHIC Y-POS OF 20-SEC PREDICTOR	X	
039	(40-SEC PRED X POS)	V94H2035C										X								B	5.7	GRAPHIC X-POS OF 40-SEC PREDICTOR	X	
040	(40-SEC PRED Y POS)	V94H2036C										X								B	5.7	GRAPHIC Y-POS OF 40-SEC PREDICTOR	X	
041	(60-SEC PRED X POS)	V94H2040C										X								B	5.7	GRAPHIC X-POS OF 60 SEC PREDICTOR	X	
042	(60-SEC PRED Y POS)	V94H2041C										X								B	5.7	GRAPHIC Y-POS OF 60 SEC PREDICTOR	X	
043	X.X	V93A8201C	21	16		4.1							X						W, X	4.23, 4.71	DISPLAYED NORMAL ACCEL	X		
044	ORBITER (SYMBOL OE)	ADDENDUM											X							X		ORBITER SYMBOL		
045	(TGO_XTRACK_DISP)	V90U0173C		95A							X		X	A						AA	5.7	TGO/XTRACK X-POS		
046	(TGO_TICK_LOC(1))	V90U0166C		100A							X			E						AA	5.7	Time to HAC Intercept Tick X Location 1		
047	(TGO_TICK_LOC(2))	V90U0167C		100A							X			E						AA	5.7	Time to HAC Intercept Tick X Location 2		
048	(TGO_TICK_LOC(3))	V90U0168C		100A							X			E						AA	5.7	Time to HAC Intercept Tick X Location 3		
049	(TGO_TICK_LOC(4))	V90U0169C		100A							X			E						AA	5.7	Time to HAC Intercept Tick X Location 4		
050	(TGO_TICK_LOC(5))	V90U0170C		100A							X			E						AA	5.7	Time to HAC Intercept Tick X Location 5		
051	TGO_LABEL(1)	V97U6328C		128A*		1					X			E						AA	I-Load	Time to HAC Intercept Label 1		
052	TGO_LABEL(2)	V97U6329C		128A*		1					X			E						AA	I-Load	Time to HAC Intercept Label 2		
053	TGO_LABEL(3)	V97U6330C		128A*		1					X			E						AA	I-Load	Time to HAC Intercept Label 3		
054	TGO_LABEL(4)	V97U6331C		128A*		1					X			E						AA	I-Load	Time to HAC Intercept Label 4		
055	TGO_LABEL(5)	V97U6332C		128A*		1					X			E						AA	I-Load	Time to HAC Intercept Label 5		
056	(XTRACK_TICK_LOC(1))	V90U0283C		100A							X			E						AA	5.7	Xtrack Error Tick X Location 1		
057	(XTRACK_TICK_LOC(2))	V90U0284C		100A							X			E						AA	5.7	Xtrack Error Tick X Location 2		
058	(XTRACK_TICK_LOC(3))	V90U0286C		100A							X			E						AA	5.7	Xtrack Error Tick X Location 3		
059	(XTRACK_TICK_LOC(4))	V90U0287C		100A							X			E						AA	5.7	Xtrack Error Tick X Location 4		
060	(XTRACK_TICK_LOC(5))	V90U0288C		100A							X			E						AA	5.7	Xtrack Error Tick X Location 5		

Table 4.2.9-2.HORIZ SIT (PFS) CRT DISPLAY PROCESSING - COMMON

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	S	B	S	I	F	R	S	L	B	D	Add Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
061	(XTRACK_TICK_LOC(6))	V90U0289C		100A																AA	5.7	Xtrack Error Tick X Location 6		
062	(XTRACK_TICK_LOC(7))	V90U0293C		100A																AA	5.7	Xtrack Error Tick X Location 7		
063	(XTRACK_TICK_LOC(8))	V90U0294C		100A																AA	5.7	Xtrack Error Tick X Location 8		
064	(XTRACK_TICK_LOC(9))	V90U0295C		100A																AA	5.7	Xtrack Error Tick X Location 9		
065	(XTRACK_TICK_LOC(10))	V90U0296C		100A																AA	5.7	Xtrack Error Tick X Location 10		
066	(XTRACK_TICK_LOC(11))	V90U0297C		100A																AA	5.7	Xtrack Error Tick X Location 11		
067	XTRACK_LABEL	V90U0182C	450A	128A*		4														AA	5.7	Xtrack Error Label		
068	XTRACK_LABEL	V90U0182C	770A	128A*		4														AA	5.7	Xtrack Error Label		
069	(HERROR_DISP)	V90U0171C	807A*										X	A						BB	5.7	Altitude Error Y-Pos		
070	(HERROR_TICK_LOC(1))	V90U0298C	807A*											E						BB	5.7	Altitude Error Tick Y Location 1		
071	(HERROR_TICK_LOC(2))	V90U0299C	807A*											E						BB	5.7	Altitude Error Tick Y Location 2		
072	(HERROR_TICK_LOC(3))	V90U0301C	807A*											E						BB	5.7	Altitude Error Tick Y Location 3		
073	(HERROR_TICK_LOC(4))	V90U0302C	807A*											E						BB	5.7	Altitude Error Tick Y Location 4		
074	(HERROR_TICK_LOC(5))	V90U0303C	807A*											E						BB	5.7	Altitude Error Tick Y Location 5		
075	(HERROR_TICK_LOC(6))	V90U0304C	807A*											E						BB	5.7	Altitude Error Tick Y Location 6		
076	(HERROR_TICK_LOC(7))	V90U0363C	807A*											E						BB	5.7	Altitude Error Tick Y Location 7		
077	(HERROR_TICK_LOC(8))	V90U0364C	807A*											E						BB	5.7	Altitude Error Tick Y Location 8		
078	(HERROR_TICK_LOC(9))	V90U0365C	807A*											E						BB	5.7	Altitude Error Tick Y Location 9		
079	(HERROR_TICK_LOC(10))	V90U0366C	807A*											E						BB	5.7	Altitude Error Tick Y Location 10		
080	(HERROR_TICK_LOC(11))	V90U0367C	807A*											E						BB	5.7	Altitude Error Tick Y Location 11		
081	HERROR_LABEL	V90U0183C	770A*	419A*		4								E						BB	5.7	Altitude Error Label		
082	HERROR_LABEL	V90U0183C	770A*	175A*		4								E						BB	5.7	Altitude Error Label		
083	XXX (MLS)	V94X6041X	30	16		3.0	MLS					X								DD	NAV	FLAG IND MLS BEING PROCESSED		
084	(MSG LINE)	V93X0050X	1	25		44.0								G						UI	UI	MESSAGE LINE	X	
085	(BUFFER MSG)	V93X0054X	45	25		4.0								G						UI	UI	BUFFER MESSAGE INDICATOR	X	
086	(SPL)	V93X0056X	2	26		49.0								G						UI	UI	SCRATCH PAD LINE	X	

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Table 4.2.9-2A. HORIZ SIT (PFS) CRT DISPLAY PROCESSING - UNIQUE FOR 0 OR 1 GPS RECEIVER INSTALLED

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B A N K	S I Z E S	I N T E R S	F L A T T E N S H	R A T E	S I G N E R	L E V E L	B A N D W I D T H	D E L T A T E	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
001	TAC_XXX 5	V95J5022C	4	9		4.0															4.124, 4.238	AUTO TACAN CHANNEL SELECTION		
002	GPS 2 FOM	V94H1083C	5	11		2.0														NN	4.21, 4.17	GPS 2 NAV FOM		
003	GPS RA 46	V94X0931X	15	11		1.0	*														4.17	GPS RA FLAG FDBK		
004	G&N (CONE IND) 6	V95J0153C	5	13		1.0														H, J	UPP	R/L CONE IND	X	
005	G&N(OVHD/STRTIND) 6	V95X0154X	7	13		4.0														I	UPP	OVHD/STRT IND	X	
006	HSI	V90J0981C	5	14		1.0														H, K	AREA NAV	L HSI L/R HAC IND-PRI	X	
007	XEP 7	V93X4466X	1	15		1.0	N	M													KYBD	ENTRY POINT SWITCH CMD	X	
008	AIM XXXX 8	V93X4476X	7	16		4.0	CLSE	NOM													KYBD	HEAD WIND HI/LO CMD	X	
009	S/B XXXXX 39	V93J0996C	6	17		5.0															Y, Z	6.21	SHORT RUNWAY OPTION	
010	TAC AZ RESID	V90H0212C	7	19		6.2															F	NAV	TAC AZ/OPTICS H/X/AZ MEAS RESIDUAL	X
011	TAC AZ RATIO	V90U0216C	12	19		5.1															F	NAV	TAC AZ/OPTICS H/X/AZ RESID RATIO	X
012	TAC AZ RATIO (S)	V90X0213X	17	19		1.0															F 3	NAV	TAC AZ/OPTICS H/X/AZ EDIT HIST IND	X
013	TAC AUT 19	V93J4470C	20	19		1.0															F, N	KYBD	TAC A/I/F EDIT CMD	X
014*	TAC INH 20	V93J4470C	23	19		1.0															F, N	KYBD	TAC A/I/F EDIT CMD	X
015*	TAC FOR 21	V93J4470C	26	19		1.0															F, N	KYBD	TAC A/I/F EDIT CMD	X
016	TAC RNG RESID	V90H0214C	7	20		6.2															F	NAV	TAC R/OPTICS V/Y/EL MEAS RESIDUAL	X
017	TAC RNG RATIO	V90U0217C	12	20		5.1															F	NAV	TAC R/OPTICS V/Y/EL RESID RATIO	X
018	TAC RNG RATIO (S)	V90X0215X	17	20		1.0															F 3	NAV	TAC R/OPTICS V/Y/EL EDIT HIST IND	X
019	GPS RESID	V94H0976C	7	21		6.2															EE	4.21	SEL GPS MAX POS RESIDUAL	
020	GPS RATIO	V94U0973C	13	21		4.1															EE	4.21	SEL GPS MAX RES RATIO	
021	GPS RATIO X	V94X0974X	13	21		1.0	P	V													EE, FF	4.21	SEL GPS MAX RES RATIO IND	
022	GPS RATIO (S)	V94J0975C	17	21		1.0															EE 6	4.21	SEL GPS MAX RES RATIO STATUS	
023	GPS (TO NAV) AUT 42	V90J3463C	20	21		1.0															N	NAV	GPS TO NAV AUTO/INHIBIT/FORCE FDBK	
024	GPS (TO NAV) INH 43	V90J3463C	23	21		1.0															N	NAV	GPS TO NAV AUTO/INHIBIT/FORCE FDBK	
025	GPS (TO NAV) FOR 44	V90J3463C	26	21		1.0															N	NAV	GPS TO NAV AUTO/INHIBIT/FORCE FDBK	
026	DRAG H RESID	V90A0711C	7	22		6.0															O	NAV	DRAG ALT/RR R DOT MEAS RESIDUAL	X
027	DRAG H RATIO	V90U0713C	12	22		5.1															O	NAV	DRAG ALT/RR R DOT RESID RATIO	X
028	DRAG H RATIO (S)	V90X0712X	17	22		1.0															O 3	NAV	DRAG ALT/RR R DOT EDIT HIST IND	X
029	DRAG H AUT 22	V93J5013C	20	22		1.0															N, O	KYBD	DRAG H A/I/F EDIT CMD	X
030*	DRAG H INH 23	V93J5013C	23	22		1.0															N, O	KYBD	DRAG H A/I/F EDIT CMD	X

Table 4.2.9-2A. HORIZ SIT (PFS) CRT DISPLAY PROCESSING - UNIQUE FOR 0 OR 1 GPS RECEIVER INSTALLED

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E S	I N T E N S I T Y	F L A G S	R A T E	S I G N A L	L E V E L	B A N D	D I S T R I B U T I O N	Add Ref	Source	Nomenclature	C R T				
			X	Y		CHAR	BILEVEL																	TYPE			
							1	0																			
031*	DRAG H FOR 24	V93J5013C	26	22		1.0															N, O	KYBD	DRAG H A/I/F EDIT CMD	X			
032	ADTA H RESID	V90H0221C	7	23		6.0																P	NAV	BARO ALT/RR RNG MEAS RESIDUAL	X		
033	ADTA H RATIO	V90U0222C	12	23		5.1																P	NAV	BARO ALT/RR RNG RESID RATIO	X		
034	ADTA H RATIO (S)	V90X0223X	17	23		1.0																P 3	NAV	BARO ALT/RR RNG EDIT HIST IND	X		
035	ADTA H AUT 25	V93J4473C	20	23		1.0																P, N	KYBD	ADTA A/I/F EDIT CMD	X		
036*	ADTA H INH 26	V93J4473C	23	23		1.0																P, N	KYBD	ADTA A/I/F EDIT CMD	X		
037*	ADTA H FOR 27	V93J4473C	26	23		1.0																P, N	KYBD	ADTA A/I/F EDIT CMD	X		
038	GPS (TO G&C) (S)	V94X1041X	33	24		1.0																N 3	NAV	GPS TO G&C EXEC STATUS			
039	GPS (TO G&C) AUT 47	V94J1042C	36	24		1.0																N	NAV	GPS TO G&C AUT/INH/FOR FLAG FDBK			
040	GPS (TO G&C) INH 48	V94J1042C	40	24		1.0																N	NAV	GPS TO G&C AUT/INH/FOR FLAG FDBK			
041	GPS (TO G&C) FOR 49	V94J1042C	44	24		1.0																N	NAV	GPS TO G&C AUT/INH/FOR FLAG FDBK			
042	TAC 1 XXX	V90U1802C	32	18		4.0																	4.124		TACAN 1 GND STA CHAN	X	
043	TAC 1 AZ	V95H0207C	28	19		7.2																	4.23		TACAN 1 AZIMUTH	X	
044	TAC 1 RNG	V95H0201C	28	20		7.2																	4.23		TACAN 1 RANGE	X	
045	TAC 1 AZ (S)	V94J2014C	35	19		1.0																	5.7		TACAN 1 AZIMUTH STATUS	X	
046	TAC 1 RNG (S)	V94J2024C	35	20		1.0																	5.7		TACAN 1 RANGE STATUS	X	
047	TAC 2 XXX	V90U1803C	40	18		4.0																	4.124		TACAN 2 GND STA CHAN	X	
048	TAC 2 AZ	V95H0208C	36	19		7.2																	4.23		TACAN 2 AZIMUTH	X	
049	TAC 2 RNG	V95H0202C	36	20		7.2																	4.23		TACAN 2 RANGE	X	
050	TAC 2 AZ (S)	V94J2015C	43	19		1.0																	5.7		TACAN 2 AZIMUTH STATUS	X	
051	TAC 2 RNG (S)	V94J2025C	43	20		1.0																	5.7		TACAN 2 RANGE STATUS	X	
052	TAC 3 XXX	V90U1804C	48	18		4.0																	4.124		TACAN 3 GND STA CHAN	X	
053	TAC 3 AZ	V95H0209C	44	19		7.2																	4.23		TACAN 3 AZIMUTH	X	
054	TAC 3 RNG	V95H0203C	44	20		7.2																	4.23		TACAN 3 RANGE	X	
055	TAC 3 AZ (S)	V94J2016C	51	19		1.0																	5.7		TACAN 3 AZIMUTH STATUS	X	
056	TAC 3 RNG (S)	V94J2026C	51	20		1.0																	5.7		TACAN 3 RANGE STATUS	X	
057*	TAC 1 DES 31	V93X4411X	35	21		1.0																	S	KYBD	TACAN 1 DES CMD	X	
058*	TAC 2 DES 32	V93X4413X	43	21		1.0																	S	KYBD	TACAN 2 DES CMD	X	
059*	TAC 3 DES 33	V93X4415X	51	21		1.0																	S	KYBD	TACAN 3 DES CMD	X	
060	XXXX(TAC SELF TEST)	V95X5006X	47	22		4.0	TEST																R	4.43		TACAN SELF TEST IN PROGRESS	X

Table 4.2.9-2A. HORIZ SIT (PFS) CRT DISPLAY PROCESSING - UNIQUE FOR 0 OR 1 GPS RECEIVER INSTALLED

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A Z E S	I N T E N S I T Y	F L A T E N E S S	R A T E	S I G N A L	L E V E L	B A N D W I D T H	D E L T A	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																TYPE
							1	0															
061	ABS 34	V95X0227X	35	22		1.0	*												Q	UPP	TACAN/GPS ABS/DELTA DATA IND	X	
062*	DELTA 35	V95X0227X	45	22		1.0		*											Q	UPP	TACAN/GPS ABS/DELTA DATA IND	X	
063	GPS RN/AZ/H (S)	V94X1046X	31	23		1.0													CC	3	UPP	GPS 2 RNG/AZ/ALT STATUS	
064	GPS RN	V94H1044C	35	23		7.1			NM										CC		UPP	GPS 2 RNG TO SEL TAC STA	
065	GPS AZ	V94H1043C	45	23		7.2			DEG										CC		UPP	GPS 2 AZ TO SEL TAC STA	
066	GPS H	V94H1045C	46	24		6.1			KFT										CC		UPP	GPS 2 ALT TO LDG SITE THRESH	

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Table 4.2.9-2B. HORIZ SIT (PFS) CRT DISPLAY PROCESSING - UNIQUE FOR 3 GPS RECEIVERS INSTALLED

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B A N K	S I Z E S	I N T E R S	F L A T E N E S	R A T E	S L E E P M O D E	L E A R N I N G	B E C A U S E	D I S T R I B U T I O N	Add Ref	Source	Nomenclature	C R T		
			X	Y		CHAR	BILEVEL																	TYPE	
							1	0																	
001	G&N (CONE IND) 6	V95J0153C	5	11		1.0														H, J	UPP	R/L CONE IND	X		
002	G&N(OVHD/STRTIND) 6	V95X0154X	7	11		4.0															I	UPP	OVHD/STRT IND	X	
003	HSI	V90J0981C	5	12		1.0															H, K	AREA NAV	L HSI L/R HAC IND-PRI	X	
004	XEP 7	V93X4466X	1	13		1.0	N	M														KYBD	ENTRY POINT SWITCH CMD	X	
005	AIM XXXX 8	V93X4476X	7	14		4.0	CLSE	NOM														KYBD	HEAD WIND HI/LO CMD	X	
006	S/B XXXXX 39	V93J0996C	6	15		5.0																Y, Z	6.21	SHORT RUNWAY OPTION	
007	P (GPS POS CHAR)	ADDENDUM	6	18		1.0																EE, GG	4.21	SEL GPS POS CHARACTER	
008	GPS RESID	V94H0976C	7	18		6.2			NM													EE	4.21	SEL GPS MAX POS RESIDUAL	
009	GPS POS RATIO	V94U6047C	12	18		5.1																EE	4.21	SEL GPS POS RES RATIO	
010	GPS POS RATIO (S)	V94J6048C	17	18		1.0																EE 6	4.21	SEL GPS POS RES RATIO STATUS	
011	V (GPS VEL CHAR)	ADDENDUM	6	19		1.0																EE, GG	4.21	SEL GPS VEL CHARACTER	
012	GPS VEL RESID	V94L6049C	7	19		6.1			FT/S													EE	4.21	SEL GPS VEL RESIDUAL	
013	GPS VEL RATIO	V94U6050C	12	19		5.1																EE	4.21	SEL GPS VEL RES RATIO	
014	GPS VEL RATIO (S)	V94J6051C	17	19		1.0																EE 6	4.21	SEL GPS VEL RES RATIO STATUS	
015	GPS (TO NAV) AUT 42	V90J3463C	20	19		1.0																N	NAV	GPS TO NAV AUTO/INHIBIT/FORCE FDBK	
016	GPS (TO NAV) INH 43	V90J3463C	23	19		1.0																N	NAV	GPS TO NAV AUTO/INHIBIT/FORCE FDBK	
017	GPS (TO NAV) FOR 44	V90J3463C	26	19		1.0																N	NAV	GPS TO NAV AUTO/INHIBIT/FORCE FDBK	
018	DRAG H RESID	V90A0711C	7	20		6.0			FT													O	NAV	DRAG ALT/RR R DOT MEAS RESIDUAL	X
019	DRAG H RATIO	V90U0713C	12	20		5.1																O	NAV	DRAG ALT/RR R DOT RESID RATIO	X
020	DRAG H RATIO (S)	V90X0712X	17	20		1.0																O 3	NAV	DRAG ALT/RR R DOT EDIT HIST IND	X
021	DRAG H AUT 22	V93J5013C	20	20		1.0																N, O	KYBD	DRAG H A/I/F EDIT CMD	X
022*	DRAG H INH 23	V93J5013C	23	20		1.0																N, O	KYBD	DRAG H A/I/F EDIT CMD	X
023*	DRAG H FOR 24	V93J5013C	26	20		1.0																N, O	KYBD	DRAG H A/I/F EDIT CMD	X
024	ADTA H RESID	V90H0221C	7	21		6.0			FT													P	NAV	BARO ALT/RR RNG MEAS RESIDUAL	X
025	ADTA H RATIO	V90U0222C	12	21		5.1																P	NAV	BARO ALT/RR RNG RESID RATIO	X
026	ADTA H RATIO (S)	V90X0223X	17	21		1.0																P 3	NAV	BARO ALT/RR RNG EDIT HIST IND	X
027	ADTA H AUT 25	V93J4473C	20	21		1.0																P, N	KYBD	ADTA A/I/F EDIT CMD	X
028*	ADTA H INH 26	V93J4473C	23	21		1.0																P, N	KYBD	ADTA A/I/F EDIT CMD	X
029*	ADTA H FOR 27	V93J4473C	26	21		1.0																P, N	KYBD	ADTA A/I/F EDIT CMD	X
030	MLS AUT 50	V93J1629C	20	22		1.0																N	KYBD	MLS A/I/F EDIT CMD	X

Table 4.2.9-2B. HORIZ SIT (PFS) CRT DISPLAY PROCESSING - UNIQUE FOR 3 GPS RECEIVERS INSTALLED

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A Z E S	I N T E N S I T Y	F L A G S	R E S E R V E R	S L E E P M O D E	L E A R N I N G	B A N D W I D T H	D I S T A N C E	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																TYPE
							1	0															
031*	MLS INH 51	V93J1629C	23	22		1.0													N	KYBD	MLS A/I/F EDIT CMD	X	
032*	MLS FOR 52	V93J1629C	26	22		1.0													N	KYBD	MLS A/I/F EDIT CMD	X	
033	GPS (TO G&C) (S)	V94X1041X	17	23		1.0													N 3	NAV	GPS TO G&C EXEC STATUS		
034	GPS (TO G&C) AUT 47	V94J1042C	20	23		1.0													N	NAV	GPS TO G&C AUT/INH/FOR FLAG FDBK		
035	GPS (TO G&C) INH 48	V94J1042C	23	23		1.0													N	NAV	GPS TO G&C AUT/INH/FOR FLAG FDBK		
036	GPS (TO G&C) FOR 49	V94J1042C	26	23		1.0													N	NAV	GPS TO G&C AUT/INH/FOR FLAG FDBK		
037	GPS 1 (S)	V94X1037X	32	18		1.0	*												LL	4.21	GPS 1 SEL		
038	GPS 1 DISPLAY STATUS	V94J6090C	32	18		1.0				X									LL 8	5.7	GPS 1 DISPLAY STATUS		
039	GPS 1 STAT XXXX	V94J0932C	34	18		4.0					X		A						JJ	4.17	GPS 1 RCVR STATUS FOR DISPLAY		
040	GPS 2 (S)	V94X1038X	39	18		1.0	*												LL	4.21	GPS 2 SEL		
041	GPS 2 DISPLAY STATUS	V94J6091C	39	18		1.0				X									LL 8	5.7	GPS 2 DISPLAY STATUS		
042	GPS 2 STAT XXXX	V94J0933C	41	18		4.0					X		A						JJ	4.17	GPS 2 RCVR STATUS FOR DISPLAY		
043	GPS 3 (S)	V94X1039X	46	18		1.0	*												LL	4.21	GPS 3 SEL		
044	GPS 3 DISPLAY STATUS	V94J6092C	46	18		1.0				X									LL 8	5.7	GPS 3 DISPLAY STATUS		
045	GPS 3 STAT XXXX	V94J0934C	48	18		4.0					X		A						JJ	4.17	GPS 3 RCVR STATUS FOR DISPLAY		
046	GPS 1 EF REL VEL	V94L6042C	31	19		6.2													KK	NAV	GPS 1 EF RELATIVE VELOCITY		
047	GPS 2 EF REL VEL	V94L6043C	38	19		6.2													KK	NAV	GPS 2 EF RELATIVE VELOCITY		
048	GPS 3 EF REL VEL	V94L6044C	45	19		6.2													KK	NAV	GPS 3 EF RELATIVE VELOCITY		
049	P 1σ (GPS 1 QA1 FOM)	V94H1082C	31	20		6.0					X								HH,OO, RR	4.17, 4.21	GPS 1 NAV FOM		
050	GPS 1 QA1 FOM (S)	V94X1155X	37	20		1.0					X								OO,RR, UU 3	4.17, 4.21	GPS 1 FAIL FOM DISP		
051	P 1σ (GPS 2 QA1 FOM)	V94H1083C	38	20		6.0					X								HH,PP, SS	4.17, 4.21	GPS 2 NAV FOM		
052	GPS 2 QA1 FOM (S)	V94X1156X	44	20		1.0					X								PP,SS, UU 3	4.17, 4.21	GPS 2 FAIL FOM DISP		
053	P 1σ (GPS 3 QA1 FOM)	V94H1084C	45	20		6.0					X								HH,QQ, TT	4.17, 4.21	GPS 3 NAV FOM		
054	GPS 3 QA1 FOM (S)	V94X1157X	51	20		1.0					X								QQ,TT, UU 3	4.17, 4.21	GPS 3 FAIL FOM DISP		
055*	GPS 1 DES RCVR 31	V94X0964X	37	21		1.0	*												MM	4.21	DESELECT GPS RCVR 1 FDBK	X	

Table 4.2.9-2B. HORIZ SIT (PFS) CRT DISPLAY PROCESSING - UNIQUE FOR 3 GPS RECEIVERS INSTALLED

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B A N K	S I Z E S	I N T E N S I T Y	F L A T N E S S	R A T E	S I G N A L	L E V E L	B A N D W I D T H	D E L T A	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
056*	GPS 2 DES RCVR 32	V94X0965X	44	21		1.0	*		BLVL											MM	4.21	DESELECT GPS RCVR 2 FDBK	X	
057*	GPS 3 DES RCVR 33	V94X0966X	51	21		1.0	*		BLVL											MM	4.21	DESELECT GPS RCVR 3 FDBK	X	
058	SEL GPS AZ	V94H6037C	28	24		4.0			DEC	DEG	X									II	UPP	SEL GPS AZ TO LDG SITE THRESH		
059	SEL GPS RNG	V94H6038C	34	24		7.1			DEC	NM	X									II	UPP	SEL GPS RNG TO LDG SITE THRESH		
060	SEL GPS ALT	V94H6036C	43	24		6.1			DEC	KFT	X									II	UPP	SEL GPS ALT TO LDG SITE THRESH		

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Table 4.2.9-3.HORIZONTAL SITUATION (PFS) CRT DISPLAY PROCESSING
BACKGROUND REQUIREMENTS: DESIGN DEPENDENT

^a Design Dependent Constants				
Description	Symbol	Value	Type	Units
Shuttle symbol nose position in X coordinates	HXOT	512	I	AU
Shuttle symbol nose position in Y coordinates	HYOT	419	I	AU
^a Vectors				
	ORIGIN		TERMINAL	
Vector ID	X (AU)	Y (AU)	X (AU)	Y (AU)
Horizontal Scale	450	95	770	95
Vertical Scale	807	419	807	175
^{a, b} Characters				
Description	Symbol	X (AU)	Y (AU)	
Time to HAC Intercept Ticks	18	^c TGO_TICK_LOC(I)	100	
Time to HAC Intercept Labels	^c TGO_LABEL(I)	^c TGO_TICK_LOC(I)	128	
ⁱ Xtrack Error Ticks	18	^d XTRACK_TICK_LOC(J)	100	
^f Xtrack Error Zero Tick	18		100	
Xtrack Error Label	XTRACK_LABEL	610	128	
Xtrack Error Label	XTRACK_LABEL	450	128	
^j Xtrack Error Label	30	770	128	
Xtrack Error Zero Label	2D	610	^e HERROR_TICK_LOC(K)	
ⁱ Altitude Error Ticks	2D	807	297	
^f Altitude Error Zero Tick	HERROR_LABEL	807	419	
Altitude Error Label	HERROR_LABEL	770	175	
^g Altitude Error Label	30	770	297	
^g Altitude Error Label		770		
Altitude Error Zero Label				
^{a, b} Dynamic Symbols				
Time to HAC Intercept	06	TGO_XTRACK_DISP	95	
Radial Error/Y Position	0E	TGO_XTRACK_DISP	95	
Altitude Error	1F	807	HERROR_DISP	

NOTES:

- ^a X, Y positions of design dependent data are with respect to the origin being at upper left corner of CRT.
- ^b Refer to Volume III Section B.5.7 HORIZ SIT SPEC for computation of time to HAC intercept symbol location, tick and label locations, radial error/y position, and altitude error symbol locations, tick locations, and tick labels. The time to HAC intercept labels (TGO_LABEL(I)) are I-Loads.
- ^c I ranges from 1 to 5 such that 5 ticks and 5 labels may be displayed on the time to HAC intercept scale.
- ^d J ranges from 1 to XTRACK_NO_DIV + 1 (max of 11) to compute the location of the ticks to be displayed when DO_RERRC_DISPLAY = ON or DO_Y_DISPLAY = ON, XTRACK_NO_DIV is an I-Load which controls the number of ticks displayed. The 11 MSIDs for the Xtrack Error ticks shall be initialized such that only XTRACK_NO_DIV + 1 ticks are displayed once their locations are computed in the HORIZ_SIT_SPEC.

Table 4.2.9-3. HORIZONTAL SITUATION (PFS) CRT DISPLAY PROCESSING
BACKGROUND REQUIREMENTS: DESIGN DEPENDENT

- ^e K ranges from 1 to HERROR_NO_DIV + 1 (max of 11) to compute the location of the ticks to be displayed on the altitude error scale. HERROR_NO_DIV is an I-Load which controls the number of ticks displayed. The 11 MSIDs for the Altitude Error ticks shall be initialized such that only HERROR_NO_DIV + 1 ticks are displayed once their locations are computed in the HORIZ_SIT_SPEC.
- ^f The Altitude Error Zero Tick and Xtrack Error Zero Tick in the table above are displayed in addition to the computed Altitude Error Ticks and Xtrack Error Ticks such that the ticks at the zero point is overbright. Note that HERROR_NO_DIV and XTRACK_NO_DIV must be I-Loaded as even numbers so that the Zero Tick and the computed zero tick reside in the same location, resulting in overbright ticks at the zero point on the scales. The Xtrack Error Ticks shall be displayed when DO_RERRC_DISPLAY = ON or DO_Y_DISPLAY = ON.
- ^g The X, Y locations of the altitude error labels are the location of the center of the last character in the label. The labels should not have any trailing blanks.
- ^h The X, Y location of symbol 06 is the location of the lowest point on the downward pointing triangle. Symbol 0E shall be rotated “nose North” and the X, Y location listed in the location of the trail. The X, Y location of symbol 1F is the location of the tip of the arrow.
- ⁱ Xtrack Error Ticks and Altitude Error Ticks shall be initialized off the display.
- ^j Xtrack Error Label I-Loads should not have any leading blanks.

Table 4.2.9-3A. HORIZONTAL SITUATION (PFS) CRT DISPLAY PROCESSING
BACKGROUND REQUIREMENTS – COMMON FOR ALL CONFIGURATIONS

The HORIZ SIT Display shall display the following virtual display for all configurations.

Virtual Display Name	Virtual Display Number
Horizontal Situation Display Common Background	099 Hex

Table 4.2.9-3B. HORIZONTAL SITUATION (PFS) CRT DISPLAY PROCESSING
BACKGROUND REQUIREMENTS – UNIQUE FOR 0 OR 1 GPS RECEIVER
INSTALLED (3 TACANs)

The HORIZ SIT Display shall display the following virtual display when
GPS_INSTALLED = (0,0,0) or GPS_INSTALLED = (0,1,0).

Virtual Display Name	Virtual Display Number
Horizontal Situation Display 3–TACAN Background	09A Hex

Table 4.2.9-3C. HORIZONTAL SITUATION (PFS) CRT DISPLAY PROCESSING
BACKGROUND REQUIREMENTS – UNIQUE FOR 3 GPS RECEIVERS INSTALLED

The HORIZ SIT Display shall display the following virtual display when
GPS_INSTALLED = (1,1,1).

Virtual Display Name	Virtual Display Number
Horizontal Situation Display 3–GPS Background	09B Hex

TABLE 4.2.9-5. INPUT FUNCTIONAL PARAMETERS FOR HORIZONTAL SITUATION DISPLAY (REF 5.7 SPEC.) (G6.21)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
AIR_DATA_AIF	V93J5014C	ADTA TO G&C A/I/F CMD	HORIZ SIT DISP		HXS		93017G	*
AREA_SEL	V93J4392C	SELECTED AREA	HORIZ SIT DISP				93090E	
AREA_SEL	V93J4392CA	SELECTED AREA	ENT SITE LOOKUP				93090E	
AREA_SEL	V93J4392CB	SELECTED AREA	ASC SITE LOOKUP				93017G	*
AREA_SEL	V93J4392CC	SELECTED AREA	ASC BRG DISP				93090E	
AREA_SEL	V93J4392CD	SELECTED AREA	ENT BRG DISP				93090E	
AUTO_CHANNEL_ID	V95J5022CA	AUTO TACAN CHANNEL SELECTION	ENT SITE LOOKUP					
AUTO_CHANNEL_ID	V95J5022CB	AUTO TACAN CHANNEL SELECTION	ASC SITE LOOKUP					
BARO	V93H5005C	ALT SET TO FLD PRESS CORR TO MSL	HORIZ SIT DISP	INHG	VAR			
BARO_AIF	V93J4473C	ADTA A/I/F EDIT CMD	HORIZ SIT DISP		HXS		93017G	*
BRGDIL	V90X3603X	TACAN BEARING DILEMMA FLAG	TACAN RM		BD		93017G	*
BRGFAIL(1)	V90X3608X	TACAN BEARING 1 FAIL	TACAN RM		BD		93017G	*
BRGFAIL(2)	V90X3708X	TACAN BEARING 2 FAIL	TACAN RM		BD		93017G	*
BRGFAIL(3)	V90X3808X	TACAN BEARING 3 FAIL	TACAN RM		BD		93017G	*
CONT_2EO_START	V93X6681XA	CONTINGENCY 2-ENG OUT START FLAG	XXXXXX TRAJ 1 DISP		BD		93017G	*
CONT_2EO_START	V93X6681XB	CONTINGENCY 2-ENG OUT START FLAG	PW CONT GUID		BD		93090E	
CONT_2EO_START	V93X6681XC	CONTINGENCY 2-ENG OUT START FLAG	XXXXXX TRAJ 2 DISP		BD		93017G	*
CONT_2EO_START	V93X6681XD	CONTINGENCY 2-ENG OUT START FLAG	RTLS TRAJ 2 DISP		BD		93017G	*
CONT_3EO_START	V90X0909X	CONTINGENCY 3 E/O START FLAG	CONT 3E/O GUID		BD		93017G	*
CREW_DESELECT_RCVR(1)	V93X1205XA	DESELECT GPS 1 RCVR CMD	GPS STATUS DISP		BD		92817C	
CREW_DESELECT_RCVR(1)	V93X1205XC	DESELECT GPS 1 RCVR CMD	REL NAV DISP		BD		92817C	
CREW_DESELECT_RCVR(2)	V93X1206XA	DESELECT GPS 2 RCVR CMD	GPS STATUS DISP		BD		92817C	
CREW_DESELECT_RCVR(2)	V93X1206XC	DESELECT GPS 2 RCVR CMD	REL NAV DISP		BD		92817C	
CREW_DESELECT_RCVR(3)	V93X1207XA	DESELECT GPS 3 RCVR CMD	GPS STATUS DISP		BD		92817C	
CREW_DESELECT_RCVR(3)	V93X1207XC	DESELECT GPS 3 RCVR CMD	REL NAV DISP		BD		92817C	
CREW_DES_RCVR_RCVD(1)	V94X0964X	DESELECT GPS RCVR 1 FDBK	GPS RCVR STATE PROC		BD		92067D	
CREW_DES_RCVR_RCVD(2)	V94X0965X	DESELECT GPS RCVR 2 FDBK	GPS RCVR STATE PROC		BD		92067D	
CREW_DES_RCVR_RCVD(3)	V94X0966X	DESELECT GPS RCVR 3 FDBK	GPS RCVR STATE PROC		BD		92067D	
DELR_RATIO_GPS_SEL	V94H6047C	SEL GPS POS RES RATIO	GPS RCVR STATE PROC		SPL		92067D	
DELR_RATIO_GPS_SEL_ST	V94J6048C	SEL GPS POS RES RATIO STATUS	GPS RCVR STATE PROC		VAR		92067D	
DELR_SV_SEL	V94H0976C	SEL GPS MAX POS RESIDUAL	GPS RCVR STATE PROC	NM	SPL		91051K	
DELTA_RATIO_SV_SEL	V94U0973C	SEL GPS MAX RES RATIO	GPS RCVR STATE PROC		SPL		91051K	
DELTA_RATIO_SV_SEL_IND	V94X0974X	SEL GPS MAX RES RATIO IND	GPS RCVR STATE PROC		BD		91051K	
DELTA_RATIO_SV_SEL_STAT	V94J0975C	SEL GPS MAX RES RATIO STATUS	GPS RCVR STATE PROC		VAR		91051K	
DELTA_T	V93W5035CA	DELTA T UPDATE	HORIZ SIT DISP	S				
DELTA_T	V93W5035CB	DELTA T UPDATE	ENT NAV	S				

TABLE 4.2.9-5. INPUT FUNCTIONAL PARAMETERS FOR HORIZONTAL SITUATION DISPLAY (REF 5.7 SPEC.) (G6.21)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
DELV_GPS_SEL	V94L6049C	SEL GPS VEL RESIDUAL	GPS RCVR STATE PROC	FT/S	SPL		92067D	
DELV_RATIO_GPS_SEL	V94L6050C	SEL GPS VEL RES RATIO	GPS RCVR STATE PROC		SPL		92067D	
DELV_RATIO_GPS_SEL_ST	V94J6051C	SEL GPS VEL RES RATIO STATUS	GPS RCVR STATE PROC		VAR		92067D	
DISP_DELQ(1)	V90H0212CA	TAC AZ/OPTICS H/X/AZ MEAS RESIDUAL	RTLS NAV	RAD			93017G	*
DISP_DELQ(1)	V90H0212CB	TAC AZ/OPTICS H/X/AZ MEAS RESIDUAL	PRELAND NAV	RAD			93017G	*
DISP_DELQ(1)	V90H0212CC	TAC AZ/OPTICS H/X/AZ MEAS RESIDUAL	ENT NAV	RAD			93017G	*
DISP_DELQ(2)	V90H0214CA	TAC R/OPTICS V/Y/EL MEAS RESIDUAL	RTLS NAV	NM			93017G	*
DISP_DELQ(2)	V90H0214CB	TAC R/OPTICS V/Y/EL MEAS RESIDUAL	PRELAND NAV	NM			93017G	*
DISP_DELQ(2)	V90H0214CC	TAC R/OPTICS V/Y/EL MEAS RESIDUAL	ENT NAV	NM			93017G	*
DISP_DELQ(3)	V90H0221CA	BARO ALT/RR RNG MEAS RESIDUAL	RTLS NAV	FT			93017G	*
DISP_DELQ(3)	V90H0221CB	BARO ALT/RR RNG MEAS RESIDUAL	PRELAND NAV	FT			93017G	*
DISP_DELQ(3)	V90H0221CC	BARO ALT/RR RNG MEAS RESIDUAL	ENT NAV					
DISP_DELQ(4)	V90A0711CA	DRAG ALT/RR R DOT MEAS RESIDUAL	ENT NAV	FT			93017G	*
DISP_DELQ(4)	V90A0711CB	DRAG ALT/RR R DOT MEAS RESIDUAL	RTLS NAV	FT			93017G	*
DISP_EDIT(1)	V90X0213XA	TAC AZ/OPTICS H/X/AZ EDIT HIST IND	RTLS NAV				93017G	*
DISP_EDIT(1)	V90X0213XB	TAC AZ/OPTICS H/X/AZ EDIT HIST IND	PRELAND NAV				93017G	*
DISP_EDIT(1)	V90X0213XC	TAC AZ/OPTICS H/X/AZ EDIT HIST IND	ENT NAV				93017G	*
DISP_EDIT(2)	V90X0215XA	TAC R/OPTICS V/Y/EL EDIT HIST IND	RTLS NAV				93017G	*
DISP_EDIT(2)	V90X0215XB	TAC R/OPTICS V/Y/EL EDIT HIST IND	PRELAND NAV				93017G	*
DISP_EDIT(2)	V90X0215XC	TAC R/OPTICS V/Y/EL EDIT HIST IND	ENT NAV				93017G	*
DISP_EDIT(3)	V90X0223XA	BARO ALT/RR RNG EDIT HIST IND	RTLS NAV				93017G	*
DISP_EDIT(3)	V90X0223XB	BARO ALT/RR RNG EDIT HIST IND	PRELAND NAV				93017G	*
DISP_EDIT(3)	V90X0223XC	BARO ALT/RR RNG EDIT HIST IND	ENT NAV					
DISP_EDIT(4)	V90X0712XA	DRAG ALT/RR R DOT EDIT HIST IND	ENT NAV					
DISP_EDIT(4)	V90X0712XB	DRAG ALT/RR R DOT EDIT HIST IND	RTLS NAV					
DISP_SIG(1)	V90U0216CA	TAC AZ/OPTICS H/X/AZ RESID RATIO	RTLS NAV				93017G	*
DISP_SIG(1)	V90U0216CB	TAC AZ/OPTICS H/X/AZ RESID RATIO	PRELAND NAV				93017G	*
DISP_SIG(1)	V90U0216CC	TAC AZ/OPTICS H/X/AZ RESID RATIO	ENT NAV				93017G	*
DISP_SIG(2)	V90U0217CA	TAC R/OPTICS V/Y/EL RESID RATIO	RTLS NAV				93017G	*
DISP_SIG(2)	V90U0217CB	TAC R/OPTICS V/Y/EL RESID RATIO	PRELAND NAV				93017G	*
DISP_SIG(2)	V90U0217CC	TAC R/OPTICS V/Y/EL RESID RATIO	ENT NAV				93017G	*
DISP_SIG(3)	V90U0222CA	BARO ALT/RR RNG RESID RATIO	RTLS NAV				93017G	*
DISP_SIG(3)	V90U0222CB	BARO ALT/RR RNG RESID RATIO	PRELAND NAV				93017G	*
DISP_SIG(3)	V90U0222CC	BARO ALT/RR RNG RESID RATIO	ENT NAV					
DISP_SIG(4)	V90U0713CA	DRAG ALT/RR R DOT RESID RATIO	ENT NAV				93017G	*
DISP_SIG(4)	V90U0713CB	DRAG ALT/RR R DOT RESID RATIO	RTLS NAV					
DO_HERROR_DISPLAY	V90X0369X	DISPLAY HERROR FLAG	HORIZ SIT SPEC		BD		90960E	
DO_RERRC_DISPLAY	V90X0184X	DISPLAY RADIAL ERROR FLAG	HORIZ SIT SPEC		BD		90960E	
DO_TGO_DISPLAY	V90X0368X	DISPLAY TIME TO HAC INTERCEPT FLAG	HORIZ SIT SPEC		BD		90960E	
DO_Y_DISPLAY	V90X0185X	DISPLAY Y POSITION FLAG	HORIZ SIT SPEC		BD		90960E	
DR_RW(1)	V93H5010CA	NAV UPDATE DELTA X POSITION	HORIZ SIT DISP	FT				
DR_RW(1)	V93H5010CB	NAV UPDATE DELTA X POSITION	ENT NAV	FT				
DR_RW(1)	V93H5010CC	NAV UPDATE DELTA X POSITION	PRELAND NAV	FT				
DR_RW(1)	V93H5010CD	NAV UPDATE DELTA X POSITION	RTLS NAV	FT				
DR_RW(1)	V93H5010CE	NAV UPDATE DELTA X POSITION	ASC NAV	FT				
DR_RW(2)	V93H5011CA	NAV UPDATE DELTA Y POSITION	HORIZ SIT DISP	FT				

TABLE 4.2.9-5. INPUT FUNCTIONAL PARAMETERS FOR HORIZONTAL SITUATION DISPLAY (REF 5.7 SPEC.) (G6.21)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
DR_RW(2)	V93H5011CB	NAV UPDATE DELTA Y POSITION	ENT NAV	FT				
DR_RW(2)	V93H5011CC	NAV UPDATE DELTA Y POSITION	PRELAND NAV	FT				
DR_RW(2)	V93H5011CD	NAV UPDATE DELTA Y POSITION	RTLS NAV	FT				
DR_RW(2)	V93H5011CE	NAV UPDATE DELTA Y POSITION	ASC NAV	FT				
DR_RW(3)	V93H5012CA	NAV UPDATE DELTA Z POSITION	HORIZ SIT DISP	FT				
DR_RW(3)	V93H5012CB	NAV UPDATE DELTA Z POSITION	ENT NAV	FT				
DR_RW(3)	V93H5012CC	NAV UPDATE DELTA Z POSITION	PRELAND NAV	FT				
DR_RW(3)	V93H5012CD	NAV UPDATE DELTA Z POSITION	RTLS NAV	FT				
DR_RW(3)	V93H5012CE	NAV UPDATE DELTA Z POSITION	ASC NAV	FT				
DV_RW(1)	V93L5020CA	NAV UPDATE DELTA X VELOCITY	HORIZ SIT DISP	FT/S				
DV_RW(1)	V93L5020CB	NAV UPDATE DELTA X VELOCITY	ENT NAV	FT/S				
DV_RW(1)	V93L5020CC	NAV UPDATE DELTA X VELOCITY	PRELAND NAV	FT/S				
DV_RW(1)	V93L5020CD	NAV UPDATE DELTA X VELOCITY	RTLS NAV	FT/S				
DV_RW(1)	V93L5020CE	NAV UPDATE DELTA X VELOCITY	ASC NAV	FT/S				
DV_RW(2)	V93L5021CA	NAV UPDATE DELTA Y VELOCITY	HORIZ SIT DISP	FT/S				
DV_RW(2)	V93L5021CB	NAV UPDATE DELTA Y VELOCITY	ENT NAV	FT/S				
DV_RW(2)	V93L5021CC	NAV UPDATE DELTA Y VELOCITY	PRELAND NAV	FT/S				
DV_RW(2)	V93L5021CD	NAV UPDATE DELTA Y VELOCITY	RTLS NAV	FT/S				
DV_RW(2)	V93L5021CE	NAV UPDATE DELTA Y VELOCITY	ASC NAV	FT/S				
DV_RW(3)	V93L5022CA	NAV UPDATE DELTA Z VELOCITY	HORIZ SIT DISP	FT/S				
DV_RW(3)	V93L5022CB	NAV UPDATE DELTA Z VELOCITY	ENT NAV	FT/S				
DV_RW(3)	V93L5022CC	NAV UPDATE DELTA Z VELOCITY	PRELAND NAV	FT/S				
DV_RW(3)	V93L5022CD	NAV UPDATE DELTA Z VELOCITY	RTLS NAV	FT/S				
DV_RW(3)	V93L5022CE	NAV UPDATE DELTA Z VELOCITY	ASC NAV	FT/S				
ENT_PT_SW/NEP	V93X4466X	ENTRY POINT SWITCH CMD	HORIZ SIT DISP		BD		89250B	
FOM_GDOP_STATIC(1)	V94X6142X	GPS 1 FOM/GDOP STATIC FLAG	GPS SOP		BD		92369B	
FOM_GDOP_STATIC(2)	V94X6143X	GPS 2 FOM/GDOP STATIC FLAG	GPS SOP		BD		92369B	
FOM_GDOP_STATIC(3)	V94X6144X	GPS 3 FOM/GDOP STATIC FLAG	GPS SOP		BD		92369B	
FOM_NAV(1)	V94H1082CA	GPS 1 NAV FOM	GPS RCVR STATE PROC		HXS		92067D	
FOM_NAV(1)	V94H1082CB	GPS 1 NAV FOM	GPS SOP		HXS		92067D	
FOM_NAV(2)	V94H1083CA	GPS 2 NAV FOM	GPS RCVR STATE PROC		HXS		92067D	
FOM_NAV(2)	V94H1083CB	GPS 2 NAV FOM	GPS SOP		HXS		92067D	
FOM_NAV(3)	V94H1084CA	GPS 3 NAV FOM	GPS RCVR STATE PROC		HXS		92067D	
FOM_NAV(3)	V94H1084CB	GPS 3 NAV FOM	GPS SOP		HXS		92067D	
GI_CHANGE	V93X4476X	HEAD WIND HI/LO CMD	HORIZ SIT DISP		BD		93017G	*
GPS_AIF_EXEC	V94X1041XA	GPS TO G&C EXEC STATUS	ENT NAV		BD		91051K	
GPS_AIF_EXEC	V94X1041XB	GPS TO G&C EXEC STATUS	PRELAND NAV		BD		91051K	
GPS_AIF_EXEC	V94X1041XD	GPS TO G&C EXEC STATUS	RTLS NAV		BD		92067D	
GPS_AIF_RCVD	V94J1042CA	GPS TO G&C AUT/INH/FOR FLAG FDBK	ENT NAV		HXS		91051K	
GPS_AIF_RCVD	V94J1042CB	GPS TO G&C AUT/INH/FOR FLAG FDBK	PRELAND NAV		HXS		91051K	
GPS_AIF_RCVD	V94J1042CD	GPS TO G&C AUT/INH/FOR FLAG FDBK	RTLS NAV		HXS		92067D	
GPS_ALT(2)	V94H1045CA	GPS 2 ALT TO LDG SITE THRESH	ENT UPP	KFT	SPL		91051K	
GPS_ALT(2)	V94H1045CB	GPS 2 ALT TO LDG SITE THRESH	TAEM UPP	KFT	SPL		91051K	
GPS_ALT(2)	V94H1045CC	GPS 2 ALT TO LDG SITE THRESH	A/L UPP	KFT	SPL		91051K	
GPS_ALT(2)	V94H1045CD	GPS 2 ALT TO LDG SITE THRESH	RTLS UPP	KFT	SPL		91051K	
GPS_AZ(2)	V94H1043CA	GPS 2 AZ TO SEL TAC STA	ENT UPP	DEG	SPL		91051K	

TABLE 4.2.9-5. INPUT FUNCTIONAL PARAMETERS FOR HORIZONTAL SITUATION DISPLAY (REF 5.7 SPEC.) (G6.21)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
GPS_AZ(2)	V94H1043CB	GPS 2 AZ TO SEL TAC STA	TAEM UPP	DEG	SPL		91051K	
GPS_AZ(2)	V94H1043CC	GPS 2 AZ TO SEL TAC STA	A/L UPP	DEG	SPL		91051K	
GPS_AZ(2)	V94H1043CD	GPS 2 AZ TO SEL TAC STA	RTLS UPP	DEG	SPL		91051K	
GPS_DG_SF(1)	V94X0986X	GPS 1 DG NAV	GPS RCVR STATE PROC		BD		92369B	
GPS_DG_SF(2)	V94X0987X	GPS 2 DG NAV	GPS RCVR STATE PROC		BD		92369B	
GPS_DG_SF(3)	V94X0988X	GPS 3 DG NAV	GPS RCVR STATE PROC		BD		92369B	
GPS_DISP_FAIL_DIL(1)	V94J6090CA	GPS 1 DISPLAY STATUS	HORIZ SIT SPEC		VAR		92067D	
GPS_DISP_FAIL_DIL(2)	V94J6091CA	GPS 2 DISPLAY STATUS	HORIZ SIT SPEC		VAR		92067D	
GPS_DISP_FAIL_DIL(3)	V94J6092CA	GPS 3 DISPLAY STATUS	HORIZ SIT SPEC		VAR		92067D	
GPS_FAIL_FOM_DISP(1)	V94X1155XA	GPS 1 FAIL FOM DISP	GPS RCVR STATE PROC		BD		92067D	
GPS_FAIL_FOM_DISP(1)	V94X1155XB	GPS 1 FAIL FOM DISP	GPS SOP		BD		92067D	
GPS_FAIL_FOM_DISP(2)	V94X1156XA	GPS 2 FAIL FOM DISP	GPS RCVR STATE PROC		BD		92067D	
GPS_FAIL_FOM_DISP(2)	V94X1156XB	GPS 2 FAIL FOM DISP	GPS SOP		BD		92067D	
GPS_FAIL_FOM_DISP(3)	V94X1157XA	GPS 3 FAIL FOM DISP	GPS RCVR STATE PROC		BD		92067D	
GPS_FAIL_FOM_DISP(3)	V94X1157XB	GPS 3 FAIL FOM DISP	GPS SOP		BD		92067D	
GPS_RA_RCVD	V94X0931X	GPS RA FLAG FDBK	GPS SOP		BD		91051K	
GPS_RCVR_STATUS(1)	V94J0932C	GPS 1 RCVR STATUS FOR DISPLAY	GPS SOP		VAR		92067D	
GPS_RCVR_STATUS(2)	V94J0933C	GPS 2 RCVR STATUS FOR DISPLAY	GPS SOP		VAR		92067D	
GPS_RCVR_STATUS(3)	V94J0934C	GPS 3 RCVR STATUS FOR DISPLAY	GPS SOP		VAR		92067D	
GPS_RNG(2)	V94H1044CA	GPS 2 RNG TO SEL TAC STA	ENT UPP	NM	SPL		91051K	
GPS_RNG(2)	V94H1044CB	GPS 2 RNG TO SEL TAC STA	TAEM UPP	NM	SPL		91051K	
GPS_RNG(2)	V94H1044CC	GPS 2 RNG TO SEL TAC STA	A/L UPP	NM	SPL		91051K	
GPS_RNG(2)	V94H1044CD	GPS 2 RNG TO SEL TAC STA	RTLS UPP	NM	SPL		91051K	
GPS_RN_AZ_H_STAT	V94X1046XA	GPS 2 RNG/AZ/ALT STATUS	ENT UPP		BD		92214A	
GPS_RN_AZ_H_STAT	V94X1046XB	GPS 2 RNG/AZ/ALT STATUS	TAEM UPP		BD		92214A	
GPS_RN_AZ_H_STAT	V94X1046XC	GPS 2 RNG/AZ/ALT STATUS	A/L UPP		BD		92214A	
GPS_RN_AZ_H_STAT	V94X1046XD	GPS 2 RNG/AZ/ALT STATUS	RTLS UPP		BD		92214A	
GPS_SV_SEL_AVAIL	V90X3081XC	GPS SEL STATE VCTR AVAIL FLAG	GPS RCVR STATE PROC		BD		92132C	
GPS_TO_NAV_AIF	V90J3463CA	GPS TO NAV AUTO/INHIBIT/FORCE FDBK	ENT NAV		HXS		92132C	
GPS_TO_NAV_AIF	V90J3463CB	GPS TO NAV AUTO/INHIBIT/FORCE FDBK	PRELAND NAV		HXS		92132C	
GPS_TO_NAV_AIF	V90J3463CD	GPS TO NAV AUTO/INHIBIT/FORCE FDBK	RTLS NAV		HXS		92132C	
GPS_VEL_REL_TO_RW(1)	V94L6042CA	GPS 1 EF RELATIVE VELOCITY	ENT UPP	KFT/S	SPL		92067D	
GPS_VEL_REL_TO_RW(1)	V94L6042CB	GPS 1 EF RELATIVE VELOCITY	TAEM UPP	KFT/S	SPL		92067D	
GPS_VEL_REL_TO_RW(1)	V94L6042CC	GPS 1 EF RELATIVE VELOCITY	A/L UPP	KFT/S	SPL		92067D	
GPS_VEL_REL_TO_RW(1)	V94L6042CD	GPS 1 EF RELATIVE VELOCITY	RTLS UPP	KFT/S	SPL		92067D	
GPS_VEL_REL_TO_RW(2)	V94L6043CA	GPS 2 EF RELATIVE VELOCITY	ENT UPP	KFT/S	SPL		92067D	
GPS_VEL_REL_TO_RW(2)	V94L6043CB	GPS 2 EF RELATIVE VELOCITY	TAEM UPP	KFT/S	SPL		92067D	
GPS_VEL_REL_TO_RW(2)	V94L6043CC	GPS 2 EF RELATIVE VELOCITY	A/L UPP	KFT/S	SPL		92067D	
GPS_VEL_REL_TO_RW(2)	V94L6043CD	GPS 2 EF RELATIVE VELOCITY	RTLS UPP	KFT/S	SPL		92067D	
GPS_VEL_REL_TO_RW(3)	V94L6044CA	GPS 3 EF RELATIVE VELOCITY	ENT UPP	KFT/S	SPL		92067D	
GPS_VEL_REL_TO_RW(3)	V94L6044CB	GPS 3 EF RELATIVE VELOCITY	TAEM UPP	KFT/S	SPL		92067D	
GPS_VEL_REL_TO_RW(3)	V94L6044CC	GPS 3 EF RELATIVE VELOCITY	A/L UPP	KFT/S	SPL		92067D	
GPS_VEL_REL_TO_RW(3)	V94L6044CD	GPS 3 EF RELATIVE VELOCITY	RTLS UPP	KFT/S	SPL		92067D	
HERROR_DISP	V90U0171C	ALTITUDE ERROR Y-POS	HORIZ SIT SPEC	AU			90960E	
HERROR_FLASH	V90X0172X	ALTITUDE ERROR FLASH FLAG	HORIZ SIT SPEC		BD		90960E	
HERROR_LABEL	V90U0183C	ALTITUDE ERROR LABEL	HORIZ SIT SPEC	ND			90960E	

TABLE 4.2.9-5. INPUT FUNCTIONAL PARAMETERS FOR HORIZONTAL SITUATION DISPLAY (REF 5.7 SPEC.) (G6.21)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
HERROR_TICK_LOC(1)	V90U0298C	ALTITUDE ERROR TICK Y LOCATION 1	HORIZ SIT SPEC	AU			90960E	
HERROR_TICK_LOC(10)	V90U0366C	ALTITUDE ERROR TICK Y LOCATION 10	HORIZ SIT SPEC	AU			90960E	
HERROR_TICK_LOC(11)	V90U0367C	ALTITUDE ERROR TICK Y LOCATION 11	HORIZ SIT SPEC	AU			90960E	
HERROR_TICK_LOC(2)	V90U0299C	ALTITUDE ERROR TICK Y LOCATION 2	HORIZ SIT SPEC	AU			90960E	
HERROR_TICK_LOC(3)	V90U0301C	ALTITUDE ERROR TICK Y LOCATION 3	HORIZ SIT SPEC	AU			90960E	
HERROR_TICK_LOC(4)	V90U0302C	ALTITUDE ERROR TICK Y LOCATION 4	HORIZ SIT SPEC	AU			90960E	
HERROR_TICK_LOC(5)	V90U0303C	ALTITUDE ERROR TICK Y LOCATION 5	HORIZ SIT SPEC	AU			90960E	
HERROR_TICK_LOC(6)	V90U0304C	ALTITUDE ERROR TICK Y LOCATION 6	HORIZ SIT SPEC	AU			90960E	
HERROR_TICK_LOC(7)	V90U0363C	ALTITUDE ERROR TICK Y LOCATION 7	HORIZ SIT SPEC	AU			90960E	
HERROR_TICK_LOC(8)	V90U0364C	ALTITUDE ERROR TICK Y LOCATION 8	HORIZ SIT SPEC	AU			90960E	
HERROR_TICK_LOC(9)	V90U0365C	ALTITUDE ERROR TICK Y LOCATION 9	HORIZ SIT SPEC	AU			90960E	
I_SHORT_RW	V93J0996C	SHORT RUNWAY OPTION	HORIZ SIT DISP				93017G	*
L_HSI_P	V90J0981CA	L HSI L/R HAC INDICATOR-PRI	ENT AREA NAV					
L_HSI_P	V90J0981CB	L HSI L/R HAC INDICATOR-PRI	ASC AREA NAV					
MLS_AIF	V93J1629C	MLS A/I/F EDIT CMD	HORIZ SIT DISP		HXS		92571B	
NUM_GPS_SEL	V94U1013C	NUMBER OF GPS SEL CANDIDATES	GPS RCVR STATE PROC		HXS		92067D	
OHALERT	V90X1131XA	TAEM GUID DOWNMODE FLAG	TAEM GUID				90881A	
OHALERT	V90X1131XB	TAEM GUID DOWNMODE FLAG	GRTLS TAEM GUID				90881A	
OVHD	V95X0154XA	OVHD/STRT IND	ENT UPP	EVENT	BD		93017G	*
OVHD	V95X0154XB	OVHD/STRT IND	TAEM UPP	EVENT	BD		93017G	*
OVHD	V95X0154XC	OVHD/STRT IND	RTLS UPP	EVENT	BD		93017G	*
OVHD	V95X0154XD	OVHD/STRT IND	HORIZ SIT DISP	EVENT	BD		93017G	*
OVHD	V95X0154XE	OVHD/STRT IND	ASC BRG DISP	EVENT	BD		93204D	*
PROCESSING_MLS	V94X6041XA	FLAG IND MLS BEING PROCESSED	PRELAND NAV		BD		92067D	
PROCESSING_MLS	V94X6041XB	FLAG IND MLS BEING PROCESSED	RTLS NAV		BD		92067D	
PROCESSING_MLS	V94X6041XC	FLAG IND MLS BEING PROCESSED	ENT NAV		BD		92067D	
PTI_IND	V90X3220XA	PTI INDICATOR	HORIZ SIT SPEC		BD		79994C	
PTI_IND	V90X3220XB	PTI INDICATOR	SPTI SOP		BD		79994C	
PTI_INHIBIT	V93X5227XA	INHIBIT PTI EXECUTION	HORIZ SIT DISP				89599C	
PTI_INHIBIT	V93X5227XB	INHIBIT PTI EXECUTION	AEROJET DAP				93017G	*
PTI_INHIBIT	V93X5227XC	INHIBIT PTI EXECUTION	PTI				93017G	*
PTI_NUMBER	V90J2402C	NUMBER OF PTI TO EXECUTE	PTI		HXS		93017G	*
PVBARO	V95P3403C	PREVIOUS BAROMETRIC CORRECTION	ADTA SOP	INHG	SPL		93017G	*
RAD_HAC	V94H2052C	RADIUS OF SEL HAC	HORIZ SIT SPEC	AU	VAR			
RNGDIL	V90X3604X	TACAN RANGE DILEMMA FLAG	TACAN RM		BD		93017G	*
RNGFAIL(1)	V90X3611X	TACAN RANGE 1 FAIL	TACAN RM		BD		93017G	*
RNGFAIL(2)	V90X3711X	TACAN RANGE 2 FAIL	TACAN RM		BD		93017G	*
RNGFAIL(3)	V90X3811X	TACAN RANGE 3 FAIL	TACAN RM		BD		93017G	*
RUNWAY_NAME_PSL	V97U5681CA	RUNWAY NAME PRIME LND SITE	ENT SITE LOOKUP					
RUNWAY_NAME_PSL	V97U5681CB	RUNWAY NAME PRIME LND SITE	ASC SITE LOOKUP					
RUNWAY_NAME_SSL	V97U5682CA	RUNWAY NAME SEC LND SITE	ENT SITE LOOKUP					
RUNWAY_NAME_SSL	V97U5682CB	RUNWAY NAME SEC LND SITE	ASC SITE LOOKUP					
RW_SELECT	V93X4523XA	RUNWAY SELECTION INDICATOR	ENT SITE LOOKUP					
RW_SELECT	V93X4523XB	PRI/SEC RUNWAY SELECTION INDICATOR	ASC SITE LOOKUP					
R_FILT(1)	V90H0584CE	X-COMP OF FLTR'S CURR POS VECTOR	ENT NAV	FT			92281D	
R_FILT(2)	V90H0585CE	Y-COMP OF FLTR'S CURR POS VECTOR	ENT NAV	FT			92281D	

TABLE 4.2.9-5. INPUT FUNCTIONAL PARAMETERS FOR HORIZONTAL SITUATION DISPLAY (REF 5.7 SPEC.) (G6.21)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
R_FILT(3)	V90H0586CE	Z-COMP OF FLTR'S CURR POS VECTOR	ENT NAV	FT			92281D	
S/B_EXECUTION_LOGIC	V93X4246X	SPEEDBRAKE CONTROL LOGIC SELECT	HORIZ SIT DISP		BD		92551B	
SEL_GPS_ALT	V94H6036CA	SEL GPS ALT TO LDG SITE THRESH	ENT UPP	KFT	SPL		92067D	
SEL_GPS_ALT	V94H6036CB	SEL GPS ALT TO LDG SITE THRESH	TAEM UPP	KFT	SPL		92067D	
SEL_GPS_ALT	V94H6036CC	SEL GPS ALT TO LDG SITE THRESH	A/L UPP	KFT	SPL		92067D	
SEL_GPS_ALT	V94H6036CD	SEL GPS ALT TO LDG SITE THRESH	RTLS UPP	KFT	SPL		92067D	
SEL_GPS_AZ	V94H6037CA	SEL GPS AZ TO LDG SITE THRESH	ENT UPP	DEG	SPL		92067D	
SEL_GPS_AZ	V94H6037CB	SEL GPS AZ TO LDG SITE THRESH	TAEM UPP	DEG	SPL		92067D	
SEL_GPS_AZ	V94H6037CC	SEL GPS AZ TO LDG SITE THRESH	A/L UPP	DEG	SPL		92067D	
SEL_GPS_AZ	V94H6037CD	SEL GPS AZ TO LDG SITE THRESH	RTLS UPP	DEG	SPL		92067D	
SEL_GPS_RNG	V94H6038CA	SEL GPS RNG TO LDG SITE THRESH	ENT UPP	NM	SPL		92067D	
SEL_GPS_RNG	V94H6038CB	SEL GPS RNG TO LDG SITE THRESH	TAEM UPP	NM	SPL		92067D	
SEL_GPS_RNG	V94H6038CC	SEL GPS RNG TO LDG SITE THRESH	A/L UPP	NM	SPL		92067D	
SEL_GPS_RNG	V94H6038CD	SEL GPS RNG TO LDG SITE THRESH	RTLS UPP	NM	SPL		92067D	
SEL_RCVR(1)	V94X1037X	GPS 1 SEL	GPS RCVR STATE PROC		BD		92067D	
SEL_RCVR(2)	V94X1038X	GPS 2 SEL	GPS RCVR STATE PROC		BD		92067D	
SEL_RCVR(3)	V94X1039X	GPS 3 SEL	GPS RCVR STATE PROC		BD		92067D	
TACAN_AIF	V93J4470C	TAC A/I/F EDIT CMD	HORIZ SIT DISP		HXS		93017G	*
TACAN_ID(1)	V90U1802CA	TACAN 1 GND STA CHAN	ENT SITE LOOKUP					
TACAN_ID(1)	V90U1802CB	TACAN 1 GND STA CHAN	ASC SITE LOOKUP					
TACAN_ID(2)	V90U1803CA	TACAN 2 GND STA CHAN	ENT SITE LOOKUP					
TACAN_ID(2)	V90U1803CB	TACAN 2 GND STA CHAN	ASC SITE LOOKUP					
TACAN_ID(3)	V90U1804CA	TACAN 3 GND STA CHAN	ENT SITE LOOKUP					
TACAN_ID(3)	V90U1804CB	TACAN 3 GND STA CHAN	ASC SITE LOOKUP					
TAC_AZ(1)	V95H0207CA	TACAN 1 AZIMUTH	ENT UPP	DEG				
TAC_AZ(1)	V95H0207CB	TACAN 1 AZIMUTH	TAEM UPP	DEG				
TAC_AZ(1)	V95H0207CC	TACAN 1 AZIMUTH	A/L UPP	DEG				
TAC_AZ(1)	V95H0207CD	TACAN 1 AZIMUTH	RTLS UPP	DEG				
TAC_AZ(2)	V95H0208CA	TACAN 2 AZIMUTH	ENT UPP	DEG				
TAC_AZ(2)	V95H0208CB	TACAN 2 AZIMUTH	TAEM UPP	DEG				
TAC_AZ(2)	V95H0208CC	TACAN 2 AZIMUTH	A/L UPP	DEG				
TAC_AZ(2)	V95H0208CD	TACAN 2 AZIMUTH	RTLS UPP	DEG				
TAC_AZ(3)	V95H0209CA	TACAN 3 AZIMUTH	ENT UPP	DEG				
TAC_AZ(3)	V95H0209CB	TACAN 3 AZIMUTH	TAEM UPP	DEG				
TAC_AZ(3)	V95H0209CC	TACAN 3 AZIMUTH	A/L UPP	DEG				
TAC_AZ(3)	V95H0209CD	TACAN 3 AZIMUTH	RTLS UPP	DEG				
TAC_CHANGE	V93J4464CB	SELECTED TACAN CHANNEL	ASC SITE LOOKUP					
TAC_GPS_MODE_DISP	V95X0227XA	TACAN/GPS ABS/DELTA DATA IND	ENT UPP				91051K	
TAC_GPS_MODE_DISP	V95X0227XB	TACAN/GPS ABS/DELTA DATA IND	TAEM UPP				91051K	
TAC_GPS_MODE_DISP	V95X0227XC	TACAN/GPS ABS/DELTA DATA IND	A/L UPP				91051K	
TAC_GPS_MODE_DISP	V95X0227XD	TACAN/GPS ABS/DELTA DATA IND	RTLS UPP				91051K	
TAC_RNG(1)	V95H0201CA	TACAN 1 RANGE	ENT UPP	NM				
TAC_RNG(1)	V95H0201CB	TACAN 1 RANGE	TAEM UPP	NM				
TAC_RNG(1)	V95H0201CC	TACAN 1 RANGE	A/L UPP	NM				
TAC_RNG(1)	V95H0201CD	TACAN 1 RANGE	RTLS UPP	NM				
TAC_RNG(2)	V95H0202CA	TACAN 2 RANGE	ENT UPP	NM				

TABLE 4.2.9-5. INPUT FUNCTIONAL PARAMETERS FOR HORIZONTAL SITUATION DISPLAY (REF 5.7 SPEC.) (G6.21)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
TAC_RNG(2)	V95H0202CB	TACAN 2 RANGE	TAEM UPP	NM				
TAC_RNG(2)	V95H0202CC	TACAN 2 RANGE	A/L UPP	NM				
TAC_RNG(2)	V95H0202CD	TACAN 2 RANGE	RTLS UPP	NM				
TAC_RNG(3)	V95H0203CA	TACAN 3 RANGE	ENT UPP	NM				
TAC_RNG(3)	V95H0203CB	TACAN 3 RANGE	TAEM UPP	NM				
TAC_RNG(3)	V95H0203CC	TACAN 3 RANGE	A/L UPP	NM				
TAC_RNG(3)	V95H0203CD	TACAN 3 RANGE	RTLS UPP	NM				
TAC_STIP	V95X5006X	TACAN SELF TEST IN PROGRESS	TACAN SOP		BD			
TAL_SITE_SEL_CMD	V93J4399C	TAL SITE SELECT CMD	HORIZ SIT DISP		HXS		93017G	*
TGO_TICK_LOC(1)	V90U0166C	TIME TO HAC INTERCEPT TICK X LOC 1	HORIZ SIT SPEC	AU			90960E	
TGO_TICK_LOC(2)	V90U0167C	TIME TO HAC INTERCEPT TICK X LOC 2	HORIZ SIT SPEC	AU			90960E	
TGO_TICK_LOC(3)	V90U0168C	TIME TO HAC INTERCEPT TICK X LOC 3	HORIZ SIT SPEC	AU			90960E	
TGO_TICK_LOC(4)	V90U0169C	TIME TO HAC INTERCEPT TICK X LOC 4	HORIZ SIT SPEC	AU			90960E	
TGO_TICK_LOC(5)	V90U0170C	TIME TO HAC INTERCEPT TICK X LOC 5	HORIZ SIT SPEC	AU			90960E	
TGO_XTRACK_DISP	V90U0173C	TGO/XTRACK X-POS	HORIZ SIT SPEC	AU			90960E	
TGO_XTRACK_FLASH	V90X0174X	TGO/XTRACK FLASH FLAG	HORIZ SIT SPEC		BD		90960E	
T_CURRENT_FILT	V90W4749CC	SNAP TIME TAG CURR IMU/ATT DATA	ENT NAV	S	DPL		92281D	
V_FILT(1)	V90L0624CE	X-COMP OF FLTR'S CURR VEL VECTOR	ENT NAV	FT/S	SPL		92281D	
V_FILT(2)	V90L0625CE	Y-COMP OF FLTR'S CURR VEL VECTOR	ENT NAV	FT/S	SPL		92281D	
V_FILT(3)	V90L0626CE	Z-COMP OF FLTR'S CURR VEL VECTOR	ENT NAV	FT/S	SPL		92281D	
XTRACK_LABEL	V90U0182C	XTRACK ERROR LABEL	HORIZ SIT SPEC	ND			90960E	
XTRACK_TICK_LOC(1)	V90U0283C	XTRACK ERROR TICK X LOCATION 1	HORIZ SIT SPEC	AU			90960E	
XTRACK_TICK_LOC(10)	V90U0296C	XTRACK ERROR TICK X LOCATION 10	HORIZ SIT SPEC	AU			90960E	
XTRACK_TICK_LOC(11)	V90U0297C	XTRACK ERROR TICK X LOCATION 11	HORIZ SIT SPEC	AU			90960E	
XTRACK_TICK_LOC(2)	V90U0284C	XTRACK ERROR TICK X LOCATION 2	HORIZ SIT SPEC	AU			90960E	
XTRACK_TICK_LOC(3)	V90U0286C	XTRACK ERROR TICK X LOCATION 3	HORIZ SIT SPEC	AU			90960E	
XTRACK_TICK_LOC(4)	V90U0287C	XTRACK ERROR TICK X LOCATION 4	HORIZ SIT SPEC	AU			90960E	
XTRACK_TICK_LOC(5)	V90U0288C	XTRACK ERROR TICK X LOCATION 5	HORIZ SIT SPEC	AU			90960E	
XTRACK_TICK_LOC(6)	V90U0289C	XTRACK ERROR TICK X LOCATION 6	HORIZ SIT SPEC	AU			90960E	
XTRACK_TICK_LOC(7)	V90U0293C	XTRACK ERROR TICK X LOCATION 7	HORIZ SIT SPEC	AU			90960E	
XTRACK_TICK_LOC(8)	V90U0294C	XTRACK ERROR TICK X LOCATION 8	HORIZ SIT SPEC	AU			90960E	
XTRACK_TICK_LOC(9)	V90U0295C	XTRACK ERROR TICK X LOCATION 9	HORIZ SIT SPEC	AU			90960E	
X_20PRED	V94H2030C	GRAPHIC X-POS OF 20-SEC PREDICTOR	HORIZ SIT SPEC	AU	VAR			
X_40PRED	V94H2035C	GRAPHIC X-POS OF 40-SEC PREDICTOR	HORIZ SIT SPEC	AU	VAR			
X_60PRED	V94H2040C	GRAPHIC X-POS OF 60 SEC PREDICTOR	HORIZ SIT SPEC	AU	VAR			
X_HAC	V94H2050C	GRAPHIC X_POS OF SELECTED HAC	HORIZ SIT SPEC	AU	VAR			
X_HEAD_COORD	V94U2046C	GRAPHIC X-POS OF HAC INTERSECTION	HORIZ SIT SPEC	AU	VAR			
X_TAIL_COORD	V94U2044C	GRAPHIC X-POS OF WP2	HORIZ SIT SPEC	AU	VAR			
YSGNP/YSGN	V95J0153CA	R/L CONE IND PRI RW	ENT UPP		SPL		93017G	*
YSGNP/YSGN	V95J0153CB	R/L CONE IND PRI RW	TAEM UPP		SPL		93017G	*
YSGNP/YSGN	V95J0153CC	R/L CONE IND PRI RW	RTLS UPP		SPL		93017G	*
Y_20PRED	V94H2031C	GRAPHIC Y-POS OF 20-SEC PREDICTOR	HORIZ SIT SPEC	AU	VAR			
Y_40PRED	V94H2036C	GRAPHIC Y-POS OF 40-SEC PREDICTOR	HORIZ SIT SPEC	AU	VAR			
Y_60PRED	V94H2041C	GRAPHIC Y-POS OF 60 SEC PREDICTOR	HORIZ SIT SPEC	AU	VAR			
Y_HAC	V94H2051C	GRAPHIC Y_POS OF SELECTED HAC	HORIZ SIT SPEC	AU	VAR			
Y_HEAD_COORD	V94U2047C	GRAPHIC Y-POS OF HAC INTERSECTION	HORIZ SIT SPEC	AU	VAR			

TABLE 4.2.9-5. INPUT FUNCTIONAL PARAMETERS FOR HORIZONTAL SITUATION DISPLAY (REF 5.7 SPEC.) (G6.21)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
Y_TAIL_COORD	V94U2045C	GRAPHIC Y-POS OF WP2	HORIZ SIT SPEC	AU	VAR			
	V93A8201CA	DISPLAYED NORMAL ACCEL	ENT UPP	FT/S				
	V93A8201CB	DISPLAYED NORMAL ACCEL	SF	FT/S				
	V93J5013C	DRAG H A/I/F EDIT CMD	HORIZ SIT DISP		HXS		93017G	*
	V93X4411XA	TACAN 1 DES CMD	HORIZ SIT DISP				93017G	*
	V93X4411XB	TACAN 1 DES CMD	SENSOR SELF TEST DISP				93017G	*
	V93X4413XA	TACAN 2 DES CMD	HORIZ SIT DISP				93017G	*
	V93X4413XB	TACAN 2 DES CMD	SENSOR SELF TEST DISP				93017G	*
	V93X4415XA	TACAN 3 DES CMD	HORIZ SIT DISP				93017G	*
	V93X4415XB	TACAN 3 DES CMD	SENSOR SELF TEST DISP				93017G	*
	V94J2014C	TACAN 1 AZIMUTH STATUS	HORIZ SIT SPEC		VAR			
	V94J2015C	TACAN 2 AZIMUTH STATUS	HORIZ SIT SPEC		VAR			
	V94J2016C	TACAN 3 AZIMUTH STATUS	HORIZ SIT SPEC		VAR			
	V94J2024C	TACAN 1 RANGE STATUS	HORIZ SIT SPEC		VAR			
	V94J2025C	TACAN 2 RANGE STATUS	HORIZ SIT SPEC		VAR			
	V94J2026C	TACAN 3 RANGE STATUS	HORIZ SIT SPEC		VAR			
	V94X4810X	ILLEGAL ENTRY MSG(HORIZ SIT)	UI					

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.9-6. OUTPUT FUNCTIONAL PARAMETERS FROM HORIZONTAL SITUATION DISPLAY (REF 5.7 SPEC.) (G6.21)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
AIR_DATA_AIF	V93J5014C	ADTA TO G&C A/I/F CMD	ADTA SOP DL FMT 21/1 DL FMT 23/1		HXS		93017G	*
AREA_SEL	V93J4392C	SELECTED AREA	HORIZ SIT DISP ASC BRG DISP ASC BRG SPEC ASC SITE LOOKUP ENT BRG DISP ENT BRG SPEC ENT SITE LOOKUP				93090E	
BARO	V93H5005C	ALT SET TO FLD PRESS CORR TO MSL	HORIZ SIT DISP ADTA SOP	INHG	VAR			
BARO_AIF	V93J4473C	ADTA A/I/F EDIT CMD	HORIZ SIT DISP DL FMT 21/1 DL FMT 23/A ENT NAV GPS SOP HORIZ SIT DISP PRELAND NAV RTLS NAV		HXS		93017G	*
CREW_DESELECT_RCVR(1)	V93X1205XB	DESELECT GPS 1 RCVR CMD	GAX GPS RCVR STATE PROC GPS SOP GPS STATUS DISP REL NAV DISP		BD		92817C	
CREW_DESELECT_RCVR(2)	V93X1206XB	DESELECT GPS 2 RCVR CMD	GAX GPS RCVR STATE PROC GPS SOP GPS STATUS DISP REL NAV DISP		BD		92817C	
CREW_DESELECT_RCVR(3)	V93X1207XB	DESELECT GPS 3 RCVR CMD	GAX GPS RCVR STATE PROC GPS SOP GPS STATUS DISP REL NAV DISP		BD		92817C	
DELTA_T	V93W5035CA	DELTA T UPDATE	HORIZ SIT DISP	S				
DO_DELTA_UPDATE	V93X5030X	UPDATE DELTAS CMD	ASC NAV ENT NAV PRELAND NAV RTLS NAV TLM		BD			

TABLE 4.2.9-6. OUTPUT FUNCTIONAL PARAMETERS FROM HORIZONTAL SITUATION DISPLAY (REF 5.7 SPEC.) (G6.21)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
DR_RW(1)	V93H5010CA	NAV UPDATE DELTA X POSITION	ASC NAV ENT NAV HORIZ SIT DISP PRELAND NAV RTLS NAV TLM	FT				
DR_RW(2)	V93H5011CA	NAV UPDATE DELTA Y POSITION	ASC NAV ENT NAV HORIZ SIT DISP PRELAND NAV RTLS NAV TLM	FT				
DR_RW(3)	V93H5012CA	NAV UPDATE DELTA Z POSITION	ASC NAV ENT NAV HORIZ SIT DISP PRELAND NAV RTLS NAV TLM	FT				
DV_RW(1)	V93L5020CA	NAV UPDATE DELTA X VELOCITY	ASC NAV ENT NAV HORIZ SIT DISP PRELAND NAV RTLS NAV TLM	FT/S				
DV_RW(2)	V93L5021CA	NAV UPDATE DELTA Y VELOCITY	ASC NAV ENT NAV HORIZ SIT DISP PRELAND NAV RTLS NAV TLM	FT/S				
DV_RW(3)	V93L5022CA	NAV UPDATE DELTA Z VELOCITY	ASC NAV ENT NAV HORIZ SIT DISP PRELAND NAV RTLS NAV TLM	FT/S				
ENT_PT_SW/NEP	V93X4466X	ENTRY POINT SWITCH CMD	ASC AREA NAV ENT AREA NAV ENT UPP GRTLS TAEM GUID HORIZ SIT DISP TAEM GUID TLM		BD		89250B	

TABLE 4.2.9-6. OUTPUT FUNCTIONAL PARAMETERS FROM HORIZONTAL SITUATION DISPLAY (REF 5.7 SPEC.) (G6.21)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
GI_CHANGE	V93X4476X	HEAD WIND HI/LO CMD	A/L GUID ASC AREA NAV DL FMT 21/1 DL FMT 23/1 ENT AREA NAV GRTLS A/L GUID GRTLS TAEM GUID HORIZ SIT DISP TAEM GUID		BD		93017G	*
GPS_RA_AID	V93X1204X	GPS RCVR USE RA DATA AIDING CMD	GPS SOP		BD		91051K	
GPS_TO_GC_AIF	V93J1200CA	GPS TO G&C A/I/F CMD	ENT NAV PRELAND NAV RTLS NAV		HXS		92067D	
GPS_TO_NAV_AI	V93X1202XA	GPS TO NAV AUTO/INHIBIT CMD	ENT NAV PRELAND NAV RTLS NAV		BD		92067D	
GPS_TO_NAV_FORCE	V93X1201XA	GPS TO NAV FORCE CMD	ENT NAV PRELAND NAV RTLS NAV		BD		92067D	
I_SHORT_RW	V93J0996C	SHORT RUNWAY OPTION	A/L GUID DL FMT 21/1 DL FMT 23/1 GRTLS A/L GUID HORIZ SIT DISP				93017G	*
MLS_AIF	V93J1629C	MLS A/I/F EDIT CMD	ENT NAV HORIZ SIT DISP PRELAND NAV RTLS NAV		HXS		92571B	
NAV_UPDATE_CMD	V93X5032X	NAV UPDATE CMD	HORIZ SIT SPEC		BD			
NEW_AREA	V93J4396C	NEW LANDING AREA SELECT CMD	ASC SITE LOOKUP ENT SITE LOOKUP		HXS		92354	
OVHD	V95X0154XD	OVHD/STRT IND	DL FMT 21/1 DL FMT 23/1 HORIZ SIT DISP	EVENT	BD		93017G	*
PRI_SEL	V93X4393X	PRIMARY RUNWAY SEL CMD	ASC SITE LOOKUP ENT SITE LOOKUP TLM		BD		90000E	
PTI_INHIBIT	V93X5227XA	INHIBIT PTI EXECUTION	HORIZ SIT DISP MSC PTI SPTI SOP				89599C	
R_GND(1)	V96H3500CC	UPLINKED ORBITER POS VECTOR X	ENT NAV					
R_GND(2)	V96H3501CC	UPLINKED ORBITER POS VECTOR Y	ENT NAV					
R_GND(3)	V96H3502CC	UPLINKED ORBITER POS VECTOR Z	ENT NAV					
S/B_EXECUTION_LOGIC	V93X4246X	SPEEDBRAKE CONTROL LOGIC SELECT	HORIZ SIT DISP		BD		92551B	

TABLE 4.2.9-6. OUTPUT FUNCTIONAL PARAMETERS FROM HORIZONTAL SITUATION DISPLAY (REF 5.7 SPEC.) (G6.21)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
SEC_SEL	V93X4394X	SECONDARY RUNWAY SEL CMD	ASC SITE LOOKUP ENT SITE LOOKUP TLM		BD		90000E	
TACAN_AIF	V93J4470C	TAC A/I/F EDIT CMD	DL FMT 21/1 DL FMT 23/A ENT NAV HORIZ SIT DISP PRELAND NAV RTLS NAV		HXS		93017G	*
TAC_CHANGE	V93X4395X	PRI/SEC TACAN SELECT CMD	ASC SITE LOOKUP ENT SITE LOOKUP TLM		BD		90000E	
TAC_GPS_MODE	V93X5015X	TACAN/GPS ABSOLUTE/DELTA DATA CMD	A/L UPP ENT UPP RTLS UPP TAEM UPP		BD		91051K	
TAL_SITE_SEL_CMD	V93J4399C	TAL SITE SELECT CMD	ASC SITE LOOKUP DL FMT 21/1 ENT SITE LOOKUP HORIZ SIT DISP		HXS		93017G	*
TOGHAC	V93X4477X	R/L CONE CHG CMD	ENT NAV ENT UPP RTLS UPP TAEM UPP TLM		BD		90302B	
T_GND	V96W3520CC	UPLINKED ORB STATE VEC TIME TAG	ENT NAV					
V_GND(1)	V96L3510CC	UPLINKED ORBITER VEL VECTOR X	ENT NAV					
V_GND(2)	V96L3511CC	UPLINKED ORBITER VEL VECTOR Y	ENT NAV					
V_GND(3)	V96L3512CC	UPLINKED ORBITER VEL VECTOR Z	ENT NAV					
ZERO_DELTA_T_UPDATE	V93X1041X	ZERO DELTA T UPDATE FLAG	ENT NAV	ND	BD		92208C	
	V90M2922PA	CGRB_TAC_FAIL\$(1:)	DL FMT 23/A				93017G	*
	V93J5013C	DRAG H A/I/F EDIT CMD	DL FMT 21/A DL FMT 23/A ENT NAV HORIZ SIT DISP RTLS NAV		HXS		93017G	*
	V93X4411XA	TACAN 1 DES CMD	DL FMT 23/A GAX HORIZ SIT DISP HORIZ SIT SPEC TACAN RM				93017G	*
	V93X4413XA	TACAN 2 DES CMD	DL FMT 23/A GAX HORIZ SIT DISP HORIZ SIT SPEC TACAN RM				93017G	*

TABLE 4.2.9-6. OUTPUT FUNCTIONAL PARAMETERS FROM HORIZONTAL SITUATION DISPLAY (REF 5.7 SPEC.) (G6.21)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V93X4415XA	TACAN 3 DES CMD	DL FMT 23/A GAX				93017G	*
	V95M2885PD	LANDING OPTIONS	HORIZ SIT DISP HORIZ SIT SPEC TACAN RM				93017G	*
	V99M1854PF	LANDING CONFIGURATION	DL FMT 21/1 DL FMT 23/1 DL FMT 21/1 DL FMT 23/1				93017G	*

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
(HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

TABLE 4.2.9-7. HORIZONTAL SITUATION DISPLAY (REF 5.7 SPEC.) (G6.21) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
ALT_RA_CUTOFF_HIGH	V97U2827C	FT	F	S	D	P	G4.17 G6.21	00	GP3	92139	
GPS_INSTALLED(1)	V97U2924C	ND	D		M	X	G4.17 G4.20 G4.21 G4.23 G4.24 G4.25 G6.11 G6.21 G6.31 G6.51	00	GPI	92292B	
GPS_INSTALLED(2)	V97U2831C	ND	D		M	X	V5.1.4 G4.17 G4.20 G4.21 G4.23 G4.24 G4.25 G6.11 G6.21 G6.31 G6.51	00	GPI	92292B	
GPS_INSTALLED(3)	V97U2925C	ND	D		M	X	V5.1.4 G4.17 G4.20 G4.21 G4.23 G4.24 G4.25 G6.11 G6.21 G6.31 G6.51	00	GPI	92292B	
GPS_LOCKOUT	V97U3563C	ND	I	S	M	P	V5.1.4 G4.123 G4.139 G4.148 G6.11 G6.21 G6.51	00	GPI	92292B	
TAL_PRIME_AREA	V99U8962C	ND	I	S	M	C	G4.2 G4.4 G6.21	00	AAP	91047C	
TGO_LABEL(1)	V97U6328C	ND	CH		D	P	G6.21	00	ZFG	90960E	
TGO_LABEL(2)	V97U6329C	ND	CH		D	P	G6.21	00	ZFG	90960E	
TGO_LABEL(3)	V97U6330C	ND	CH		D	P	G6.21	00	ZFG	90960E	

TABLE 4.2.9-7. HORIZONTAL SITUATION DISPLAY (REF 5.7 SPEC.) (G6.21) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
TGO_LABEL(4)	V97U6331C	ND	CH		D	P	G6.21	00	ZFG	90960E	
TGO_LABEL(5)	V97U6332C	ND	CH		D	P	G6.21	00	ZFG	90960E	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.9-8. HORIZONTAL SITUATION DISPLAY (REF 5.7 SPEC.) (G6.21) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.9-9. HORIZONTAL SITUATION DISPLAY (REF 5.7 SPEC.) (G6.21) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.10 XXXXX MANEUVER YYYYYY (PFS/BFS)

TITLE: XXXXX MNVR YYYYYY

TYPE: OPS 1041, 1051, 1061, 2021, 3011, 3021, 3031

AVAILABILITY: PFS: GNC OPS 1, 2, 3

BFS: GNC OPS 1, 3

4.2.10.1 Purpose, Operation, and Organization

The purpose of this display is to provide a means of inputting maneuvers, evaluating their effects on the trajectory and adjusting parameters, as necessary. It also assists the crew in maneuver setup and maneuver monitoring, and is used for trimming burn residuals when required. Controls are provided to allow for the selection of the active OMS engine gimbal drive system. Actual engine gimbal angle readouts are provided to monitor TVC operation and status.

The title of this display is partially dynamic due to the number of maneuvers it must support. It is used for all insertions, on-orbit, rendezvous and deorbit maneuver planning and execution. The following titles will be driven on the display:

<u>OPS</u>	<u>MM</u>	<u>TITLE</u>
1	104	OMS 1 MNVR EXEC (Abort to Orbit (ATO) or Abort
1	104	ATO 1 MNVR EXEC Once Around (AOA)
1	104	AOA 1 MNVR EXEC targeting Primary Function,
1	105	OMS 2 MNVR EXEC not via mode transition)
1	105	ATO 2 MNVR EXEC
1	105	AOA MNVR TRANS
1	106	OMS 2 MNVR COAST
1	106	ATO 2 MNVR COAST
3	301	DEORB MNVR COAST
3	302	DEORB MNVR EXEC
3	303	DEORB MNVR COAST
2	202	ORBIT MNVR EXEC

In MM104 and MM105, the display provides the capability to declare an AOA or ATO abort as well as an override of the automatic target selection. This backup to the dedicated abort switch also provides the capability to change the type of abort desired. In MM105, the display also provides the crew an indication of when targeting for the AOA OMS 2 burn has been completed.

In OPS 3 only, this display provides the additional capability to execute and terminate a burnoff of forward RCS propellant for center-of-gravity control, as well as to execute and terminate the simultaneous motion of all aerosurfaces for hydraulic fluid thermal conditioning.

The same display is used for ascent, orbit and entry for Execute (EXEC), Coast (COAST) and Transition (TRANS) major modes, thus the title changes are associated with major mode transitions and corresponding changes in cyclic processing of some parameters depending upon the major mode. The display is forced up for MM104, MM105, MM106, MM202, MM301, MM302 and MM303. When the display is called, the data presented consists of current propulsive and OMS TRIM information, current engine selection, current Orbiter weight, and the desired maneuver targets (from I-load, ground uplink, or other targeting function). Any other maneuver-related data from a previous maneuver shall be blanked.

The crew then has the option of changing this data via item entries prior to transferring it to the applicable DIP via the LOAD control item. The load item initiates computation of maneuver-related data for display.

Whenever the display is forced up, the following parameters shall be updated cyclically; current apogee, current perigee and OMS gimbal positions. In OPS 1 and OPS 2 time to apsis shall also be updated cyclically. Certain data are dependent upon guidance computation using loaded target data. These parameters are initially blank and are obtained once and displayed following completion of guidance computations after each LOAD item entry. These parameters are burn attitude, total delta velocity, targeted apogee, targeted perigee, and burn time. Delta velocity in body components is also computed following the LOAD, but it is displayed and updated cyclically to account for current body attitude. In MM301 and MM302, time-to-400,000 feet and range-from-400,000 feet altitude to the targeted landing site remain blank until computed by guidance following each LOAD Item entry, whereupon they shall be obtained once and displayed (predicted values at the end of the burn). In OPS 1 and OPS 3, if guidance does not converge following a load, targeted apogee and targeted perigee will be zeroed and burn attitude will be blanked. If in OPS 3, time-to-400,000 feet and range from 400,000 feet altitude to the targeted landing site will be zeroed.

For PFS, at initiation of cyclic guidance computation, burn time and total delta velocity will be updated cyclically until engine cutoff. In MM202, beginning at (TIG – BURN_ENABLE_WINDOW seconds) and in MM104, MM105 and MM302, beginning at TIG, burn attitude will be updated cyclically until engine cutoff. After burn cutoff, burn time is maintained at its last computed value, and the delta velocity in body components, total delta velocity and burn attitude shall continue to be updated cyclically until transition to the next major mode.

For BFS, at initiation of cyclic guidance computation, burn attitude, burn time and total delta velocity will be updated cyclically until engine cutoff. After burn cutoff, burn time is maintained at its last computed value, and the delta velocity in body components, total delta velocity and burn attitude shall continue to be updated cyclically until transition to the next major mode.

Upon transitioning to the Coast major mode, following the Maneuver Execute major mode, the display title will change and the following parameters will blank: burn attitude (except in MM303), targeted apogee, targeted perigee, burn time, total delta velocity and delta velocity in body components.

In MM303 time-to-400,000 feet and range from 400,000 feet to the targeted landing site shall be updated once. Burn attitude shall be updated once upon transition to MM303 or when changed manually.

Figure 4.2.10-1 shows the XXXXX MNVR YYYYYY Display Format. Tables 4.2.10-1 and 4.2.10-2 define the parameter processing requirements for the keyboard and the display, respectively. The remainder of this display requirements description will define the various data and status parameters as well as control items on the display.

- (1) Controls are provided for selecting the engine or engines to be used for the burn and that guidance will use in its computations. A choice between both OMS (BOTH), left OMS (L), right OMS (R), and RCS SEL acceleration (-X thrusters firing) is made by Item entries 1,2,3 and 4, respectively. A down arrow (↓) is displayed in the parameter status column after L and R when predefined I-Load thresholds for chamber pressure and delta velocity are exceeded. The down arrow (↓) is removed by OMS RM during initialization.

OMS RM can be reset by selecting the OMS BOTH engine option. However, the down arrow (↓) will not be blanked until OMS RM is running.

The four engine select options are mutually exclusive and the selected option is indicated by an asterisk (*) appearing beside the appropriate item number. Selection of an engine option is recognized by guidance when LOAD is executed. The first time this display is called in MM104, the OMS BOTH item is initially enabled. Subsequent display callups will reflect the last selected engine option configuration. The last engine option selection is transferred across OPS 1, 2, and 3.

Item 5 (TV ROLL) defines the desired local roll angle at ignition (zero degrees is heads up). The TV Roll angle to be displayed shall come from a Compool (I-Loaded, uplinked or crew-input value). The crew shall have the capability to update the displayed value in OPS 2 via this item number. Upon reinitialization of the display, the latest value of TV roll shall be displayed in OPS 1, 2 & 3. This item is legal in OPS 2 only; its execution elsewhere will result in an "ILLEGAL ENTRY" message.

- (2) The digital autopilot (DAP) computation of engine gimbal trim angles (Trim Load) in degrees, pitch (P) for both engines, and yaw for the left (LY) and right (RY), are displayed. The pitch trim angle for the left and right engines can be changed via Item 6 entry and yaw trim angles for left and right engines can be changed via Item 7 and 8 entries, respectively. Modification of the trim angles requires execution of the LOAD (Item 22) for recognition by the DAP and guidance. The initial values on the display when it is called up are the current DAP values.
- (3) The capability to display and change the total Orbiter weight (WT) in pounds is available via Item 9. The WT is calculated by the MNVR DIP the first time this display is called and if "LOAD" is not flashing, shall be updated cyclically as current mass is updated. The value of WT can be updated by ground up-link or crew entry to account for changes in total Orbiter mass not accounted for by guidance. A change of the mass is recognized when the LOAD item is executed.
- (4) Targeting information (TGT) for the various powered explicit guidance (PEG) modes is displayed in the lower left section of the display.
 - a. TIG is the desired mission elapsed time of ignition in days/hour:minute:second. Item 10 goes with days. Items 11, 12 and 13 are implied and go with hours, minutes and seconds, respectively. The TIG will be checked by the MNVR DIP upon performing a LOAD to verify that the TIG is within "X" minutes in the past and "Y" hours in the future. If the TIG is not within this envelope (for an auto LOAD in MM104 or crew manual LOAD in all other applicable major modes), an "ILLEGAL ENTRY" message will be generated. In MM202, ORB MNVR DIP will compare the current time to TIG for Lambert Maneuvers when LOAD is requested. In this case, if LOAD was requested past TIG, an "ILLEGAL ENTRY" message will be generated.
 - b. Item 14 for C1 and Item 15 for C2 are coefficients of the line equation: $V_{vert} = C1 + C2 V_{hor}$, which defines the desired flight path angle at the end of the coast phase (C1 is in feet per second and C2 is a scalar) for PEG 4 maneuvers. These items are legal only in OPS 1 and 3.
 - c. Two items identify the target used for PEG 4 maneuvers. Item 16 for HT is the target radius at the end of the coast phase in nautical miles.

Item 17 for θT , in OPS 1, is the target central angle of travel in degrees between the projection of the launch site into the orbital plane and the desired target radius (HT) at the end of the coast phase. In OPS 3, θT is the in-plane central angle of travel at target radius (HT). The items are "ILLEGAL" in OPS 2.

- d. Item 18 PRPLT defines the total propellant in pounds to be used by the deorbit maneuver. It includes the propellant required to reach desired in-plane targets plus the propellant to be wasted in order to achieve a desired burnout mass. If "LOAD" is not flashing, PRPLT shall be updated cyclically as the current mass is updated. The sign of this quantity defines on which side of the orbital plane the propellant should be wasted. This item shall be honored in OPS 3 only. Execution of this item in OPS 1 or 2 shall be treated as an operator error resulting in an "ILLEGAL ENTRY" message. Execution of this item with a non-zero value entered when LOAD is not flashing shall also result in the "ILLEGAL ENTRY" message. However, when LOAD is not flashing this item can be executed when the value entered is zero. This allows the crew to terminate wasting during the deorbit maneuver burn.
- e. An external delta velocity targeting option (PEG 7) can be exercised by input of the target delta velocities (feet per second) in the local vertical (ΔV_X , ΔV_Y , ΔV_Z) system at ignition via Items 19, 20 and 21, respectively. The loading of these items initiates a guidance switch to the PEG 7 (external delta velocity) guidance mode. These items are legal in OPS 1, 2 and 3.
- f. All targeting inputs are sent to guidance upon execution of the LOAD item, except if ITEM 18(PRPLT) is entered as zero when LOAD is not flashing this data entry will be sent to guidance immediately without the necessity of executing the LOAD item.
- g. Whenever PEG 4 targets are entered and LOAD (Item 22) executed the LVLH components of velocity-to-be gained (VGO) shall be computed (LVLH at TIG) and displayed in the PEG 7 delta velocity data fields (Items 19, 20 and 21). At planned time of ignition, the LVLH components of VGO shall be updated cyclically until cyclic guidance is terminated to display the current LVLH components during the burn. Whenever PEG 7 targets are entered and loaded, the PEG 4 target data fields shall be blanked, and PEG 7 target delta velocities (Items 19, 20 and 21) shall be displayed throughout LOAD and OMS burn or until a new target item is entered.

Whenever any PEG 7 target data (Items 19, 20 or 21) is entered after a PEG 4 or Lambert LOAD or burn, data being displayed in the PEG 7 slots (PEG 4 or Lambert LVLH VGO's) will be replaced with the entered data and any data not entered will be replaced with the latest previous PEG 7 target data (MSID's V93L6950C, V93L6951C, V93L6952C).

- h. In MM202, text will be displayed to identify the rendezvous guidance option chosen by the ORBIT TARGETING SPEC. A discrete will be set (1) when the Lambert guidance option is chosen and the text "LAMBERT" will be displayed. The discrete will be reset (0) by the crew retargeting to external ΔV on either the ORBIT TARGETING or XXXXX MNVR YYYYYY displays, or by the ground uplinking external ΔV targeting data. When the discrete is reset (0) the text "EXT ΔV " will be displayed.

- (5) The word "LOAD" is dynamic and the function is executed via Item 22. The word LOAD shall flash any time the display is called up (except for OPS 1, MM104). Once the item number is executed, the engine selection, trim data, vehicle weight and target data are all transferred to guidance and certain display parameters are computed. At this time, the flashing of the word LOAD stops.

When the display is first called in MM104, execution of this item is performed automatically by the software. If prior to burn enable or after burn completion, any item of the targeting or set up data (including engine selection, trim and vehicle weight) is altered by crew input or by ground uplink (except propellant to be consumed during the deorbit maneuver) or if the computation of the first or second maneuver of a two-impulse set is in progress on the ORBIT TGT SPEC, the word LOAD shall flash. This shall terminate all burn guidance computations and the load dependent parameters shall be blanked. Guidance computations shall be re-initiated if the LOAD item is subsequently executed. Any change of the targeting or setup parameters (See Table 4.2.10.1-1) while the burn is enabled or prior to burn completion (except entry of a zero value for the propellant to be consumed during the deorbit maneuver) will result in an "ILLEGAL ENTRY" message. Entry of zero PRPLT during a burn will cause the burn to execute without out-of-plane wasting and without causing LOAD to flash. No other item entries affect this LOAD flash function.

NOTE: An attempt to execute TARGET, LOAD, (all OPS) or ST CRT TMR (OPS 1) while targeting is still active from a previous command will result in an "ILLEGAL ENTRY" message display.

- (6) The "TIMER" (Item 23) initiates the CRT event timer to count-down to the loaded TIG in guidance. This function occurs only if Item 23 has been executed (except for OMS 1 where it is started automatically at the initiation of MM104).
- (7) The burn attitude (BURN ATT) in degrees, computed by guidance, is displayed in ADI "INERTIAL" reference roll (R), pitch (P), and yaw (Y) angles at ignition, (Items 24, 25 and 26, respectively) for MM104, MM105, MM202, MM301, and MM302 which are computed and displayed upon crew execution of a legal LOAD item entry. Attitude errors are also displayed by the ADI error needles at the same time in MM104, MM105, MM301 and MM302. In MM202 the ADI error needles are not driven until Item 27 (MNVR) is executed. The roll orientation about the thrust vector is I-loaded and may be changed by uplink or in OPS-2 by crew input.

In OPS 3, BURN ATT Roll, Pitch and Yaw (items 24, 25 and 26) shall be displayed as follows:

- a. Upon entry to OPS 3, the values of BURN ATT Roll, Pitch and Yaw (items 24, 25 and 26, respectively) are blanked.

Subsequently, the display is in accordance with the current source of the burn attitude data, either keyboard or guidance.

- b. In MM301 and MM302, upon the execution of a legal "LOAD" item entry or while cyclic guidance is active, BURN ATT Roll, Pitch and Yaw display the guidance-computed values, overriding any previous values, except that if guidance computes a burn attitude that results in an angle singularity, the Roll and Pitch values on the display are blanked and the Yaw value is displayed.

For BFS, the Roll and Pitch values will not be blanked in the event of a singularity until guidance has converged (LOAD_DONE is ON, and either targeted apogee, TGT_HA, or targeted perigee, TGT_HP, is non-zero).

- c. Upon keyboard entry of items 24, 25 or 26, the crew-entered values for BURN ATT Roll, Pitch and Yaw are displayed, overriding any previous values, and if any of these items is not overridden via keyboard entry, its last assigned value is displayed.

For MM303, BURN ATT R, P, and Y will display a preflight I-Load desired attitude, a ground uplinked attitude (may be changed in OPS 2, MM301 or MM302), or a crew-entered attitude. This attitude will be used to generate ADI attitude errors such that the crew can maneuver manually or automatically to a desired attitude (normally entry interface attitude). BURN ATT R, P, and Y are only enabled for data loading in MM301, MM302 and MM303 and execution of the corresponding item numbers in any other major mode shall be treated as an operator error resulting in an "ILLEGAL ENTRY" message.

For PFS, in MM202, beginning at (TIG – BURN_ENABLE_WINDOW seconds) and in MM104, MM105 and MM302, beginning at TIG, the burn attitude (based on the current guidance computed body quaternion) shall be displayed cyclically and terminated upon transition to the next major mode.

For BFS, the burn attitude (based on the current guidance computed body quaternion) shall be displayed cyclically upon initiation of cyclic guidance computation and terminated upon transition to the next major mode.

For both PFS and BFS, if guidance computes an attitude singularity, indicated by the variable X_FLAG = off, then the roll and pitch angles of the burn attitude shall be blank, and the yaw angle shall be displayed.

This shall apply only for the following:

For PFS: MM202, MM104, MM105, MM301, and MM302.

For BFS: MM104, MM105, MM301, and MM302.

- (8) Item 27 (MNVR) shall provide a control to initiate an automatic maneuver to the desired attitude (BURN ATT). When executed an asterisk(*) shall be displayed next to the item number while the DAP is either maneuvering to or holding about the pre-burn attitude in OPS 1 and 3, and while maneuvering to the pre-burn attitude in OPS 2.
 - a. The current DAP selection will be continuously displayed as AUTO, INRTL, FREE, or LVLH in normal intensity. The DAP selection will be displayed as double overbright when an ITEM 27 (Preburn maneuver to attitude) has been requested and the DAP selection is not AUTO. The DAP selection will return to normal intensity once auto is selected.
 - b. The current preburn maneuver time to go (TTG) is displayed whenever the preburn maneuver is in progress (PREBURN_MNVR_DISP is ON) and blanked otherwise. When displayed, the TTG field is displayed double overbright whenever the TTG_FLAG is ON.
- (9) Below the BURN ATT section, data shall be displayed to inform the crew of projected mission milestones.

- a. During OPS 3, a display of the Orbiter range (REI) from 400,000 feet to the target landing site is available to the crew in nautical miles. In OPS 1 and 2 the data field is blanked.
 - b. A time display (TXX) shall be provided which is either time-to-next-apsis for OPS 1 and 2 or time-to-400,000 feet (above a spherical earth) for OPS 3 in minutes and seconds. In MM303 REI and TFF are recomputed whenever the state vector is updated by either uplink or HSD entry.
 1. During OPS 1 and 2 the dynamic title field TXX displays either TTA or TTP and the time field displays the time to apogee or perigee, whichever is closer. For orbits where the difference between apogee and perigee altitudes is less than five nautical miles, the dynamic characters become TTC (Time-To-Circularize) and the time field is blanked.
 2. During OPS 3 the dynamic title field TXX displays TFF (time-to Free Fall) and the time field displays the time-to-400,000 feet.
- (10) The center of the display contains propulsion information relative to the OMS TVC. The "GMBL" data provides the crew with a monitoring capability of the pitch and yaw engine gimbal positions for the left and right OMS actuators. These gimbal positions (displayed in degrees) are from the position transducers located on the gimbal drive actuators for the selected drive systems. These gimbal positions are monitored during burns or gimbal drive checkout to verify satisfactory TVC operation. The pitch and yaw angle data for the left and right engines are displayed simultaneously. The parameter status indicator column for each gimbal drive system normally will be blank. Upon detection of a gimbal actuator failure by FDI, a down arrow (↓) will be driven adjacent to the failed actuator. A down arrow (↓) shall be cleared whenever the associated L GMBL PRI/SEC actuator select (Items 28 and 30) or R GMBL PRI/SEC actuator select (Items 29 and 31) are selected or reselected. The status indicator columns are blanked until a failure occurs and is detected on the selected system. A data missing indicator "M" shall be displayed in the status column and the parameter data field blanked when a commfault exists. The "M" has priority over the down arrow (↓). A status indicator is provided for each gimbal system.
- a. GMBL PRI/SEC L (Items 28 and 30) provide the capability for the crew to select the active gimbal drive system (primary or secondary) on the left (L) engine, while GMBL PRI/SEC R (Items 29 and 31) provide the capability to select the active gimbal drive system primary or secondary on the right (R) engine. Selection of either gimbal drive system (PRI or SEC) causes both the pitch and yaw actuators to be driven by the designated controller system. Whenever any one of ITEMS 28 thru 31 is executed a flag is sent to OMS TVC CMD SOP (4.64) which initiates a command sequence intended to free the OMS ACTUATORS. The sequence is performed for all actuators. GMBL OFF L/R (Items 32 and 33) provide the capability to power down the respective left and right gimbal drive systems. An asterisk (*) will be displayed next to the selected left gimbal drive system item number and the selected right gimbal drive system item number. PRI, SEC, and OFF are mutually exclusive in that only one function may be selected at any time. However, either left engine gimbal drive system (PRI or SEC) may be selected concurrently with either right engine gimbal drive system (PRI or SEC). When the display is first called, the PRI gimbal drive systems on both engines are selected unless a previous selection has been made automatically during ascent. The gimbal drive system selected

last in OPS-1 shall be initialized in OPS-2, 3 and 6 upon transitioning from OPS 1 to any of these OPS's. Thereafter, gimbal drive system selection will reflect crew inputs.

- b. GMBL CK (Item 34) provides the capability for the crew to initiate an automatic TVC check of the active gimbal drive systems in all major modes in which the display is available. An asterisk (*) is displayed next to the item number while the check is in progress. At the completion of the drive check the gimbals are returned to their initial positions and the asterisk (*) blanked. The gimbal drive check will be inhibited when the display is called up.
- (11) ABORT TGT (Item 35) provides a method of selecting an AOA or ATO abort as well as the target set. Once this item entry control has been exercised, the ATO outputs from the dedicated abort switch or the backup ATO abort select item on the "OVERRIDE" display shall be ignored. The item allows the crew to either upmode or downmode the type of abort desired.

If an ATO abort is selected via the dedicated abort switch, the automatically selected abort target set ID (from the stored matrix of nominal, AOA, ATO, or ditch target sets) will be displayed. Any automatically selected target set ID may be overridden via the item entry control. The item entry control also allows the crew to select an AOA or ATO abort and the respective target sets desired by entering the appropriate target ID. (If the crew selects a particular OMS-1 target set in MM104, the associated OMS-2 target is automatically selected and the ID displayed upon transitioning to MM105. The crew may override this automatic OMS-2 target selection by entry of a new target set ID in MM105 prior to the OMS-2 burn for ATO or prior to OPS-3 transition for AOA.) The abort target set ID shall be initially set equal to zero and displayed upon entering MM104 and thereafter may be set equal to 1 through 12 (by crew entry or automatically by AOA/ATO Targeting when an abort is declared).

An operator error shall result and the "ILLEGAL ENTRY" CRT message annunciated for any of the following:

- Execution of the ABORT TGT Item in any Major Mode except MM104 or MM105.
 - Entry of an ABORT TGT ID not equal to 1 or 3-5 in MM104.
 - Entry of an ABORT TGT ID not equal to 1-12 in MM105.
 - Entry of an ABORT TGT ID while an OMS burn is enabled or in progress.
- (11a) If an AOA abort is selected in MM105, the text words "OPS 301" will flash on the display indicating when the targeting for the AOA OMS 2 burn is completed and the crew can then execute "OPS 301 PRO". The AOA targets shall be displayed in MM105. During an AOA, manual changes to the automatically displayed targeting data when entered in MM105 shall be carried across the OPS transition to MM301 without the crew having to perform an item 22 (LOAD).
- (12) The upper right section of the display contains various burn data information as follows:
- a. A dynamic character field "EXEC" shall appear double overbright and flashing at TIG - BURN_ENABLE_WINDOW seconds and flash until KYBD "EXEC" is performed, at which time the characters disappear. Ignition is inhibited until this entry is made. A KYBD "EXEC" prior to TIG - BURN_ENABLE_WINDOW seconds does not constitute

an enable for the maneuver and will result in an "ILLEGAL ENTRY" error message. KYBD "EXEC" after TIG enables the maneuver to start immediately after the "EXEC" is entered.

If a Major Mode transition is made out of a Maneuver Execute Major Mode (i.e., MM104, MM105, MM202, MM302) while a Burn is Enabled or in Progress, the burn will be cancelled or terminated, as applicable.

- b. The total delta velocity ($\Delta VTOT$) in feet per second predicted for the burn of the targeted maneuver, as computed by guidance.
- c. TGO (Time-to-Go) reflects the predicted burn time (min:sec) prior to TIG and the actual burn time remaining during the burn.
- d. The velocity-to-be-gained by the maneuver, expressed in vehicle body axis components (VGO X, VGO Y, VGO Z), is displayed in feet per second.
- e. The apogee (HA) and perigee (HP) values in altitude (nautical miles) above a spherical earth for two conditions.
 - 1. Target (TGT) – Predicted post-burn values of apogee and perigee.
 - 2. Current (CUR) – The current orbit apogee and perigee values.

- (13) Items 36, 37, and 38 (FWD RCS ARM,DUMP,OFF) provide the capability to arm, dump and turn off, respectively, a forward RCS propellant burnoff during OPS 3 only. Both the RCS ARM and DUMP Items, executed in that order, are required to initiate the burnoff. If the DUMP item is executed without the ARM item having been executed an "ILLEGAL ENTRY" message shall result. The selection of these two items will be indicated by displaying an asterisk(*) after the appropriate item numbers. The execution of FWD RCS OFF terminates the burnoff and results in the display of an asterisk (*) after the item number and blanks the asterisks (*'s) beside ARM and DUMP. The OFF item is mutually exclusive with the ARM and DUMP item controls. The forward RCS burnoff is inhibited when the display is initially called. If the burnoff is still enabled at the transition to MM304, it will be automatically terminated.

Execution of these item numbers in OPS 1 and 2 shall be treated as an operator error.

- (14) A capability to initiate and terminate a flight control surface drive function (SURF DRIVE) is provided by Items 39(ON) and 40(OFF), respectively. The surface drive function provides simultaneous motion of all aerosurfaces for hydraulic fluid thermal conditioning in OPS 3 only. These ON and OFF items are mutually exclusive. An asterisk (*) will be displayed next to the selected item number. The surface drive is in the off state when this display is initially called, remains in the selected state for transitions from MM301 to MM302 and MM302 to MM303, and if still running at transition to MM304 it is automatically turned off. Execution of these item numbers in OPS 1 and 2 shall be treated as an operator error.

Table 4.2.10.1-1. Setup & Targeting Parameters	
<u>ITEM NO.</u>	<u>PARAMETER NAME</u>
1-4	Engine Select
5	TV ROLL
6-8	Gimbal Trim
9	Weight
10-13	TIG
14-18	PEG 4 TGT Inputs
19-21	PEG 7 TGT Inputs
22	LOAD
24-26	Burn Attitude Inputs
35	Abort TGT ID

4.2.10.2 BFS Supplemental Description

1. Data shown over a stippled background on the display format signifies background nomenclature and/or data fields supported and driven only by BFS.
2. The item entries and controls as identified with an “X” in the “DK” column of the Keyboard Processing Table 4.2.10-1 and the Keyboard “EXEC” for OMS Burn Enable shall respond to PASS keyboard inputs via a selective DK listen mode as well as to inputs made on a keyboard dedicated to the BFS (Reference BFS PRD MG038101, Sec. 3.3.7.1).
3. The OMS L and R engine parameter status down arrow (↓) indicator is driven after Item 2 and/or 3 only if the OMS chamber pressure falls below a preflight I-loaded limit value during an OMS burn. The down arrow (↓) is reset (blanked) if that particular OMS L, R or BOTH OMS engines are reselected via Items 1, 2 or 3. The reset occurs at OMS RM initialization.
4. Item 5 (TV ROLL) shall not be supported by BFS. However, the I-loaded or uplinked value of the ROLL ANGLE shall be displayed in OPS 1 and 3.
5. Item 27 (MNVR) shall not be supported by BFS.
6. Following a delta state update, the calculated value for TFF is displayed. Upon transition to MM 303, TFF shall begin to decrement at an update rate of 1920 ms.
7. The following is for User Information only to reflect how BFS differs from PASS in the setting/resetting of OMS actuator fail indications: The OMS gimbal drive actuator parameter status indicator column for each system normally will be blank. A down arrow (↓) to indicate an actuator failure will be driven in the parameter status column adjacent to the failed actuator gimbal angles (Left P, Y; Right P, Y) whenever the difference between the command and position feedback is greater than the I-Loaded value of the OMS servo amplifier deadband (V97U3077C, OMS_SERVO_AMP_DB) for I-Loaded counts (V97U3061C, O_A_COUNTB). The down arrow (↓) will be cleared whenever the difference between the

commanded and position feedback is less than or equal to the I-Loaded value of the OMS servo amplifier deadband. (See PRD MG038106, BFS GN&C HIP for actual requirements).

8. Execution of GMBL CK (ITEM 34) in the pre-engage mode shall be treated as an operator error resulting in an "ILLEGAL ENTRY" message.
9. CR29886C shall not be supported by BFS (Ref: CR59041A).
The exception to this shall be to support the capability to display the LVLH components of VGO in the PEG 7 delta velocity data fields (items 19, 20, 21) whenever PEG 4 targets are entered and LOAD (item 22) is executed. Paragraphs 4.2.10.1 # (4) item g and 4.2.10.3 item e give the detailed requirements for providing this capability. BFS shall use the variables PEG 4 LVLH X-COMP OF VGO, PEG 4 LVLH Y-COMP OF VGO and PEG 4 LVLH Z-COMP OF VGO as referenced in Table 4.2.10-2.
10. BFS shall not be required to support the display of leading 0 (zero) characters for the TIG hours and minutes data.
11. LOAD_CMD shall be set ON if [Item 22 has been entered or (TGT_DATA_SET has been set true in Major Mode 104)]

and

Current time – 5 minutes < TIG < Current time + 12 hours

otherwise an "ILLEGAL ENTRY" message shall be generated and no LOAD_CMD shall be set. For the automatic LOAD case, a class 3 "ILLEGAL TIG" will be generated on all BFS-commanded DEUs. For the manual LOAD case, a class 5 "ILLEGAL ENTRY" will be generated on the DEU corresponding to the item entry.

The LOAD_CMD is reset to off in OMS guidance.

The following reflects how BFS differs from PASS in processing an illegal LOAD Item 22. In the BFS, when Item 22 is rejected (because it was entered when MONITOR_FLAG is OFF or TIG is not within 5 minutes in the past or 12 hours in the future), then BFS will generate an ILLEGAL ENTRY message with no further Item 22 processing. On the other hand, under the same conditions, PASS will stop the CRT timer, stop the time base calculations, blank the targetting solution data, and terminate the active guidance function before it issues the ILLEGAL ENTRY message.

In BFS, the following display fields are blanked if a legal Item 22 (LOAD) is entered: EXEC, BURN ATT R/P/Y, REI, TXX (TIME) DELTA VTOT, TGO, VGO X/Y/Z, and TGT HA/HP. This is the same requirement included in Section 4.2.10.4, Addendum Reference F. except that PASS sets LOAD_CMD and blanks these fields even if an illegal Item 22 is entered.

12. TGT_DATA_BLANK shall be set as follows:

ON (Blank Targets)

MM 103 to MM 104

MM 104 to MM 105

MM 104 to MM 301

MM 106 to MM 301

OPS 0 to MM 301
Start of OMS 2 AOA Target selection*

OFF (Display Targets)

MM 105 to MM 106

MM 302 to MM 303

After any target uplink*

After any PEG 4 target selection (including OMS 2 AOA)*

*: Set by OMS guidance.

13. LOAD_FLASH shall be set ON if:

(A) TGT_DATA_SET has been turned ON; there are two exceptions:

1. In MM 104, LOAD_FLASH will remain OFF since an automatic LOAD_CMD will be generated if TIG is within limits.
2. If the TGT_DATA_SET is due to selection of OMS 2 AOA targets in MM 105, then LOAD_FLASH will be turned OFF in MM 105, but will be turned ON in MM 301.

(B) UPLINK_DATA_SET has been turned ON

(C) A keyboard item entry has been made to change a target (Items 1–4, 6–17, 19–21) while MONITOR_FLAG is still ON.

(D) OMS 2 AOA targets were selected in MM105 and transition to MM301 has occurred.

14. LOAD_FLASH shall be turned OFF if:

(A) A keyboard item 22 has been executed.

(B) One of the following Major Mode transitions has occurred:

103 to 104

104 to 105

0 to 301

104 to 301

106 to 301

105 to 106

302 to 303

(C) An automatic load has occurred in MM104.

(D) An AOA is declared in MM105.

15. Table 4.2.10.2-1 specifies which item entries are legal in which major modes.

Attempts to enter items that are illegal will result in generation of an “ILLEGAL ENTRY” error message.

The values of items 1 through 21, inclusive, shall be copied from the GN&C buffer to the local display buffer when UPLINK_DATA_SET is ON. The values of items 9 through 18, inclusive, shall be copied from the GN&C buffer to the local display buffer when TGT_DATA_SET is ON. (Note: The value of Item 18, PRPLT, shall be displayed in OPS 3 only.)

16. Deleted.
17. The down arrow parameter status indicators for items 2 and 3 are only driven when BFS is engaged.
18. When a parameter is blanked and unblanked, the previous data may be shown for up to 1.92 seconds after unblanking. The current data is then displayed.
19. The following is for User Information Only to reflect how BFS differs from PASS in driving the ADI error needles when LOAD is flashing: Entering roll, pitch, or yaw burn attitude item entries (24, 25, 26) on the MNVR display, in MM301 and 302 while LOAD is flashing, results in the ADI error needles being briefly commanded to new positions, based on the entered attitude, and then being immediately zeroed out again. When LOAD is not flashing, these new keyboard attitude entries will drive the ADI error needles as expected. (See PRD MG038104, BFS GN&C Guidance and Navigation, for actual requirements).

Table 4.2.10.2-1. Item Entry Legalities

		Major Modes						Notes
#	Name	104	105	106	301	302	303	
1	OMS BOTH	X	X	-	X	X	-	(1)
2	OMS L	X	X	-	X	X	-	(1)
3	OMS R	X	X	-	X	X	-	(1)
4	RCS SEL	X	X	-	X	X	-	(1)
5	TV ROLL	-	-	-	-	-	-	(2)
6	TRIM LOAD - P	X	X	-	X	X	-	(1)
7	TRIM LOAD - LY	X	X	-	X	X	-	(1)
8	TRIM LOAD - RY	X	X	-	X	X	-	(1)
9	WT	X	X	-	X	X	-	(1)
10	TIG - DAY	X	X	-	X	X	-	(1)
11	TIG - HR	X	X	-	X	X	-	(1)
12	TIG - MIN	X	X	-	X	X	-	(1)
13	TIG - SEC	X	X	-	X	X	-	(1)
14	C1	X	X	-	X	X	-	(1)
15	C2	X	X	-	X	X	-	(1)
16	HT	X	X	-	X	X	-	(1)
17	THETAT	X	X	-	X	X	-	(1)
18	PRPLT	-	-	-	X	X	-	(6)

Table 4.2.10.2-1. Item Entry Legalities								
		Major Modes						Notes
#	Name	104	105	106	301	302	303	
19	DELTA V – X	X	X	–	X	X	–	(1)
20	DELTA V – Y	X	X	–	X	X	–	(1)
21	DELTA V – Z	X	X	–	X	X	–	(1)
22	LOAD	X	X	–	X	X	–	(1), (3)
23	TIMER	X	X	–	X	X	–	(3)
24	BURN ATT – R	–	–	–	X	X	X	(1)
25	BURN ATT – P	–	–	–	X	X	X	(1)
26	BURN ATT – Y	–	–	–	X	X	X	(1)
27	MNVR	–	–	–	–	–	–	(4)
28	GMBL – L – PRI	X	X	X	X	X	X	
29	GMBL – R – PRI	X	X	X	X	X	X	
30	GMBL – L – SEC	X	X	X	X	X	X	
31	GMBL – R – SEC	X	X	X	X	X	X	
32	GMBL – L – OFF	X	X	X	X	X	X	
33	GMBL – R – OFF	X	X	X	X	X	X	
34	GMBL CK	X	X	X	X	X	X	
35	ABORT TGT	X	X	–	–	–	–	(1), (5)
36	FWD RCS – ARM	–	–	–	X	X	X	
37	FWD RCS – DUMP	–	–	–	X	X	X	
38	FWD RCS – OFF	–	–	–	X	X	X	
39	SURF DRIVE – ON	–	–	–	X	X	X	
40	SURF DRIVE – OFF	–	–	–	X	X	X	

X = Legal entry, – = Illegal entry

Notes: (1) Legal only if MONITOR_FLAG is ON.
 (2) Display only, not manually alterable.
 (3) Legal only if TIG is within the range of 5 minutes in the past, to 12 hours in the future.
 (4) Automatic maneuver to burn attitude is not available in BFS.
 (5) Only values of 1, 3, 4, 5 are legal in Major Mode 104.
 Only values of 1 through 12 are legal in Major Mode 105.
 (6) Only legal value is zero when LOAD is not flashing.

4.2.10.3 XXXXX Maneuver YYYYY (PFS/BFS) Keyboard Processing Addendum

- A. Target Data Change Signal. Prior to burn enable or after burn completion, if the targeted data is changed, a DATA_ENTER discrete signal (V93X6973X) is sent to the active Maneuver DIP indicating that the target data has been changed. An exception is the entry of a value of zero for PRPLT (Item 18) when LOAD is not flashing, in this case the signal V93X6973X is not sent. Any change of these targeting parameters while burn is enabled or prior to burn completion (except entry of a zero value for the propellant to be consumed during the deorbit maneuver) will result in an operator error. Entry of a zero value for the propellant to be consumed while the burn is enabled or prior to completion will not cause the signal V93X6973X to be sent.
- B. Attitude Change Signal. For PFS, in MM301, MM302 and MM303, whenever a new desired attitude is entered either by the crew or by the uplink command, a discrete (V93X6972X) is sent to the DEORB MNVR DIP (4.211). Attempts to enter a desired attitude in any other major mode will result in an operator error.

For BFS, in MM301, MM302 and MM303, whenever a new desired attitude is entered by the crew, the variable X_FLAG is set to display the desired roll, pitch and yaw angles. Attempts to enter a desired attitude in any other major mode will result in an operator error.

- C. Left and Right PRI/SEC/OFF GMBL ACTR SEL CMDs. These commands are derived from two signals: OMSL_ACT_SEL (V93J6904C) and OMSR_ACT_SEL (V93J6906C) for the left and right gimbal drive systems respectively. Each measurement has the following three states:

- 0 – PRI
- 1 – SEC
- 2 – OFF

Destinations for these commands are:

- CRT (6.35)
- OMS TVC CMD SOP (4.64)
- OMS TVC FB SOP (4.65)
- OMS RM (4.92)

ACTUATOR FAIL Reset and Signal Destinations: The OMS ACTUATOR FAIL FLAGS for a given set of gimbals [OMSL_PITCH_FAIL (V90X7677X)/OMSL_YAW_FAIL (V90X7679X) or OMSR_PITCH_FAIL (V90X7678X)/OMSR_YAW_FAIL (V90X7680X)] shall be reset to zero whenever the associated L GMBL ACTR SEL Items (PRI Item 28, SEC Item 30) or R GMBL ACTR SEL Items (PRI Item 29, SEC Item 31) are selected or reselected. The destinations for the OMS ACTUATOR FAIL FLAGS are GAX (4.110) and TLM.

- D. Execute Command Window. A discrete signal (V93X1050X) is sent to the active maneuver DIP [ASC MNVR DIP (4.210), DEORB MNVR DIP (4.211) or ORB MNVR DIP (4.158)] when the EXEC key is depressed and the current time is either within BURN_ENABLE_WINDOW(V97U5181C) seconds of the targeted TIG or after the targeted TIG (V94X3813X) provides the window. Otherwise, if the EXEC key is pressed and current time is not within BURN_ENABLE_WINDOW seconds of the targeted TIG, an "ILLEGAL ENTRY" message will be issued. The EXEC command will enable the firing of the engines as targeted.

- E. PEG4/PEG7 DATA ENTERED. A discrete (V93X6976X) is set or reset whenever the PEG4 (Items 14–18) or PEG7 (Items 19–21) targets are entered respectively. Whenever the discrete is set the PEG7 targets shall be blanked and upon execution of LOAD (Item 22) for the PEG4 target set, the computed LVLH components of PEG4 VGO shall be displayed, in the PEG7 delta velocity data fields (Items 19, 20 and 21). Whenever the discrete is reset the PEG4 targets shall be blanked and the PEG7 targets will be displayed.
- F. PREBURN MNVR CMD. Destinations for this signal are the ON–ORB DAP (4.35) in OPS–2 and the TRANS DAP (4.201) in OPS 1 and 3.
- G. PRPLT, FWD RCS and SURF DRIVE Item Execution Legality. These signals are legal entries in OPS 3 only and execution shall result in an operator error in OPS 1 and 2.
- H. PEG 4 TGT Data Item Entry Legality and Signal Destinations. These signals are legal entries in OPS 1 and 3 only and will result in an operator error in OPS 2. Destinations for these signals are DEORB MNVR DIP (4.211), ASC MNVR DIP (4.210) and CRT (6.35).
- I. Out of Plane PRPLT Waste and Burn ATT R,P,Y Signal Destinations. Destinations for these signals are DEORB MNVR DIP (4.211) CRT (6.35) and TLM.
- J. ENG SEL, LOAD CMD and START CRT TIMER CMD Signal Destinations. Destinations for these signals are DEORB MNVR DIP (4.211), ASC MNVR DIP (4.210), ORB MNVR DIP (4.158) and CRT (6.35). An additional destination for LOAD_CMD is MSC.
- K. VEH WT, TIG and PEG 7 DELTA V Data Item Entry Signal Destinations. Destinations for these signals are DEORB MNVR DIP (4.211), ASC MNVR DIP (4.210), ORB MNVR DIP (4.158), CRT (6.35) and TLM.
- L. TRIM LOAD Data Item Entry Signal Destination. Destinations for these signals are TRANS DAP (4.102), ON–ORB DAP (4.35) and CRT (6.35).
- M. SURF DRIVE ON/OFF CMD. Destinations for this signal are HYD THERMAL COND (4.232), GAX (4.110) and CRT (6.35).
- N. Abort Target Selection. Whenever a CREW TARGET INDEX FLAG (I_TGT) in PFS or I_ABT (BFS) value (1–12) is entered by the crew, the integer signal (V93J6962C) is sent to AOA/ATO TGT (4.13), CRT (6.35) and TLM.

In addition:

- If the integer value of I_TGT (PFS) or I_ABT (BFS) equals 1 or 2, the ATO TARGET SELECTION (ATO_TGT_SEL) discrete signal (V93X6964X) shall be set and sent to AOA/ATO TGT (4.13) and MSC (TABLE 3–3).
- If the integer value of I_TGT (PFS) or I_ABT (BFS) equals 3–12, the AOA TARGET SELECTION (AOA_TGT_SEL) discrete signal (V93X6963X) shall be set and sent to AOA/ATO TGT (4.13) and MSC (TABLE 3–3).
- In MM104, if an integer value for I_TGT (PFS) or I_ABT (BFS) equal to 2 or 6–12 is entered, an operator error shall result.

- O. TV ROLL ANGLE Data Item Entry Legality and Signal Destinations. Execution of this item is legal in OPS 2 only and shall be an operator error in OPS 1 and OPS 3. Destinations for this signal are ORB MNVR DIP (4.158) and CRT (6.35).
- P. ZAP COMMAND. The discrete signal ZAP_CMD (V93X6908X) is sent to the OMS TVC CMD SOP (4.64) whenever Item 28, 29, 30 or 31 (DRIVE CHANNEL SELECTS) is selected or reselected by the crew.

4.2.10.4 XXXXX Maneuver YYYYY (PFS/BFS) CRT Display Processing Addendum

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word “STAT” being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT display processing Table 4.2.10-2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code. When the “M” PSI is displayed (for Commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)			
Blank (default)	↓		M	∅
1	↓	↑	M	∅
2		↑	M	∅
3	↓			∅
4		↑		∅
5	↓		?	∅
6	↓	↑		∅
7			M	∅
8	↓		?	M ∅
9			?	M ∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.2.10-2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. Dynamic Title The title of this display is driven by the value of MNVR_TITLE_IND (V94U4096C) as follows:

<u>Values</u>	<u>TITLE</u>
1	OMS 1 MNVR EXEC
2	ATO 1 MNVR EXEC
3	AOA 1 MNVR EXEC
4	OMS 2 MNVR EXEC
5	ATO 2 MNVR EXEC
6	AOA MNVR TRANS
7	OMS 2 MNVR COAST
8	ATO 2 MNVR COAST
9	DEORB MNVR COAST
10	DEORB MNVR EXEC
11	ORBIT MNVR EXEC

For BFS, only values from 1 to 10 are supported, the title shall be “????? MNVR ?????” for all other values.

- B. VEH WT, TIG, PEG 4 & PEG 7 TGT Data, LOAD FLASH, ΔVTOT, VGO, HA &HP Data Signal Sources. During MM301, MM302 and MM303 the signal is input from DEORB MNVR DIP (4.211). During MM104, MM105 and MM106 it is input from ASC MNVR DIP (4.210) and during MM202 it is input from ORB MNVR DIP (4.158). In addition, the source for TIG, PEG 4 and PEG 7 targets and vehicle weight can be the keyboard.
- C. TV Roll Angle Signal Source. The sources for this signal are ASC MNVR DIP (4.210) during OPS 1; ORB MNVR DIP (4.158) and Keyboard during OPS 2; and DEORB MNVR DIP (4.211) during OPS 3.
- D. Out-of-Plane PRPLT Waste. The sign of this item defines the out-of-plane fuel wasting direction. The sources for this signal are DEORB MNVR DIP (4.211) and the keyboard.
- E. LOAD Command. The word “LOAD” flashes when LOAD_FLASH (V94X3814X) is set, otherwise it is displayed without flashing.
- F. LOAD Dependent Parameters. These data fields are blanked when LOAD_FLASH (V94X3814X) is set, or when the LOAD_CMD (V93X6956X) is set, or when the display is first called or after transitioning to a Coast Major Mode (MM106, MM201, MM301 or MM303), except burn ATT, TFF and REI in MM303. Refer to Section 4.2.10.2 "BFS Supplemental Description" Paragraph 11 for differing LOAD related requirements for BFS.
- G. TTA, TTP, TTC, TFF and REI Data Field. In OPS 1 & 2, the time-of-apsis shall be updated every 1920 MS. If TTC is displayed the field will be blank. In MM301 and MM302, these data fields shall be blank until computed once and displayed following each LOAD item entry. In MM303, TFF and REI data shall be updated once. In OPS 3, the display will be initialized with the remote text “TFF” displayed since only TFF is calculated.
- H. Minutes – Seconds Conversion. The time data, provided in seconds, will be converted into minutes and seconds and displayed as XX:XX.

- I. TXX Label Field. TXX label field is determined by the TXX ID value as follows:

<u>TXX ID Values</u>	<u>TXX Labels</u>
0	TFF (OPS 3 only)
1	TTA (OPS 1 & 2)
2	TTP (OPS 1 & 2)
3	TTC (OPS 1 & 2)

- J. Left and Right GMBL ACTR Selection. The selection of PRI, SEC, or OFF for the left and right GMBL ACTR systems is indicated by driving an asterisk (*) after Items 28, 30 or 32 and 29, 31 or 33. For the left and right gimbal ACTR systems respectively, two signals OMSL_ACT_SEL (V93J6904C) and OMSR_ACT_SEL (V93J6906C) which have three states to define whether PRI, SEC or OFF are selected and determined as follows:

SIGNAL STATE	SYMBOLS AFTER ITEM NOS.		
	28 & 29 (PRI)	30 & 31 (SEC)	32 & 33 (OFF)
0	*	∅	∅
1	∅	*	∅
2	∅	∅	*

- K. OPS 301 Indicator. Upon completion of the AOA OMS 2 targeting in MM105 and with the AOA abort switch selected, the discrete V94X3911X is set. When this signal is set, the characters “OPS 301” will be displayed flashing.
- L. TGO & ΔV TOT. These parameters shall be updated cyclically once every 1920 ms at initiation of guidance cyclic processing.
- M. FWD FCS ARM/DUMP/OFF INDICATOR. Symbols displayed next to Items 36, 37 and 38 are driven by the following signal which has three states as follows:

SIGNAL STATE V94J4069C	SYMBOLS AFTER ITEM NOS.		
	36 (ARM)	37 (DUMP)	38 (OFF)
1	*	∅	∅
2	*	*	∅
3	∅	∅	*

- N. PEG 4 TGT Data signal Sources. The sources for these signals are DEORB MNVR DIP (4.211), ASC MNVR DIP (4.210) and KYBD.

- O. TGO Signal Sources. The sources for this signal are ORB INS GUID (4.3), DEORB GUID (4.209) and ON-ORB GUID (4.7).
- P. MNVR-IN-PROGRESS Flag Signal Source. The source of this signal is the ON-ORB DAP (4.35) in OPS-2 and the TRANS DAP (4.201) in OPS 1 and 3.
- Q. GUIDANCE OPTION FLAG. In MM202 character strings will be displayed depending on the state of the GUIDANCE OPTION FLAG (V94X4029X) determined by the ORB TGT SPEC (5.10). When the flag is set to one "LAMBERT" (Lambert Guidance) will be displayed. When the flag is reset to zero "EXT ΔV" (External ΔV) will be displayed.
- R. ABORT TARGET INDEX FLAG. The sources for this signal are AOA/ATO TGT (4.13) and KYBD.
- S. PEG4 TARGET LVLH COMPONENTS OF VGO. Whenever the PEG MODE 4 discrete (V93X6976X) is set, upon execution of LOAD (Item 22) for the PEG4 target set the computed preburn LVLH components of VGO (at TIG) shall be displayed in the PEG7 target data fields. At planned time of ignition, if the PEG_MODE_4 discrete is set, the PEG4 target LVLH components of VGO shall be updated cyclically until termination of cyclic guidance (to display current LVLH components during the burn).
- T. BURN ATT DATA SIGNAL SOURCES (PFS/BFS)
- Upon execution of LOAD, the signal sources for the computed BURN ATT data are as follows prior to cyclic guidance initiation:
 - ASC MNVR DIP (4.210) during MM104 and MM105
 - ORB MNVR DIP (4.158) during MM202
 - DEORB MNVR DIP (4.211) during MM301 and MM302
 - Upon initiation of cyclic guidance, the signal sources for the BURN ATT data are as follows:
 - ORB INS GUID (4.3) during MM104 and MM105
 - ORB GUID (4.7) during MM202
 - DEORB GUID (4.209) during MM302
 - In MM301, MM302 and MM303 ONLY, the BURN ATT data can also be input from the keyboard.
 - In OPS 3, BURN ATT Roll, Pitch and Yaw (items 24, 25 and 26) shall be displayed as follows:
 - a. Upon entry to OPS 3, the values of BURN ATT Roll, Pitch and Yaw (items 24, 25 and 26, respectively) are blanked.
- Subsequently, the display is in accordance with the current source of the burn attitude data, either keyboard or guidance.

- b. In MM301 and MM302, upon the execution of “LOAD” or while cyclic guidance is active, BURN ATT Roll, Pitch and Yaw display the guidance-computed values, overriding any previous values, except that if guidance computes a burn attitude that results in an angle singularity, the Roll and Pitch values on the display are blanked and the Yaw value is displayed.

For BFS, the Roll and Pitch values will not be blanked in the event of a singularity until guidance has converged (LOAD_DONE is ON, and either targeted apogee, TGT_HA, or targeted perigee, TGT_HP, is non-zero).

- c. Upon keyboard entry of items 24, 25 or 26, the crew-entered values for BURN ATT Roll, Pitch and Yaw are displayed, overriding any previous values, and if any of these items is not overridden via keyboard entry, its last assigned value is displayed.
- d. Upon transition into MM303, the BURN ATT data are initialized with the preflight I-load desired attitude data or ground uplinked attitude data.

- U. BURN ATT R, P, Y CYCLIC UPDATE (PFS/BFS). For PFS, in MM202, beginning at (TIG – BURN_ENABLE_WINDOW seconds) and in MM104, MM105 and MM302, beginning at TIG, the burn attitude (roll, pitch, yaw based on the guidance computed body quaternion) shall be updated cyclically every 960 ms, and the updating shall be terminated upon transition to the next major mode.

For BFS, the burn attitude (roll, pitch, yaw based on the guidance computed body quaternion) shall be updated cyclically every 1920 ms upon initiation of cyclic guidance, and the updating shall be terminated upon transition to the next major mode.

For both PFS and BFS, if guidance computes an attitude singularity, indicated by the variable X_FLAG = off, then the roll and pitch angles of the burn attitude shall be blank, and the yaw angle shall be displayed.

This shall apply only for the following:

For PFS: MM202, MM104, MM105, MM301, and MM302.

For BFS: MM104, MM105, MM301, and MM302.

- V. PREBURN MNVR TIME TO GO (PFS). The source of this signal is the ORB MNVR DIP (4.158) in OPS 2, the ASCENT MNVR DIP (4.210) in OPS 1, and the DEORB MNVR DIP (4.211) in OPS 3. The value of TTG shall be displayed as a character string in MM:SS format. This requires conversion from seconds to minutes and seconds. Also, the TTG MM:SS field shall be displayed in normal intensity when TTG_FLAG is OFF or in double overbright when TTG_FLAG is ON. The MM:SS field shall be blank when the following condition occurs:

If the PREBURN_MNVR_DISP flag is OFF.

- W. DAP SELECT (PFS). The source of this signal is the ON-ORB DAP (4.35) in OPS 2 and the TRANS DAP (4.201) in OPS 1 and 3. The current DAP selection shall be displayed as a character string (left justified) when the DAP is selected as either AUTO, FREE, INRTL, or LVLH, and shall be displayed as double overbright when a “MNVR” (ITEM 27) is requested and the DAP_SELECT is not AUTO. The DAP selection will return to normal intensity when AUTO is selected.

ON-ORB DAP

FSSR NAME	M/S ID	If M/S ID's value is 1 (ON) then set DAP_SELECT to:
LAMP_AUTO	V72X2850XA	AUTO
LAMP_FREE	V72X2897X	FREE
LAMP_INRTL	V72X2849XA	INRTL
LAMP_LVLH	V72X2868X	LVLH

TRANS DAP

FSSR NAME	M/S ID	If M/S ID's value is set to 1 then set DAP_SELECT to:
AUTO_MODE	V72X2850XB	AUTO
MAN_INRTL_MODE	V72X2849XB	INRTL

4.2.10.5 XXXXX Maneuver YYYYY Figure/Table References

- Figure 4.2.10-1 XXXXX MNVR YYYYY Display (PFS/BFS)
- Table 4.2.10-1 Keyboard Processing Table
- Table 4.2.10-2 CRT Display Processing Table
- Table 4.2.10-3 CRT Display Processing Background Requirements N/A
- Table 4.2.10-4 Mission Design Background Constants N/A
- Table 4.2.10-5 Input Functional Parameters
- Table 4.2.10-6 Output Functional Parameters
- Table 4.2.10-7 I-Loads
- Table 4.2.10-8 K-Loads
- Table 4.2.10-9 Constants

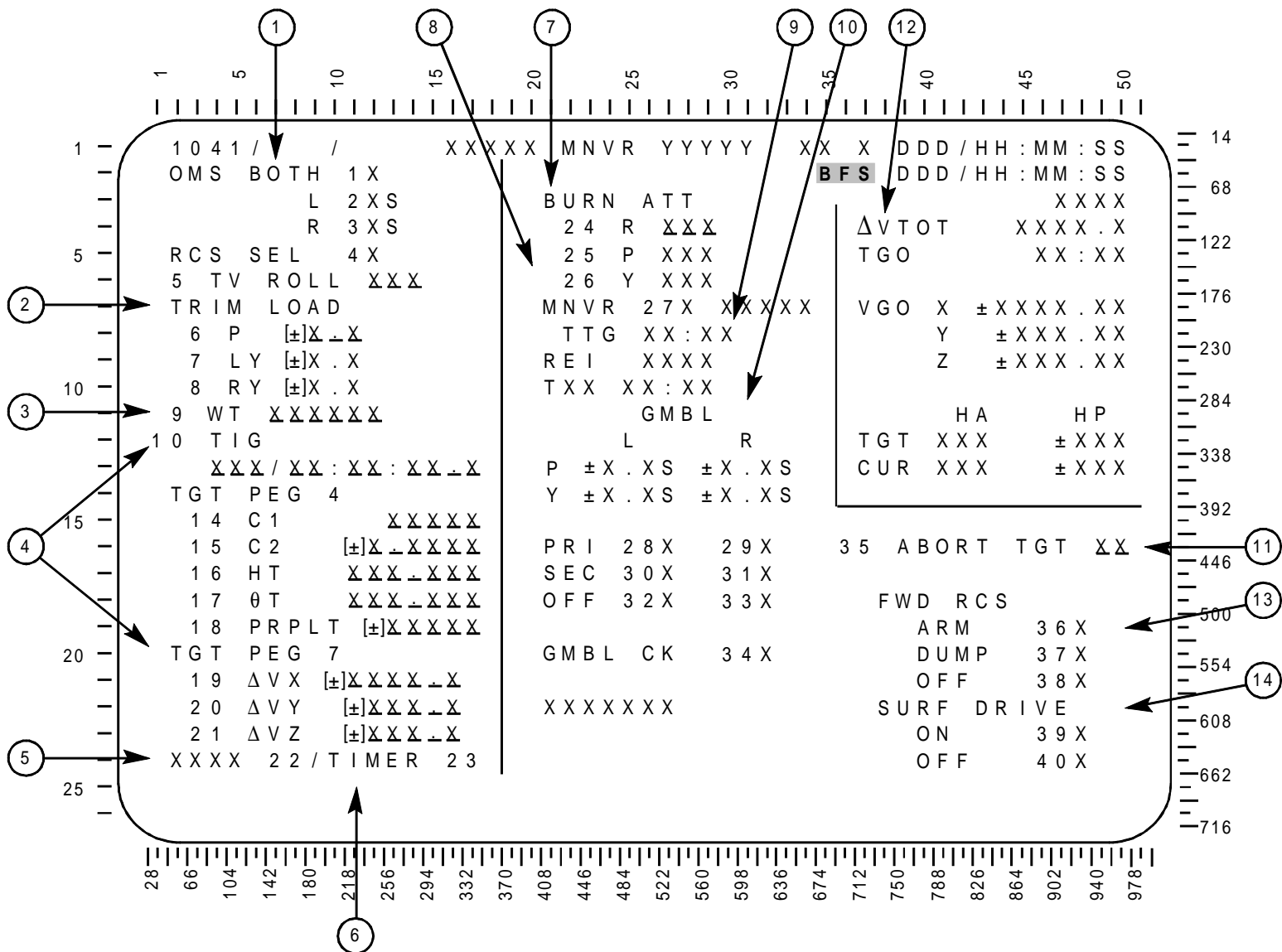


FIGURE 4.2.10-1.XXXXX MNVR YYYYY Display (PFS/BFS)

Table 4.2.10-1. XXXXX MNVR YYYYY (PFS/BFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination		Nomenclature	C R T
								MIN	MAX		PFS	BFS		
001	OMS BOTH 1	V93X6922X	0.0	CTRL		X	1			AJ	4.211	DOP 1	BOTH OMS ENG SEL	X
002	OMS L 2	V93X6925X	0.0	CTRL		X	2			AJ	4.211	DOP 1	L OMS ENG SEL	X
003	OMS R 3	V93X6926X	0.0	CTRL		X	3			AJ	4.211	DOP 1	R OMS ENG SEL	X
004	RCS SEL 4	V93X6929X	0.0	CTRL		X	4			AJ	4.211	DOP 1	RCS ENG SEL CMD	X
005	5 TV ROLL	V93H6936C	4.0	DEC	DEG		5	000	359	AO	4.211	N/S	ROLL ANGLE	X
006	TRIM LOAD 6 P	V93H6915C	4.1	DEC	DEG	X	6	-9.9	+9.9	AL	4.201	T DAP	OMS PITCH TRIM INTEGRATOR	X
007	TRIM LOAD 7 LY	V93H6916C	4.1	DEC	DEG	X	7	-9.9	+9.9	AL	4.201	T DAP	OMS L YAW TRIM INTEGRATOR	X
008	TRIM LOAD 8 RY	V93H6918C	4.1	DEC	DEG	X	8	-9.9	+9.9	AL	4.201	T DAP	OMS R YAW TRIM INTEGRATOR	X
009	WT 9	V93G6940C	7.0	DEC	LBS	X	9	100000	999999	AK	4.211	DOP 1	VEHICLE WEIGHT	X
010	10 TIG (DAYS)	V93W6947C	4.0	DEC	DAYS	X	10	000	365	AK	4.211	DOP 1	TIG(DAYS)	X
011	11 TIG (HOURS)	V93W6944C	3.0	DEC	HRS	X	11	00	23	AK	4.211	DOP 1	TIG(HOURS)	X
012	12 TIG (MINS)	V93W6945C	3.0	DEC	MINS	X	12	00	59	AK	4.211	DOP 1	TIG(MINS)	X
013	13 TIG (SECS)	V93W6946C	5.1	DEC	SECS	X	13	00.0	59.9	AK	4.211	DOP 1	TIG(SEC)	X
014	TGT PEG 4 C1 14	V93U6966C	6.0	DEC	FPS	X	14	00000	99999	AEH	4.211	DOP 1	INTERCEPT OF TARGET LINE	X
015	TGT PEG 4 C2 15	V93U6967C	7.4	DEC		X	15	-9.9999	+9.9999	AEH	4.211	DOP 1	SLOPE OF TARGET LINE	X
016	TGT PEG 4 HT 16	V93U6968C	8.3	DEC	NM	X	16	0	999.999	AEH	4.211	DOP 1	TGT ALTITUDE MAGNITUDE	X
017	TGT PEG 4 THETA T17	V93U6969C	8.3	DEC	DEG	X	17	0	540.000	AEH	4.211	DOP 1	TGT INPLN DNRNG ANG FROM LANH	X
018	TGT PEG 4 PRPLT 18	V93U6970C	6.0	DEC	LBS	X	18	-99999	+99999	EAGI	4.211	DOP 1	OUT OF PLANE PRPLT WASTE	X
019	TGT PEG 7 DEL VX 19	V93L6950C	7.1	DEC	FPS	X	19	-9999.9	+9999.9	AEK	4.211	DOP 1	EXT DELTA V X-COMP	X
020	TGT PEG 7 DEL VY 20	V93L6951C	6.1	DEC	FPS	X	20	-999.9	+999.9	AEK	4.211	DOP 1	EXT DELTA V Y-COMP	X
021	TGT PEG 7 DEL VZ 21	V93L6952C	6.1	DEC	FPS	X	21	-999.9	+999.9	AEK	4.211	DOP 1	EXT DELTA V Z-COMP	X
022	XXXX (LOAD) 22	V93X6956X	0.0	CTRL		X	22			J	4.211	DOP 1	LOAD COMMAND	X
023	TIMER 23	V93X6553X	0.0	CTRL		X	23			J	4.211	DOP 1	START CRT TIMER CMD	X
024	BURN ATT R 24	V93U6910C	4.0	DEC	DEG	X	24	0	359	BI	4.211	DOP 1	ROLL ANGLE IN ADI INERTIAL COORD	X
025	BURN ATT P 25	V93U6909C	4.0	DEC	DEG	X	25	0	359	BI	4.211	DOP 1	PITCH ANGLE IN ADI INERTIAL COORD	X

Table 4.2.10-1. XXXXX MNVR YYYYY (PFS/BFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination		Nomenclature	C R T
								MIN	MAX		PFS	BFS		
026	BURN ATT Y 26	V93U6911C	4.0	DEC	DEG	X	26	0	90	BI	4.211	DOP 1	YAW ANGLE IN ADI INERTIAL COORD	X
027		*						270	359					
028	MNVR 27	V93X6912X	0.0	CTRL			27			F	4.35	N/S	PREBURN MNVR CMD	X
029	GMBL PRI L 28	V93J6904C	0.0	CTRL		X	28			C,P	4.64	TVCCMD	L P/S/OFF GMBL ACTR SEL	X
030	GMBL PRI R 29	V93J6906C	0.0	CTRL		X	29			C,P	4.64	TVCCMD	R P/S/OFF GMBL ACTR SEL	X
031*	GMBL SEC L 30	V93J6904C	0.0	CTRL		X	30			C,P	4.64	TVCCMD	L P/S/OFF GMBL ACTR SEL	X
032*	GMBL SEC R 31	V93J6906C	0.0	CTRL		X	31			C,P	4.64	TVCCMD	R P/S/OFF GMBL ACTR SEL	X
033*	GMBL OFF L 32	V93J6904C	0.0	CTRL		X	32			C	4.64	TVCCMD	L P/S/OFF GMBL ACTR SEL	X
034*	GMBL OFF R 33	V93J6906C	0.0	CTRL		X	33			C	4.64	TVCCMD	R P/S/OFF GMBL ACTR SEL	X
035	GMBL CK 34	V93X6901X	0.0	CTRL			34				4.64	TVCCMD	OMS CK ENA CMD	X
036	35 ABORT TGT	V93J6962C	3.0	DEC		X	35	1	12	N	4.13	DOP 1	CREW TARGET INDEX FLAG	X
037	FWD RCS ARM 36	V93X6941X	0.0	CTRL			36			G	4.211	DOP 1	FWD RCS ARM CMD	X
038	FWD RCS DUMP 37	V93X6942X	0.0	CTRL			37			G	4.211	DOP 1	FWD RCS DUMP CMD	X
039	FWD RCS OFF 38	V93X6943X	0.0	CTRL			38			G	4.211	DOP 1	FWD RCS OFF CMD	X
040	SURF DRIVE ON 39	V93X6961X	0.0	CTRL			39			GM	4.232	DOP 1	SURF DRIVE ON/OFF CMD	X
041*	SURF DRIVE OFF 40	V93X6961X	0.0	CTRL			40			GM	4.232	DOP 1	SURF DRIVE ON/OFF CMD	X
042	XXXX (EXEC_CMD)	V93X1050X	0.0	CTRL		X	NA			D	4.211	DOP 1	BURN EXECUTE CMD	X

Table 4.2.10-2. XXXXX MNVR YYYY (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source		Nomenclature	C R T		
			X	Y		CHAR	BILEVEL														TYPE	PFS			BFS	
							1	0																		
001	(OPS)	V93X0040X	2	1		5.0																UI	N/S	OPS FUNCTION PAGE	X	
002	(OPS)	V93X0040X	2	1		5.0																	N/S	MI	OPS FUNCTION PAGE	X
003	(SPEC)	V93X0042X	7	1		4.0																	UI	MI	SPEC FUNCTION PAGE	X
004	(DISP)	V93X0044X	10	1		4.0																	UI	MI	DISPLAY FUNCTION PAGE	X
005	(TITLE)	V93X0046X	16	1		17.0														A			UI	MI	CRT TITLE	X
006	(UL)	V92X5032X	34	1		2.0	UL							X	G								UI	MI	UPLINK ACTIVITY IND	X
007	(GPC)	V93X0048X	36	1		2.0									E								UI	N/S	GPC DRIVER	X
008	(GPC)	V93X0048X	36	1		2.0									B								N/S	MI	GPC DRIVER	X
009	(MT)	V91W1990C	39	1		12.0			DHMS						A								FCOS	BOS	MISSION ELAPSED TIME	X
010	(CRT TIMER)	V91W1987C	39	2		12.0			DHMS						A								FCOS	BOS	DISPLAY CRT TIMER,GNC	X
011	OMS BOTH 1	V93X6922X	12	2		1.0	*								E								KYBD	KYBD	BOTH OMS ENG SEL	X
012	OMS L 2	V93X6925X	12	3		1.0	*								E								KYBD	KYBD	L OMS ENG SEL	X
013	OMS R 3	V93X6926X	12	4		1.0	*								E								KYBD	KYBD	R OMS ENG SEL	X
014	RCS SEL 4	V93X6929X	12	5		1.0	*								E								KYBD	KYBD	RCS ENG SEL CMD	X
015	OMS L 2 (S)	V94X4681X	13	3		1.0									B					3			4.92	DOP 1	LEFT OMS ALERT FLAG	X
016	OMS R 3 (S)	V94X4682X	13	4		1.0									B					3			4.92	DOP 1	RIGHT OMS ALERT FLAG	X
017	5 TV ROLL	V93H6936C	11	6		4.0			DEG						E					C			KYBD	DOP 1	ROLL ANGLE	X
018	TRIM LOAD 6 P	V93H6915C	8	8		4.1			DEG						E	X							4.201	T DAP	OMS PITCH TRIM INTEGRATOR	X
019	TRIM LOAD 7 LY	V93H6916C	8	9		4.1			DEG						E	X							4.201	T DAP	OMS L YAW TRIM INTEGRATOR	X
020	TRIM LOAD 8 RY	V93H6918C	8	10		4.1			DEG						E	X							4.201	T DAP	OMS R YAW TRIM INTEGRATOR	X
021	WT 9	V93G6940C	6	11		7.0			LBS						B							B	4.211	DOP 1	VEHICLE WEIGHT	X
022	10 TIG (DAYS)	V93W6947C	3	13		4.0			DAYS						E							B	4.211	DOP 1	TIG(DAYS)	X
023	11 TIG (HOURS)	V93W6944C	7	13		3.0			HRS						E		X					B	4.211	DOP 1	TIG(HOURS)	X
024	12 TIG (MINS)	V93W6945C	10	13		3.0			MINS						E		X					B	4.211	DOP 1	TIG(MINS)	X
025	13 TIG (SECS)	V93W6946C	13	13		5.1			SECS						E		X					B	4.211	DOP 1	TIG(SEC)	X

Table 4.2.10-2. XXXXX MNVR YYYYY (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S	Add Ref	Source		Nomenclature	C R T	
			X	Y		CHAR	BILEVEL														TYPE	PFS			BFS
							1	0																	
026	TGT PEG 4 C1 14	V93U6966C	12	15		6.0			DEC	FPS										B N	4.211	DOP 1	INTERCEPT OF TARGET LINE	X	
027	TGT PEG 4 C2 15	V93U6967C	11	16		7.4			DEC											B N	4.211	DOP 1	SLOPE OF TARGET LINE	X	
028	TGT PEG 4 HT 16	V93U6968C	10	17		8.3			DEC	NM										B N	4.211	DOP 1	TGT ALTITUDE MAGNITUDE	X	
029	TGT PEG 4 THETA T17	V93U6969C	10	18		8.3			DEC	DEG										B N	4.211	DOP 1	TGT INPLN DNRNG ANG FROM LANH	X	
030	TGT PEG 4 PRPLT 18	V93U6970C	12	19		6.0			DEC	LBS										D	KYBD	DOP 1	OUT OF PLANE PRPLT WASTE	X	
031	TGT PEG 7 DEL VX 19	V93L6950C	10	21		7.1			DEC	FPS										B,S	KYBD	DOP 1	EXT DELTA V X-COMP	X	
032	TGT PEG 7 DEL VX 19	V94L3945C	10	21		7.1			DEC	FPS										B,S	4.210	DOP 1	PEG 4 LVLH X-COMP OF VGO	X	
033	TGT PEG 7 DEL VY 20	V93L6951C	11	22		6.1			DEC	FPS										B,S	KYBD	DOP 1	EXT DELTA V Y-COMP	X	
034	TGT PEG 7 DEL VY 20	V94L3946C	11	22		6.1			DEC	FPS										B,S	4.210	DOP 1	PEG 4 LVLH Y-COMP OF VGO	X	
035	TGT PEG 7 DEL VZ 21	V93L6952C	11	23		6.1			DEC	FPS										B,S	KYBD	DOP 1	EXT DELTA V Z-COMP	X	
036	TGT PEG 7 DEL VZ 21	V94L3947C	11	23		6.1			DEC	FPS										B,S	4.210	DOP 1	PEG 4 LVLH Z-COMP OF VGO	X	
037	XXXX (LOAD) 22	V94X3814X	2	24		4.0	LOAD	LOAD	BLVL											B E	4.211	DOP 1	LOAD FLASH FLAG	X	
038	BURN ATT R 24	V93U6910C	26	4		4.0			DEC	DEG										X				ROLL ANGLE IN ADI INERTIAL COORD	X
039	BURN ATT P 25	V93U6909C	26	5		4.0			DEC	DEG										X				PITCH ANGLE IN ADI INERTIAL COORD	X
040	BURN ATT Y 26	V93U6911C	26	6		4.0			DEC	DEG										X				YAW ANGLE IN ADI INERTIAL COORD	X
041	DAP_SELECT	ADDENDUM	30	7		5.0			CHAR															DAP MODE SELECTION	X
042	TTG	V90W2638C	26	8		5.0			CHAR	MS														DISPLAY PREBURN MNVR TIME TO GO	X
043	MNVR 27	V90X1589X	28	7		1.0	*		BLVL															PRE-BURN MNVR-IN-PROGRESS FLAG	X
044	REI	V94H4095C	25	9		5.0			DEC	NM														RNGE TO LDNG SITE FROM ENTRY I/F	X
045	TXX (FLAG)	V94J4098C	22	10		2.0			RTXT															TIME TO XXXXX DISPLAY FIELD IND	X

Table 4.2.10-2. XXXXX MNVR YYYY (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source		Nomenclature	C R T	
			X	Y		CHAR	BILEVEL														TYPE	PFS			BFS
							1	0																	
046	TXX (TIME)	V94W3796C	25	10		5.0			CHAR	MS											FGH	4.211	DOP 1	TIME TO NEXT APSIS/FREE FALL	X
047	GMBL L P	V95H1601C	23	13		4.1			DEC	DEG												4.65	TVCFB	OMS-L SELECTED PITCH ACTR PFB	X
048	GMBL L Y	V95H1602C	23	14		4.1			DEC	DEG												4.65	TVCFB	OMS-L SELECTED YAW ACTR PFB	X
049	GMBL R P	V95H1603C	29	13		4.1			DEC	DEG												4.65	TVCFB	OMS-R SELECTED PITCH ACTR PFB	X
050	GMBL R Y	V95H1604C	29	14		4.1			DEC	DEG												4.65	TVCFB	OMS-R SELECTED YAW ACTR PFB	X
051	GMBL L P (S)	V94J4065C	27	13		1.0			STAT													4.92	DOP 1	OMS-L PITCH ACTR STATUS	X
052	GMBL L Y (S)	V94J4066C	27	14		1.0			STAT													4.92	DOP 1	OMS-L YAW ACTR STATUS	X
053	GMBL R P (S)	V94J4067C	33	13		1.0			STAT													4.92	DOP 1	OMS-R PITCH ACTR STATUS	X
054	GMBL R Y (S)	V94J4068C	33	14		1.0			STAT													4.92	DOP 1	OMS-R YAW ACTR STATUS	X
055	GMBL PRI L 28	V93J6904C	27	16		1.0			CHAR												J	KYBD	DOP 1	L P/S/OFF GMBL ACTR SEL	X
056*	GMBL SEC L 30	V93J6904C	27	17		1.0			CHAR												J	KYBD	DOP 1	L P/S/OFF GMBL ACTR SEL	X
057*	GMBL OFF L 32	V93J6904C	27	18		1.0			CHAR												J	KYBD	DOP 1	L P/S/OFF GMBL ACTR SEL	X
058	GMBL PRI R 29	V93J6906C	32	16		1.0			CHAR												J	KYBD	DOP 1	R P/S/OFF GMBL ACTR SEL	X
059	GMBL SEC R 31	V93J6906C	32	17		1.0			CHAR												J	KYBD	DOP 1	R P/S/OFF GMBL ACTR SEL	X
060*	GMBL OFF R 33	V93J6906C	32	18		1.0			CHAR												J	KYBD	DOP 1	R P/S/OFF GMBL ACTR SEL	X
061	GMBL CK 34	V95X1568X	32	20		1.0	*		BLVL													4.64	TVCCMD	OMS DRIVE IN PROCESS	X
062	XXXX (EXEC FLAG)	V94X3813X	47	3		4.0	EXEC		BLVL				X	X							B F	4.211	DOP 1	ENGINE IGNITION MINUS 5 SEC FLAG	X
063	DELTA VTOT	V94L3795C	44	4		7.1			DEC	FPS		X									BFL	4.211	DOP 1	TOTAL DELTA V REQD FOR MANEUVER	X
064	TGO	V90W1941C	46	5		5.0			CHAR	MS		X									FHLO	4.3	N/S	TIME TO GO TO VELOCITY CUTOFF	X
065	VGO X	V94U3800C	43	7		8.2			DEC	FPS		X									B F	4.211	DOP 1	X-COMP OF VGO OF MNVR-BODY COORD	X

Table 4.2.10-2. XXXXX MNVR YYYYY (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S	Add Ref	Source		Nomenclature	C R T	
			X	Y		CHAR	BILEVEL														TYPE	PFS			BFS
							1	0																	
066	VGO Y	V94U3801C	44	8		7.2			DEC	FPS						A	X			B F	4.211	DOP 1	Y-COMP OF VGO OF MNVR-BODY COORD	X	
067	VGO Z	V94U3802C	44	9		7.2			DEC	FPS						A	X			B F	4.211	DOP 1	Z-COMP OF VGO OF MNVR-BODY COORD	X	
068	HA TGT	V94H3798C	40	12		4.0			DEC	NM						E				B F	4.211	DOP 1	TARGET APOGEE ALTITUDE	X	
069	HA CUR	V94H3810C	40	13		4.0			DEC	NM						B				B	4.211	DOP 1	CURRENT APOGEE ALTITUDE	X	
070	HP TGT	V94H3799C	47	12		4.0			DEC	NM						E	X			B F	4.211	DOP 1	TARGET PERIGEE ALTITUDE	X	
071	HP CUR	V94H3811C	47	13		4.0			DEC	NM						B	X			B	4.211	DOP 1	CURRENT PERIGEE ALTITUDE	X	
072	35 ABORT TGT	V93J6962C	48	16		3.0			DEC							B				R	4.13	DOP 1	CREW TARGET INDEX FLAG	X	
073	FWD RCS ARM 36	V94J4069C	48	19		1.0			CHAR							E				M	4.211	DOP 1	RCS DUMP STATUS DRIVER	X	
074*	FWD RCS DUMP 37	V94J4069C	48	20		1.0			CHAR							E				M	4.211	DOP 1	RCS DUMP STATUS DRIVER	X	
075*	FWD RCS OFF 38	V94J4069C	48	21		1.0			CHAR							E				M	4.211	DOP 1	RCS DUMP STATUS DRIVER	X	
076	SURF DRIVE ON 39	V93X6961X	48	23		1.0	*		BLVL							E					KYBD	DOP 1	SURF DRIVE ON/OFF CMD	X	
077	SURF DRIVE OFF 40	V93X6961X	48	24		1.0		*	BLVL							E					KYBD	DOP 1	SURF DRIVE ON/OFF CMD	X	
078	XXX XXX (OPS 301)	V94X3911X	21	22		7.0			CHAR					X		B				K	4.210	DOP 1	AOA OMS-2 TARGETING COMPLETE FLAG	X	
079	XXXXXXX(GD OPT FLAG)	V94X4029X	21	22		7.0			CHAR							B				Q	5.10	N/S	GUIDANCE OPTION FLAG	X	
080	(MSG LINE)	V93X0050X	1	25		44.0			CHAR							G					UI	N/S	MESSAGE LINE	X	
081	(MSG LINE)	V93X0050X	2	25		46.0			CHAR							G					N/S	MI	MESSAGE LINE	X	
082	(BUFFER MSG)	V93X0054X	45	25		4.0			CHAR							G					UI	N/S	BUFFER MESSAGE INDICATOR	X	
083	(BUFFER MSG)	V93X0054X	48	25		4.0			CHAR							G					N/S	MI	BUFFER MESSAGE INDICATOR	X	
084	(SPL)	V93X0056X	2	26		49.0			CHAR							G					UI	MI	SCRATCH PAD LINE	X	
085	(BFS)	V98X0015X	35	2		3.0			CHAR				X			G					N/S	MI	BFS IDENTIFIER	BFS X	

TABLE 4.2.10-5. INPUT FUNCTIONAL PARAMETERS FOR XXXXX MANEUVER YYYYYY DISPLAY (G6.35)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(TITLE)	V93X0046X	CRT TITLE	UI		BD			
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
AOA_TGT_SEL	V93X6963XB	AOA TARGET SELECTION	AOA/ATO TGT					
ATO_TGT_SEL	V93X6964XB	ATO TARGET SELECTION	AOA/ATO TGT					
AUTO_MODE	V72X2850XB	FWD DAP AUTO (LIGHT)	TRANS DAP				93017G	*
BACKGROUND_CALC	V95X7329X	BACKGROUND CALC IN PROGRESS FLAG	ORB TGT SPEC					
BOTH_OMS	V93X6922XA	BOTH OMS ENG SEL	XXXXX MNVR DISP					
BOTH_OMS	V93X6922XC	BOTH OMS ENG SEL	DEORB MNVR DIP					
BOTH_OMS	V93X6922XD	BOTH OMS ENG SEL	ORB MNVR DIP					
C1_DISP	V93U6966CA	INTERCEPT OF TARGET LINE	XXXXX MNVR DISP	FT/S				
C1_DISP	V93U6966CB	INTERCEPT OF TARGET LINE	DEORB MNVR DIP	FT/S			93017G	*
C1_DISP	V93U6966CC	INTERCEPT OF TARGET LINE	ASC MNVR DIP	FT/S			93017G	*
C2_DISP	V93U6967CA	SLOPE OF TARGET LINE	XXXXX MNVR DISP					
C2_DISP	V93U6967CB	SLOPE OF TARGET LINE	DEORB MNVR DIP				93017G	*
C2_DISP	V93U6967CC	SLOPE OF TARGET LINE	ASC MNVR DIP				93017G	*
CUR_HA	V94H3810CA	CURRENT APOGEE ALTITUDE	ASC MNVR DIP	NM			93017G	*
CUR_HA	V94H3810CB	CURRENT APOGEE ALTITUDE	ORB MNVR DIP	NM			93017G	*
CUR_HA	V94H3810CC	CURRENT APOGEE ALTITUDE	DEORB MNVR DIP	NM			93017G	*
CUR_HP	V94H3811CA	CURRENT PERIGEE ALTITUDE	ASC MNVR DIP	NM			93017G	*
CUR_HP	V94H3811CB	CURRENT PERIGEE ALTITUDE	ORB MNVR DIP	NM			93017G	*
CUR_HP	V94H3811CC	CURRENT PERIGEE ALTITUDE	DEORB MNVR DIP	NM			93017G	*
DRIVE_OMS	V95X1568X	OMS DRIVE IN PROCESS	OMS TVC CMD SOP		BD			
DV_TOT	V94L3795CA	TOTAL DELTA V REQD FOR MANEUVER	ASC MNVR DIP	FT/S			93017G	*
DV_TOT	V94L3795CB	TOTAL DELTA V REQD FOR MANEUVER	ORB MNVR DIP	FT/S			93017G	*
DV_TOT	V94L3795CC	TOTAL DELTA V REQD FOR MANEUVER	DEORB MNVR DIP	FT/S			93017G	*
EXT_DV_LVLH(1)	V93L6950CA	EXT DELTA V X-COMP	XXXXX MNVR DISP	FT/S			93017G	*
EXT_DV_LVLH(1)	V93L6950CB	EXT DELTA V X-COMP	ORB TGT SPEC	FT/S			93017G	*
EXT_DV_LVLH(1)	V93L6950CC	EXT DELTA V X-COMP	DEORB MNVR DIP	FT/S			93017G	*
EXT_DV_LVLH(1)	V93L6950CD	EXT DELTA V X-COMP	ASC MNVR DIP	FT/S				
EXT_DV_LVLH(1)	V93L6950CE	EXT DELTA V X-COMP	ORB MNVR DIP	FT/S			93017G	*
EXT_DV_LVLH(2)	V93L6951CA	EXT DELTA V Y-COMP	XXXXX MNVR DISP	FT/S			93017G	*
EXT_DV_LVLH(2)	V93L6951CB	EXT DELTA V Y-COMP	ORB TGT SPEC	FT/S			93017G	*
EXT_DV_LVLH(2)	V93L6951CC	EXT DELTA V Y-COMP	DEORB MNVR DIP	FT/S			93017G	*
EXT_DV_LVLH(2)	V93L6951CD	EXT DELTA V Y-COMP	ASC MNVR DIP	FT/S				
EXT_DV_LVLH(2)	V93L6951CE	EXT DELTA V Y-COMP	ORB MNVR DIP	FT/S			93017G	*
EXT_DV_LVLH(3)	V93L6952CA	EXT DELTA V Z-COMP	XXXXX MNVR DISP	FT/S			93017G	*
EXT_DV_LVLH(3)	V93L6952CB	EXT DELTA V Z-COMP	ORB TGT SPEC	FT/S			93017G	*
EXT_DV_LVLH(3)	V93L6952CC	EXT DELTA V Z-COMP	DEORB MNVR DIP	FT/S			93017G	*
EXT_DV_LVLH(3)	V93L6952CD	EXT DELTA V Z-COMP	ASC MNVR DIP	FT/S				

TABLE 4.2.10-5. INPUT FUNCTIONAL PARAMETERS FOR XXXXX MANEUVER YYYYYY DISPLAY (G6.35)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
EXT_DV_LVLH(3)	V93L6952CE	EXT DELTA V Z-COMP	ORB MNVR DIP	FT/S			93017G	*
GUID_FLAG	V94X4029X	GUIDANCE OPTION FLAG	ORB TGT SPEC		BD		93017G	*
HTGT_DISP	V93U6968CA	TGT ALTITUDE MAGNITUDE	XXXXX MNVR DISP	NM				
HTGT_DISP	V93U6968CB	TGT ALTITUDE MAGNITUDE	DEORB MNVR DIP	NM			93017G	*
HTGT_DISP	V93U6968CC	TGT ALTITUDE MAGNITUDE	ASC MNVR DIP	FT			93017G	*
I_TGT	V93J6962CA	CREW TARGET INDEX FLAG	XXXXX MNVR DISP				93017G	*
I_TGT	V93J6962CB	CREW TARGET INDEX FLAG	AOA/ATO TGT				93017G	*
LAMP_AUTO	V72X2850XA	FWD DAP AUTO (LIGHT)	ORB DAP				93017G	*
LAMP_FREE	V72X2897X	FWD FREE DRIFT MODE (LIGHT)	ORB DAP	EVENT	BD		93017G	*
LAMP_INRTL	V72X2849XA	FWD DAP MAN INRTL (LIGHT)	ORB DAP				93017G	*
LAMP_LVLH	V72X2868X	FWD MANUAL LVLH (LIGHT)	ORB DAP		BD		93017G	*
LEFT_OMS	V93X6925XA	L OMS ENG SEL	XXXXX MNVR DISP					
LEFT_OMS	V93X6925XC	L OMS ENG SEL	DEORB MNVR DIP					
LEFT_OMS	V93X6925XD	L OMS ENG SEL	ORB MNVR DIP					
LOAD_CMD	V93X6956X	LOAD COMMAND	XXXXX MNVR DISP		BD		93177D	*
LOAD_FLASH	V94X3814XA	LOAD FLASH FLAG	ASC MNVR DIP				93017G	*
LOAD_FLASH	V94X3814XB	LOAD FLASH FLAG	ORB MNVR DIP				93017G	*
LOAD_FLASH	V94X3814XC	LOAD FLASH FLAG	DEORB MNVR DIP				93017G	*
MAN_INRTL_MODE	V72X2849XB	FWD DAP MAN INRTL (LIGHT)	TRANS DAP				93017G	*
MNVR_TITLE_IND	V94U4096CA	DISPLAY TITLE IND	DEORB MNVR DIP				91072D	
MNVR_TITLE_IND	V94U4096CB	DISPLAY TITLE IND	ASC MNVR DIP				91072D	
MNVR_TITLE_IND	V94U4096CC	DISPLAY TITLE IND	ORB MNVR DIP				91072D	
OMSL_ACT_SEL	V93J6904CA	L P/S/OFF GMBL ACTR SEL	XXXXX MNVR DISP					
OMSL_PITCH_STATUS	V94J4065C	OMS-L PITCH ACTR STATUS	OMS RM		VAR			
OMSL_YAW_STATUS	V94J4066C	OMS-L YAW ACTR STATUS	OMS RM		VAR			
OMSR_ACT_SEL	V93J6906CA	R P/S/OFF GMBL ACTR SEL	XXXXX MNVR DISP					
OMSR_PITCH_STATUS	V94J4067C	OMS-R PITCH ACTR STATUS	OMS RM		VAR			
OMSR_YAW_STATUS	V94J4068C	OMS-R YAW ACTR STATUS	OMS RM		VAR			
OMS_PITCH_TRIM	V93H6915CA	OMS PITCH TRIM INTEGRATOR	XXXXX MNVR DISP	DEG	SPL		93017G	*
OMS_PITCH_TRIM	V93H6915CB	OMS PITCH TRIM	ORB DAP	DEG	SPL		89645A	
OMS_PITCH_TRIM	V93H6915CC	OMS PITCH TRIM INTEGRATOR	TRANS DAP	DEG	SPL		93017G	*
OMS_YAW_TRIM(1)	V93H6916CA	OMS L YAW TRIM INTEGRATOR	XXXXX MNVR DISP	DEG	SPL		93017G	*
OMS_YAW_TRIM(1)	V93H6916CB	OMS L YAW TRIM	ORB DAP	DEG	SPL		89645A	
OMS_YAW_TRIM(1)	V93H6916CC	OMS L YAW TRIM INTEGRATOR	TRANS DAP	DEG	SPL		93017G	*
OMS_YAW_TRIM(2)	V93H6918CA	OMS R YAW TRIM INTEGRATOR	XXXXX MNVR DISP	DEG	SPL		93017G	*
OMS_YAW_TRIM(2)	V93H6918CB	OMS R YAW TRIM	ORB DAP	DEG	SPL		89645A	
OMS_YAW_TRIM(2)	V93H6918CC	OMS R YAW TRIM INTEGRATOR	TRANS DAP	DEG	SPL		93017G	*
PEG_MODE_4	V93X6976XA	PEG4/PEG7 TGT DATA ENTERED	XXXXX MNVR DISP					
PEG_MODE_4	V93X6976XB	PEG4/PEG7 TGT DATA ENTERED	DEORB MNVR DIP					
PEG_MODE_4	V93X6976XC	PEG4/PEG7 TGT DATA ENTERED	ASC MNVR DIP				92354	
PLUS_X_RCS	V93X6929XA	RCS ENG SEL CMD	XXXXX MNVR DISP					
PLUS_X_RCS	V93X6929XC	RCS ENG SEL CMD	DEORB MNVR DIP					
PLUS_X_RCS	V93X6929XD	RCS ENG SEL CMD	ORB MNVR DIP					
PREBURN_MNVR_DISP	V85X9529XA	PREBURN MANEUVER DISPLAY FLAG	ASC MNVR DIP		BD		92859C	
PREBURN_MNVR_DISP	V85X9529XB	PREBURN MANEUVER DISPLAY FLAG	ORB MNVR DIP		BD		92859C	
PREBURN_MNVR_DISP	V85X9529XC	PREBURN MANEUVER DISPLAY FLAG	DEORB MNVR DIP		BD		92859C	

TABLE 4.2.10-5. INPUT FUNCTIONAL PARAMETERS FOR XXXXX MANEUVER YYYYYY DISPLAY (G6.35)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
PREBURN_MNVR_IN_PROGRESS	V90X1589XA	PRE-BURN MNVR-IN-PROGRESS FLAG	TRANS DAP				89645A	
PREBURN_MNVR_IN_PROGRESS	V90X1589XB	PRE-BURN MNVR-IN-PROGRESS FLAG	ORB DAP				92510E	
PROP_DEP	V93U6970CA	OUT OF PLANE PRPLT WASTE	XXXXX MNVR DISP	LB				
PROP_DEP	V93U6970CB	OUT OF PLANE PRPLT WASTE	DEORB MNVR DIP	LB			93017G	*
PROP_DEP	V93U6970CC	OUT OF PLANE PRPLT WASTE	ASC MNVR DIP	LB				
RCS_DUMP_DRV	V94J4069C	RCS DUMP STATUS DRIVER	DEORB MNVR DIP		VAR			
REI_LS	V94H4095C	RNGE TO LDNG SITE FROM ENTRY I/F	DEORB MNVR DIP	NM	SPL		93017G	*
RIGHT_OMS	V93X6926XA	R OMS ENG SEL	XXXXX MNVR DISP					
RIGHT_OMS	V93X6926XC	R OMS ENG SEL	DEORB MNVR DIP					
RIGHT_OMS	V93X6926XD	R OMS ENG SEL	ORB MNVR DIP					
SOMSLPFDBK	V95H1601C	OMS-L SELECTED PITCH ACTR PFB	OMS TVC FB SOP	DEG	BSS			
SOMSLYFDBK	V95H1602C	OMS-L SELECTED YAW ACTR PFB	OMS TVC FB SOP	DEG	BSS			
SOMSRPFDBK	V95H1603C	OMS-R SELECTED PITCH ACTR PFB	OMS TVC FB SOP	DEG	BSS			
SOMSRYFDBK	V95H1604C	OMS-R SELECTED YAW ACTR PFB	OMS TVC FB SOP	DEG	BSS			
S_OPS3_TGT_ROY	V94X3911X	AOA OMS-2 TARGETING COMPLETE FLAG	ASC MNVR DIP		BD			
TFF	V94W3796CC	TIME TO NEXT APSIS/FREE FALL	DEORB MNVR DIP	S				
TGO	V90W1941CB	TIME TO GO TO VELOCITY CUTOFF	ORB INS GUID	S			93017G	*
TGO	V90W1941CD	TIME TO GO TO VELOCITY CUTOFF	DEORB GUID	S			93017G	*
TGT_HA	V94H3798CA	TARGET APOGEE ALTITUDE	ASC MNVR DIP	NM			92354	
TGT_HA	V94H3798CB	TARGET APOGEE ALTITUDE	ORB MNVR DIP	NM			92354	
TGT_HA	V94H3798CC	TARGET APOGEE ALTITUDE	DEORB MNVR DIP	NM			92354	
TGT_HP	V94H3799CA	TARGET PERIGEE ALTITUDE	ASC MNVR DIP	NM			92354	
TGT_HP	V94H3799CB	TARGET PERIGEE ALTITUDE	ORB MNVR DIP	NM			92354	
TGT_HP	V94H3799CC	TARGET PERIGEE ALTITUDE	DEORB MNVR DIP	NM			92354	
THETA_DISP	V93U6969CA	TGT INPLN DNRNG ANG FROM LANH	XXXXX MNVR DISP	DEG				
THETA_DISP	V93U6969CB	TGT INPLN DNRNG ANG FROM LANH	DEORB MNVR DIP	DEG			93017G	*
THETA_DISP	V93U6969CC	TGT INPLN DNRNG ANG FROM LANH	ASC MNVR DIP	DEG			93017G	*
TIG_DAY	V93W6947CA	TIG(DAYS)	XXXXX MNVR DISP	DAYS				
TIG_DAY	V93W6947CC	TIG(DAYS)	DEORB MNVR DIP	DAYS				
TIG_DAY	V93W6947CD	TIG(DAYS)	ASC MNVR DIP	DAYS				
TIG_DAY	V93W6947CE	TIG(DAYS)	ORB MNVR DIP	DAYS				
TIG_GUID_DAY	V93W6947CB	TIG(DAYS)	ORB TGT SPEC	DAY				
TIG_GUID_HR	V93W6944CB	TIG(HOURS)	ORB TGT SPEC	HR				
TIG_GUID_MIN	V93W6945CB	TIG(MIN)	ORB TGT SPEC	MIN				
TIG_GUID_SEC	V93W6946CB	TIG(SEC)	ORB TGT SPEC	S				
TIG_HR	V93W6944CA	TIG(HOURS)	XXXXX MNVR DISP	HRS				
TIG_HR	V93W6944CC	TIG(HOURS)	DEORB MNVR DIP	HR				
TIG_HR	V93W6944CD	TIG(HOURS)	ASC MNVR DIP	HRS				
TIG_HR	V93W6944CE	TIG(HOURS)	ORB MNVR DIP	HR				
TIG_MIN	V93W6945CA	TIG(MIN)	XXXXX MNVR DISP	MIN				
TIG_MIN	V93W6945CC	TIG(MIN)	DEORB MNVR DIP	MIN				
TIG_MIN	V93W6945CD	TIG(MIN)	ASC MNVR DIP	MIN				
TIG_MIN	V93W6945CE	TIG(MIN)	ORB MNVR DIP	MIN				
TIG_MINUS5_FLAG	V94X3813XA	ENGINE IGNITION MINUS 5 SEC FLAG	ASC MNVR DIP					
TIG_MINUS5_FLAG	V94X3813XB	ENGINE IGNITION MINUS 5 SEC FLAG	ORB MNVR DIP					
TIG_MINUS5_FLAG	V94X3813XC	ENGINE IGNITION MINUS 5 SEC FLAG	DEORB MNVR DIP					

TABLE 4.2.10-5. INPUT FUNCTIONAL PARAMETERS FOR XXXXX MANEUVER YYYYYY DISPLAY (G6.35)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
TIG_SEC	V93W6946CA	TIG(SEC)	XXXXX MNVR DISP	S				
TIG_SEC	V93W6946CC	TIG(SEC)	DEORB MNVR DIP	S				
TIG_SEC	V93W6946CD	TIG(SEC)	ASC MNVR DIP	S				
TIG_SEC	V93W6946CE	TIG(SEC)	ORB MNVR DIP	S				
TTG	V90W2638CA	DISPLAY PREBURN MNVR TIME TO GO	ASC MNVR DIP	S	SPL		92510E	
TTG	V90W2638CB	DISPLAY PREBURN MNVR TIME TO GO	ORB MNVR DIP	S	SPL		92510E	
TTG	V90W2638CC	DISPLAY PREBURN MNVR TIME TO GO	DEORB MNVR DIP	S	SPL		92510E	
TTG_FLAG	V90X2639XA	TTG DISPLAY INTENSITY FLAG	ASC MNVR DIP		BD		92510E	
TTG_FLAG	V90X2639XB	TTG DISPLAY INTENSITY FLAG	ORB MNVR DIP		BD		92510E	
TTG_FLAG	V90X2639XC	TTG DISPLAY INTENSITY FLAG	DEORB MNVR DIP		BD		92510E	
TTX_FLAG_DISP	V94J4098CA	TIME TO XXXXX DISPLAY FIELD IND	ASC MNVR DIP					
TTX_FLAG_DISP	V94J4098CB	TIME TO XXXXX DISPLAY FIELD IND	DEORB MNVR DIP					
TT_X	V94W3796CB	TIME TO NEXT APSIS/FREE FALL	ORB MNVR DIP	S			93017G	*
TT_X_DISP	V94W3796CA	TIME TO NEXT APSIS/FREE FALL	ASC MNVR DIP	S			93017G	*
TVR_ROLL	V93H6936CA	ROLL ANGLE	XXXXX MNVR DISP	DEG				
TVR_ROLL	V93H6936CB	ROLL ANGLE	DEORB MNVR DIP	DEG				
TVR_ROLL	V93H6936CC	ROLL ANGLE	ORB MNVR DIP	DEG			93017G	*
TVR_ROLL	V93H6936CE	ROLL ANGLE	ASC MNVR DIP	DEG				
TTX_FLAG_DISP	V94X3961X	APSYS INDICATOR (A.P.C)	ORB MNVR DIP		BD			
VEH_PITCH	V93U6909CA	PITCH ANGLE IN ADI INERTIAL COORD	XXXXX MNVR DISP	DEG			93017G	*
VEH_PITCH	V93U6909CB	PITCH ANGLE IN ADI INERTIAL COORD	DEORB MNVR DIP	DEG			93017G	*
VEH_PITCH	V93U6909CC	PITCH ANGLE IN ADI INERTIAL COORD	ASC MNVR DIP	DEG			93017G	*
VEH_PITCH	V93U6909CD	PITCH ANGLE IN ADI INERTIAL COORD	ORB MNVR DIP	DEG			93017G	*
VEH_PITCH	V93U6909CF	PITCH ANGLE IN ADI INERTIAL COORD	ORB INS GUID	DEG			93017G	*
VEH_PITCH	V93U6909CH	PITCH ANGLE IN ADI INERTIAL COORD	ORB GUID	DEG			93017G	*
VEH_PITCH	V93U6909CJ	PITCH ANGLE IN ADI INERTIAL COORD	DEORB GUID	DEG			93017G	*
VEH_ROLL	V93U6910CA	ROLL ANGLE IN ADI INERTIAL COORD	XXXXX MNVR DISP	DEG			93017G	*
VEH_ROLL	V93U6910CB	ROLL ANGLE IN ADI INERTIAL COORD	DEORB MNVR DIP	DEG			93017G	*
VEH_ROLL	V93U6910CC	ROLL ANGLE IN ADI INERTIAL COORD	ASC MNVR DIP	DEG			93017G	*
VEH_ROLL	V93U6910CD	ROLL ANGLE IN ADI INERTIAL COORD	ORB MNVR DIP	DEG			93017G	*
VEH_ROLL	V93U6910CF	ROLL ANGLE IN ADI INERTIAL COORD	ORB INS GUID	DEG			93017G	*
VEH_ROLL	V93U6910CH	ROLL ANGLE IN ADI INERTIAL COORD	ORB GUID	DEG			93017G	*
VEH_ROLL	V93U6910CJ	ROLL ANGLE IN ADI INERTIAL COORD	DEORB GUID	DEG			93017G	*
VEH_YAW	V93U6911CA	YAW ANGLE IN ADI INERTIAL COORD	XXXXX MNVR DISP	DEG			93017G	*
VEH_YAW	V93U6911CB	YAW ANGLE IN ADI INERTIAL COORD	DEORB MNVR DIP	DEG			93017G	*
VEH_YAW	V93U6911CC	YAW ANGLE IN ADI INERTIAL COORD	ASC MNVR DIP	DEG			93017G	*
VEH_YAW	V93U6911CD	YAW ANGLE IN ADI INERTIAL COORD	ORB MNVR DIP	DEG			93017G	*
VEH_YAW	V93U6911CF	YAW ANGLE IN ADI INERTIAL COORD	ORB INS GUID	DEG			93017G	*
VEH_YAW	V93U6911CH	YAW ANGLE IN ADI INERTIAL COORD	ORB GUID	DEG			93017G	*
VEH_YAW	V93U6911CJ	YAW ANGLE IN ADI INERTIAL COORD	DEORB GUID	DEG			93017G	*
VGO_DISP(X)	V94U3800CA	X-COMP OF VGO OF MNVR-BODY COORD	ASC MNVR DIP	FT/S			93017G	*
VGO_DISP(X)	V94U3800CB	X-COMP OF VGO OF MNVR-BODY COORD	ORB MNVR DIP	FT/S			93017G	*
VGO_DISP(X)	V94U3800CC	X-COMP OF VGO OF MNVR-BODY COORD	DEORB MNVR DIP	FT/S			93017G	*
VGO_DISP(Y)	V94U3801CA	Y-COMP OF VGO OF MNVR-BODY COORD	ASC MNVR DIP	FT/S			93017G	*
VGO_DISP(Y)	V94U3801CB	Y-COMP OF VGO OF MNVR-BODY COORD	ORB MNVR DIP	FT/S			93017G	*
VGO_DISP(Y)	V94U3801CC	Y-COMP OF VGO OF MNVR-BODY COORD	DEORB MNVR DIP	FT/S			93017G	*

TABLE 4.2.10-5. INPUT FUNCTIONAL PARAMETERS FOR XXXXX MANEUVER YYYYYY DISPLAY (G6.35)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
VGO_DISP(Z)	V94U3802CA	Z-COMP OF VGO OF MNVR-BODY COORD	ASC MNVR DIP	FT/S			93017G	*
VGO_DISP(Z)	V94U3802CB	Z-COMP OF VGO OF MNVR-BODY COORD	ORB MNVR DIP	FT/S			93017G	*
VGO_DISP(Z)	V94U3802CC	Z-COMP OF VGO OF MNVR-BODY COORD	DEORB MNVR DIP	FT/S			93017G	*
VGO_LVLH(X)	V94L3945CA	PEG 4 LVLH X-COMP OF VGO	ASC MNVR DIP	FT/S			93017G	*
VGO_LVLH(X)	V94L3945CB	PEG 4 LVLH X-COMP OF VGO	DEORB MNVR DIP	FT/S			93017G	*
VGO_LVLH(X)	V94L3945CC	PEG 4 LVLH X-COMP OF VGO	ORB MNVR DIP	FT/S				
VGO_LVLH(Y)	V94L3946CA	PEG 4 LVLH Y-COMP OF VGO	ASC MNVR DIP	FT/S			93017G	*
VGO_LVLH(Y)	V94L3946CB	PEG 4 LVLH Y-COMP OF VGO	DEORB MNVR DIP	FT/S			93017G	*
VGO_LVLH(Y)	V94L3946CC	PEG 4 LVLH Y-COMP OF VGO	ORB MNVR DIP	FT/S				
VGO_LVLH(Z)	V94L3947CA	PEG 4 LVLH Z-COMP OF VGO	ASC MNVR DIP	FT/S			93017G	*
VGO_LVLH(Z)	V94L3947CB	PEG 4 LVLH Z-COMP OF VGO	DEORB MNVR DIP	FT/S			93017G	*
VGO_LVLH(Z)	V94L3947CC	PEG 4 LVLH Z-COMP OF VGO	ORB MNVR DIP	FT/S				
WT_DISP	V93G6940CA	VEHICLE WEIGHT	XXXXX MNVR DISP	LB				
WT_DISP	V93G6940CB	VEHICLE WEIGHT	ASC MNVR DIP	LBS				
WT_DISP	V93G6940CC	VEHICLE WEIGHT	ORB MNVR DIP	LB				
WT_DISP	V93G6940CE	VEHICLE WEIGHT	DEORB MNVR DIP	LBS				
X_FLAG	V90X0414XA	VALID ANGLE COMP FLAG	ORB INS GUID		BD		90763E	
X_FLAG	V90X0414XB	VALID ANGLE COMP FLAG	ORB GUID		BD		90763E	
X_FLAG	V90X0414XC	VALID ANGLE COMP FLAG	ORB MNVR DIP		BD		90763E	
X_FLAG	V90X0414XD	VALID ANGLE COMP FLAG	DEORB GUID		BD		90763E	
X_FLAG	V90X0414XE	VALID ANGLE COMP FLAG	ASC MNVR DIP		BD		90763E	
X_FLAG	V90X0414XF	VALID ANGLE COMP FLAG	DEORB MNVR DIP		BD		90763E	
	V90X1481X	FORWARD DUMP COMMAND VERIFICATION	TRANS DAP					
	V93X6961X	SURF DRIVE ON/OFF CMD	XXXXX MNVR DISP		BD			
	V94X4681X	LEFT OMS ALERT FLAG	OMS RM		BD		93017G	*
	V94X4682X	RIGHT OMS ALERT FLAG	OMS RM		BD		93017G	*
	V94X4804X	ILLEGAL ENTRY MSG(XXXXXMNVRYYYYY)	UI					

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.10-6. OUTPUT FUNCTIONAL PARAMETERS FROM XXXXX MANEUVER YYYYYY DISPLAY (G6.35)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
AOA_TGT_SEL	V93X6963XA	AOA TARGET SELECTION	AOA/ATO TGT MSC					
ATO_TGT_SEL	V93X6964XA	ATO TARGET SELECTION	AOA/ATO TGT MSC					
BOTH_OMS	V93X6922XA	BOTH OMS ENG SEL	ASC MNVR DIP DEORB MNVR DIP ORB MNVR DIP					
C1_DISP	V93U6966CA	INTERCEPT OF TARGET LINE	XXXXX MNVR DISP ASC MNVR DIP DEORB MNVR DIP	FT/S				
C2_DISP	V93U6967CA	SLOPE OF TARGET LINE	XXXXX MNVR DISP ASC MNVR DIP DEORB MNVR DIP					
DATA_ENTER	V93X6973X	TGT/SETUP DATA ENTERED FLAG	XXXXX MNVR DISP ASC MNVR DIP DEORB MNVR DIP					
EXEC_CMD	V93X1050XA	BURN EXECUTE CMD	ORB MNVR DIP ASC MNVR DIP DEORB MNVR DIP					
EXT_DV_LVLH(1)	V93L6950CA	EXT DELTA V X-COMP	ORB MNVR DIP ASC MNVR DIP DEORB MNVR DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1	FT/S			93017G	*
EXT_DV_LVLH(2)	V93L6951CA	EXT DELTA V Y-COMP	ORB MNVR DIP XXXXX MNVR DISP ASC MNVR DIP DEORB MNVR DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1	FT/S			93017G	*
EXT_DV_LVLH(3)	V93L6952CA	EXT DELTA V Z-COMP	ORB MNVR DIP XXXXX MNVR DISP ASC MNVR DIP DEORB MNVR DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1	FT/S			93017G	*
HTGT_DISP	V93U6968CA	TGT ALTITUDE MAGNITUDE	ORB MNVR DIP XXXXX MNVR DISP ASC MNVR DIP DEORB MNVR DIP XXXXX MNVR DISP	NM				

TABLE 4.2.10-6. OUTPUT FUNCTIONAL PARAMETERS FROM XXXXX MANEUVER YYYYYY DISPLAY (G6.35)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
I_TGT	V93J6962CA	CREW TARGET INDEX FLAG	AOA/ATO TGT DL FMT 21/1				93017G	*
LEFT_OMS	V93X6925XA	L OMS ENG SEL	XXXXX MNVR DISP ASC MNVR DIP DEORB MNVR DIP ORB MNVR DIP					
LOAD_CMD	V93X6956X	LOAD COMMAND	XXXXX MNVR DISP ASC MNVR DIP DEORB MNVR DIP MSC ORB MNVR DIP		BD		93177D	*
OMSL_ACT_SEL	V93J6904CA	L P/S/OFF GMBL ACTR SEL	XXXXX MNVR DISP OMS RM OMS TVC CMD SOP OMS TVC FB SOP					
OMSL_PITCH_FAIL	V90X7677XB	OMS L PITCH GIMBAL FAIL FLAG	XXXXX MNVR DISP DL FMT 21/A DL FMT 22/A DL FMT 23/A GAX		BD		93017G	*
OMSL_YAW_FAIL	V90X7679XB	OMS L YAW GIMBAL FAIL FLAG	DL FMT 21/A DL FMT 22/A DL FMT 23/A GAX		BD		93017G	*
OMSR_ACT_SEL	V93J6906CA	R P/S/OFF GMBL ACTR SEL	OMS RM OMS TVC CMD SOP OMS TVC FB SOP XXXXX MNVR DISP					
OMSR_PITCH_FAIL	V90X7678XB	OMS R PITCH GIMBAL FAIL FLAG	DL FMT 21/A DL FMT 22/A DL FMT 23/A GAX		BD		93017G	*
OMSR_YAW_FAIL	V90X7680XB	OMS R YAW GIMBAL FAIL FLAG	DL FMT 21/A DL FMT 22/A DL FMT 23/A GAX		BD		93017G	*
OMS_PITCH_TRIM	V93H6915CA	OMS PITCH TRIM INTEGRATOR	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 ORB DAP TRANS DAP XXXXX MNVR DISP	DEG	SPL		93017G	*

TABLE 4.2.10-6. OUTPUT FUNCTIONAL PARAMETERS FROM XXXXX MANEUVER YYYYYY DISPLAY (G6.35)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
OMS_YAW_TRIM(1)	V93H6916CA	OMS L YAW TRIM INTEGRATOR	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 ORB DAP TRANS DAP XXXXX MNVR DISP	DEG	SPL		93017G	*
OMS_YAW_TRIM(2)	V93H6918CA	OMS R YAW TRIM INTEGRATOR	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 ORB DAP TRANS DAP XXXXX MNVR DISP	DEG	SPL		93017G	*
PEG_MODE_4	V93X6976XA	PEG4/PEG7 TGT DATA ENTERED	ASC MNVR DIP DEORB MNVR DIP XXXXX MNVR DISP					
PLUS_X_RCS	V93X6929XA	RCS ENG SEL CMD	ASC MNVR DIP DEORB MNVR DIP ORB MNVR DIP XXXXX MNVR DISP					
PREBURN_MNVR	V93X6912X	PREBURN MNVR CMD	ORB DAP TRANS DAP		BD		89688A	
PROP_DEP	V93U6970CA	OUT OF PLANE PRPLT WASTE	ASC MNVR DIP DEORB MNVR DIP XXXXX MNVR DISP	LB				
RIGHT_OMS	V93X6926XA	R OMS ENG SEL	ASC MNVR DIP DEORB MNVR DIP ORB MNVR DIP XXXXX MNVR DISP					
ST_CRT_TIMER	V93X6553X	START CRT TIMER CMD	ASC MNVR DIP DEORB MNVR DIP ORB MNVR DIP		BD		89461	
THETA_DISP	V93U6969CA	TGT INPLN DNRNG ANG FROM LANH	ASC MNVR DIP DEORB MNVR DIP XXXXX MNVR DISP	DEG				
TIG_DAY	V93W6947CA	TIG(DAYS)	ASC MNVR DIP DEORB MNVR DIP ORB MNVR DIP XXXXX MNVR DISP	DAYS				
TIG_HR	V93W6944CA	TIG(HOURS)	ASC MNVR DIP DEORB MNVR DIP ORB MNVR DIP XXXXX MNVR DISP	HRS				
TIG_MIN	V93W6945CA	TIG(MIN)	ASC MNVR DIP DEORB MNVR DIP ORB MNVR DIP XXXXX MNVR DISP	MIN				

TABLE 4.2.10-6. OUTPUT FUNCTIONAL PARAMETERS FROM XXXXX MANEUVER YYYYYY DISPLAY (G6.35)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
TIG_SEC	V93W6946CA	TIG(SEC)	ASC MNVR DIP DEORB MNVR DIP ORB MNVR DIP XXXXX MNVR DISP	S				
TVR_ROLL	V93H6936CA	ROLL ANGLE	ORB MNVR DIP XXXXX MNVR DISP	DEG				
VEH_PITCH	V93U6909CA	PITCH ANGLE IN ADI INERTIAL COORD	DEORB MNVR DIP DL FMT 21/A DL FMT 22/A DL FMT 23/1 XXXXX MNVR DISP	DEG			93017G	*
VEH_ROLL	V93U6910CA	ROLL ANGLE IN ADI INERTIAL COORD	DEORB MNVR DIP DL FMT 21/A DL FMT 22/A DL FMT 23/1 XXXXX MNVR DISP	DEG			93017G	*
VEH_YAW	V93U6911CA	YAW ANGLE IN ADI INERTIAL COORD	DEORB MNVR DIP DL FMT 21/A DL FMT 22/A DL FMT 23/1 XXXXX MNVR DISP	DEG			93017G	*
WT_DISP	V93G6940CA	VEHICLE WEIGHT	ASC MNVR DIP DEORB MNVR DIP ORB MNVR DIP TLM XXXXX MNVR DISP	LB				
ZAP_CMD	V93X6908X V90M2959PB	ZAP COMMAND CGRB_OMS_FDI_FLAGS_HFE	OMS TVC CMD SOP DL FMT 21/A DL FMT 22/A DL FMT 23/A				93017G	*
	V93X6901X	OMS CK ENA CMD	OMS TVC CMD SOP		BD			
	V93X6941X	FWD RCS ARM CMD	DEORB MNVR DIP		BD			
	V93X6942X	FWD RCS DUMP CMD	DEORB MNVR DIP		BD			
	V93X6943X	FWD RCS OFF CMD	DEORB MNVR DIP		BD			
	V93X6961X	SURF DRIVE ON/OFF CMD	GAX		BD			
			HYD THERMAL COND XXXXX MNVR DISP					
	V93X6972X	DESIRED R,P,Y DATA ENTER FLAG	DEORB MNVR DIP					

TABLE 4.2.10-6. OUTPUT FUNCTIONAL PARAMETERS FROM XXXXX MANEUVER YYYYYY DISPLAY (G6.35)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
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NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
 (HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

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TABLE 4.2.10-7. XXXXX MANEUVER YYYYYY DISPLAY (G6.35) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.10-8. XXXXX MANEUVER YYYYYY DISPLAY (G6.35) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.10-9. XXXXX MANEUVER YYYYYY DISPLAY (G6.35) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.11 HORIZONTAL SITUATION (BFS)

TITLE: HORIZ SIT

TYPE: SPEC/050

AVAILABILITY: OPS 1, 3 and 6

4.2.11.1 Purpose, Operation, and Organization

This display provides Orbiter position and heading information with respect to the ground plane. The HORIZ SIT display format requirements for zero or one GPS receiver installed on the Orbiter are presented in Figure 4.2.11-1. Zero GPS receivers installed on the Orbiter is indicated by a value of zero for the I-Load Derived Parameter NUM_GPS_INSTALLED (See Table 4.2.37-9). One GPS receiver installed on the Orbiter is indicated by a value of one for NUM_GPS_INSTALLED. The HORIZ SIT display format requirements are presented in Figure 4.2.11-2 for three GPS receivers installed on the Orbiter which is indicated by a value of three for NUM_GPS_INSTALLED.

- (1) The position of the vehicle shall be represented by an Orbiter symbol. The HORIZ SIT display shall graphically display this fixed vehicle symbol and the following variable data: the runway and the right or left heading alignment cone. The display design is intended to create an out-the-window view for the crew, which can be visualized as a ground plane projection containing the Orbiter and the landing site in a coordinate system fixed to the vehicle. The HORIZ SIT scaling shall vary so that the landing site shall always be within the display for any reasonable geometry.

The HORIZ SIT shall also include three double overbright predictor indicators which give the position of the Shuttle relative to the ground at 20, 40, and 60 seconds in the future. The effects of winds shall be included in the computation of these predictors.

The landing site graphics variable data described above is blanked by BSS at completion of TAEM guidance (TG_END = 1). (OPS 3 & 6.)

- (2) Item 41 provides the capability to specify a landing area by entering an index from 1 - 45. Entry of an index other than 1 - 45 shall cause an ILLEGAL ENTRY message to be displayed. Each landing area consists of 2 runways, (primary (PRI) and secondary (SEC)), 2 TACAN's, and MSBLS where affected. Also, MECO targets are associated with each of the designated RTLS and TAL abort sites. The landing site index shall be displayed next to item 41 with the associated runway and TACAN channel data displayed next to items 3, 4 and 5. Per Navigation requirements, the landing site displayed at initialization in MM101 will reflect selection of the primary RTLS landing site. The text 'RTLS' or 'TAL' shall be displayed next to Item 41 to indicate the availability of RTLS or TAL abort site selection, respectively. 'RTLS' shall be displayed throughout OPS 1 unless a TAL abort is declared, and throughout OPS 6. If a TAL abort is declared in OPS 1, 'TAL' shall be displayed until a transition to OPS 3 occurs.

While 'RTLS' is displayed next to Item 41: entry of an RTLS site via Item 41 specifies both the RTLS MECO targets and the landing site data for the selected site and can be used in OPS 1 prior to fine countdown (MECO minus 10 sec) and prior to Powered Pitch-down in OPS 6. After Powered Pitch-down, Item 41 can be used to change the RTLS landing site, however the MECO targets will not change.

Entering a non-designated RTLS landing site while 'RTLS' is displayed will result in a 'TARGET ERR RTLS' error message. Prior to RTLS abort selection, the entry of a non-designated landing site will be rejected. After RTLS abort selection, the error message will be generated and while the erroneous target will be honored by the display and NAV; it will not be honored by Guidance. After TAL ABORT selection, the data associated with Items 41, 3, 4 and 5 will be automatically updated to reflect the TAL site selected via Item 40.

While 'TAL' is displayed next to Item 41: Item 41 can be used to change the TAL MECO targets and landing site until fine countdown. After fine countdown, Item 41 can be used to change the TAL landing site; however, the MECO targets will not change. Regardless of fine countdown, the error message 'TARGET ERR TAL' will be generated if the site index entered via Item 41 has not been designated as a TAL site. The erroneous target will be honored by the display and NAV, but not Guidance.

In OPS 3, 'LAND' shall be displayed next to Item 41 and any one of 45 landing areas may be selected. TARGET ERR messages shall not be generated in OPS 3.

Items 3 & 4 provide the capability to select the primary or secondary runway once a landing area has been selected. Whenever a landing area is selected automatically or via item 41, the ID of the primary and secondary runways is displayed next to items 3 and 4 respectively and the primary runway is selected automatically. Thereafter, as long as a landing area remains selected, runway selection is controlled by items 3 & 4. Items 3 & 4 are mutually exclusive; execution of one will select its associate runway and deselect the other runway. The selected runway is indicated by an asterisk displayed next to the appropriate item.

Item 5 provides the capability to select one of the 2 TACAN's associated with the selected landing area. When a landing area is selected, automatically or via item 41, the primary TACAN is automatically selected. Subsequent executions of item 5 will alternately select the secondary and primary TACAN's. The channel ID of the selected TACAN will be displayed next to item 5. This item shall only be legal when TACAN hardware is installed on the Orbiter which is indicated by NUM_GPS_INSTALLED set equal to zero or one. When three GPS receivers are installed, indicated by NUM_GPS_INSTALLED equal to three, this item and its associated data field and the background "TAC" character string shall not appear on the display (refer to Figure 4.2.11-2.). In addition, when NUM_GPS_INSTALLED is equal to three, execution of item 5 shall result in an "ILLEGAL ENTRY" message being displayed and the input rejected.

Items 41, 3 and 4 of the HSD must be supported in all major modes of OPS-1, OPS-6, and OPS-3. Item 5 must be supported in all major modes of OPS-1, OPS-6, and OPS-3, only if NUM_GPS_INSTALLED is equal to zero or one.

- (3) Item 6 (G&N) provides the capability to select which of two heading alignment cones (HAC) is to be used during ENTRY and RTLS. Text (OVHD or STRT) is displayed next to Item 6 to indicate whether the approach is to be overhead or straight in. This item shall be displayed only in MM101, MM304, MM305, MM602, and MM603. Item 6 can be used only in MM101 to change from OVHD to STRT; attempts to toggle from STRT to OVHD will have no effect. If OVHD must be reselected in MM101, it can be done by selecting a new landing area or by reselecting the original landing area using Item 41. This is used by Powered RTLS Guidance to setup the energy at RTLS MECO corresponding to the approach selected. The approach selected in MM101 will be carried over into MM602. In MM304, MM305, MM602, and

MM603, Item 6 can be used to change from OVHD to STRT or from STRT to OVHD. Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements.

In addition, indicators are provided for GN&C and the HSI to indicate whether the left (L) or right (R) HAC is selected. These indicators (G&N, HSI R/L HAC) are blank prior to MM304 or MM602. These indicators will respond to changes in the approach (OVHD to STRT or vice versa) based on vehicle position relative to the runway centerline. The response is determined by criteria internal to NAV (G&N) and AREA NAV (HSI). Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements.

Whenever OVHD is selected and the vehicle energy drops below the level required for an OVHD approach and the range to the runway and the required turn angle are within I-Loaded limits a class 3 alarm will be generated and the text OVHD will flash until a STRT approach is selected.

Item 6 is legal only in MM101, MM304, MM305, MM602 and MM603.

- (4) The HORIZ SIT display shall have an entry point indicator. Initially, the indicator shall be driven as nominal entry point (NEP). Execution of item 7 (XEP, where the "X" is dynamic) allows the crew to switch to the minimum entry point (MEP) or from MEP back to NEP.
- (5) A control shall be provided to redesignate a glide-slope (GLD SLOPE) ground intercept point. The display is initialized with the nominal intercept point selected, indicated by "NOM" text being displayed next to item 8. Execution of item 8 (AIM) selects the intercept point closest to the runway for high head winds. This is indicated by "CLSE" text being displayed next to the item 8. Reexecuting item 8 reselects the nominal intercept point. It is possible to switch back and forth between the nominal and close intercept points until the TAEM/AUTOLAND interface. Switching the intercept point causes other appropriate values for TAEM geometry parameters to be used.
- (6) Item 9, the ALTM data field, shall provide the capability to input the field barometric altimeter setting corrected to mean sea level. This display is initialized the first time with this parameter set to 29.92 IN-HG, and thereafter shall reflect crew inputs.
- (7) Items 10 through 15 provides the capability to enter delta position and velocity components in runway coordinates. Only components requiring an update need to be entered. Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements.

These item entries shall be available at all times the display is active except when a state vector transfer is in progress, as indicated by the variable XSV = 1. If any of keyboard item entry numbers 10 through 15 is executed while XSV = 1 then an operator error shall result, the input rejected, and the "ILLEGAL ENTRY" CRT message shall be displayed.

- (8) Item 16 (LOAD) provides the capability to command a delta update to the navigated state of the Orbiter using the data entered in Items 10 through 15 or to command a delta time update if item 18 is entered. It also provides the capability to perform a PFS to BFS state vector transfer using Item 17 (as described in paragraph 15). Upon completion of the delta update by NAV, these items and their associated buffer will be zeroed by NAV (refer to the BFS GUID/NAV PRD, MG038104, section 3.2.2.3.2.6).

- (9) Item 18 (ΔT) provides the capability to update state vector downtrack errors by means of adding or subtracting a delta time in seconds. The update is performed after a time value is entered via Item 18 (ΔT) and verified, followed by the execution of control Item 16 (LOAD). The delta time display field shall be zeroed by NAV upon completion of a delta time update by NAV. Item 18 is legal in OPS 3 only; executing this item in any other OPS will cause an “ILLEGAL ENTRY” message to be generated. Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements.
- (10) The RESID column contains the residual data value for each component of each data type that is being processed by the NAV filter. The residual is formed in navigation by subtracting the NAV estimate of the data from the selection filter output of the data. (It should be noted here that navigation uses the composite data output from the selection filter as inputs to the navigation filter so that no distinctions are made as to the LRU source of the data to the NAV filter. In the two-LRU cases, the LRU data are averaged so that the data cannot be distinguished as to LRU.) The residual value gives the crew an indication of how well the data and the NAV estimate of the data agree. However, this data alone cannot identify whether the data or the NAV estimate of the data is in error. Refer to (21) for the description of GPS residual.
- (11) The RATIO column contains the edit ratio computed in navigation as the ratio of the data residual to the maximum allowable residual. If this ratio is less than one, the residual edit test performed by navigation on the data is passed, and the data is subsequently used to update the state vector. If the data fails the residual edit test, the ratio will be displayed as a number equal to or larger than one and will not be used to update the state vector. Thus, the edit ratio and the ratio parameter status indicators give the crew an indication of whether a particular data type is being incorporated into the state vector. The residuals and edit ratios are computed by navigation for each NAV cycle and are available for display. When data is not being processed by the NAV filter, the residual and ratio data fields for that parameter shall be blanked. A parameter status indicator column to the right of the RATIO will contain a down arrow when the parameter has failed the update edit test. The down arrow (\downarrow) will disappear when the edit test is passed by a predefined percentage of “Good” data. The parameters defining percentage of “Good” data are I-loaded. Refer to (21) for the description of GPS ratio.
- (12) There are three incorporation control options: auto (AUT), inhibit (INH), and force (FOR), which the crew can exercise. The requirements to support a mixed fleet of NAV sensor hardware consisting of (a) TACANs and no GPS receiver installed (b) TACANs and one GPS receiver installed and (c) No TACANs and three GPS receivers installed shall be discussed separately as follows.

FOR NO GPS:

When TACAN hardware is installed on the Orbiter and no GPS hardware is installed, indicated by the I-Load Derived Parameter NUM_GPS_INSTALLED set equal to zero, the crew can control three data types: TACAN (TAC AZ and RNG), drag altitude (DRAG H), and baro altitude (ADTA H) to update navigation. Items 19, 22 and 25 allow navigation to automatically (AUT) select data to be used if it passes the edit test. Items 20, 23 and 26 preclude (INH) updating the state vector with the selected data, but this data is used to generate the displayed residual and ratio values. Items 21, 24 and 27 (FOR) shall override the edit and force the data to be used to update the state vector. When no GPS hardware is installed, execution of GPS AUT/INH/FOR items 42, 43 or 44 shall result in an “ILLEGAL ENTRY”

message being displayed and the input rejected, and no asterisk (*) shall appear next to these items (see below). Refer to Figure 4.2.11-1 for the display format for this NAV sensor hardware configuration.

FOR ONE GPS:

When TACAN hardware is installed on the Orbiter and one GPS receiver is installed, indicated by NUM_GPS_INSTALLED set equal to one, the crew can control four data types: TACAN (TAC AZ and RNG), GPS, drag altitude (DRAG H), and baro altitude (ADTA H) to update navigation. Items 19, 42, 22 and 25 allow navigation to automatically (AUT) select data to be used if it passes the edit test. Items 20, 43, 23 and 26 preclude (INH) updating the state vector with the selected data, but this data is used to generate the displayed residual and ratio values. Items 21, 44, 24 and 27 (FOR) shall override the edit and force the data to be used to update the state vector. Refer to Figure 4.2.11-1 for the display format for this NAV sensor hardware configuration.

FOR THREE GPS:

When three GPS receivers are installed on the Orbiter and no TACAN hardware is installed, indicated by NUM_GPS_INSTALLED set equal to three, the crew can control three data types: GPS (GPS P and V), drag altitude (DRAG H), and baro altitude (ADTA H) to update navigation. Items 42, 22 and 25 allow navigation to automatically (AUT) select data to be used if it passes the edit test. Items 43, 23 and 26 preclude (INH) updating the state vector with the selected data, but this data is used to generate the displayed residual and ratio values. Items 44, 24 and 27 (FOR) shall override the edit and force the data to be used to update the state vector. For this case of 3 GPS and no TACANs installed, items 19, 20 and 21 are not shown on the display (see Figure 4.2.11-2); however it is physically possible to execute these items via the keyboard. Such execution of item 19, 20 or 21 shall result in an "ILLEGAL ENTRY" message being displayed and the input rejected, and no asterisk (*) corresponding to the attempted selection shall be shown anywhere on the display. Refer to Figure 4.2.11-2 for the display format for this NAV sensor hardware configuration.

For both the single GPS receiver installed configuration and the three GPS receivers installed configuration, the ability to update the BFS state vector with GPS data is additionally controlled by the I-Load GPS_AVAIL. The meaning of this I-Load is shown below:

GPS_AVAIL =

- 0 Incorporation of the GPS navigation state vector into the BFS state vector is not allowed by the BFS software.
- 1 Incorporation of the GPS navigation state vector into the BFS state vector is not allowed by the BFS software.
- 2 Incorporation of the GPS navigation state vector into the BFS state vector is allowed under crew control and only in major modes 106 or 301.
- 3 Incorporation of the GPS navigation state vector into the BFS state vector is allowed under crew control in any major mode.

ALL GPS CONFIGURATIONS:

No GPS Hardware installed on the vehicle is indicated to the BFS software by a value of zero for NUM_GPS_INSTALLED. Refer to the BFS HIP PRD (MG038106 section 3.2.5.2.4.1) for a discussion of NUM_GPS_INSTALLED.

For all three NAV sensor hardware configurations, i.e. NUM_GPS_INSTALLED equal to zero, one or three, the AUT/INH/FOR item entries for any given NAV sensor are mutually exclusive. An asterisk (*) shall appear next to any Item (19-27, 42-44) that has been selected except for two cases:

- 1) Items 42, 43 and 44 when no GPS hardware is installed (i.e., NUM_GPS_INSTALLED = 0) in which case no asterisk (*) shall appear next to these items, and
- 2) Items 19, 20 and 21 when no TACAN hardware is installed (i.e., NUM_GPS_INSTALLED = 3) in which case no asterisk (*) corresponding to the attempted item selection shall appear anywhere on the display.

Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements.

- (13) The requirements paragraphs associated with (13) are applicable only when there is TACAN hardware installed on the Orbiter, which is indicated by a value of either zero or one for NUM_GPS_INSTALLED. Refer to Figure 4.2.11-1.

The TACAN channel of the ground station that TAC 1, 2, and 3 is locked-on-to or attempting to lock-on-to is displayed. The sign of the channel is determined by the X/Y mode select bit, X mode being positive. The absolute value of TACAN azimuth and range shall be displayed for the three TACANs.

A parameter status indicator column is provided for the azimuth and range of each TACAN. A blank in the column indicates normal operation. A down arrow will be displayed to indicate manual deselection of a TACAN via Items 31, 32, or 33, loss of lock, a commfault, loss of power, or self-test in progress. The down arrow will be blanked if a TACAN is reselected via Items 31, 32 or 33, lock-on is reacquired, the commfault is cleared, power is restored, or the self-test terminates.

Items 31-33 provide the capability for each TACAN to be deselected or reselected for use by the selection filter. If a TACAN is deselected, this shall prevent the TACAN HIP from using azimuth and range as inputs to the selection filter. Deselection shall be indicated by an asterisk (*) adjacent to the DES Item (31, 32, 33) and down arrows (↓) in the azimuth and range parameter status indicator columns. The display shall be initialized with all TACANs selected upon entry into OPS 1 or OPS 3 from OPS 0 and shall thereafter reflect crew inputs. If a TACAN is manually deselected in the PASS, it does not need to be manually deselected in the BFS as Items 31-33 shall be DK listened.

Prior to MM304 or MM602, the TACAN azimuth and range data for TAC 1, TAC 2, and TAC 3 shall be blanked and down arrow indicators shall be displayed since lock-on cannot be achieved. If a new TACAN channel is selected, the corresponding TACAN azimuth and range data shall be updated within 2 seconds.

The TACAN channel shall be displayed in all major modes of OPS 1, 3 and 6.

- (14) Items 28-30 provide control over the source of air data parameters to Guidance and Flight Control. Item 28 (AUT) provides auto transition from NAV derived air data to ADTA. Item 29 (INH) inhibits the ADTA data. Item 30 (FOR) forces the use of ADTA data. These items are mutually exclusive. The display will be initialized with Item 28 (AUT) selected.

- (15) Item 17 (PASS/BFS SV XFER) provides the capability to command the BFS to read the primary system state vector information and display the deltas between the PFS and BFS state vectors in Items 10–15. If Item 16 (LOAD) is then executed, the BFS state vector will be updated by the PFS state vector (propagated to BFS current filter cycle time) (see paragraphs 6 and 7 for requirements description of Items 10–16). An asterisk will be displayed next to Item 17 to enable the PFS to BFS state vector update via Item 16. The asterisk is reset when NAV has completed the required state vector update or when the crew re-executes Item 17 which disables the PFS to BFS state vector update and zeroes the deltas in Items 10–15.
- (16) IMPLIED ITEM NUMBERS. Items 1 (PTI SEL - appears only on PFS display), 2, and 34 through 39 are implied and are not legal for use on the BFS “HORIZ SIT” display. If any of these item numbers is executed, an operator error shall result, the input rejected and the “ILLEGAL ENTRY” CRT message shall be displayed.
- (17) The item entries and controls as identified with an “X” in the “DK” column of the Keyboard processing Table 4.2.11–1 shall respond to PASS keyboard inputs via a selective DK listen mode as well as to inputs made on a keyboard dedicated to the BFS. (Reference – BFS PRD MG038101, Section 3.3.7.1.)
- (18) Deleted.
- (19) Item 40, TAL SITE, gives the crew the capability to select the TAL SITE in OPS 1. An index from 1 – 45 entered via item 40 specifies the Landing Site for TAL including MECO targets and landing site runways, TACANS, and MSBLS data where applicable. The selected TAL site index is displayed next to item 40 until a TAL abort is declared, at which time the TAL site index is blanked, and the TAL site index, primary and secondary runways and primary TACAN channel are displayed next to items 41, 3, 4 and 5. Item 40 is legal in OPS 1 only, including after AOA or ATO abort selection. Execution of this item in any other OPS or after an RTLS or TAL abort has been declared will cause an “ILLEGAL ENTRY” message to be generated. Item 40 is initialized with the primary TAL Site selected (I–Loaded) and thereafter reflects crew inputs. Item 40 is blanked throughout OPS 3 and 6 and in OPS 1 after an RTLS or TAL has been declared. Abort scenarios ATO and AOA do not blank Item 40. If Item 40 is not blanked, and the TAL site index entered via Item 40 has not been designated as a TAL site, an error message “TARGET ERR TAL” will be generated and the TAL site entry will be rejected.
- (20) The requirements associated with (20) are different depending on the NAV sensor hardware configuration installed on the Orbiter. The three possible configurations are (a) TACANs and no GPS receiver installed (b) TACANs and one GPS receiver installed and (c) No TACANs and three GPS receivers installed. The requirements for this section of the display shall be discussed separately as follows.

FOR NO GPS OR ONE GPS:

When TACANs are installed and either zero or one GPS receiver is installed, which is indicated by a value of zero or one for NUM_GPS_INSTALLED, the display shall present the GPS AZ and RNG background as shown in Figure 4.2.11-1. When there is one GPS receiver installed, which is indicated by a value of one for NUM_GPS_INSTALLED, GPS-derived values for azimuth and range to the selected TACAN ground station shall be displayed for comparison to the TACAN data (refer to Figure 4.2.11-1). The values for GPS azimuth and range shall be obtained from the GPS_INPUT_HIP computed variables GPSAZ and GPSRNG, respectively. Parameter status indicators shall also be available to show the validity of the data. The GPS-

derived azimuth data is valid when the GPS_INPUT_HIP variable GAZGD is true. The GPS-derived range data is valid when the GPS_INPUT_HIP variable GRNGGD is true. If GAZGD is false, a down arrow (↓) shall be displayed in the azimuth parameter status indicator field; if GAZGD is true, the azimuth parameter status indicator field shall be blanked. If GRNGGD is false, a down arrow (↓) shall be displayed in the range parameter status indicator field; if GRNGGD is true, the range parameter status indicator field shall be blanked. Refer to BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements for the GPSAZ, GPSRNG, GAZGD, and GRNGGD variables. If there is no GPS hardware on board the Orbiter, which is indicated by a value of zero for NUM_GPS_INSTALLED, then the display of GPS-derived azimuth and range data and parameter status indicators shall be blanked.

FOR THREE GPS:

When there are three GPS receivers installed, which is indicated by a value of three for NUM_GPS_INSTALLED, the display shall present the GPS navigation status, GPS failure status, GPS VEL, GPS P 1σ, GPS DES and GPS AZ, RNG and ALT background character string labels as shown in Figure 4.2.11-2. There are 5 rows of data and controls that shall be discussed separately in the following paragraphs.

The first row shall display the navigation status and the failure status of each GPS receiver. The determination of which navigation status message to display shall be made by examining the NAV variables GPS1IND, GPS2IND, and GPS3IND according to the table below.

VALUE OF GPS _x IND; x = 1, 2, 3	DISPLAY	MESSAGE DESCRIPTION
0	∅	Receiver data available for NAV use
1	↓	Receiver data not available for NAV use
2	?	Receiver data available for NAV use but rejected due to a receiver-to-receiver miscomparison

The determination of which failure status message to display for each receiver shall be made by examining the GPS_INPUT_HIP variables GPS1STAT, GPS2STAT and GPS3STAT according to the table below. In the following table, the GPS mode is shown under the message description to aid in understanding the relationship between mode and status. However, this interdependency of status and mode is accounted for in the GPS_INPUT_HIP so that the display need only examine the GPS1STAT, GPS2STAT and GPS3STAT variables. Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements for the GPS1STAT, GPS2STAT and GPS3STAT variables.

GPS_INPUT_HIP VARIABLE	DISPLAY	MESSAGE DESCRIPTION
GPS1STAT	Display for GPS1	
0	∅	<u>Mode</u> Init: STAT field not supported by BFS Test: STAT field not supported by BFS Nav: GPS1 receiver healthy
1	M	N/A: GPS1 is Communication faulted
2	BIT	Test: Not supported by BFS
3	RPF	Nav: GPS1 Receiver/Processor (R/P) failure
4	BATT	Nav: GPS1 R/P battery voltage low
5	DGF	Nav: GPS1 Data Good Fail
GPS2STAT	Display for GPS2	
0	∅	<u>Mode</u> Init: STAT field not supported by BFS Test: STAT field not supported by BFS Nav: GPS2 receiver healthy
1	M	N/A: GPS2 is Communication faulted
2	BIT	Test: Not supported by BFS
3	RPF	Nav: GPS2 Receiver/Processor (R/P) failure
4	BATT	Nav: GPS2 R/P battery voltage low
5	DGF	Nav: GPS2 Data Good Fail
GPS3STAT	Display for GPS3	
0	∅	<u>Mode</u> Init: STAT field not supported by BFS Test: STAT field not supported by BFS Nav: GPS3 receiver healthy
1	M	N/A: GPS3 is Communication faulted
2	BIT	Test: Not supported by BFS
3	RPF	Nav: GPS3 Receiver/Processor (R/P) failure
4	BATT	Nav: GPS3 R/P battery voltage low
5	DGF	Nav: GPS3 Data Good Fail

1 NOTE: All character strings shall be displayed right justified.

2 NOTE: "BIT", "BATT", and "DGF" shall be displayed at normal intensity. "M" and "RPF" shall be displayed at double overbright intensity.

The next row shall display each GPS receivers' estimate of Orbiter velocity (VEL) as approximate Mach number. The values for GPS velocity shall be obtained from the GPS_INPUT_HIP variables GPS1MACH, GPS2MACH and GPS3MACH. Whenever a particular GPS receiver is not in one of the three navigation submodes (INS, PVA, or STA) or indicates a Receiver/Processor failure, its corresponding velocity data field shall be blanked. The determination of whether to display or blank the VEL field is made by the GPS_INPUT_HIP so that the display need only examine the GPS1BLK, GPS2BLK, and GPS3BLK blanking control variables. If the blanking control variable for a particular receiver is On, then the VEL field corresponding to that receiver shall be blanked. If the blanking control variable for a particular receiver is Off, then the Mach number corresponding to that receiver shall be displayed in its VEL field. Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements for the GPS1MACH, GPS2MACH, GPS3MACH, GPS1BLK, GPS2BLK, and GPS3BLK variables.

The next row shall display each GPS receivers' estimate of maximum navigational error (P 1 σ) in feet in its own computed vehicle position vector. The values for these fields shall be obtained from the GPS_INPUT_HIP variables GPS1ERR, GPS2ERR and GPS3ERR. Refer to the BFS HIP PRD (MG038106, section 3.2.5.2.4) for the computations of GPS1ERR, GPS2ERR, and GPS3ERR. Whenever a particular GPS receiver is not in one of the three navigation submodes (INS, PVA, or STA) or indicates a Receiver/Processor failure, its corresponding P 1 σ data field shall be blanked. The determination of whether to display or blank the P 1 σ field is made by the GPS_INPUT_HIP so that the display need only examine the GPS1BLK, GPS2BLK, and GPS3BLK blanking control variables. If the blanking control variable for a particular receiver is On, then the P 1 σ field corresponding to that receiver shall be blanked. If the blanking control variable for a particular receiver is Off, then the P 1 σ data corresponding to that receiver shall be displayed in its P 1 σ field.

If a particular GPS receiver's estimate of position error has passed the I-Loaded threshold test for an I-Loaded number of consecutive cycles, the parameter status indicator field for the P 1 σ field corresponding to that particular GPS receiver shall be blank. Otherwise, a down arrow (\downarrow) shall be displayed in this field. The information to drive the P 1 σ parameter status indicators is obtained by examining the GPS_INPUT_HIP failure flags ERR1FAIL, ERR2FAIL and ERR3FAIL corresponding to GPS1, GPS2, and GPS3, respectively. If the failure flag is On for a particular receiver, then a down arrow (\downarrow) shall be displayed in the corresponding receiver's parameter status indicator field. The parameter status indicator field shall be blanked if the failure flag for a particular GPS receiver is Off. Whenever the P 1 σ field for a particular receiver is blanked because the GPS_INPUT_HIP blanking control variable for that receiver is set ON (GPS1BLK, GPS2BLK and GPS3BLK), then the corresponding parameter status indicator field for that particular receiver shall also be blanked. Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements for the GPS1ERR, GPS2ERR, GPS3ERR, ERR1FAIL, ERR2FAIL, ERR3FAIL, GPS1BLK, GPS2BLK, and GPS3BLK variables.

When there are three GPS receivers installed, which is indicated by a value of three for NUM_GPS_INSTALLED, items 31, 32 and 33 provide the capability to deselect/re-select (toggle) the GPS receivers respectively as GPS1, GPS2 and GPS3. When a GPS receiver is deselected an asterisk (*) shall be displayed next to the corresponding item number (e.g. item 31 execute for GPS1 results in an asterisk being displayed next to item 31). A blank next to item 31, 32 or 33 shall indicate that the particular GPS receiver corresponding to the item number

has not been deselected or has been re-selected. The crew item control of deselect/re-select status for each GPS receiver shall be conveyed to the GPS_INPUT_HIP and GPS_TIME_ADJ via the GPS1DES, GPS2DES, and GPS3DES interface variables. These variables shall also be available to the GPS STATUS display and the BFS GAX. If a GPS receiver is manually deselected via item entry on either the PASS GPS STATUS display or the PASS HORIZ SIT display, it does not need to be manually deselected on the BFS HORIZ SIT display as items 31, 32 and 33 shall be DK listened. The HORIZ SIT display shall also maintain the correct deselect/re-select status of all three GPS receivers when deselect/re-select item entries are made on the BFS GPS STATUS display. Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements for the GPS1DES, GPS2DES, and GPS3DES variables.

The bottom row shall display GPS-derived values of current Orbiter azimuth, range and altitude to the runway threshold for situational awareness. The values for GPS azimuth, range and altitude shall be obtained from the GPS_INPUT_HIP computed variables GPSAZ, GPSRNG, and GPSALT, respectively. The altitude data computed by the GPS_INPUT_HIP is Orbiter altitude above the runway and is provided to the HORIZ SIT in the units of thousands of feet and is limited by the GPS_INPUT_HIP to be between 0.0 kft and 999.9 kft. The azimuth data computed by the GPS_INPUT_HIP is in degrees and is limited by the GPS_INPUT_HIP to be between 0 degrees and 360 degrees. The range data provided by the GPS_INPUT_HIP is in nautical miles and is limited by the GPS_INPUT_HIP to be between 0.0 nautical miles and 9999.9 nautical miles. The GPS-derived azimuth, range and altitude data are valid when there is valid GPS data available for processing by Navigation, which is indicated by the GPS_INPUT_HIP variable GPSSITDG. If GPSSITDG is On, then the GPS-derived azimuth, range and altitude data shall be displayed in their corresponding fields. If GPSSITDG is Off, then the GPS-derived azimuth, range and altitude fields shall all be blanked. Refer to BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements for the GPSAZ, GPSRNG, GPSALT, and GPSSITDG variables.

- (21) The requirements associated with (21) are different depending on the NAV sensor hardware configuration installed on the Orbiter. The three possible configurations are (a) TACANs and no GPS receiver installed (b) TACANs and one GPS receiver installed and (c) No TACANs and three GPS receivers installed. The requirements for this section of the display shall be discussed separately as follows.

FOR NO GPS OR ONE GPS:

When TACANs are installed and either zero or one GPS receiver is installed, which is indicated by a value of zero or one for NUM_GPS_INSTALLED, the display shall present the display format shown in Figure 4.2.11-1. When one GPS receiver is installed, which is indicated by a value of one for NUM_GPS_INSTALLED, the GPS position residual data shall be displayed in addition to the other residual data for each data type that is being processed by the NAV filter (TAC AZ, TAC RNG, DRAG H and ADTA H). The GPS position residual represents the difference between GPS and navigation. The GPS residual value shall be obtained from the NAV computed variable GPSPRES. The units of GPSPRES are feet (FT), and shall be converted by Displays software to Nautical Miles (NM) for display. The GPS ratio field contains the edit ratio computed in navigation as the ratio of the GPS position residual data to the maximum allowable residual. The GPS ratio shall be obtained from the NAV computed variable GPSRAT. The GPS ratio parameter status indicator field associated with the ratio field indicates whether the position and velocity residual edit tests performed by navigation have

both passed. The edit tests pass when the position ratio is less than or equal to one and the velocity residual is less than or equal to an I-Loaded allowable tolerance. The edit tests fail when the position ratio is greater than one or the velocity residual is greater than an I-Loaded allowable tolerance. The GPS ratio parameter status indicator shall be determined by examining the NAV variable GPSEEDIT. When GPSEEDIT is On, the position edit test and/or the velocity edit test has failed and a down arrow (↓) shall be displayed in the GPS ratio parameter status indicator field. When GPSEEDIT is Off, the GPS ratio parameter status indicator shall be blanked. If there is no GPS data available for processing by navigation, which is indicated by the NAV computed variable GPSDGE equal to Off, then the display of GPS position residual, GPS ratio and parameter status indicator shall be blanked. If there is no GPS hardware installed on the Orbiter, which is indicated by a value of zero for NUM_GPS_INSTALLED, then the display of GPS position residual, GPS ratio and parameter status indicator shall be blanked.

FOR THREE GPS:

When no TACANs and three GPS receivers are installed, which is indicated by a value of three for NUM_GPS_INSTALLED, the display shall present the GPS position residual data and GPS velocity residual data in addition to the other residual data for each data type that is being processed by the NAV filter (DRAG H and ADTA H). The display format for this section of the display when three GPS receivers are installed is shown in Figure 4.2.11-2. The GPS position residual represents the difference between the selected GPS position data and the on-board navigation position data. The GPS position residual shall be obtained from the NAV computed variable GPSPRES. The units of GPSPRES are feet (FT), and shall be converted by Displays software to Nautical Miles (NM) for display. The GPS position ratio field contains the position ratio computed by NAV as the ratio of the GPS position residual to the maximum allowable position residual. The GPS position ratio shall be obtained from the NAV computed variable GPSPRAT. The GPS position ratio parameter status indicator associated with the position ratio indicates whether the position residual edit test performed by NAV has passed. The position residual edit test passes when the position ratio is less than or equal to one. The position residual edit test fails when the position ratio is greater than one. The GPS position ratio parameter status indicator shall be determined by examining the NAV variable GPSEEDIT. When GPSEEDIT is On, a down arrow (↓) shall be displayed in the GPS position ratio parameter status indicator field. When GPSEEDIT is Off, the GPS position ratio parameter status indicator field shall be blanked.

Below the GPS position residual and ratio fields are the GPS velocity residual and ratio fields. The GPS velocity residual represents the difference between the selected GPS velocity data and the on-board navigation velocity data. The GPS velocity residual shall be obtained from the NAV computed variable GPSVRES. The units of GPSVRES are feet per second (FPS), and shall be displayed as FPS. The GPS velocity ratio field contains the edit velocity ratio computed by NAV as the ratio of the GPS velocity residual to the maximum allowable velocity residual. The GPS velocity ratio shall be obtained from the NAV computed variable GPSVRAT. The GPS velocity ratio parameter status indicator associated with the GPS velocity ratio indicates whether the velocity residual edit test performed by NAV has passed. The velocity residual edit test passes when the velocity ratio is less than or equal to one. The velocity residual edit test fails when the velocity ratio is greater than one. The GPS velocity ratio parameter status indicator shall be determined by examining the NAV variable GPSVEDIT. When GPSVEDIT is On, a down arrow (↓) shall be displayed in the GPS

velocity ratio parameter status indicator field. When GPSVEDIT is Off, the GPS velocity ratio parameter status indicator field shall be blanked. If there is no GPS data available for processing by NAV, which is indicated by the NAV computed variable GPSDG equal to Off, then the display of GPS position residual, GPS position ratio, GPS position ratio parameter status indicator, GPS velocity residual, GPS velocity ratio and GPS velocity ratio parameter status indicator shall all be blanked. Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements for the GPSPRES, GPSPRAT, GPSVRES, GPSVRAT, GPSEEDIT, GPSPEEDIT, GPSVEDIT, and GPSDGD variables.

4.2.11.2 Horizontal Situation (BFS) Keyboard Processing Addendum.

4.2.11.2.1 Horizontal Situation (BFS) Keyboard Processing Addendum for No GPS or Single String GPS (refer to Figure 4.2.11-1.).

- A. Ground Intercept Designation Command and Entry Point Switch Command. Destinations for these signals are TAEM GUID, NAV and CRT.
- B. TACAN DESELECT COMMAND. Destinations for this signal are TAC HIP and CRT.
- C. NAVIGATION UPDATE COMMANDS.

When Item 16 (LOAD) is executed, the following processing shall be performed by NAV:

- IF DO_DELTA_T_UPDATE FLAG = ON, perform DELTA_T_UPDATE.
 - IF DO_DELTA_T_UPDATE FLAG = OFF, perform DELTA_NAV_UPDATE.
- D. DELTA T UPDATE. Entry of a DELTA T UPDATE (V93W5035C) value sets the DO_DELTA_T_UPDATE FLAG.
 - E. Deleted.
 - F. OVHD/STRT IND Status.
 - Horizontal Situation shall provide for the setting of the R/L CONE CHNG CMD (V93X4477X) to 1 and the corresponding OVHD/STRT IND (V95J0154C) output to 0 (STRT) when an Item 6 is executed in MM101. Subsequent execution of item 6 in MM101 shall have no effect.
 - Whenever a legal item 6 is entered, R/L CONE CHG CMD (V93X4477X) shall be set to 1.
 - Destination for the OVHD/STRT IND (V95J0154C) output is CRT.
 - G. XXXX SITE. Whenever a legal item 41 is executed, the parameter NEW_AREA (V93X4398X) = ON.
 - If a legal Item 41, XXXX SITE, is executed in MM101, set R/L CONE CHNG CMD (V93X4477X) = 0, and OVHD/STRT IND (V95J0154C) = 1 (OVHD).
 - The display shall treat a DK listen Item Entry 41 from the PFS's Ascent Bearing Display and Entry Bearing Display as an Item Entry made on this display.
 - H. TAL SITE SELECT CMD. Destinations for this signal are SITE LOOKUP and CRT.

- I. TACAN A/I/F Edit Command. Destinations for this signal are NAV and CRT. The TACAN AUT/INH/FOR Edit Command selection is defined by one signal (V93J4470C) with three states.

Signal State	Indicator to be Driven After
0	AUT (Auto Selected)
1	INH (Inhibited Selected)
2	FOR (Force Selected)

- J. GPS A/I/F Edit Command. Destinations for this signal are NAV and CRT. The GPS A/I/F Edit Command is defined by one signal, GPSAIF (V98J7210C), which is defined by three states.

Signal State	Indicator to be Driven After
0	AUT (Auto Selected)
1	INH (Inhibited Selected)
2	FOR (Force Selected)

The legality of items 42-44 is based on the value of the I-Load GPS_AVAIL.

GPS_AVAIL	Items 42-44 Legal Major Modes
0	Never Legal
1	Never Legal
2	Legal in MMs 106 and 301 only*
3	Always Legal
* when GPS_AVAIL = 2, an A/I/F command entered in MM 106 or 301 shall only be valid during that MM. When leaving MM 106 or 301, the A/I/F signal state shall revert back to the initialized value of inhibit (1), except that the value in MM 106 shall be carried over to MM 301 on a MM 106 to MM 301 transition.	

Execution of items 42-44 during an illegal Major Mode shall result in an “ILLEGAL ENTRY” message being displayed and the input rejected.

- K. DRAG H A/I/F Edit Command. Destinations for this signal are NAV and CRT. The DRAG H A/I/F Edit Command is defined by one signal (V93J5013C) which is defined by three states.

Signal State	Indicator to be Driven After
0	AUT (Auto Selected)
1	INH (Inhibited Selected)
2	FOR (Force Selected)

- L. ADTA H A/I/F Edit Command. Destinations for this signal are NAV and CRT. The ADTA H A/I/F Edit Command selection is defined by one signal (V93J4473C) with three states.

Signal State	Indicator to be Driven After
0	AUT (Auto Selected)
1	INH (Inhibited Selected)
2	FOR (Force Selected)

- M. ADTA to G&C A/I/F Edit Command. Destinations for this signal are ADTA HIP and CRT. The ADTA to G&C A/I/F Command Signal is defined by one signal (V93J5014C) which has three states.

Signal State	Indicator to be Driven After
0	AUT (Auto Selected)
1	INH (Inhibited Selected)
2	FOR (Force Selected)

- N. Illegal Entry Requirements for NAV UPDATE DELTAs. If this keyboard item entry is executed while a state vector transfer is in progress, as indicated by the variable XSV = 1, then an operator error shall result, the input rejected, and the "ILLEGAL ENTRY" CRT message shall be displayed.

4.2.11.2.2 Horizontal Situation (BFS) Keyboard Processing Addendum for Three String GPS (refer to Figure 4.2.11-2.)

- A. Ground Intercept Designation Command and Entry Point Switch Command. Destinations for these signals are TAEM GUID, NAV and CRT.
- B. GPS DESELECT RCVR COMMANDS. The GPS Deselect discretes (item 31 for GPS 1, item 32 for GPS 2, or item 33 for GPS 3) shall be set or reset only by item entry. The sources of these item entries are BFS HORIZONTAL SITUATION display, the BFS GPS STATUS display, the PASS GPS STATUS display (with DK listen by BFS) and the PASS HORIZONTAL SITUATION display (with DK listen by BFS). When a GPS receiver is deselected (i.e., a "1" state of the signal), an asterisk (*) shall be displayed next to the

corresponding item number (e.g., item 31 entry to deselect GPS1 results in an asterisk being displayed next to item 31). A blank next to the item number shall indicate that the corresponding GPS receiver has not been deselected or has been re-selected. Destinations of this item entry are CRT, BFS GPS STATUS DISPLAY, BFS GAX, GPS_TIME_ADJ, and GPS_INPUT_HIP (via the GPS1DES, GPS2DES and GPS3DES interface variables).

C. NAVIGATION UPDATE COMMANDS.

When Item 16 (LOAD) is executed, the following processing shall be performed by NAV:

- IF DO_DELTA_T_UPDATE FLAG = ON, perform DELTA_T_UPDATE.
- IF DO_DELTA_T_UPDATE FLAG = OFF, perform DELTA_NAV_UPDATE.

D. DELTA T UPDATE. Entry of a DELTA T UPDATE (V93W5035C) value sets the DO_DELTA_T_UPDATE FLAG.

E. Deleted.

F. OVHD/STRT IND Status.

- Horizontal Situation shall provide for the setting of the R/L CONE CHNG CMD (V93X4477X) to 1 and the corresponding OVHD/STRT IND (V95J0154C) output to 0 (STRT) when an Item 6 is executed in MM101. Subsequent execution of item 6 in MM101 shall have no effect.
- Whenever a legal item 6 is entered, R/L CONE CHG CMD (V93X4477X) shall be set to 1.
- Destination for the OVHD/STRT IND (V95J0154C) output is CRT.

G. XXXX SITE. Whenever a legal item 41 is executed, the parameter NEW_AREA (V93X4398X) = ON.

- If a legal Item 41, XXXX SITE, is executed in MM101, set R/L CONE CHNG CMD (V93X4477X) = 0, and OVHD/STRT IND (V95J0154C) = 1 (OVHD).
- The display shall treat a DK listen Item Entry 41 from the PFS's Ascent Bearing Display and Entry Bearing Display as an Item Entry made on this display.

H. TAL SITE SELECT CMD. Destinations for this signal are SITE LOOKUP and CRT.

I. Deleted.

- J. GPS A/I/F Edit Command. Destinations for this signal are NAV and CRT. The GPS A/I/F Edit Command is defined by one signal, GPSAIF (V98J7210C) which is defined by three states.

Signal State	Indicator to be Driven After
0	AUT (Auto Selected)
1	INH (Inhibited Selected)
2	FOR (Force Selected)

The legality of items 42 - 44 is based on the value of the I-Load GPS AVAIL.

GPS_AVAIL	Items 42 - 44 Legal Major Modes
0	Never Legal
1	Never Legal
2	Legal in MMs 106 and 301 only*
3	Always Legal
<p>* When GPS_AVAIL = 2, an A/I/F command entered in MM 106 or 301 shall only be valid during that MM. When leaving MM 106 or 301, the A/I/F signal state shall revert back to the initialized value of inhibit (1), except that the value in MM 106 shall be carried over to MM 301 on a MM 106 to MM 301 transition.</p>	

Execution of items 42 - 44 during an illegal Major Mode shall result in an “ILLEGAL ENTRY” message being displayed and the input rejected.

- K. DRAG H A/I/F Edit Command. Destinations for this signal are NAV and CRT. The DRAG H A/I/F Edit Command is defined by one signal (V93J5013C) which is defined by three states.

Signal State	Indicator to be Driven After
0	AUT (Auto Selected)
1	INH (Inhibited Selected)
2	FOR (Force Selected)

- L. ADTA H A/I/F Edit Command. Destinations for this signal are NAV and CRT. The ADTA H A/I/F Edit Command selection is defined by one signal (V93J4473C) with three states.

Signal State	Indicator to be Driven After
0	AUT (Auto Selected)
1	INH (Inhibited Selected)
2	FOR (Force Selected)

- M. ADTA to G&C A/I/F Edit Command. Destinations for this signal are ADTA HIP and CRT. The ADTA to G&C A/I/F Command Signal is defined by one signal (V93J5014C) which has three states.

Signal State	Indicator to be Driven After
0	AUT (Auto Selected)
1	INH (Inhibited Selected)
2	FOR (Force Selected)

- N. Illegal Entry Requirements for NAV UPDATE DELTAs. If this keyboard item entry is executed while a state vector transfer is in progress, as indicated by the variable XSV = 1, then an operator error shall result, the input rejected, and the "ILLEGAL ENTRY" CRT message shall be displayed.

4.2.11.3 Horizontal Situation CRT Display Processing Addendum.

4.2.11.3.1 Horizontal Situation CRT Display Processing Addendum No GPS or Single String GPS (refer to Figure 4.2.11-1.).

Processing for dynamic symbols of this display is defined in Appendix B.5.7 (HSD specialist function DIP) of this FSSR.

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word "STAT" being inserted in the FORMAT TYPE column, and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT display processing Table 4.2.11-2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the "M" PSI is displayed (for Commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)
Blank (default)	↓ M ∅
1	↓ ↑ M ∅
2	↑ M ∅
3	↓ ∅
4	↑ ∅
5	↓ ? ∅
6	↓ ↑ ∅
7	M ∅
8	↓ ? M ∅
9	? M ∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.2.11–2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. Heading Alignment Cone. Display a circle with the HAC RADIUS (V94U2048C) on the CRT defined by X and Y positions (V94H2010C and V94H2011C) and (V94H2020C and V94H2021C).
- B. Position Predictor Symbol. A circle with a radius of 5 Addressable Units (AUs) displayed double overbright is the symbol used for the 20, 40 and 60 second position predictors.
- C. Runway Vector and Runway Symbol. Display a line segment between the WP2 and HAC intersection using the preceding four raster counts. The circle with a radius of 5 AUs is displayed at WP2 X and Y location for the runway.
- D. Deleted.
- E. Nav Filter Indicators. The indicator (*) for the TACAN, GPS, DRAG H, ADTA H, and ADTA to G&C AUT/INH/FOR filter control option selected is defined by the following signals V90J0226C, V98J7210C (GPSAIF), V90J0714C, V90J0227C, and V95J3138C, respectively; each of which has three states for determining where the indicator is to be driven:

Signal State	Indicator to be Driven After
0	AUT (Auto Selected)
1	INH (Inhibited Selected)
2	FOR (Force Selected)

No asterisk (*) shall be displayed next to items 42-44 when the I-Load Derived Parameter NUM_GPS_INSTALLED = 0.

- F. PASS/BFS SV XFER CMD. This signal is set whenever Item 17 is executed and is reset by NAV when the state vector update is complete, or if Item 17 is reexecuted.

- G. ΔT UPDATE. The Delta Time value entered via the Keyboard is displayed until NAV has performed the state vector update and then is zeroed by NAV. The sources of this signal are KYBD and NAV.
- H. GPS and TACAN Azimuth and Range Data Blanking. Prior to MM304 or MM602, the GPS azimuth and range data and status indicators shall be blanked. Prior to MM304 or MM602, the TACAN azimuth and range data for TAC1, TAC2, and TAC3 shall be blanked.

If there is no GPS hardware on board the vehicle, which is indicated by a value of zero for the I-Load Derived Parameter NUM_GPS_INSTALLED, then the display of GPS azimuth and range data and status indicators shall be blanked at all times.

- I. TAC DES Indicator, TAC AZ and TAC RNG Parameter Status Indicators. For TAC1, TAC2 and TAC3, the deselect discrettes (V93X4411X, V93X4413X & V93X4415X, respectively) are set or reset only by item entry. Whenever a discrete is set (i.e., “1” state of the signal) an asterisk (*) shall be driven after the DES item number of the appropriate TAC and shall be blanked when the discrete is reset.

Whenever a TACAN is deselected, a down arrow (↓) shall be driven in the TAC AZ and TAC RNG parameter status indicator columns for the appropriate TAC.

- J. R/L CONE IND and HSI L/R HAC IND. – Each signal (V95J0153C and V90J0981C) has two states which determine the remote text to be displayed as follows:

Signal State	RTXT
+1	R
-1	L

Prior to MM304 or MM602, the displayed shall be initialized with the RTXT fields blank

- K. OVHD/STRT IND. – This signal (V95J0154C) has two states which determine the remote text to be displayed as follows:

Signal State	RTXT
1	OVHD
0	STRT

Whenever the REVERSE HAC ENERGY STATUS FLAG (V90X1131X) is set and V95J0154C is equal to 1, the remote text “OVHD” shall be flashed. Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements.

L. The XXXX Site Character String is displayed according to the table below:

OPS	ABORT MODE	CHAR STRING
1	TAL (V90X8658X=1)	∅TAL
	OTHERWISE	RTLS
6	N/A	RTLS
3	N/A	LAND

M. The TAL Site Index (Item 40) will be blanked under the following conditions:

- OPS 3
- OPS 6
- OPS 1 – if TAL ABORT Declared (V90X8658X=1) or
RTLS ABORT Declared (V90X8637XB=1)

N. The ITEM 40 character string is displayed according to the table below:

OPS	ABORT MODE	TEXT
1	TAL RTLS	∅
	Otherwise	40 ∅TAL ∅ ∅ SITE
All Other OPS	N/A	∅

∅ = blank

- O. TACAN Bearing data (V94J4184C, V94J4185C, V94J4186C) in engineering units shall be converted to degrees prior to being displayed.
- P. TACAN Range data (V94J4187C, V94J4188C, V94J4189C) shall be converted from double precision scalar to single precision scalar prior to being displayed.
- Q. GPS Residual, GPS Ratio, and GPS Ratio Parameter Status Indicator blanking. The display of GPS residual, GPS ratio and the parameter status indicator shall be blanked when there is no GPS data available for processing which is indicated by the NAV computed variable GPSDG equal to Off.

If there is no GPS hardware on board the vehicle, which is indicated by a value of zero for the I-Load Derived Parameter NUM_GPS_INSTALLED, then the display of GPS residual, GPS ratio and the parameter status indicators shall be blanked.

- R. GPS POSITION RESIDUAL UNITS. The units of GPS position residual data obtained from the NAV computed variable GPSPRES are feet (FT). This data shall be converted by Displays software to Nautical Miles (NM) for display.

4.2.11.3.2 Horizontal Situation CRT Display Processing Addendum for Three String GPS (refer to Figure 4.2.11-2).

Processing for dynamic symbols of this display is defined in Appendix B.5.7 (HSD specialist function DIP) of this FSSR.

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word “STAT” being inserted in the FORMAT TYPE column, and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT display processing Table 4.2.11-2A. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the “M” PSI is displayed (for Commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)			∅ = blank
Blank (default)	↓		M	∅
1	↓	↑	M	∅
2		↑	M	∅
3	↓			∅
4		↑		∅
5	↓		?	∅
6	↓	↑		∅
7			M	∅
8	↓		?	M
9			?	M

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.2.11-2A whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. Heading Alignment Cone. Display a circle with the HAC RADIUS (V94U2048C) on the CRT defined by X and Y positions (V94H2010C and V94H2011C) and (V94H2020C and V94H2021C).
- B. Position Predictor Symbol. A circle with a radius of 5 Addressable Units (AUs) displayed double overbright is the symbol used for the 20, 40 and 60 second position predictors.

- C. Runway Vector and Runway Symbol. Display a line segment between the WP2 and HAC intersection using the preceding four raster counts. The circle with a radius of 5 AUs is displayed at WP2 X and Y location for the runway.
- D. Deleted.
- E. Nav Filter Indicators. The indicator (*) for the GPS, DRAG H, ADTA H, and ADTA to G&C AUT/INH/FOR filter control option selected is defined by the following signals V98J7210C (GPSAIF), V90J0714C, V90J0227C, and V95J3138C, respectively; each of which has three states for determining where the indicator is to be driven:

Signal State	Indicator to be Driven After
0	AUT (Auto Selected)
1	INH (Inhibited Selected)
2	FOR (Force Selected)

No Asterisk (*) shall be displayed next to items 42 - 44 when the I-Load GPS_AVAIL = 0.

- F. PASS/BFS SV XFER CMD. This signal is set whenever Item 17 is executed and is reset by NAV when the state vector update is complete, or if Item 17 is reexecuted.
- G. ΔT UPDATE. The Delta Time value entered via the keyboard is displayed until NAV has performed the state vector update and then zeroed by NAV. The sources of this signal are KYBD and NAV.
- H. Deleted.
- I. Deleted.
- J. R/L CONE IND and HSI L/R HAC IND. Each signal (V95J0153C and V90J0981C) has two states which determine the remote text to be displayed as follows:

Signal State	RTXT
+1	R
-1	L

Prior to MM304 or MM602, the displayed shall be initialized with the RTXT fields blank.

- K. OVHD/STRT IND. This signal (V95J0154C) has two states which determine the remote text to be displayed as follows:

Signal State	RTXT
1	OVHD
0	STRT

Whenever the REVERSE HAC ENERGY STATUS FLAG (V90X1131X) is set and V95J0154C is equal to 1, the remote text “OVHD” shall be flashed. Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements.

- L. The XXXX Site Character String is displayed according to the table below:

OPS	ABORT MODE	CHAR STRING
1	TAL (V90X8658X = 1)	∅TAL
	OTHERWISE	RTLS
6	N/A	RTLS
3	N/A	LAND

- M. The TAL Site Index (Item 40) will be blanked under the following conditions:

- OPS 3
- OPS 6
- OPS 1 - if TAL ABORT Declared (V90X8658X = 1) or
RTLS ABORT Declared (V90X8637XB = 1)

- N. The ITEM 40 character string is displayed according to the table below:

OPS	ABORT MODE	TEXT
1	TAL RTLS	∅
	OTHERWISE	40 ∅TAL ∅ ∅ SITE
All Other OPS	N/A	∅

∅ = blank

- O. Deleted.
- P. Deleted.
- Q. GPS Residual, GPS Ratio, and GPS Ratio Parameter Status Indicator Blanking. The display of GPS Position Residual, GPS Position Ratio, GPS Position Ratio Parameter Status Indicator, GPS Velocity Residual, GPS Velocity Ratio, and GPS Velocity Ratio Parameter Status Indicator shall be blanked when the NAV computed variable GPSDGD is Off, indicating that there is no GPS data available for processing.
- R. Additional GPS Position Ratio Parameter Status Indicator Blanking. In addition to the blanking requirement in Addendum Reference “Q” above, the GPS Position Ratio Parameter Status Indicator shall be blanked when the NAV computed variable GPSPEEDIT is Off.
- S. Additional GPS Velocity Ratio Parameter Status Indicator Blanking. In addition to the blanking requirement in Addendum Reference “Q” above, the GPS Velocity Ratio Parameter Status Indicator shall be blanked when the NAV computed variable GPSVEDIT is Off.
- T. GPS STAT Blanking. This field shall be blanked when the corresponding GPS_INPUT_HIP status variable (i.e., GPS1STAT for GPS1, GPS2STAT for GPS2, GPS3STAT for GPS3) equals zero.
- U. GPS STAT Intensity Level. If a communication failure or receiver/processor failure occurs for a GPS receiver (i.e., the GPSxSTAT variable for that receiver equals one or three, where x = receiver number) then the “M” or “RPF” displayed in the corresponding STAT field as required in the table in paragraph 4.2.11.1(20) shall be displayed at double overbright intensity. All other STAT field displays shown in that table shall be at normal intensity.
- V. GPS VELOCITY and P 1 σ blanking, and P 1 σ Parameter Status Indicator display. The GPS VELOCITY, P 1 σ and the P 1 σ Parameter Status Indicator fields for a particular receiver shall be blanked if the GPS_INPUT_HIP variable GPSxBLK is On, where x = receiver number. When GPSxBLK is Off, the P 1 σ Parameter Status Indicator display shall depend on the value of the GPS_INPUT_HIP failure flag ERRxFail as follows:
- * When ERRxFail is On, a down arrow (\downarrow) shall be displayed in the P 1 σ Parameter Status Indicator field for receiver x.
 - * When ERRxFail is Off, the P 1 σ Parameter Status Indicator field for receiver x shall be blanked.
- W. GPS DESELECT RCVR Processing. For a particular GPS receiver, the corresponding deselect discrete shall be set or reset only by item entry. If a discrete is set (i.e., a “1” state of the GPS_INPUT_HIP deselect variable GPSxDES, where x = receiver number) an asterisk (*) shall be displayed after the corresponding item number, and a blank shall be displayed if the discrete is reset.
- X. GPS-DERIVED AZIMUTH, RANGE, and ALTITUDE Blanking. These fields shall be blanked when the GPS_INPUT_HIP blanking variable GPSSITDGD is Off.

- Y. GPS POSITION RESIDUAL UNITS. The units of GPS position residual data obtained from the NAV computed variable GPSPRES are feet (FT). This data shall be converted by Displays software to Nautical Miles (NM) for display.
- Z. GPS NAVIGATION DISPLAY STATUS. The navigation availability status shall be displayed according to the following requirements:

VALUE OF GPSxIND: x = 1,2,3	DISPLAY	MESSAGE DESCRIPTION
0	∅	Receiver data available for NAV use
1	↓	Receiver data not available for NAV use
2	?	Receiver data available for NAV use but rejected due to a receiver-to-receiver miscomparison

4.2.11.4 Horizontal Situation Figure/Table References

- Figure 4.2.11-1 Horiz Sit Display (BFS) for No GPS or Single String GPS
- Figure 4.2.11-2 Horiz Sit Display (BFS) for Three String GPS
- Table 4.2.11-1 Keyboard Processing Table for No GPS or Single String GPS
- Table 4.2.11-1A Keyboard Processing Table for Three String GPS
- Table 4.2.11-2 CRT Display Processing Table for No GPS or Single String GPS
- Table 4.2.11-2A CRT Display Processing Table for Three String GPS
- Table 4.2.11-3 CRT Display Processing Background Requirements
- Table 4.2.11-4 Mission Design Background Constants N/A
- Table 4.2.11-5 Input Functional Parameters N/A
- Table 4.2.11-6 Output Functional Parameters N/A
- Table 4.2.11-7 I-Loads
- Table 4.2.11-8 K-Loads
- Table 4.2.11-9 Constants N/A

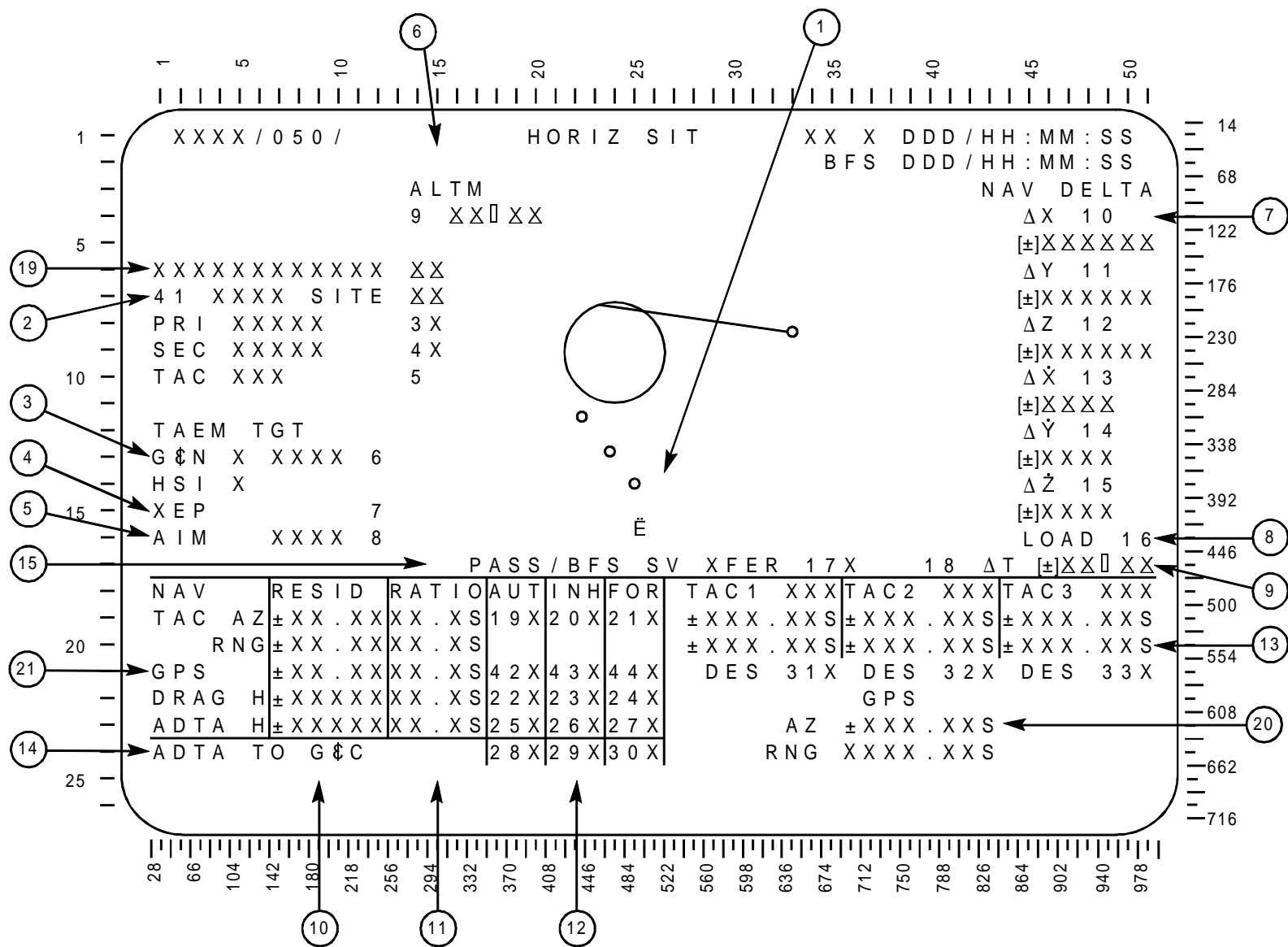


FIGURE 4.2.11-1. Horiz Sit Display (BFS) for No GPS or Single String GPS

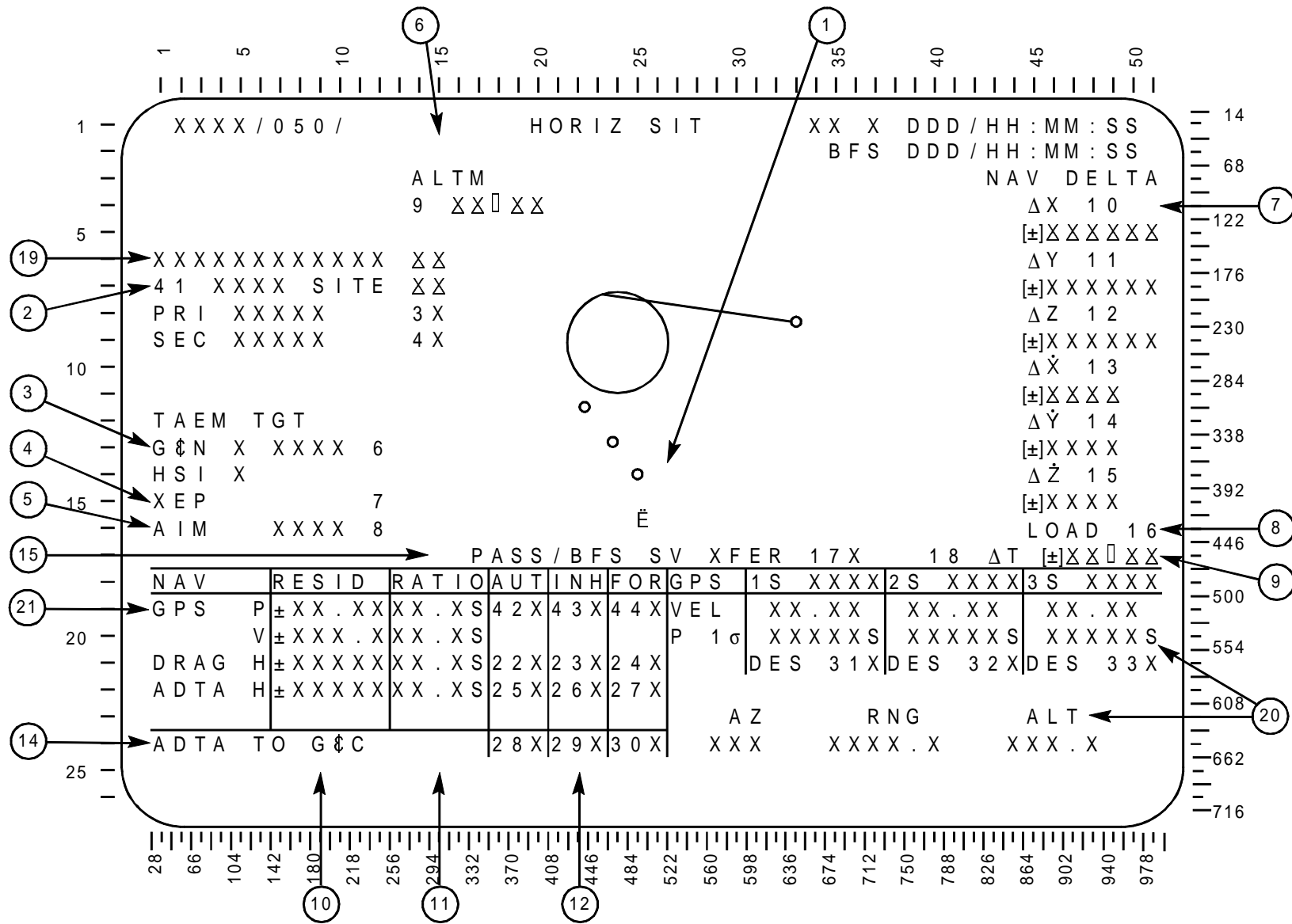


FIGURE 4.2.11-2. Horiz Sit Display (BFS) for Three String GPS

Table 4.2.11-1. HORIZ SIT (BFS) KEYBOARD PROCESSING FOR NO GPS OR SINGLE STRING GPS

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination		Nomenclature	C R T
								MIN	MAX		PFS	BFS		
001	40 TAL SITE XX	V93J4399C	3.0	DEC		X	40	1	45	H		ADDEND	TAL SITE SELECT CMD	
002	41 SITE XX	V93J4396C	3.0	DEC	N/A	X	41	1	45	F, G		STE LK	NEW LANDING AREA SELECT CMD	
003	PRI 3	V93X4393X	0.0	CTRL		X	3					STE LK	PRIMARY RUNWAY SEL CMD	
004	SEC 4	V93X4394X	0.0	CTRL		X	4					STE LK	SECONDARY RUNWAY SEL CMD	
005	TAC 5	V93X4395X	0.0	CTRL		X	5					STE LK	PRI/SEC TACAN SELECT CMD	
006	G&N X XXXX 6	V93X4477X	0.0	CTRL		X	6			A, F		NAV	R/L CONE CHG CMD	X
007	XEP 7	V93X4466X	0.0	CTRL		X	7			A		GD, CRT	ENTRY POINT SWITCH CMD	X
008*	AIM 8	V93X4476X	0.0	CTRL		X	8			A		GD, CRT	HEAD WIND HI/LO CMD	X
009	ALTM 9	V93H5005C	6.2	DEC	IN HG	X	9	27.00	35.00			ADTA	ALT SET TO FLD PRESS CORR TO MSL	X
010	DELTA X 10	V93H5010C	7.0	DEC	FT		10	-999999	+999999	N		NAV, CRT	NAV UPDATE DELTA X POSITION	X
011	DELTA Y 11	V93H5011C	7.0	DEC	FT		11	-999999	+999999	N		NAV, CRT	NAV UPDATE DELTA Y POSITION	X
012	DELTA Z 12	V93H5012C	7.0	DEC	FT		12	-999999	+999999	N		NAV, CRT	NAV UPDATE DELTA Z POSITION	X
013	DELTA X-DOT 13	V93L5020C	5.0	DEC	FPS		13	-9999	+9999	N		NAV, CRT	NAV UPDATE DELTA X VELOCITY	X
014	DELTA Y-DOT 14	V93L5021C	5.0	DEC	FPS		14	-9999	+9999	N		NAV, CRT	NAV UPDATE DELTA Y VELOCITY	X
015	DELTA Z-DOT 15	V93L5022C	5.0	DEC	FPS		15	-9999	+9999	N		NAV, CRT	NAV UPDATE DELTA Z VELOCITY	X
016	LOAD 16	V93X5030X	0.0	CTRL			16			C		NAV	UPDATE DELTAS CMD	X
017	PASS/BFS SV XFER 17	V93X4484X	0.0	CTRL			17					BOS, NAV	PASS/BFS STATE VECTOR XFER CMD	X
018	18 DELTA T	V93W5035C	6.2	DEC	SEC		18	-99.99	+99.99	C, D		NAV	DELTA T UPDATE	X
019	TAC AUT 19	V93J4470C	0.0	CTRL			19			I		NAV, CRT	TAC A/I/F EDIT CMD	X
020*	TAC INH 20	V93J4470C	0.0	CTRL			20			I		NAV, CRT	TAC A/I/F EDIT CMD	X
021*	TAC FOR 21	V93J4470C	0.0	CTRL			21			I		NAV, CRT	TAC A/I/F EDIT CMD	X
022	GPS AUT 42	V98J7210C	0.0	CTRL			42			J		NAV, CRT	GPS AUTO INHIBIT FORCE FLAG	X
023	GPS INH 43	V98J7210C	0.0	CTRL			43			J		NAV, CRT	GPS AUTO INHIBIT FORCE FLAG	X
024*	GPS FOR 44	V98J7210C	0.0	CTRL			44			J		NAV, CRT	GPS AUTO INHIBIT FORCE FLAG	X
025	DRAG H AUT 22	V93J5013C	0.0	CTRL			22			K		NAV, CRT	DRAG H A/I/F EDIT CMD	X
026*	DRAG H INH 23	V93J5013C	0.0	CTRL			23			K		NAV, CRT	DRAG H A/I/F EDIT CMD	X
027*	DRAG H FOR 24	V93J5013C	0.0	CTRL			24			K		NAV, CRT	DRAG H A/I/F EDIT CMD	X
028	ADTA H AUT 25	V93J4473C	0.0	CTRL			25			L		NAV, CRT	ADTA A/I/F EDIT CMD	X
029*	ADTA H INH 26	V93J4473C	0.0	CTRL			26			L		NAV, CRT	ADTA A/I/F EDIT CMD	X
030*	ADTA H FOR 27	V93J4473C	0.0	CTRL			27			L		NAV, CRT	ADTA A/I/F EDIT CMD	X

Table 4.2.11-1. HORIZ SIT (BFS) KEYBOARD PROCESSING FOR NO GPS OR SINGLE STRING GPS

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination		Nomenclature	C R T
								MIN	MAX		PFS	BFS		
031	ADTA TO G&C AUT 28	V93J5014C	0.0	CTRL			28			M		ADDEND	ADTA TO G&C A/I/F CMD	X
032*	ADTA TO G&C INH 29	V93J5014C	0.0	CTRL			29			M		ADDEND	ADTA TO G&C A/I/F CMD	X
033*	ADTA TO G&C FOR 30	V93J5014C	0.0	CTRL			30			M		ADDEND	ADTA TO G&C A/I/F CMD	X
034*	TAC1 DES 31	V93X4411X	0.0	CTRL			31			B		ADDEND	TACAN 1 DES CMD	X
035*	TAC2 DES 32	V93X4413X	0.0	CTRL			32			B		ADDEND	TACAN 2 DES CMD	X
036*	TAC3 DES 33	V93X4415X	0.0	CTRL			33			B		ADDEND	TACAN 3 DES CMD	X

Table 4.2.11-1A. HORIZ SIT (BFS) KEYBOARD PROCESSING FOR THREE STRING GPS

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination		Nomenclature	C R T
								MIN	MAX		PFS	BFS		
001	40 TAL SITE XX	V93J4399C	3.0	DEC		X	40	1	45	H		ADDEND	TAL SITE SELECT CMD	
002	41 SITE XX	V93J4396C	3.0	DEC	N/A	X	41	1	45	F, G		STE LK	NEW LANDING AREA SELECT CMD	
003	PRI 3	V93X4393X	0.0	CTRL		X	3					STE LK	PRIMARY RUNWAY SEL CMD	
004	SEC 4	V93X4394X	0.0	CTRL		X	4					STE LK	SECONDARY RUNWAY SEL CMD	
005	G&N X XXXX 6	V93X4477X	0.0	CTRL		X	6			A, F		NAV	R/L CONE CHG CMD	X
006	XEP 7	V93X4466X	0.0	CTRL		X	7			A		GD, CRT	ENTRY POINT SWITCH CMD	X
007	AIM 8	V93X4476X	0.0	CTRL		X	8			A		GD, CRT	HEAD WIND HI/LO CMD	X
008	ALTM 9	V93H5005C	6.2	DEC	IN HG	X	9	27.00	35.00			ADTA	ALT SET TO FLD PRESS CORR TO MSL	X
009	DELTA X 10	V93H5010C	7.0	DEC	FT		10	-999999	+999999	N		NAV, CRT	NAV UPDATE DELTA X POSITION	X
010	DELTA Y 11	V93H5011C	7.0	DEC	FT		11	-999999	+999999	N		NAV, CRT	NAV UPDATE DELTA Y POSITION	X
011	DELTA Z 12	V93H5012C	7.0	DEC	FT		12	-999999	+999999	N		NAV, CRT	NAV UPDATE DELTA Z POSITION	X
012	DELTA X-DOT 13	V93L5020C	5.0	DEC	FPS		13	-9999	+9999	N		NAV, CRT	NAV UPDATE DELTA X VELOCITY	X
013	DELTA Y-DOT 14	V93L5021C	5.0	DEC	FPS		14	-9999	+9999	N		NAV, CRT	NAV UPDATE DELTA Y VELOCITY	X
014	DELTA Z-DOT 15	V93L5022C	5.0	DEC	FPS		15	-9999	+9999	N		NAV, CRT	NAV UPDATE DELTA Z VELOCITY	X
015	LOAD 16	V93X5030X	0.0	CTRL			16			C		NAV	UPDATE DELTAS CMD	X
016	PASS/BFS SV XFER 17	V93X4484X	0.0	CTRL			17					BOS, NAV	PASS/BFS STATE VECTOR XFER CMD	X
017	18 DELTA T	V93W5035C	6.2	DEC	SEC		18	-99.99	+99.99	C, D		NAV	DELTA T UPDATE	X
018	GPS AUT 42	V98J7210C	0.0	CTRL			42			J		NAV, CRT	GPS AUTO INHIBIT FORCE FLAG	X
019	GPS INH 43	V98J7210C	0.0	CTRL			43			J		NAV, CRT	GPS AUTO INHIBIT FORCE FLAG	X
020	GPS FOR 44	V98J7210C	0.0	CTRL			44			J		NAV, CRT	GPS AUTO INHIBIT FORCE FLAG	X
021	DRAG H AUT 22	V93J5013C	0.0	CTRL			22			K		NAV, CRT	DRAG H A/I/F EDIT CMD	X
022	DRAG H INH 23	V93J5013C	0.0	CTRL			23			K		NAV, CRT	DRAG H A/I/F EDIT CMD	X
023	DRAG H FOR 24	V93J5013C	0.0	CTRL			24			K		NAV, CRT	DRAG H A/I/F EDIT CMD	X
024	ADTA H AUT 25	V93J4473C	0.0	CTRL			25			L		NAV, CRT	ADTA A/I/F EDIT CMD	X
025	ADTA H INH 26	V93J4473C	0.0	CTRL			26			L		NAV, CRT	ADTA A/I/F EDIT CMD	X
026	ADTA H FOR 27	V93J4473C	0.0	CTRL			27			L		NAV, CRT	ADTA A/I/F EDIT CMD	X
027	ADTA TO G&C AUT 28	V93J5014C	0.0	CTRL			28			M		ADDEND	ADTA TO G&C A/I/F CMD	X
028	ADTA TO G&C INH 29	V93J5014C	0.0	CTRL			29			M		ADDEND	ADTA TO G&C A/I/F CMD	X
029	ADTA TO G&C FOR 30	V93J5014C	0.0	CTRL			30			M		ADDEND	ADTA TO G&C A/I/F CMD	X
030	GPS1 DES RCVR 31	V98X0089X	0.0	CTRL		X	31			B		ADDEND	GPS 1 DESELECT RCVR CMD	X
031	GPS2 DES RCVR 32	V98X0623X	0.0	CTRL		X	32			B		ADDEND	GPS 2 DESELECT RCVR CMD	X
032	GPS3 DES RCVR 33	V98X0664X	0.0	CTRL		X	33			B		ADDEND	GPS 3 DESELECT RCVR CMD	X

Table 4.2.11-2. HORIZ SIT (BFS) CRT DISPLAY PROCESSING FOR NO GPS OR SINGLE STRING GPS

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	SATAZTNS	BLINK	SITNS	FLATS	RATES	SILEN	LERN	BAND	DWN	Add Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL																TYPE
							1	0															
001	(OPS)	V93X0040X	2	1		5.0														MI	OPS FUNCTION PAGE	X	
002	(SPEC)	V93X0042X	7	1		4.0														MI	SPEC FUNCTION PAGE	X	
003	(DISP)	V93X0044X	10	1		4.0														MI	DISPLAY FUNCTION PAGE	X	
004	(UL)	V92X5032X	34	1		2.0	UL						X							MI	UPLINK ACTIVITY IND	X	
005	(GPC)	V93X0048X	36	1		2.0														MI	GPC DRIVER	X	
006	(MT)	V91W1990C	39	1		12.0			DHMS											BOS	MISSION ELAPSED TIME	X	
007	(CRT TIMER)	V91W1987C	39	2		12.0			DHMS											BOS	DISPLAY CRT TIMER,GNC	X	
008	XXXXXXXXXXXX	ADDENDUM	1	6		12.0													N	6.21	ITEM 40 CHAR STRING		
009	40 TAL SITE XX	V93J4399C	13	6		3.0				X									M	KYBD	TAL SITE SELECT CMD		
010	41 XXXX SITE	ADDENDUM	4	7		4.0													L	6.21	LAND SITE CHAR STRING		
011	41 SITE XX	V93J4392C	13	7		3.0														STE LK	SELECTED AREA		
012	PRI XXXXX 3	V97U5681C	5	8		5.0														STE LK	RUNWAY NAME PRIME LANDING SITE		
013	SEC XXXXX 4	V97U5682C	5	9		5.0														STE LK	RUNWAY NAME SECONDARY LANDING SITE		
014	PRI_SEL X	V93X4523X	15	8		1.0	*													STE LK	RUNWAY SELECTION INDICATOR		
015	SEC_SEL X	V93X4523X	15	9		1.0		*												STE LK	RUNWAY SELECTION INDICATOR		
016	TAC_XXX 5	V95J5022C	4	10		4.0														STE LK	SELECTED TACAN CHANNEL		
017	G&N (CONE IND) 6	V95J0153C	5	13		1.0				X									J	NAV	R/L CONE IND	X	
018	G&N (OVHD/STRT IND) 6	V95J0154C	7	13		4.0							X						K	GUID	OVHD/STRT IND	X	
019	HSI	V90J0981C	5	14		1.0				X									J	NAV	L HSI L/R HAC IND-PRI	X	
020	XEP 7	V93X4466X	1	15		1.0	N	M						E						KYBD	ENTRY POINT SWITCH CMD	X	
021	AIM XXXX 8	V93X4476X	7	16		4.0	CLSE	NOM						E						KYBD	HEAD WIND HI/LO CMD	X	
022	ALTM 9	V93H5005C	15	4		6.2			IN HG											KYBD	ALT SET TO FLD PRESS CORR TO MSL	X	
023	DELTA X 10	V93H5010C	45	5		7.0			FT					X						NAV, KBD	NAV UPDATE DELTA X POSITION	X	
024	DELTA Y 11	V93H5011C	45	7		7.0			FT					X						NAV, KBD	NAV UPDATE DELTA Y POSITION	X	
025	DELTA Z 12	V93H5012C	45	9		7.0			FT					X						NAV, KBD	NAV UPDATE DELTA Z POSITION	X	
026	DELTA X-DOT 13	V93L5020C	45	11		5.0			FPS					X						NAV, KBD	NAV UPDATE DELTA X VELOCITY	X	
027	DELTA Y-DOT 14	V93L5021C	45	13		5.0			FPS					X						NAV, KBD	NAV UPDATE DELTA Y VELOCITY	X	
028	DELTA Z-DOT 15	V93L5022C	45	15		5.0			FPS					X						NAV, KBD	NAV UPDATE DELTA Z VELOCITY	X	
029	PASS/BFS SV XFER 17	V93X4484X	36	17		1.0	*							X					F	NAV, KBD	PASS/BFS STATE VECTOR XFER CMD	X	
030	18 DELTA T	V93W5035C	46	17		6.2			SEC					X					G	NAV, KBD	DELTA T UPDATE	X	

Table 4.2.11-2. HORIZ SIT (BFS) CRT DISPLAY PROCESSING FOR NO GPS OR SINGLE STRING GPS

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A Z E K	S I N E N H	I N L I N E S	F L A T G E N	R A T I O E C S	S L I D E R H T	B D A N L E C S	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL															TYPE
							1	0														
031	TAC AZ RESID	V90H0212C	7	19		6.2			DEC											NAV	TAC AZ/OPTICS H/X/AZ MEAS RESIDUAL	X
032	TAC AZ RATIO	V90U0216C	12	19		5.1			DEC											NAV	TAC AZ/OPTICS H/X/AZ RESID RATIO	X
033	TAC AUT 19	V90J0226C	20	19		1.0			CHAR					E				E		KYBD	TACAN AUT/INH/FOR FLAG FDBK	X
034*	TAC INH 20	V90J0226C	23	19		1.0			CHAR					E				E		KYBD	TACAN AUT/INH/FOR FLAG FDBK	X
035*	TAC FOR 21	V90J0226C	26	19		1.0			CHAR					E				E		KYBD	TACAN AUT/INH/FOR FLAG FDBK	X
036	TAC RNG RESID	V90H0214C	7	20		6.2			DEC							X				NAV	TAC R/OPTICS V/Y/EL MEAS RESIDUAL	X
037	TAC RNG RATIO	V90U0217C	12	20		5.1			DEC											NAV	TAC R/OPTICS V/Y/EL RESID RATIO	X
038	GPS RESID	V98H0152C	7	21		6.2			DEC			X						R, Q		NAV	GPS MEAS RESIDUAL	X
039	GPS RATIO	V98U0153C	12	21		5.1			DEC			X						Q		NAV	GPS RESID RATIO	X
040	GPS AUT 42	V98J7210C	20	21		1.0			CHAR					E				E		KYBD	GPS AUTO INHIBIT FORCE FLAG	X
041*	GPS INH 43	V98J7210C	23	21		1.0			CHAR					E				E		KYBD	GPS AUTO INHIBIT FORCE FLAG	X
042*	GPS FOR 44	V98J7210C	26	21		1.0			CHAR					E				E		KYBD	GPS AUTO INHIBIT FORCE FLAG	X
043	DRAG H RESID	V90A0711C	7	22		6.0			DEC						X					NAV	DRAG ALT/RR R DOT MEAS RESIDUAL	X
044	DRAG H RATIO	V90U0713C	12	22		5.1			DEC											NAV	DRAG ALT/RR R DOT RESID RATIO	X
045	DRAG H AUT 22	V90J0714C	20	22		1.0			CHAR					E				E		KYBD	DRAG H A/I/F EDIT IND	X
046*	DRAG H INH 23	V90J0714C	23	22		1.0			CHAR					E				E		KYBD	DRAG H A/I/F EDIT IND	X
047*	DRAG H FOR 24	V90J0714C	26	22		1.0			CHAR					E				E		KYBD	DRAG H A/I/F EDIT IND	X
048	ADTA H RESID	V90H0221C	7	23		6.0			DEC						X					NAV	BARO ALT/RR RNG MEAS RESIDUAL	X
049	ADTA H RATIO	V90U0222C	12	23		5.1			DEC											NAV	BARO ALT/RR RNG RESID RATIO	X
050	ADTA H AUT 25	V90J0227C	20	23		1.0			CHAR					E						KYBD	BARO AUT/INH/FOR FLAG FDBK	X
051*	ADTA H INH 26	V90J0227C	23	23		1.0			CHAR					E				E		KYBD	BARO AUT/INH/FOR FLAG FDBK	X
052*	ADTA H FOR 27	V90J0227C	26	23		1.0			CHAR					E				E		KYBD	BARO AUT/INH/FOR FLAG FDBK	X
053	ADTA TO G&C AUT 28	V95J3138C	20	24		1.0			CHAR					E				E		KYBD	ADTA TO GC A/I/F FEEDBACK	X
054*	ADTA TO G&C INH 29	V95J3138C	23	24		1.0			CHAR					E				E		KYBD	ADTA TO GC A/I/F FEEDBACK	X
055*	ADTA TO G&C FOR 30	V95J3138C	26	24		1.0			CHAR					E				E		KYBD	ADTA TO GC A/I/F FEEDBACK	X
056	TAC AZ RATIO (S)	V90X0213X	17	19		1.0			STAT									3		NAV	TAC AZ/OPTICS H/X/AZ EDIT HIST IND	X
057	TAC RNG RATIO (S)	V90X0215X	17	20		1.0			STAT									3		NAV	TAC R/OPTICS V/Y/EL EDIT HIST IND	X
058	GPS RATIO (S)	V98X0154X	17	21		1.0			STAT									Q	3	NAV	GPS EDIT HIST IND	X
059	DRAG H RATIO (S)	V90X0712X	17	22		1.0			STAT									3		NAV	DRAG ALT/RR R DOT EDIT HIST IND	X
060	ADTA H RATIO (S)	V90X0223X	17	23		1.0			STAT									3		NAV	BARO ALT/RR RNG EDIT HIST IND	X

Table 4.2.11-2. HORIZ SIT (BFS) CRT DISPLAY PROCESSING FOR NO GPS OR SINGLE STRING GPS

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L K	S I Z E N H	I N T E R S E C T I O N	R A N G E S	L E N G T H	B E C A U S E	D E T E R M I N E D	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL															TYPE
							1	0														
061	TAC 1 XXX	V90U1802C	32	18		4.0		DEC														X
062	TAC 1 AZ	V94J4184C	28	19		7.2		DEC	DEG		X				X			H, O	NAV	TACAN 1 AZIMUTH DATA		X
063	TAC 1 RNG	V94J4187C	28	20		7.2		DEC	NM		X				X			H, P	NAV	TACAN 1 RANGE DATA		X
064	TAC 1 AZ (S)	V94J2014C	35	19		1.0		STAT										I 3	NAV	TACAN 1 AZIMUTH STATUS		X
065	TAC 1 RNG (S)	V94J2024C	35	20		1.0		STAT										I 3	NAV	TACAN 1 RANGE STATUS		X
066	TAC 2 XXX	V90U1803C	40	18		4.0		DEC														X
067	TAC 2 AZ	V94J4185C	36	19		7.2		DEC	DEG		X				X			H, O	NAV	TACAN 2 AZIMUTH DATA		X
068	TAC 2 RNG	V94J4188C	36	20		7.2		DEC	NM		X				X			H, P	NAV	TACAN 2 RANGE DATA		X
069	TAC 2 AZ (S)	V94J2015C	43	19		1.0		STAT										I 3	NAV	TACAN 2 AZIMUTH STATUS		X
070	TAC 2 RNG (S)	V94J2025C	43	20		1.0		STAT										I 3	NAV	TACAN 2 RANGE STATUS		X
071	TAC 3 XXX	V90U1804C	48	18		4.0		DEC														X
072	TAC 3 AZ	V94J4186C	44	19		7.2		DEC	DEG		X				X			H, O	NAV	TACAN 3 AZIMUTH DATA		X
073	TAC 3 RNG	V94J4189C	44	20		7.2		DEC	NM		X				X			H, P	NAV	TACAN 3 RANGE DATA		X
074	TAC 3 AZ (S)	V94J2016C	51	19		1.0		STAT										I 3	NAV	TACAN 3 AZIMUTH STATUS		X
075	TAC 3 RNG (S)	V94J2026C	51	20		1.0		STAT										I 3	NAV	TACAN 3 RANGE STATUS		X
076*	TAC1 DES 31	V93X4411X	35	21		1.0	*	BLVL						E				I	KYBD	TACAN 1 DES CMD		X
077*	TAC2 DES 32	V93X4413X	43	21		1.0	*	BLVL						E				I	KYBD	TACAN 2 DES CMD		X
078*	TAC3 DES 33	V93X4415X	51	21		1.0	*	BLVL						E				I	KYBD	TACAN 3 DES CMD		X
079	GPS AZ	V98J0155C	36	21		7.2		DEC	DEG		X				X			H	GPS INPUT	GPS AZIMUTH DATA		X
080	GPS RNG	V98J0156C	35	24		8.2		DEC	NM		X							H	GPS INPUT	GPS RANGE DATA		X
081	GPS AZ (S)	V98J0157C	43	24		1.0		STAT			X							H 3	GPS INPUT	GPS AZIMUTH STATUS		X
082	GPS RNG (S)	V98J0158C	43	24		1.0		STAT			X							H 3	GPS INPUT	GPS RANGE STATUS		X
083	(HAC X-POS)	V94H2050C						DEC						A				A	DOP 4	GRAPHIC X-POS OF SELECTED HAC		X
084	(HAC Y-POS)	V94H2051C						DEC						A				A	DOP 4	GRAPHIC Y-POS OF SELECTED HAC		X
085	(HAC-RADIUS)	V94H2052C						DEC						A				A	DOP 4	RADIUS OF SEL HAC		X
086	(WP 2 X POS)	V94U2044C						DEC						A				C	DOP 4	GRAPHIC X-POS OF WP2		X
087	(WP 2 Y POS)	V94U2045C						DEC						A				C	DOP 4	GRAPHIC Y-POS OF WP2		X
088	(HAC X-CEPT X POS)	V94U2046C						DEC						A				C	DOP 4	GRAPHIC X-POS OF HAC INTERSECTION		X
089	(HAC X-CEPT Y POS)	V94U2047C			*			DEC						A				C	DOP 4	GRAPHIC Y-POS OF HAC INTERSECTION		X
090	(20-SEC PRED X POS)	V94H2030C						DEC				X		A				B	DOP 4	GRAPHIC X-POS OF 20-SEC PREDICTOR		X

Table 4.2.11-2. HORIZ SIT (BFS) CRT DISPLAY PROCESSING FOR NO GPS OR SINGLE STRING GPS

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	S	B	S	I	F	R	S	L	B	D	Add Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
091	(20-SEC PRED Y POS)	V94H2031C			*								X	A						B	DOP 4	GRAPHIC Y-POS OF 20-SEC PREDICTOR	X	
092	(40-SEC PRED X POS)	V94H2035C											X	A						B	DOP 4	GRAPHIC X-POS OF 40-SEC PREDICTOR	X	
093	(40-SEC PRED Y POS)	V94H2036C			*								X	A						B	DOP 4	GRAPHIC Y-POS OF 40-SEC PREDICTOR	X	
094	(60-SEC PRED X POS)	V94H2040C											X	A						B	DOP 4	GRAPHIC X-POS OF 60 SEC PREDICTOR	X	
095	(60-SEC PRED Y POS)	V94H2041C			*								X	A						B	DOP 4	GRAPHIC Y-POS OF 60 SEC PREDICTOR	X	
096	(MSG LINE)	V93X0050X	2	25		46.0								G							MI	MESSAGE LINE	X	
097	(BUFFER MSG)	V93X0054X	48	25		4.0								G							MI	BUFFER MESSAGE INDICATOR	X	
098	(SPL)	V93X0056X	2	26		49.0								G							MI	SCRATCH PAD LINE	X	
200	(BFS)	V98X0015X	35	2		3.0							X	G							MI	BFS IDENTIFIER	X	

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Table 4.2.11-2A. HORIZ SIT (BFS) CRT DISPLAY PROCESSING FOR THREE STRING GPS

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	S	B	S	I	F	R	S	L	B	D	Add Ref	Source	Nomenclature	CRT		
			X	Y		CHAR	BILEVEL																	TYPE	
							1	0																	
001	(OPS)	V93X0040X	2	1		5.0															MI	OPS FUNCTION PAGE	X		
002	(SPEC)	V93X0042X	7	1		4.0																MI	SPEC FUNCTION PAGE	X	
003	(DISP)	V93X0044X	10	1		4.0																MI	DISPLAY FUNCTION PAGE	X	
004	(UL)	V92X5032X	34	1		2.0	UL						X									MI	UPLINK ACTIVITY IND	X	
005	(GPC)	V93X0048X	36	1		2.0																MI	GPC DRIVER	X	
006	(MT)	V91W1990C	39	1		12.0																BOS	MISSION ELAPSED TIME	X	
007	(CRT TIMER)	V91W1987C	39	2		12.0																BOS	DISPLAY CRT TIMER,GNC	X	
008	XXXXXXXXXXXX	ADDENDUM	1	6		12.0															N	6.21	ITEM 40 CHAR STRING		
009	40 TAL SITE XX	V93J4399C	13	6		3.0															M	KYBD	TAL SITE SELECT CMD		
010	41 XXXX SITE	ADDENDUM	4	7		4.0															L	6.21	LAND SITE CHAR STRING		
011	41 SITE XX	V93J4392C	13	7		3.0																STE LK	SELECTED AREA		
012	PRI XXXXX 3	V97U5681C	5	8		5.0																STE LK	RUNWAY NAME PRIME LANDING SITE		
013	SEC XXXXX 4	V97U5682C	5	9		5.0																STE LK	RUNWAY NAME SECONDARY LANDING SITE		
014	PRI_SEL X	V93X4523X	15	8		1.0	*															STE LK	RUNWAY SELECTION INDICATOR		
015	SEC_SEL X	V93X4523X	15	9		1.0		*														STE LK	RUNWAY SELECTION INDICATOR		
016	G&N (CONE IND) 6	V95J0153C	5	13		1.0															J	NAV	R/L CONE IND	X	
017	G&N (OVHD/STRT IND) 6	V95J0154C	7	13		4.0							X								K	GUID	OVHD/STRT IND	X	
018	HSI	V90J0981C	5	14		1.0															J	NAV	L HSI L/R HAC IND-PRI	X	
019	XEP 7	V93X4466X	1	15		1.0	N	M														KYBD	ENTRY POINT SWITCH CMD	X	
020	AIM XXXX 8	V93X4476X	7	16		4.0	CLSE	NOM														KYBD	HEAD WIND HI/LO CMD	X	
021	ALTM 9	V93H5005C	15	4		6.2																KYBD	ALT SET TO FLD PRESS CORR TO MSL	X	
022	DELTA X 10	V93H5010C	45	5		7.0																NAV, KBD	NAV UPDATE DELTA X POSITION	X	
023	DELTA Y 11	V93H5011C	45	7		7.0																NAV, KBD	NAV UPDATE DELTA Y POSITION	X	
024	DELTA Z 12	V93H5012C	45	9		7.0																NAV, KBD	NAV UPDATE DELTA Z POSITION	X	
025	DELTA X-DOT 13	V93L5020C	45	11		5.0																NAV, KBD	NAV UPDATE DELTA X VELOCITY	X	
026	DELTA Y-DOT 14	V93L5021C	45	13		5.0																NAV, KBD	NAV UPDATE DELTA Y VELOCITY	X	
027	DELTA Z-DOT 15	V93L5022C	45	15		5.0																NAV, KBD	NAV UPDATE DELTA Z VELOCITY	X	
028	PASS/BFS SV XFER 17	V93X4484X	36	17		1.0	*															F	NAV, KBD	PASS/BFS STATE VECTOR XFER CMD	X
029	18 DELTA T	V93W5035C	46	17		6.2																G	NAV, KBD	DELTA T UPDATE	X
030	GPS POS RESID	V98H0897C	7	19		6.2																Q, Y	NAV	GPS POSITION RESIDUAL	X

Table 4.2.11-2A. HORIZ SIT (BFS) CRT DISPLAY PROCESSING FOR THREE STRING GPS

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A Z E S	S I N E S	I N T E S E N S	F L A T T E N S	R A T I O	S I G N A L	L E V E L	B I T S	D I S T A N C E	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
031	GPS POS RATIO	V98U0898C	12	19		5.1															Q	NAV	GPS POSITION RATIO	X
032	GPS POS RATIO (S)	V98X0899X	17	19		1.0															Q, R 3	NAV	GPS POSITION RATIO IND	X
033	GPS AUT 42	V98J7210C	20	19		1.0															E	KYBD	GPS AUTO INHIBIT FORCE FLAG	X
034	GPS INH 43	V98J7210C	23	19		1.0															E	KYBD	GPS AUTO INHIBIT FORCE FLAG	X
035	GPS FOR 44	V98J7210C	26	19		1.0															E	KYBD	GPS AUTO INHIBIT FORCE FLAG	X
036	GPS VEL RESID	V98L0900C	7	20		6.1			FPS												Q	NAV	GPS VELOCITY RESIDUAL	X
037	GPS VEL RATIO	V98U0901C	12	20		5.1															Q	NAV	GPS VELOCITY RATIO	X
038	GPS VEL RATIO (S)	V98X0902X	17	20		1.0															Q, S 3	NAV	GPS VELOCITY RATIO IND	X
039	DRAG H RESID	V90A0711C	7	21		6.0			FT													NAV	DRAG ALT/RR R DOT MEAS RESIDUAL	X
040	DRAG H RATIO	V90U0713C	12	21		5.1																NAV	DRAG ALT/RR R DOT RESID RATIO	X
041	DRAG H AUT 22	V90J0714C	20	21		1.0															E	KYBD	DRAG H A/I/F EDIT IND	X
042	DRAG H INH 23	V90J0714C	23	21		1.0															E	KYBD	DRAG H A/I/F EDIT IND	X
043	DRAG H FOR 24	V90J0714C	26	21		1.0															E	KYBD	DRAG H A/I/F EDIT IND	X
044	ADTA H RESID	V90H0221C	7	22		6.0			FT												X	NAV	BARO ALT/RR RNG MEAS RESIDUAL	X
045	ADTA H RATIO	V90U0222C	12	22		5.1																NAV	BARO ALT/RR RNG RESID RATIO	X
046	ADTA H AUT 25	V90J0227C	20	22		1.0															E	KYBD	BARO AUT/INH/FOR FLAG FDBK	X
047	ADTA H INH 26	V90J0227C	23	22		1.0															E	KYBD	BARO AUT/INH/FOR FLAG FDBK	X
048	ADTA H FOR 27	V90J0227C	26	22		1.0															E	KYBD	BARO AUT/INH/FOR FLAG FDBK	X
049	ADTA TO G&C AUT 28	V95J3138C	20	24		1.0															E	KYBD	ADTA TO GC A/I/F FEEDBACK	X
050	ADTA TO G&C INH 29	V95J3138C	23	24		1.0															E	KYBD	ADTA TO GC A/I/F FEEDBACK	X
051	ADTA TO G&C FOR 30	V95J3138C	26	24		1.0															E	KYBD	ADTA TO GC A/I/F FEEDBACK	X
052	DRAG H RATIO (S)	V90X0712X	17	22		1.0															3	NAV	DRAG ALT/RR R DOT EDIT HIST IND	X
053	ADTA H RATIO (S)	V90X0223X	17	23		1.0															3	NAV	BARO ALT/RR RNG EDIT HIST IND	X
054	GPS 1 NAV STATUS (S)	V98J2916C	32	18		1.0															5	NAV	GPS 1 NAVIGATION STATUS	X
055	GPS 1 STAT XXXX	V98J0088C	34	18		4.0															T, U	GPS INPUT	GPS 1 STATUS	X
056	GPS 1 VEL	V98L0903C	31	19		6.2															V	GPS INPUT	GPS 1 VELOCITY	X
057	GPS 1 P 1σ	V98J0091C	31	20		6.0			FT												V	GPS INPUT	GPS 1 MAX NAV ERR	X
058	GPS 1 P 1σ (S)	V98J0092C	37	20		1.0															V 3	GPS INPUT	GPS 1 MAX NAV ERR IND	X
059	GPS 2 NAV STATUS (S)	V98J2917C	39	18		1.0															5	NAV	GPS 2 NAVIGATION STATUS	X
060	GPS 2 STAT XXXX	V98J0622C	41	18		4.0															T, U	GPS INPUT	GPS 2 STATUS	X

Table 4.2.11-2A. HORIZ SIT (BFS) CRT DISPLAY PROCESSING FOR THREE STRING GPS

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A Z K	S I Z E N	I N T E R N H	F I L T E R S	R E G I S T E R E N	L E A D I N G R A T I O	B I T S	D I S T A N C E	Add Ref	Source	Nomenclature	C R T			
			X	Y		CHAR	BILEVEL																TYPE		
							1	0																	
061	GPS 2 VEL	V98L0904C	38	19		6.2			DEC											V	GPS INPUT	GPS 2 VELOCITY	X		
062	GPS 2 P 1σ	V98J0625C	38	20		6.0			DEC	FT										V	GPS INPUT	GPS 2 MAX NAV ERR	X		
063	GPS 2 P 1σ (S)	V98J0626C	44	20		1.0			STAT											V	3	GPS INPUT	GPS 2 MAX NAV ERR IND	X	
064	GPS 3 NAV STATUS (S)	V98J2918C	46	18		1.0			STAT											Z	5	NAV	GPS 3 NAVIGATION STATUS	X	
065	GPS 3 STAT XXXX	V98J0662C	48	18		4.0			RTXT			X								T, U		GPS INPUT	GPS 3 STATUS	X	
066	GPS 3 VEL	V98L0905C	45	19		6.2			DEC											V		GPS INPUT	GPS 3 VELOCITY	X	
067	GPS 3 P 1σ	V98J0665C	45	20		6.0			DEC	FT										V		GPS INPUT	GPS 3 MAX NAV ERR	X	
068	GPS 3 P 1σ (S)	V98J0666C	51	20		1.0			STAT											V	3	GPS INPUT	GPS 3 MAX NAV ERR IND	X	
069	GPS 1 DES RCVR 31	V98X0089X	37	21		1.0	*		BLVL											W		KYBD	GPS 1 DESELECT RCVR CMD	X	
070	GPS 2 DES RCVR 32	V98X0623X	44	21		1.0	*		BLVL											W		KYBD	GPS 2 DESELECT RCVR CMD	X	
070	GPS 3 DES RCVR 33	V98X0664X	51	21		1.0	*		BLVL											W		KYBD	GPS 3 DESELECT RCVR CMD	X	
071	GPS AZ	V98H0906C	28	24		4.0			DEC	DEG										X		GPS INPUT	GPS DERIVED AZIMUTH DATA	X	
072	GPS RNG	V98H0907C	34	24		7.1			DEC	NM										X		GPS INPUT	GPS DERIVED RANGE DATA	X	
073	GPS ALT	V98H0908C	43	24		6.1			DEC	KFT										X		GPS INPUT	GPS DERIVED ALTITUDE DATA	X	
074	(HAC X-POS)	V94H2050C							DEC											A		DOP 4	GRAPHIC X-POS OF SELECTED HAC	X	
075	(HAC Y-POS)	V94H2051C							DEC											A		DOP 4	GRAPHIC Y-POS OF SELECTED HAC	X	
076	(HAC-RADIUS)	V94H2052C							DEC											A		DOP 4	RADIUS OF SEL HAC	X	
077	(WP 2 X POS)	V94U2044C							DEC											C		DOP 4	GRAPHIC X-POS OF WP2	X	
078	(WP 2 Y POS)	V94U2045C							DEC											C		DOP 4	GRAPHIC Y-POS OF WP2	X	
079	(HAC X_CEPT X POS)	V94U2046C							DEC											C		DOP 4	GRAPHIC X-POS OF HAC INTERSECTION	X	
080	(HAC X_CEPT Y POS)	V94U2047C			*				DEC											C		DOP 4	GRAPHIC Y-POS OF HAC INTERSECTION	X	
081	(20-SEC PRED X POS)	V94H2030C							DEC				X							B		DOP 4	GRAPHIC X-POS OF 20-SEC PREDICTOR	X	
082	(20-SEC PRED Y POS)	V94H2031C			*				DEC				X							B		DOP 4	GRAPHIC Y-POS OF 20-SEC PREDICTOR	X	
083	(40-SEC PRED X POS)	V94H2035C							DEC				X							B		DOP 4	GRAPHIC X-POS OF 40-SEC PREDICTOR	X	
084	(40-SEC PRED Y POS)	V94H2036C			*				DEC				X							B		DOP 4	GRAPHIC Y-POS OF 40-SEC PREDICTOR	X	
085	(60-SEC PRED X POS)	V94H2040C							DEC				X							B		DOP 4	GRAPHIC X-POS OF 60 SEC PREDICTOR	X	
086	(60-SEC PRED Y POS)	V94H2041C			*				DEC				X							B		DOP 4	GRAPHIC Y-POS OF 60 SEC PREDICTOR	X	
087	(MSG LINE)	V93X0050X	2	25		46.0			CHAR													MI	MESSAGE LINE	X	
088	(BUFFER MSG)	V93X0054X	48	25		4.0			CHAR													MI	BUFFER MESSAGE INDICATOR	X	
089	(SPL)	V93X0056X	2	26		49.0			CHAR													MI	SCRATCH PAD LINE	X	
200	(BFS)	V98X0015X	35	2		3.0			CHAR				X									MI	BFS IDENTIFIER	BFS	X

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Table 4.2.11-3. HORIZONTAL SITUATION (BFS) CRT DISPLAY PROCESSING DESIGN DEPENDENT CONSTANTS				
Description	Symbol	Value	Type	Units
Shuttle symbol nose position in X coordinates	HXOT	512	I	AU
Shuttle symbol nose position in Y coordinates	HYOT	419	I	AU

NOTES: The Shuttle symbol X and Y position data are shown with respect to the origin being in the upper left corner of the CRT.

TABLE 4.2.11-7. BFS HORIZONTAL SITUATION DISPLAY (4.2.11) I-LOADS

BFS NAME	MSID	ENG UNITS	DT	PR	D	S	PARA	MC	CAT	LAST CR	R E V
GPS_AVAIL	V97U2126C	ND	I	S	M	B	4.2.11 8.8.8.8	00	GPI	92292B	
TAL_PRIME_AREA	V99U8962C	ND	I	S	M	C	4.2.11	00	AAP	91047C	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.11-8. BFS HORIZONTAL SITUATION DISPLAY (4.2.11) K-LOADS

BFS NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PARA	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.12 GNC SYSTEMS SUMMARY 1 (BFS)

TITLE: GNC SYS SUMM 1

TYPE: DISP/018 OR SYS SUMM KEY (BFS KYBD)

AVAILABILITY: BFS ONLY, GNC OPS 1, 3 AND 6

4.2.12.1 Purpose, Operation and Organization

This display along with GNC SYS SUMM 2 are the principal CRT formats for monitoring performance of Orbiter flight critical subsystems for the GNC major function. The parameters displayed were chosen to support the Caution and Warning (C&W) function by aiding the crew in determining proper response to a C&W alarm.

GNC SYS SUMM 1 is called by the SYS SUMM key or by the SPEC key sequence (SPEC 018 PRO).

GNC SYS SUMM 1, as shown in Figure 4.2.12-1, presents digital quantitative data and/or status information chosen to support the Orbiter aerosurfaces, main propulsion system, data processing system, flight control subsystem channels and navigation sensor subsystems.

Descriptions of each format subsection follow:

- (1) The computed aerosurface positions and loading status shall be displayed. The surface positions shall be displayed in degrees for elevons, aileron, and rudder. Position feedback data with plus (+) and minus (-) signs shall be scaled to display the following:

Elevon – As “U” (up) or “D” (down) for the trailing edge surface position

Aileron – As “R” (right) when trailing edges of right elevons are positioned up and left elevons are positioned down or “L” (left) when trailing edges of right elevons are positioned down and left elevons are positioned up

Rudder – As “R” (right) or “L” (left) for pressure on the right or left pedal

Positions for the speedbrake and body flap shall be displayed in percent. For the speedbrake position, 100 percent equals full deflection. For the body flap position, 0 percent equals -11.71 degrees and 100 percent equals +22.55 degrees. The current hinge moment on the elevons shall be displayed as percent of maximum allowed. A position saturation status shall be output for the elevons as a down arrow (↓) in the row corresponding to the surface which is below the low limit and up arrow (↑) when the upper limit is exceeded. A hinge moment status indicator shall be output as an up arrow (↑) when the hinge moment exceeds the maximum limit and shall be blank otherwise.

The parameters of this subsection are only supported in OPS 3 and OPS 6 (MM602 and MM603) and shall be blank in OPS 1 and MM601.

- (2) The Data Processing System (DPS) shall provide failure indications for each data path (MDM FF 1-4, FA 1-4 and PL 1,2). For any failure a down arrow (↓) shall be displayed overbright. For MDM FF 1-4 & FA 1-4, Pre-engage failure of the BFS to track the PFS shall be indicated by displaying an “M” overbright. The two string (MDM FF, FA) lines shall provide a summary status of any flight critical data path for the forward and aft half. The status shall be

output against the FF or FA MDM half of the string where the fault occurred. Similarly, the status output shall be supported for the PL MDM's.

- (3) The FCS CH status indicators shall be displayed for actuator bypass manual deselection of any of the four FCS channels down arrow (↓), commfault (M) or blank.
- (4) For the Main Propulsion System (MPS), helium tank (HE TK), regulator (HE REG) A and B pressures in PSIA, and HE system pressure decay rate (HE dP/dT) pressures in PSIA per 3 seconds, shall be displayed for each of the three engines. These parameters are monitored to detect leaks or regulator problems which require manual crossover or helium tank isolation. Also, the external tank ullage pressures (ET ULL P) shall be displayed in PSIA for LH2 and in PSIG for LO2 for each of the three engines. Manifold pressures (MANF P) for the same propellants shall be displayed in PSIA. The MPS GH2 outlet pressure (GH2 OUT P) and the GO2 outlet temperature (GO2 OUT T) shall be displayed in PSIA and degrees F, respectively, for each of the three engines. The MPS pneumatic valve helium (MPS PNEU HE P) supply (TK), regulator outlet (REG) and accumulator (ACUM) pressures shall be displayed in PSIA. The status indicator for helium tank pressures (HE TK P) shall display a down arrow (↓) if the pressure falls beneath its lower limit. The status indicator for HE system pressure decay (HE dP/dT) shall display an up arrow (↑) if the pressure decay rate goes above its upper limit. For helium regulator pressures A & B (HE REG P A; B), and external tank ullage pressures (ET ULL P LH2; L02) the status indicators displayed shall be an up arrow (↑) or down arrow (↓) to indicate operation above or below the tolerance band. For LO2 and LH2 Manifold pressure (MANF P), an up arrow (↑) shall be displayed to indicate that an upper limit has been exceeded. The status indicators for the MPS GH2 outlet pressure (GH2 OUT P) and GO2 outlet temperature (GO2 OUT T) shall display a down arrow (↓) to indicate operation below the tolerance band. The status indicators for pneumatic valve helium supply (TK) and accumulator (ACUM) pressures shall display a down arrow (↓) if the pressure falls below its lower limit and the regulator outlet pressure shall display an up arrow (↑) or down arrow (↓) to indicate operation above or below the tolerance band. Except for HE system pressure decay (HE dP/dT), an "M" shall be driven for a commfault.

The parameters on this format shall be displayed in the following Major Modes or OPS and the data fields blanked and limit sensing/annunciation terminated in all other Major Modes or OPS except as noted:

- Supported in all of OPS 1 and OPS 6.
 - MPS Manifold Pressure – LH2, LO2
 - MPS Helium Tank Pressure – L, C, R
 - MPS ET Ullage Pressure LH2 – L, C, R
 - MPS ET Ullage Pressure LO2 – L, C, R
 - MPS GH2 Outlet Pressure – L, C, R

- MPS GO2 Outlet Temperature – L, C, R
- MPS Helium dP/dT – L, C, R
- MPS Pneumatic Valve Helium Pressures – TK, ACUM
- Supported in all of OPS 1, 3 and 6.
- MPS Helium Regulator Pressure A – L, C, R
- MPS Helium Regulator Pressure B – L, C, R
- MPS Pneumatic Valve Helium Pressure – REG

For AS32_MECO_CMD (EVENT AS32), i.e. MECO in a nominal ascent, limit sensing/annunciation shall be terminated at MECO COMMAND for the MPS Pneumatic Valve Helium Supply (TK) pressure, Accumulator (ACUM) pressure, MPS GH2 outlet pressure (OUT P) and GO2 outlet temperature (OUT T) parameters.

For AB35_MECO_CMD (EVENT AB35), i.e. MECO in an RTLS, limit sensing/annunciation shall be terminated at MECO COMMAND for the MPS Pneumatic Valve Helium Supply (TK) pressure and Accumulator (ACUM) pressure parameters.

Limit sensing/annunciation shall begin after transition to MM 102 and shall be terminated at MECO COMMAND for MPS GH2 outlet pressure (OUT P) and GO2 outlet temperature (OUT T) parameters.

Low Limit sensing/annunciation shall be terminated at MECO CONFIRMED for both LH2 and LO2 MPS ET ULL pressure parameters.

Low Limit sensing/annunciation shall begin after transition to MM 102 and shall be terminated at MECO CONFIRMED for both LH2 and LO2 MPS ET ULL pressure parameters.

- (5) The status for the Inertial Measurement Units (IMU) and the Air Data Transducer Assembly (ADTA) navigation sensors shall be supported as follows:
- IMU 1, 2, 3: All OPS
 - ADTA 1, 2, 3, 4: OPS3, MM602 and MM603

For each LRU, the display output shall be blank unless a failure condition has been determined, data is missing or an IMU has been deselected via item entry on the BFS OVERRIDE display. A down arrow (↓) shall be displayed to indicate the failure, missing data or manual deselection of an IMU. Those parameters of this format subsection which are not supported in a particular Major Mode (MM) shall be blanked.

- (6) The status for the Tactical Air Navigation (TACAN) receivers or the Global Positioning System (GPS) receivers shall be supported in this format subsection depending on the on-board hardware configuration. When there is TACAN hardware installed, which is indicated by a value of zero or one for the I-Load Derived Parameter NUM_GPS_INSTALLED (see Table 4.2.37-9.), character string “TAC” shall be displayed along with the status of the TACAN receivers. The display of the status of the TACANs shall be supported during OPS3 and during Major Modes 602 and 603. During other major modes, the TACAN status shall be blanked. For each TACAN, the display output shall be blank unless a failure condition has been determined, data is missing or a TACAN has been deselected on the HORIZ SIT display. A down arrow (↓) shall be displayed to indicate failure, missing data, or manual deselection.

When three GPS receivers are installed on-board, which is indicated by a value of three for NUM_GPS_INSTALLED, the character string “GPS” shall be displayed along with the status of the GPS receivers. The display of the GPS receivers’ statuses shall be supported during OPS 1, 3 and 6.

The GPS_INPUT_HIP variables GPS1STAT, GPS2STAT, and GPS3STAT shall be examined by GAX to determine if any GPS receivers have been communication faulted or have failed. The assembly deselect variables GPS1DES, GPS2DES, GPS3DES shall be examined to determine if any GPS receivers have been deselected (e.g. GPS1DES = On means that GPS1 has been deselected by the crew). There are four sources for deselection of a GPS receiver: the BFS GPS STATUS display, the BFS HORIZ SIT display, the PASS GPS STATUS display and the PASS HORIZ SIT display. Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements for the GPS1STAT, GPS2STAT, GPS3STAT, GPS1DES, GPS2DES and GPS3DES variables.

For each communication faulted GPS, its corresponding parameter status indicator shall display an M. For each failed GPS, its corresponding parameter status indicator shall display a down arrow (↓). For each deselected GPS that is not communication faulted, its corresponding parameter status indicator shall display a down arrow (↓). The GPS parameter status indicator shall be blanked for each GPS receiver that is not communication faulted, has not failed, and has not been deselected.

TABLE 4.2.12-1 GNC Systems Summary 1 BFS Keyboard Processing

Not applicable

4.2.12.2 GNC Systems Summary 1 BFS Keyboard Processing Addendum

Not applicable

4.2.12.3 GNC Systems Summary 1 CRT Display Processing Addendum

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word “STAT” being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT Display Processing Table 4.2.12-2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the “M” PSI is displayed (for commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)			
Blank (default)	↓		M	∅
1	↓ ↑		M	∅
2	↑		M	∅
3	↓			∅
4	↑			∅
5	↓	?		∅
6	↓ ↑			∅
7			M	∅
8	↓	?	M	∅
9		?	M	∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.2.12–2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. Display Parameter Support. Parameters for the following elements are not supported for display in the OPS and/or Major Modes (MM’s) as indicated and the data/status fields shall be blank:

For OPS 1 and MM601

Flight control surfaces – Elevons, Aileron, Rudder, Speed Brake, Body Flap

Navigation aids status – Tacan 1, 2, 3; ADTA 1, 2, 3, 4

For OPS 3

- MPS Manifold Pressure – LH2, LO2
- MPS Helium dP/dT – L, C, R
- MPS Helium Tank Pressure – L, C, R
- MPS ET Ullage Pressure LH2 – L, C, R
- MPS ET Ullage Pressure LO2 – L, C, R
- MPS GH2 Outlet Pressure – L, C, R
- MPS GO2 Outlet Temperature – L, C, R
- MPS Pneumatic Valve Helium Pressures – TK, ACUM

- B. Elevon Directional Symbol. The position data will be multiplied by a scale factor of “–1” and a “U” or “D” for the trailing edge of an elevon “up” or “down” is displayed in place of the suppressed plus (+) or minus (–) sign.

- C. Aileron Directional Symbol. When the aileron position is such that the right elevons are positioned with their trailing edges up (negative feedback signals) and the left elevons are positioned with their trailing edges down (positive feedback signals), the aileron direction is displayed as “R”. When the right elevons have their trailing edges down (positive feedback signals) and the left elevons have their trailing edges up (negative feedback signals), the aileron direction is displayed as “L”.
- D. Rudder Directional Symbol. The position data will be multiplied by a scale factor of “-1” and a “R” or “L” for pressure on the right or left pedal, respectively, is displayed in place of the suppressed plus (+) or minus (-) signs.
- E. Each IMU status parameter shall be driven by either of two signals:
 - (1) V94J4160C (IMU 1), V94J4161C (IMU 2), and V94J4162C (IMU 3) shall indicate a BITE failure or a commfault with a down arrow (↓) and normal operation with a blank. The source for these signals is GAX.
 - (2) V93X6711X (IMU 1), V93X6712X (IMU 2), and V93X6713X (IMU 3) shall drive a down arrow (↓) when in the zero state (deselected) and a blank when in the one state (selected). The source for these signals is the keyboard for item entry on the BFS OVERRIDE display.
- F. The units for MPS HE dP/dT P(L,C, and R) shall be PSIA per 3 seconds.
- G. TACAN or GPS Character String and Parameter Status Indicator. If three GPS receivers are installed on-board, which is indicated by the value of the I-Load derived parameter NUM_GPS_INSTALLED = 3, the character string “GPS” shall be displayed along with the corresponding GPS parameter status indicator; else the character string “TAC” shall be displayed along with the corresponding TACAN parameter status indicator.

4.2.12.4 GNC Systems Summary 1 Figure/Table References

Figure 4.2.12-1	GNC SYS SUMM 1 Display (BFS)
Table 4.2.12-1	Keyboard Processing Table N/A
Table 4.2.12-2	CRT Display Processing Table
Table 4.2.12-3	CRT Display Processing Background Requirements N/A
Table 4.2.12-4	Mission Design Background Constants N/A
Table 4.2.12-5	Input Functional Parameters N/A
Table 4.2.12-6	Output Functional Parameters N/A
Table 4.2.12-7	I-Loads
Table 4.2.12-8	K-Loads
Table 4.2.12-9	Constants N/A

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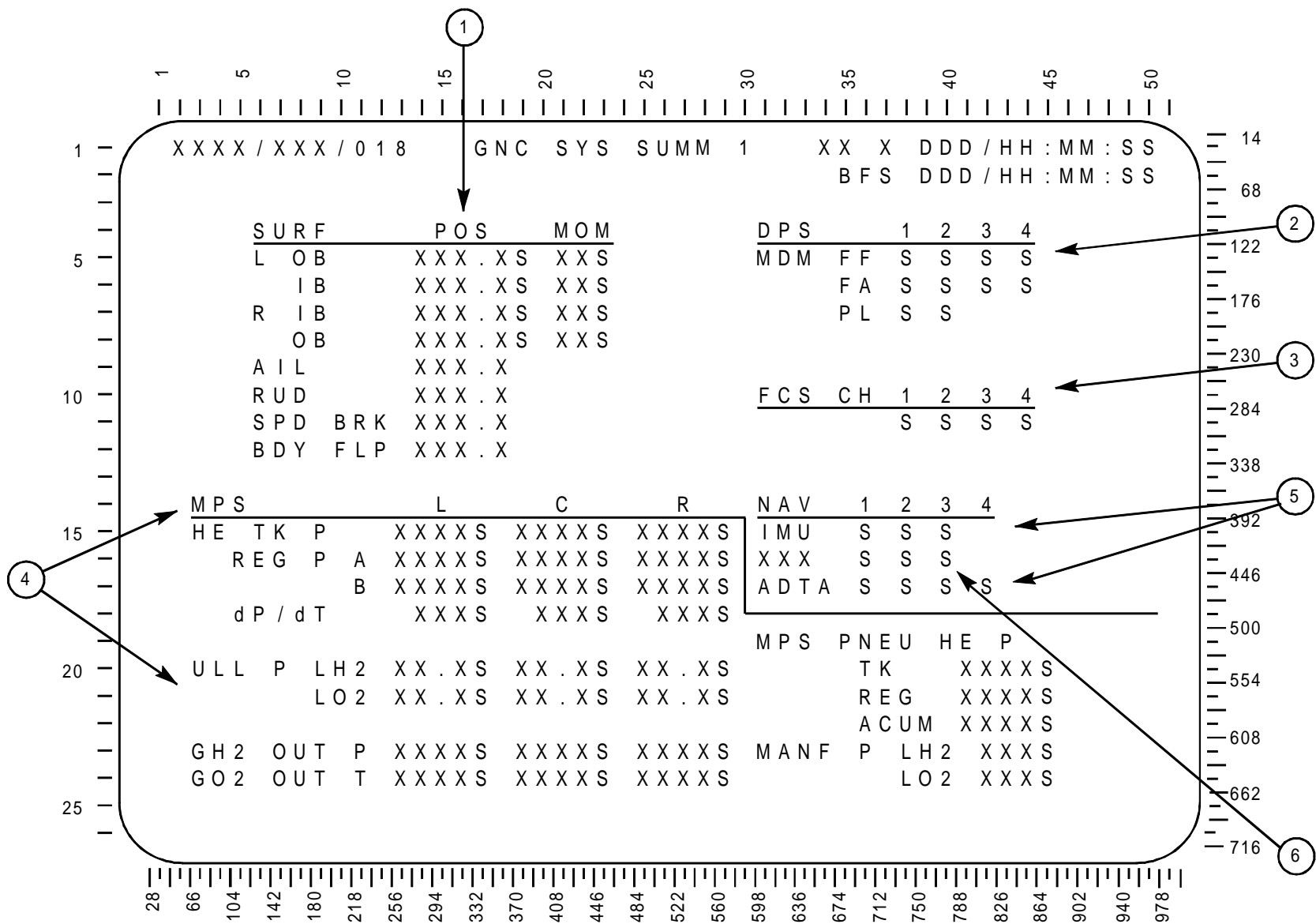


FIGURE 4.2.12-1.GNC SYS SUMM 1 Display (BFS)

Table 4.2.12-2. GNC SYS SUMM 1 (BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
026	RIB MOM (S)	V94J4678C	23	7		1.0			STAT											A 4	GAX	RIB HINGE MOMENT EXCEED STATUS	X	
027	ROB MOM (S)	V94J4679C	23	8		1.0			STAT											A 4	GAX	ROB HINGE MOMENT EXCEED STATUS	X	
028	MPS HE TK P L	V94P4555C	12	15		5.0			DEC	PSIA										A	GAX	SSME HE TK PRESS 2	X	
029	MPS HE REG P A L	V94P4558C	12	16		5.0			DEC	PSIA											GAX	SSME HE REG PRESS 2A	X	
030	MPS HE REG P B L	V94P4566C	12	17		5.0			DEC	PSIA											GAX	SSME HE REG PRESS 2B	X	
031	MPS HE TK P C	V94P4554C	18	15		5.0			DEC	PSIA										A	GAX	SSME HE TK PRESS 1	X	
032	MPS HE REG P A C	V94P4557C	18	16		5.0			DEC	PSIA											GAX	SSME HE REG PRESS 1A	X	
033	MPS HE REG P B C	V94P4565C	18	17		5.0			DEC	PSIA											GAX	SSME HE REG PRESS 1B	X	
034	MPS HE TK P R	V94P4556C	24	15		5.0			DEC	PSIA										A	GAX	SSME HE TK PRESS 3	X	
035	MPS HE REG P A R	V94P4559C	24	16		5.0			DEC	PSIA											GAX	SSME HE REG PRESS 3A	X	
036	MPS HE REG P B R	V94P4567C	24	17		5.0			DEC	PSIA											GAX	SSME HE REG PRESS 3B	X	
037	MPS HE DP/DT P L	V98P4998C	13	18		4.0			DEC											A F	MPS HE	SSME HE TK PRESS 2 CHG RATE BFS	X	
038	MPS HE DP/DT P C	V98P4997C	19	18		4.0			DEC											A F	MPS HE	SSME HE TK PRESS 1 CHG RATE BFS	X	
039	MPS HE DP/DT P R	V98P4999C	25	18		4.0			DEC											A F	MPS HE	SSME HE TK PRESS 3 CHG RATE BFS	X	
040	MPS ULL P LH2 L	V94P4835C	12	20		5.1			DEC	PSIA										A	GAX	MPS ET LH2 ULLAGE PRESS 2	X	
041	MPS ULL P LH2 C	V94P4834C	18	20		5.1			DEC	PSIA										A	GAX	MPS ET LH2 ULLAGE PRESS 1	X	
042	MPS ULL P LH2 R	V94P4836C	24	20		5.1			DEC	PSIA										A	GAX	MPS ET LH2 ULLAGE PRESS 3	X	
043	MPS ULL P LO2 R	V94P4842C	24	21		5.1			DEC	PSIG										A	GAX	MPS ET LO2 ULLAGE PRESS 3	X	
044	MPS GH2 OUT P L	V94P5003C	12	23		5.0			DEC	PSIA										A	GAX	MPS GH2 OUTLET PRESS 2		
045	MPS GH2 OUT P C	V94P5002C	18	23		5.0			DEC	PSIA										A	GAX	MPS GH2 OUTLET PRESS 1		
046	MPS GH2 OUT P R	V94P5004C	24	23		5.0			DEC	PSIA										A	GAX	MPS GH2 OUTLET PRESS 3		
047	MPS GO2 OUT T L	V94T5008C	12	24		5.0			DEC	DEGF										A	GAX	MPS GO2 OUTLET TEMP 2		
048	MPS GO2 OUT T C	V94T5007C	18	24		5.0			DEC	DEGF										A	GAX	MPS GO2 OUTLET TEMP 1		
049	MPS GO2 OUT T R	V94T5009C	24	24		5.0			DEC	DEGF										A	GAX	MPS GO2 OUTLET TEMP 3		
050*	MPS PNEU HE P ACUM	V94P4354C	40	22		5.0			DEC	PSIA										A	GAX	MPS PNEU HE ACUM PRESS		

Table 4.2.12-2. GNC SYS SUMM 1 (BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
051	MPS ULL P LO2 L	V94P4841C	12	21		5.1		DEC	PSIG											A	GAX	MPS ET LO2 ULLAGE PRESS 2	X	
052	MPS ULL P LO2 C	V94P4840C	18	21		5.1		DEC	PSIG											A	GAX	MPS ET LO2 ULLAGE PRESS 1	X	
053	MPS MANF P LH2	V94P4563C	41	23		4.0		DEC	PSIA											A	GAX	SSME FUEL MANIFOLD PRESSURE	X	
054*	MPS PNEU HE P TK	V94P4352C	40	20		5.0		DEC	PSIA											A	GAX	MPS PNEU HE TANK PRESS		
055*	MPS PNEU HE P REG	V94P4353C	40	21		5.0		DEC	PSIA											A	GAX	MPS PNEU HE REG PRESS		
056	MPS MANF P LO2	V94P4564C	41	24		4.0		DEC	PSIA											A	GAX	SSME OXID MANIFOLD PRESSURE	X	
057*	MPS HE DP/DT P L(S)	V98P4998C	17	18		1.0		STAT												A	4	MPS HE	SSME HE TK PRESS 2 CHG RATE BFS	X
058*	MPS HE DP/DT P C(S)	V98P4997C	23	18		1.0		STAT												A	4	MPS HE	SSME HE TK PRESS 1 CHG RATE BFS	X
059*	MPS HE DP/DT P R(S)	V98P4999C	29	18		1.0		STAT												A	4	MPS HE	SSME HE TK PRESS 3 CHG RATE BFS	X
060	MPS HE TK P L (S)	V94J4615C	17	15		1.0		STAT												A		GAX	SSME HE TK PRESS 2 LOW/IO STATUS	X
061	MPS HE REG P A L(S)	V94J4618C	17	16		1.0		STAT													1	GAX	SSME HE REG PRESS 2A HI/LO/IO STAT	X
062	MPS HE REG P B L(S)	V94J4602C	17	17		1.0		STAT													1	GAX	SSME HE REG PRESS 2B HI/LO/IO STAT	X
063	MPS ULL P LO2 L (S)	V94J4844C	17	21		1.0		STAT												A	1	GAX	MPS ET LO2 ULL P2 HI/LO/IO STATUS	X
064	MPS ULL P LO2 C (S)	V94J4843C	23	21		1.0		STAT												A	1	GAX	MPS ET LO2 ULL P1 HI/LO/IO STATUS	X
065	MPS ULL P LO2 R (S)	V94J4845C	29	21		1.0		STAT												A	1	GAX	MPS ET LO2 ULL P3 HI/LO/IO STATUS	X
066	MPS GH2 OUT P L (S)	V94J5014C	17	23		1.0		STAT												A		GAX	MPS GH2 OUT P2 LO/IO STATUS	
067	MPS GH2 OUT P C (S)	V94J5013C	23	23		1.0		STAT												A		GAX	MPS GH2 OUT P1 LO/IO STATUS	
068	MPS GH2 OUT P R (S)	V94J5015C	29	23		1.0		STAT												A		GAX	MPS GH2 OUT P3 LO/IO STATUS	
069	MPS GO2 OUT T L (S)	V94J5018C	17	24		1.0		STAT												A		GAX	MPS GO2 OUT T2 LO/IO STATUS	
070	MPS GO2 OUT T C (S)	V94J5017C	23	24		1.0		STAT												A		GAX	MPS GO2 OUT T1 LO/IO STATUS	

Table 4.2.12-2. GNC SYS SUMM 1 (BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
071	MPS GO2 OUT T R (S)	V94J5019C	29	24		1.0														A	GAX	MPS GO2 OUT T3 LO/IO STATUS		
072*	MPS PNEU HE P TK (S)	V94J4355C	45	20		1.0														A	GAX	MPS PNEU HE TK PRESS LO/IO STATUS		
073*	MPS PNEU HE P REG(S)	V94J4356C	45	21		1.0														1	GAX	MPS PNEU HE REG P HI/LO/IO STATUS		
074*	MPS PNEU HE P ACUM(S)	V94J4357C	45	22		1.0														A	GAX	MPS PNEU HE ACUM P LO/IO STATUS		
075	MPS HE TK P C (S)	V94J4614C	23	15		1.0														A	GAX	SSME HE TK PRESS 1 LOW/IO STATUS	X	
076	MPS HE REG P A C(S)	V94J4617C	23	16		1.0														1	GAX	SSME HE REG PRESS 1A HI/LO/IO STAT	X	
077	MPS HE REG P B C(S)	V94J4601C	23	17		1.0														1	GAX	SSME HE REG PRESS 1B HI/LO/IO STAT	X	
078	MPS HE TK P R (S)	V94J4616C	29	15		1.0														A	GAX	SSME HE TK PRESS 3 LOW/IO STATUS	X	
079	MPS HE REG P A R(S)	V94J4619C	29	16		1.0														1	GAX	SSME HE REG PRESS 3A HI/LO/IO STAT	X	
080	MPS HE REG P B R(S)	V94J4603C	29	17		1.0														1	GAX	SSME HE REG PRESS 3B HI/LO/IO STAT	X	
081	MPS ULL P LH2 L (S)	V94J4838C	17	20		1.0														A	1	GAX	MPS ET LH2 ULL P2 HI/LO/IO STATUS	X
082	MPS ULL P LH2 C (S)	V94J4837C	23	20		1.0														A	1	GAX	MPS ET LH2 ULL P1 HI/LO/IO STATUS	X
083	MPS ULL P LH2 R (S)	V94J4839C	29	20		1.0														A	1	GAX	MPS ET LH2 ULL P3 HI/LO/IO STATUS	X
084	MPS MANF P LH2 (S)	V94J4620C	45	23		1.0														A	2	GAX	SSME MANF PRESS FU HI/IO STATUS	X
085	MPS MANF P LO2 (S)	V94J4621C	45	24		1.0														A	2	GAX	SSME MANF PRESS OX HI STATUS	X

Table 4.2.12-2. GNC SYS SUMM 1 (BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S I T Y	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T			
			X	Y		CHAR	BILEVEL																	TYPE		
							1	0																		
086	MDM FF 1 (S)	V91X2011X	38	5		1.0															3	GAX	FF 1 MDM FAIL	X		
087	MDM FF 2 (S)	V91X2012X	40	5		1.0																3	GAX	FF 2 MDM FAIL	X	
088	MDM FF 3 (S)	V91X2013X	42	5		1.0																3	GAX	FF 3 MDM FAIL	X	
089	MDM FF 4 (S)	V91X2014X	44	5		1.0																3	GAX	FF 4 MDM FAIL	X	
090	MDM FA 1 (S)	V91X2015X	38	6		1.0																3	GAX	FA 1 MDM FAIL	X	
091	MDM FA 2 (S)	V91X2016X	40	6		1.0																3	GAX	FA 2 MDM FAIL	X	
092	MDM FA 3 (S)	V91X2017X	42	6		1.0																3	GAX	FA 3 MDM FAIL	X	
093	MDM FA 4 (S)	V91X2018X	44	6		1.0																3	GAX	FA 4 MDM FAIL	X	
094	MDM PL 1 (S)	V91X2019X	38	7		1.0																3	GAX	PL 1 MDM FAIL	X	
095	MDM PL 2 (S)	V91X2020X	40	7		1.0																3	GAX	PL 2 MDM FAIL	X	
096	FCS CH 1 (S)	V94J4210C	38	11		1.0																3	GAX	FCS CH 1 I/O, FAIL STATUS	X	
097	FCS CH 2 (S)	V94J4211C	40	11		1.0																3	GAX	FCS CH 2 I/O, FAIL STATUS	X	
098	FCS CH 3 (S)	V94J4212C	42	11		1.0																3	GAX	FCS CH 3 I/O, FAIL STATUS	X	
099	FCS CH 4 (S)	V94J4213C	44	11		1.0																3	GAX	FCS CH 4 I/O, FAIL STATUS	X	
100	IMU 1 (S)	V94J4160C	36	15		1.0															E	3	GAX	IMU 1 I/O, FAIL STATUS	X	
101	IMU 2 (S)	V94J4161C	38	15		1.0																E	3	GAX	IMU 2 I/O, FAIL STATUS	X
102	IMU 3 (S)	V94J4162C	40	15		1.0																E	3	GAX	IMU 3 I/O, FAIL STATUS	X
103	XXX	ADDENDUM	31	16		3.0																G		ADDENDUM	GPS OR TACAN SELECT CHAR STRING	X
104	TAC 1 (S)	V94J4190C	36	16		1.0																A, G	3	GAX	TACAN 1 I/O, FAIL STATUS	X
105	TAC 2 (S)	V94J4191C	38	16		1.0																A, G	3	GAX	TACAN 2 I/O, FAIL STATUS	X
106	TAC 3 (S)	V94J4192C	40	16		1.0																A, G	3	GAX	TACAN 3 I/O, FAIL STATUS	X
107	GPS 1 (S)	V94J4196C	36	16		1.0																G		GAX	GPS 1 I/O FAIL STATUS	X
108	GPS 2 (S)	V94J4197C	38	16		1.0																G		GAX	GPS 2 I/O FAIL STATUS	X
109	GPS 3 (S)	V94J4198C	40	16		1.0																G		GAX	GPS 3 I/O FAIL STATUS	X
110	ADTA 1	V98X4881X	36	17		1.0																A	3	GAX	ADTA 1 FAIL STATUS	X

Table 4.2.12-2. GNC SYS SUMM 1 (BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S I T Y	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
111	ADTA 2	V98X4882X	38	17		1.0														A 3	GAX	ADTA 2 FAIL STATUS	X	
112	ADTA 3	V98X4883X	40	17		1.0															A 3	GAX	ADTA 3 FAIL STATUS	X
113	ADTA 4	V98X4884X	42	17		1.0															A 3	GAX	ADTA 4 FAIL STATUS	X
114	(MSG LINE)	V93X0050X	2	25		46.0																MI	MESSAGE LINE	X
115	(BUFFER MSG)	V93X0054X	48	25		4.0																MI	BUFFER MESSAGE INDICATOR	X
116	(SPL)	V93X0056X	2	26		49.0																MI	SCRATCH PAD LINE	X
117	(BFS)	V98X0015X	35	2		3.0							X									MI	BFS IDENTIFIER BFS	X

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TABLE 4.2.12-7. BFS GNC SYS SUMM 1 (4.2.12) I-LOADS

BFS NAME	MSID	ENG UNITS	DT	PR	D	S	PARA	MC	CAT	LAST CR	R E V
----------	------	-----------	----	----	---	---	------	----	-----	---------	-------------

NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.12-8. BFS GNC SYS SUMM 1 (4.2.12) K-LOADS

BFS NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PARA	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.13 RCS (PFS)

TITLE: RCS

TYPE: SPEC/023

AVAILABILITY: GNC OPS 1,2,3,6 AND 8

4.2.13.1 Purpose, Operation, and Organization

This display provides the crew with the capability to select the desired RCS module for display of RM and system data, monitor and control the jet RM, control the RCS crossfeed and RCS/OMS interconnect operations and disable/enable the RCS auto-manifold close capability.

A. Functional requirements:

- (1) The display is organized into three major parts. Part of the display is dedicated to RM functions, part to RCS system data and part contains crew control for system operation and module selection.
- (2) The display allows crew selection control via three item numbers for the desired RCS module. Data for one module only will be displayed at one time. A universal matrix is used to display RM-associated data. An asterisk (*) will be driven next to the appropriate item number to indicate whether that control function has been performed.
- (3) The first time this display is called, the forward module shall be automatically displayed. Subsequent callup of this display shall cause the last selected module data to be displayed.
- (4) The jet ID column shall identify each jet for the selected module. Three characters will be used to identify each jet. The first character identifies the module to which a jet is assigned, the second character identifies the manifold to which a jet is assigned, and the third character identifies the direction of jet exhaust. All characters are driven dynamically when the desired RCS module is selected, except for 'U', 'D', '2D', and '5', which are displayed as static characters.
- (5) A capability is provided to display RM states for each jet in the module selected. Three classes of RM failures will be individually displayed – on, off and leak. RM shall automatically deselect any jet failed OFF or leaking (LK). Jets failed ON will not be deselected. An RM-determined deselection of a jet (OFF, LK) shall cause an asterisk(*) to be displayed next to the deselect item associated with the failed jet. If the crew subsequently reselects the failed jet (OFF, LK); via item entry and the manifold isolation valve is open or by reopening the manifold isolation valve (ON), the RM monitor which detected the failure shall be over-ridden and prohibited from causing another deselection of the failed jet. The failure indication (ON, OFF, LK) shall continue to be displayed.

The DAP priority for each primary jet in the selected POD will be displayed as an integer (1–4). The priority for each vernier jet in a selected POD will be displayed as a blank.

- (6) Each jet will have a deselect inhibit capability via an associated item number. These items may be used to prevent automatic deselection of a failed “OFF” or “LEAK” Jet. RM will ignore, but continue to annunciate, all failures on a jet that has its DES INH item executed (indicated by an asterisk). A jet’s failure(s) can be reset by re-executing its DES INH item.

Whenever a jet's DES INH item is executed (from not inhibited to inhibited) the DAP priority of the jet will be changed to the lowest priority for that jet group. The priorities of the other jets in the affected group which were previously of a lower priority than the subject jet will be moved up by one. The changes in the jet priorities will be reflected in the PTY column of the RCS display. Re-executing the DES INH item (from inhibited to not inhibited) will have no effect on the jet's priority.

- (7) Each jet will have a deselect capability via an associated item number. The items will work as flip-flops. RM removes jets from the DAP availability table if: the manifold isolation valve is closed; a jet failure (OFF, LK) has been detected by RM, or the crew executes the deselect item. An asterisk (*) will be displayed next to the deselect item whenever the associated jet is removed from the availability table. In the absence of RM detected failures, jets are replaced in the availability table by re-executing the deselect item if the manifold isolation valve is open or vice versa. If RM has detected a jet failure (OFF, LK) and the manifold isolation valve is open, executing the deselect item overrides the failure, places the jet back into the availability table, inhibits the RM monitor which detected the failure, and clears the asterisk(*). The failure indicator will continue to be displayed. RM does not automatically deselect a jet failed ON. If, however, RM detects a jet failed ON, and the deselect item is executed, to remove the jet from the availability table, the display works as described for OFF and LK.
- (8) One item allows the crew to input the number of failures which can cause jets to be removed from the availability table by RM for each POD. The limits are initially I-loaded values and thereafter reflect crew inputs.
- (9) Gauging of OMS propellant used by RCS and automatic OMS ullage pressure maintenance will be provided by four item numbers (5, 6, 7 and 48). Item 5 will initiate the gauging of the left OMS feed to the aft RCS and automatic maintenance of left OMS ullage pressure. Item 6 will initiate the gauging of the right OMS feed to the aft RCS and automatic maintenance of right OMS ullage pressure. The selection of the forward gauging functions (either Item 46 or Item 47) will result in a Class 5 "ILLEGAL ENTRY" CRT message in OPS 2 or OPS 8.

Item 48 inhibits only the ullage pressure maintenance sequence, but not the gauging, initiated by Items 5 and 6. An indication via text will be displayed by the execute item. Item 48 is available during all OPS 2 and OPS 8.

Item 7 terminates the gauging and ullage pressure maintenance initiated/inhibited by Items 5, 6 and 48. An indicator will be displayed by this "all off" execute item. For Items 5 and 6, only the latest item execution will have an indicator (i.e., they are mutually exclusive). Items 5, 6, and 48 will be toggled if selected again. At least one item (5, 6, 7) will be selected at all times. Gauging can be switched from one OMS counter to another directly. Execution of Item 7 (OMS PRESS ENA OFF) is not required when switching from one OMS counter to another. The first time this display is called, the "OFF" state (Item 7) shall be automatically selected. Subsequent callup of this display shall cause the last selected state to be selected.

Selection of Item 5 or Item 6 will control the state of RCS_NORM. RCS_NORM will be used by the Orbit DAP to signal use of the Aft crossfeed. Reference section 4.2.13.3, RCS CRT Display Processing Addendum paragraph N for the control algorithm.

Even though the RCS display is available in OPS 1, OPS 3, and OPS 6 Items 5, 6, 7, 46, 47 and 48 are illegal. Entry of any of these six items will result in a Class 5 "ILLEGAL ENTRY" CRT message in OPS 1, OPS 3 and OPS 6.

- (10) Five items allow the crew to override the manifold isolation valve status determined by RM.
- (11) Two digital readouts, Items 49 and 50, of either the left or right OMS propellant used by the RCS system(s) are provided in percent of total OMS quantity, when the OMS or RCS interconnect is enabled. Items 49 and 50 allow the crew to override the digital readouts of the left and/or right OMS propellant used by the RCS system(s) in OPS 2 and OPS 8. The displayed quantities, whether overridden or not, are to be carried across any and all combinations of OPS 2, OPS 3, and OPS 8 transitions. Items 49 and 50 shall be valid in OPS 2 and 8 only. Entry of either item outside of OPS 2 and 8 shall be rejected and result in a Class 5 "ILLEGAL ENTRY" CRT message.
- (12) RCS propellant systems data for both fuel and oxidizer are displayed. The data shown on the display are: helium pressure 1, propellant tank pressures, temperature and quantity, manifold pressures, isolation valve positions and aft crossfeed pressures. The isolation valve positions shall be that determined by RM. A status discrete to the right of the data field shall be driven as follows:
- For the manifold pressures, the status shall be driven for a commfault ("M") or good data (blank).
 - For the isolation valves, the status shall be driven for a commfault ("M"), good data (blank), or for a RCS manifold isolation valve dilemma question mark (?).
 - For the helium tank pressures, the status shall be driven for low limit down arrow (↓), commfault ("M") or good data (blank).
 - For propellant tank pressures and temperatures, the status shall be driven for out of limits high up arrow (↑) or low down arrow (↓), commfault ("M") or good data (blank).
- NOTE: For all of the above status parameters, the commfault indicator ("M") shall have precedence.
- For the propellant quantities, the status shall be driven for low limit down arrow (↓) or good data (blank).
 - For the aft crossfeed line pressures, the status shall be driven for commfault ("M") or good data (blank).
- (13) The jet reset capability is provided by Item 45 which allows the crew to manually reset all failed jets that have not been automatically or manually deselected and also resets all fail counters to zero. Execution of Item 45 clears the fail column for those jets which have not been automatically or manually deselected, provided the associated manifold isolation valve is open.
- (14) STS-114 Only: The automatic closure of RCS manifold isolation valves due to a failed-on jet during OPS 2 and 8 can be enabled or disabled via Item 51. Execution of Item 51 shall toggle (from ON to OFF or OFF to ON) the automatic closure enable discrete (AUTO_MANF_CL_ENA). An asterisk (*) shall be displayed next to the item number when

the automatic manifold closure is enabled (AUTO_MANF_CL_ENA = ON). AUTO_MANF_CL_ENA is initialized by RCS RM (4.91). The automatic manifold closure capability exists only in OPS 2 and 8, but Item 51 shall be valid in all OPS that the display is available (execution of Item 51 in OPS 1, for example, will allow the crew to enable or disable the automatic manifold closure capability prior to OPS 2).

Post STS-114: The automatic closure of RCS manifold isolation valves due to a failed-on jet during OPS 2 and 8 can be enabled or disabled via Item 51. Execution of Item 51 shall toggle (from ON to OFF or OFF to ON) the automatic closure enable discrete (AUTO_MANF_CL_ENA). When AUTO_MANF_CL_ENA is ON, the display shall read "51 AUT MANF CL ENA". When AUTO_MANF_CL_ENA is OFF, the display shall read "51 AUT MANF CL INH". AUTO_MANF_CL_ENA is initialized by RCS RM (4.91). The automatic manifold closure capability exists only in OPS 2 and 8, but Item 51 shall be valid in all OPS that the display is available (execution of Item 51 in OPS 1, for example, will allow the crew to enable or disable the automatic manifold closure capability prior to OPS 2).

4.2.13.2 RCS Keyboard Processing Addendum

- A. L OMS to Aft Pressure Enable and R OMS to Aft Pressure Enable Commands. The destinations for these signals are as follows: OMS/RCS GAUGING (4.101), ORB OMS/RCS CONN (4.212), ORB RCS COMMAND SOP (4.191), MSC and CRT (6.7).
- B. OMS Pressure Inhibit. The destinations for this signal are as follows: ORB OMS/RCS CONN (4.212), and CRT (6.7).
- C. OMS Pressure Enable Off Command. The destinations for this signal are as follows: MSC and CRT (6.7).
- D. RCS-SEL JET SEL/DES Flag. The JET SEL/DES Flag is reset either by execution of the associated item or by RM when it detects a jet failure (OFF, LK).
- E. Left and Right OMS Quantity Used Override Commands. Execution of items 49 and 50 shall be limited to OPS 2 and 8. Execution in any other OPS shall be rejected and result in a Class 5 "ILLEGAL ENTRY" CRT message being generated.
- F. Auto Manifold Close Enable/Disable. The destinations for this signal are as follows: RCS RM (4.91) and CRT (6.7).
- G. L OMS to Forward Pressure Enable and R OMS to Forward Pressure Enable Commands. Execution of the forward gauging functions (either Item 46 or Item 47) shall be rejected and result in a Class 5 "ILLEGAL ENTRY" CRT message in all OPS.

4.2.13.3 RCS CRT Display Processing Addendum

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word "STAT" being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT Display Processing Table 4.2.13-2a (STS-114 only) or CRT Display Processing Table 4.2.13-2b (Post STS-114). The numeric code, corresponding to one of those listed in the table, indicates the specific status

processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the “M” PSI is displayed (for commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)			
Blank (default)	↓		M	∅
1	↓	↑	M	∅
2		↑	M	∅
3	↓			∅
4		↑		∅
5	↓		?	∅
6	↓	↑		∅
7			M	∅
8	↓		?	M ∅
9			?	M ∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.2.13–2a (STS–114 only) or Table 4.2.13–2b (Post STS–114) whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. Module Selection Symbols. Module selection symbols after Items 1, 2, and 3 are driven by POD_SELECTION_ID (V95U8494C) as follows:

POD_SELECTION_ID	Output Symbols for Items		
	1	2	3
V93X5110X (ON) = Value 1 (note)	*	(blank)	(blank)
V93X5111X (ON) = Value 2	(blank)	*	(blank)
V93X5112X (ON) = Value 3	(blank)	(blank)	*

Note: the first time this display is called, a value of 1 shall be automatically supplied.

- B. Deleted
- C. Symbols for Selected Module In Jet ID. One character dynamic symbol for the selected RCS pod is displayed five times, one for each manifold, in column 2 of the CRT. The symbol is driven by POD_SELECTION_ID (V95U8494C) as follows:

POD_SELECTION_ID	Output Symbols
V93X5110X (ON) = Value 1 (note)	F
V93X5111X (ON) = Value 2	L
V93X5112X (ON) = Value 3	R

Note: the first time this display is called, a value of 1 shall be automatically supplied.

- D. Symbols for Thrust Direction in Jet ID. One character dynamic symbol for thrust direction of 10 jets on column 4 of the CRT is driven by POD_SELECTION_ID (V95U8494C) as follows:

Y Position	(Row)	9	10	11	12	16	20	21	22	23	24
POD_	V93X5110X (ON) = Value 1 (note)	L	L	R	R	D	F	F	F	L	R
SELECTION_	V93X5111X (ON) = Value 2	L	L	L	L		A	A		L	D
ID	V93X5112X (ON) = Value 3	R	R	R	R		A	A		R	D

Note: the first time this display is called, a value of 1 shall be automatically supplied.

- E. Fail Status. Remote texts displayed in this field are:

ON (runaway jet)
 LK (leak)
 OFF (failure to fire)

If multiple failures occur in a single manifold, the last detected failure status will be displayed. Blank indicates no failures.

- F. Deleted.

- G. The SEL JET AVAILABILITY FLAG is reset whenever RM detects a failure (OFF, LK), a commfault, or a crew action (execution of Items 9, 11, 13...41 or closure of the RCS MANIFOLD ISOLATION VALVE) which causes it to remove the associated jet from the jet availability table. Once reset, the SEL JET AVAILABILITY FLAG is set whenever:

- a. With the RCS MANIFOLD ISOLATION valve status OPEN and no commfault present, the crew reselects a jet by executing one of Items 9, 11, 13...41. The jet may have been deselected automatically by RM declaring a failure (OFF, LK) or manually by the crew via Items 9, 11, 13...41. If the flag is set via item number with an RM declared failure (ON, OFF, LK) in effect, the RM monitor which detected the failure is overridden and is prohibited from resetting the flag, and the associated text (“ON”, “OFF”, “LK”) continues to be displayed. The JET FAIL column will always display the last declared RM failure.
- b. With no commfault present, and the jet not deselected, either automatically or manually, the crew re-opens the RCS MANIFOLD ISOLATION VALVE.

- c. With the jet not deselected, either automatically or manually, and with the RCS MANIFOLD ISOLATION VALVE STATUS OPEN, RM clears a previously declared commfault.
- H. Isolation Valve Status. Whenever a commfault occurs (“M” displayed in the parameter status field), the isolation valve status (“OP” or “CL”) shall continue to be displayed.
- I. The Selected Jet Priority (PTY) shall be displayed as an integer value of 1 through 4
- J. Manifold Selection I.D. A one character dynamic symbol for the manifold ID of 13 jets in column 3 of the CRT is driven by POD_SELECTION_ID (V95U8494C) as follows:

Y Position	(Row)	9	10	11	12	13	14	15	16	17	19	20	21	22
POD_ SELECTION_ ID	V93X5110X (ON) = Value 1 (note)	1	3	2	4	1	3	2	1	3	4	1	3	2
	V93X5111X (ON) = Value 2	4	2	3	1	4	2	1		4	3	3	1	
	V93X5112X (ON) = Value 3	4	2	3	1	4	2	1		4	3	1	3	

Note: the first time this display is called, a value of 1 shall be automatically supplied.

- K. Crossfeed Pressure. The crossfeed pressure shall be displayed for the left and right RCS systems only. The forward crossfeed pressures and status indicators will be blanked. The remote text string is driven by POD_SELECTION_ID (V95U8494C) as follows:

POD_SELECTION_ID	Output Characters	Output Press (OX)	Output Press (FU)
V93X5110X (ON) = Value 1 (note)	(blank)	N/A	N/A
V93X5111X (ON) = Value 2	AFT	V95P8794C	V95P8795C
V93X5112X (ON) = Value 3	AFT	V95P8794C	V95P8795C

Note: the first time this display is called, a value of 1 shall be automatically supplied.

- L. Deleted.
- M. OMS PRESS ENA INHIBIT. The remote text INH is displayed on the CRT to read PRESS “INH” when Item 48 is selected (MSID V93X5116X = 1). When Item 48 has not been selected, the remote text ENA is displayed on the CRT to read PRESS “ENA.” The first time this display is called, PRESS “ENA” shall be automatically supplied.
- N. RCS NORM Control Algorithm. When either Item 5 or 6 is selected, then RCS_NORM is set to a false state (V93X5117X = 0). For all other cases where the OMS and RCS propellant valves are set in a straightfeed configuration, RCS_NORM is set to the true state (V93X5117X = 1). The state of RCS_NORM is used by the Orbit DAP to signal use of the aft crossfeed.

- O. L OMS-RCS QTY. Upon receipt of keyboard entry on Item 49, perform the following:
- a. Set UPD_L_OMS_USG (V90X0432X) to ON and make it available to OMS/RCS Gauging to indicate crew update of the left OMS-RCS quantity.
 - b. Display the L OMS-RCS QTY value in percent on the CRT.
 - c. Convert L OMS-RCS QTY into a value in pounds by dividing the keyboard entry value by 7.72×10^{-3} , rename this value in pounds NEW OMS L USAGE IN LBS (V90Q8455C) and provide it to OMS/RCS Gauging.

Note: the first time this display is called, NEW OMS L USAGE IN LBS (V90Q8455C) shall be initialized to zero and UPD_L_OMS_USG (V90X0432X) to OFF.

- P. R OMS-RCS QTY. Upon receipt of keyboard entry on Item 50, perform the following:
- a. Set UPD_R_OMS_USG (V90X0433X) to ON and make it available to OMS/RCS Gauging to indicate crew update of the right OMS-RCS quantity.
 - b. Display the R OMS-RCS QTY value in percent on the CRT.
 - c. Convert R OMS-RCS QTY into a value in pounds by dividing the keyboard entry value by 7.72×10^{-3} , rename this value in pounds NEW OMS R USAGE IN LBS (V90Q8456C) and provide it to OMS/RCS Gauging.

Note: the first time this display is called, NEW OMS R USAGE IN LBS (V90Q8456C) shall be initialized to zero and UPD_R_OMS_USG (V90X0433X) to OFF.

- Q. Carry UPD_L_OMS_USG, UPD_R_OMS_USG, NEW OMS L USAGE IN LBS, and NEW OMS R USAGE IN LBS, across any and all transitions between OPS 2, OPS 3, and OPS 8.

4.2.13.4 RCS Figure/Table References

Figure 4.2.13-1a	RCS Display (PFS) (STS-114 only)
Figure 4.2.13-1b	RCS Display (PFS) (Post STS-114)
Table 4.2.13-1a	Keyboard Processing Table (STS-114 only)
Table 4.2.13-1b	Keyboard Processing Table (Post STS-114)
Table 4.2.13-2a	CRT Display Processing Table (STS-114 only)
Table 4.2.13-2b	CRT Display Processing Table (Post STS-114)
Table 4.2.13-3	CRT Display Processing Background Requirements N/A
Table 4.2.13-4	Mission Design Background Constants N/A
Table 4.2.13-5	Input Functional Parameters
Table 4.2.13-6	Output Functional Parameters

Table 4.2.13-7	I-Loads
Table 4.2.13-8	K-Loads
Table 4.2.13-9	Constants

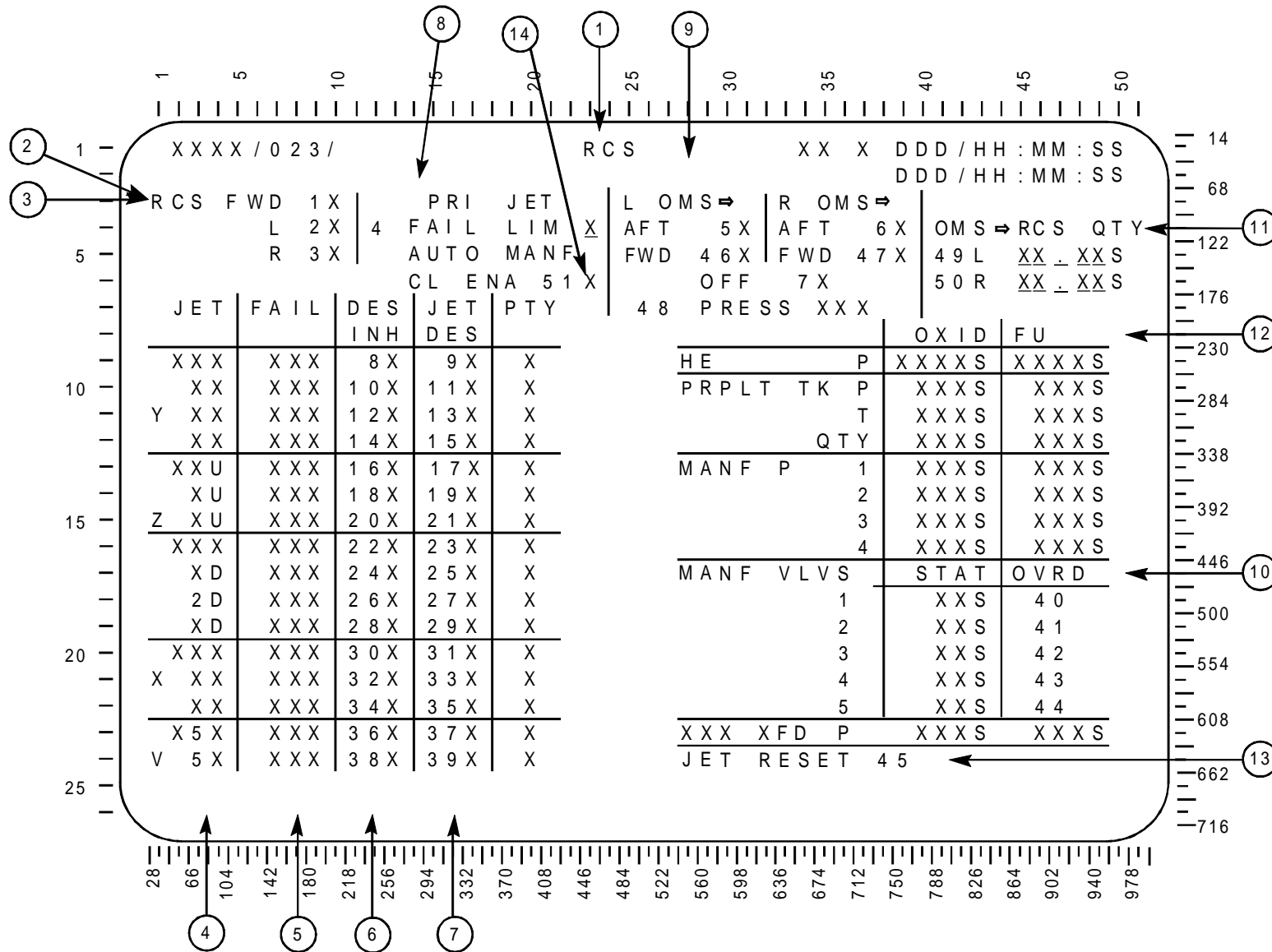


FIGURE 4.2.13-1a. RCS Display (PFS) (STS-114 only)

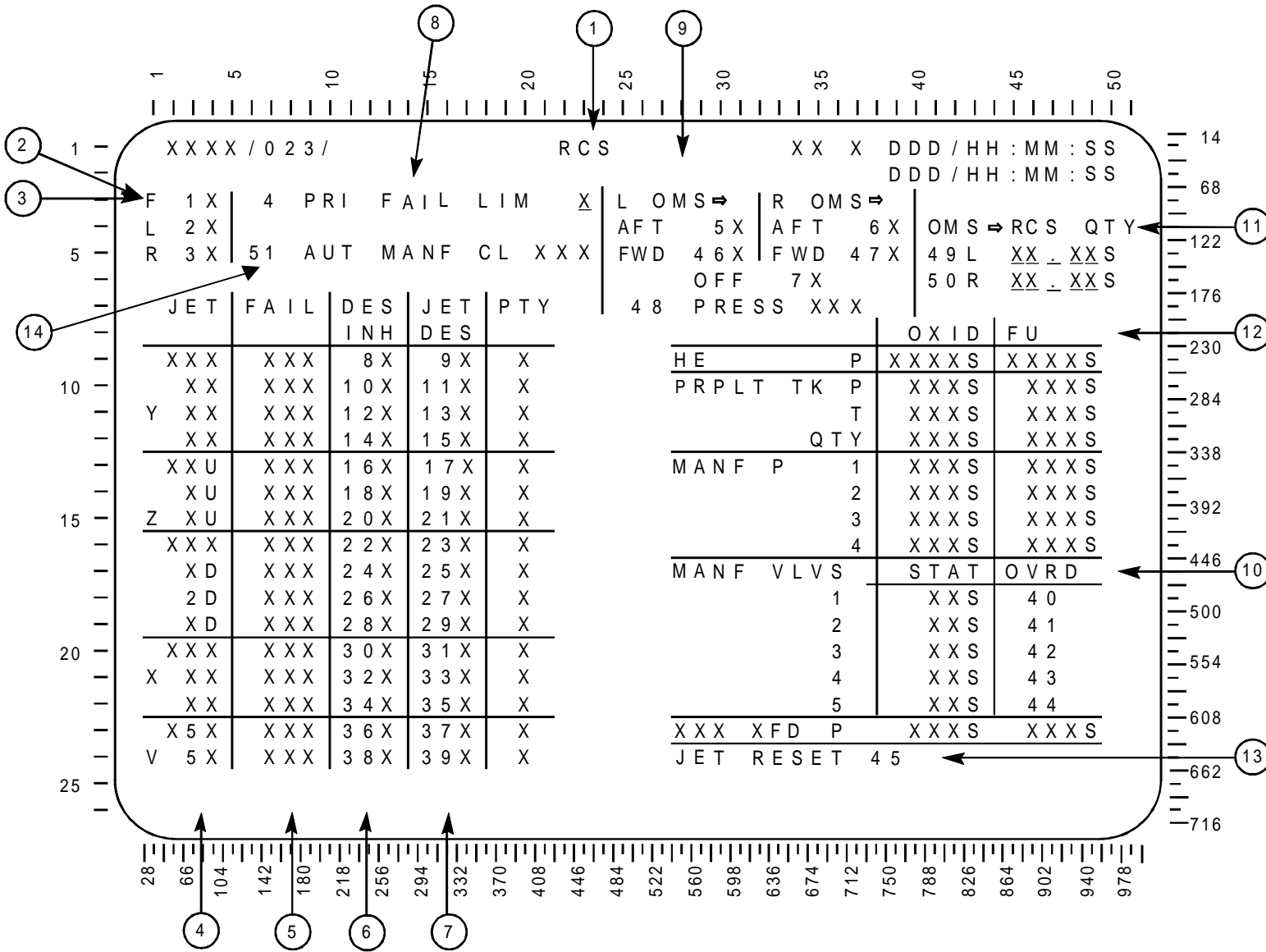


FIGURE 4.2.13-1b. RCS Display (PFS) (Post STS-114)

Table 4.2.13-1a. RCS (PFS) KEYBOARD PROCESSING (STS-114 Only)

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
001	RCS FWD 1	V93X5110X	0.0	CTRL			1				RCS SPEC,CRT	RCS-FWD RCS MODULE DSPL REQ	X
002	RCS L 2	V93X5111X	0.0	CTRL			2				RCS SPEC,CRT	RCS-LEFT RCS MODULE DSPL REQ	X
003	RCS R 3	V93X5112X	0.0	CTRL			3				RCS SPEC,CRT	RCS-RIGHT RCS MODULE DSPL REQ	X
004*	4 PRI JET FAIL LIMIT	V93J5113C	2.0	DEC			4	0	9		RCS SPEC	SEL PRI RCS JET FAIL LIMIT CMD	X
005	LOMS TO AFT RCS 5	V93X5100X	0.0	CTRL			5			A	RCS CONN, MSC, OMS/RCS GAUG, ORB RCS CMD SOP	LOMS TO AFT RCS PRESS ENA	X
006	ROMS TO AFT RCS 6	V93X5101X	0.0	CTRL			6			A	RCS CONN, MSC, OMS/RCS GAUG, ORB RCS CMD SOP	ROMS TO AFT RCS PRESS ENA	X
007	OMS PRESS ENA OFF 7	V93X5102X	0.0	CTRL			7			C	CRT, MSC	OMS PRESS ENA OFF	X
008	JET (1) DES INH 8	V93X5120X	0.0	CTRL			8				RCS SPEC	RCS-SEL JET 1 DES AUTO/INH FLAG	X
009	JET (2) DES INH 10	V93X5121X	0.0	CTRL			10				RCS SPEC	RCS-SEL JET 2 DES AUTO/INH FLAG	X
010	JET (3) DES INH 12	V93X5122X	0.0	CTRL			12				RCS SPEC	RCS-SEL JET 3 DES AUTO/INH FLAG	X
011	JET (4) DES INH 14	V93X5123X	0.0	CTRL			14				RCS SPEC	RCS-SEL JET 4 DES AUTO/INH FLAG	X
012	JET (5) DES INH 16	V93X5124X	0.0	CTRL			16				RCS SPEC	RCS-SEL JET 5 DES AUTO/INH FLAG	X
013	JET (6) DES INH 18	V93X5125X	0.0	CTRL			18				RCS SPEC	RCS-SEL JET 6 DES AUTO/INH FLAG	X
014	JET (7) DES INH 20	V93X5126X	0.0	CTRL			20				RCS SPEC	RCS-SEL JET 7 DES AUTO/INH FLAG	X
015	JET (8) DES INH 22	V93X5127X	0.0	CTRL			22				RCS SPEC	RCS-SEL JET 8 DES AUTO/INH FLAG	X
016	JET (9) DES INH 24	V93X5128X	0.0	CTRL			24				RCS SPEC	RCS-SEL JET 9 DES AUTO/INH FLAG	X
017	JET (10) DES INH 26	V93X5129X	0.0	CTRL			26				RCS SPEC	RCS-SEL JET 10 DES AUTO/INH FLAG	X
018	JET (11) DES INH 28	V93X5130X	0.0	CTRL			28				RCS SPEC	RCS-SEL JET 11 DES AUTO/INH FLAG	X
019	JET (12) DES INH 30	V93X5131X	0.0	CTRL			30				RCS SPEC	RCS-SEL JET 12 DES AUTO/INH FLAG	X
020	JET (13) DES INH 32	V93X5132X	0.0	CTRL			32				RCS SPEC	RCS-SEL JET 13 DES AUTO/INH FLAG	X
021	JET (14) DES INH 34	V93X5133X	0.0	CTRL			34				RCS SPEC	RCS-SEL JET 14 DES AUTO/INH FLAG	X
022	JET (15) DES INH 36	V93X5134X	0.0	CTRL			36				RCS SPEC	RCS-SEL JET 15 DES AUTO/INH FLAG	X
023	JET (16) DES INH 38	V93X5135X	0.0	CTRL			38				RCS SPEC	RCS-SEL JET 16 DES AUTO/INH FLAG	X
024	JET (1) JET DES 9	V93X5150X	0.0	CTRL			9			D	RCS SPEC	RCS-SEL JET 1 SEL/DES FLAG	X
025	JET (2) JET DES 11	V93X5151X	0.0	CTRL			11			D	RCS SPEC	RCS-SEL JET 2 SEL/DES FLAG	X
026	JET (3) JET DES 13	V93X5152X	0.0	CTRL			13			D	RCS SPEC	RCS-SEL JET 3 SEL/DES FLAG	X
027	JET (4) JET DES 15	V93X5153X	0.0	CTRL			15			D	RCS SPEC	RCS-SEL JET 4 SEL/DES FLAG	X
028	JET (5) JET DES 17	V93X5154X	0.0	CTRL			17			D	RCS SPEC	RCS-SEL JET 5 SEL/DES FLAG	X

Table 4.2.13-1a. RCS (PFS) KEYBOARD PROCESSING (STS-114 Only)

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
029	JET (6) JET DES 19	V93X5155X	0.0	CTRL			19			D	RCS SPEC	RCS-SEL JET 6 SEL/DES FLAG	X
030	JET (7) JET DES 21	V93X5156X	0.0	CTRL			21			D	RCS SPEC	RCS-SEL JET 7 SEL/DES FLAG	X
031	JET (8) JET DES 23	V93X5157X	0.0	CTRL			23			D	RCS SPEC	RCS-SEL JET 8 SEL/DES FLAG	X
032	JET (9) JET DES 25	V93X5158X	0.0	CTRL			25			D	RCS SPEC	RCS-SEL JET 9 SEL/DES FLAG	X
033	JET (10) JET DES 27	V93X5159X	0.0	CTRL			27			D	RCS SPEC	RCS-SEL JET 10 SEL/DES FLAG	X
034	JET (11) JET DES 29	V93X5160X	0.0	CTRL			29			D	RCS SPEC	RCS-SEL JET 11 SEL/DES FLAG	X
035	JET (12) JET DES 31	V93X5161X	0.0	CTRL			31			D	RCS SPEC	RCS-SEL JET 12 SEL/DES FLAG	X
036	JET (13) JET DES 33	V93X5162X	0.0	CTRL			33			D	RCS SPEC	RCS-SEL JET 13 SEL/DES FLAG	X
037	JET (14) JET DES 35	V93X5163X	0.0	CTRL			35			D	RCS SPEC	RCS-SEL JET 14 SEL/DES FLAG	X
038	JET (15) JET DES 37	V93X5164X	0.0	CTRL			37			D	RCS SPEC	RCS-SEL JET 15 SEL/DES FLAG	X
039	JET (16) JET DES 39	V93X5165X	0.0	CTRL			39			D	RCS SPEC	RCS-SEL JET 16 SEL/DES FLAG	X
040*	MANF 1 VLVS OVRD 40	V93X5167X	0.0	CTRL			40				RCS SPEC	SELECTED RCS MANF1 OP/CL STAT OVRD	X
041*	MANF 2 VLVS OVRD 41	V93X5168X	0.0	CTRL			41				RCS SPEC	SELECTED RCS MANF2 OP/CL STAT OVRD	X
042*	MANF 3 VLVS OVRD 42	V93X5169X	0.0	CTRL			42				RCS SPEC	SELECTED RCS MANF3 OP/CL STAT OVRD	X
043*	MANF 4 VLVS OVRD 43	V93X5170X	0.0	CTRL			43				RCS SPEC	SELECTED RCS MANF4 OP/CL STAT OVRD	X
044*	MANF 5 VLVS OVRD 44	V93X5171X	0.0	CTRL			44				RCS SPEC	SELECTED RCS MANF5 OP/CL STAT OVRD	X
045*	JET RESET 45	V93X5173X	0.0	CTRL			45				RCS SPEC	RCS JET RESET	X
046	LOMS TO FWD RCS 46	V93X5114X	0.0	CTRL			46			A	RCS CONN, MSC, OMS/RCS GAUG, ORB RCS CMD SOP	LOMS TO FWD RCS PRESS ENA	X
047	ROMS TO FWD RCS 47	V93X5115X	0.0	CTRL			47			A	RCS CONN, MSC, OMS/RCS GAUG, ORB RCS CMD SOP	ROMS TO FWD RCS PRESS ENA	X
048	OMS PRESS ENA INH 48	V93X5116X	0.0	CTRL			48			B	RCS CONN	OMS PRESS ENA INHIBIT	X
049	L OMS-RCS QTY 49	V90Q8535C	6.2	DEC			49	00.00	99.99	E	CRT	LT OMS TOTAL QUANTITY USED (%)	X
050	R OMS-RCS QTY 50	V90Q8536C	6.2	DEC			50	00.00	99.99	E	CRT	RT OMS TOTAL QUANTITY USED (%)	X
051	AUTO MANF CL ENA 51	V93X1068X	0.0	CTRL			51			F	RCS RM, CRT	AUTO MANF CLOSE ENABLE	X

Table 4.2.13-1b. RCS (PFS) KEYBOARD PROCESSING (Post STS-114)

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
001	F 1	V93X5110X	0.0	CTRL			1				RCS SPEC,CRT	RCS-FWD RCS MODULE DSPL REQ	X
002	L 2	V93X5111X	0.0	CTRL			2				RCS SPEC,CRT	RCS-LEFT RCS MODULE DSPL REQ	X
003	R 3	V93X5112X	0.0	CTRL			3				RCS SPEC,CRT	RCS-RIGHT RCS MODULE DSPL REQ	X
004*	4 PRI FAIL LIM	V93J5113C	2.0	DEC			4	0	9		RCS SPEC	SEL PRI RCS JET FAIL LIMIT CMD	X
005	LOMS TO AFT RCS 5	V93X5100X	0.0	CTRL			5			A	RCS CONN, MSC, OMS/RCS GAUG, ORB RCS CMD SOP	LOMS TO AFT RCS PRESS ENA	X
006	ROMS TO AFT RCS 6	V93X5101X	0.0	CTRL			6			A	RCS CONN, MSC, OMS/RCS GAUG, ORB RCS CMD SOP	ROMS TO AFT RCS PRESS ENA	X
007	OMS PRESS ENA OFF 7	V93X5102X	0.0	CTRL			7			C	CRT, MSC	OMS PRESS ENA OFF	X
008	JET (1) DES INH 8	V93X5120X	0.0	CTRL			8				RCS SPEC	RCS-SEL JET 1 DES AUTO/INH FLAG	X
009	JET (2) DES INH 10	V93X5121X	0.0	CTRL			10				RCS SPEC	RCS-SEL JET 2 DES AUTO/INH FLAG	X
010	JET (3) DES INH 12	V93X5122X	0.0	CTRL			12				RCS SPEC	RCS-SEL JET 3 DES AUTO/INH FLAG	X
011	JET (4) DES INH 14	V93X5123X	0.0	CTRL			14				RCS SPEC	RCS-SEL JET 4 DES AUTO/INH FLAG	X
012	JET (5) DES INH 16	V93X5124X	0.0	CTRL			16				RCS SPEC	RCS-SEL JET 5 DES AUTO/INH FLAG	X
013	JET (6) DES INH 18	V93X5125X	0.0	CTRL			18				RCS SPEC	RCS-SEL JET 6 DES AUTO/INH FLAG	X
014	JET (7) DES INH 20	V93X5126X	0.0	CTRL			20				RCS SPEC	RCS-SEL JET 7 DES AUTO/INH FLAG	X
015	JET (8) DES INH 22	V93X5127X	0.0	CTRL			22				RCS SPEC	RCS-SEL JET 8 DES AUTO/INH FLAG	X
016	JET (9) DES INH 24	V93X5128X	0.0	CTRL			24				RCS SPEC	RCS-SEL JET 9 DES AUTO/INH FLAG	X
017	JET (10) DES INH 26	V93X5129X	0.0	CTRL			26				RCS SPEC	RCS-SEL JET 10 DES AUTO/INH FLAG	X
018	JET (11) DES INH 28	V93X5130X	0.0	CTRL			28				RCS SPEC	RCS-SEL JET 11 DES AUTO/INH FLAG	X
019	JET (12) DES INH 30	V93X5131X	0.0	CTRL			30				RCS SPEC	RCS-SEL JET 12 DES AUTO/INH FLAG	X
020	JET (13) DES INH 32	V93X5132X	0.0	CTRL			32				RCS SPEC	RCS-SEL JET 13 DES AUTO/INH FLAG	X
021	JET (14) DES INH 34	V93X5133X	0.0	CTRL			34				RCS SPEC	RCS-SEL JET 14 DES AUTO/INH FLAG	X
022	JET (15) DES INH 36	V93X5134X	0.0	CTRL			36				RCS SPEC	RCS-SEL JET 15 DES AUTO/INH FLAG	X
023	JET (16) DES INH 38	V93X5135X	0.0	CTRL			38				RCS SPEC	RCS-SEL JET 16 DES AUTO/INH FLAG	X
024	JET (1) JET DES 9	V93X5150X	0.0	CTRL			9			D	RCS SPEC	RCS-SEL JET 1 SEL/DES FLAG	X
025	JET (2) JET DES 11	V93X5151X	0.0	CTRL			11			D	RCS SPEC	RCS-SEL JET 2 SEL/DES FLAG	X
026	JET (3) JET DES 13	V93X5152X	0.0	CTRL			13			D	RCS SPEC	RCS-SEL JET 3 SEL/DES FLAG	X
027	JET (4) JET DES 15	V93X5153X	0.0	CTRL			15			D	RCS SPEC	RCS-SEL JET 4 SEL/DES FLAG	X
028	JET (5) JET DES 17	V93X5154X	0.0	CTRL			17			D	RCS SPEC	RCS-SEL JET 5 SEL/DES FLAG	X

Table 4.2.13-1b. RCS (PFS) KEYBOARD PROCESSING (Post STS-114)

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
029	JET (6) JET DES 19	V93X5155X	0.0	CTRL			19			D	RCS SPEC	RCS-SEL JET 6 SEL/DES FLAG	X
030	JET (7) JET DES 21	V93X5156X	0.0	CTRL			21			D	RCS SPEC	RCS-SEL JET 7 SEL/DES FLAG	X
031	JET (8) JET DES 23	V93X5157X	0.0	CTRL			23			D	RCS SPEC	RCS-SEL JET 8 SEL/DES FLAG	X
032	JET (9) JET DES 25	V93X5158X	0.0	CTRL			25			D	RCS SPEC	RCS-SEL JET 9 SEL/DES FLAG	X
033	JET (10) JET DES 27	V93X5159X	0.0	CTRL			27			D	RCS SPEC	RCS-SEL JET 10 SEL/DES FLAG	X
034	JET (11) JET DES 29	V93X5160X	0.0	CTRL			29			D	RCS SPEC	RCS-SEL JET 11 SEL/DES FLAG	X
035	JET (12) JET DES 31	V93X5161X	0.0	CTRL			31			D	RCS SPEC	RCS-SEL JET 12 SEL/DES FLAG	X
036	JET (13) JET DES 33	V93X5162X	0.0	CTRL			33			D	RCS SPEC	RCS-SEL JET 13 SEL/DES FLAG	X
037	JET (14) JET DES 35	V93X5163X	0.0	CTRL			35			D	RCS SPEC	RCS-SEL JET 14 SEL/DES FLAG	X
038	JET (15) JET DES 37	V93X5164X	0.0	CTRL			37			D	RCS SPEC	RCS-SEL JET 15 SEL/DES FLAG	X
039	JET (16) JET DES 39	V93X5165X	0.0	CTRL			39			D	RCS SPEC	RCS-SEL JET 16 SEL/DES FLAG	X
040*	MANF 1 VLVS OVRD 40	V93X5167X	0.0	CTRL			40				RCS SPEC	SELECTED RCS MANF1 OP/CL STAT OVRD	X
041*	MANF 2 VLVS OVRD 41	V93X5168X	0.0	CTRL			41				RCS SPEC	SELECTED RCS MANF2 OP/CL STAT OVRD	X
042*	MANF 3 VLVS OVRD 42	V93X5169X	0.0	CTRL			42				RCS SPEC	SELECTED RCS MANF3 OP/CL STAT OVRD	X
043*	MANF 4 VLVS OVRD 43	V93X5170X	0.0	CTRL			43				RCS SPEC	SELECTED RCS MANF4 OP/CL STAT OVRD	X
044*	MANF 5 VLVS OVRD 44	V93X5171X	0.0	CTRL			44				RCS SPEC	SELECTED RCS MANF5 OP/CL STAT OVRD	X
045*	JET RESET 45	V93X5173X	0.0	CTRL			45				RCS SPEC	RCS JET RESET	X
046	LOMS TO FWD RCS 46	V93X5114X	0.0	CTRL			46			G	RCS CONN, MSC, OMS/RCS GAUG, ORB RCS CMD SOP	LOMS TO FWD RCS PRESS ENA	X
047	ROMS TO FWD RCS 47	V93X5115X	0.0	CTRL			47			G	RCS CONN, MSC, OMS/RCS GAUG, ORB RCS CMD SOP	ROMS TO FWD RCS PRESS ENA	X
048	OMS PRESS ENA INH 48	V93X5116X	0.0	CTRL			48			B	RCS CONN	OMS PRESS ENA INHIBIT	X
049	L OMS-RCS QTY 49	V90Q8535C	6.2	DEC			49	00.00	99.99	E	CRT	LT OMS TOTAL QUANTITY USED (%)	X
050	R OMS-RCS QTY 50	V90Q8536C	6.2	DEC			50	00.00	99.99	E	CRT	RT OMS TOTAL QUANTITY USED (%)	X
051	51 AUT MANF CL XXX	V93X1068X	0.0	CTRL			51			F	RCS RM, CRT	AUTO MANF CLOSE ENABLE	X

Table 4.2.13-2a. RCS (PFS) CRT DISPLAY PROCESSING (STS-114 Only)

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
001	(OPS)	V93X0040X	2	1		5.0															UI	OPS FUNCTION PAGE	X	
002	(SPEC)	V93X0042X	7	1		4.0																UI	SPEC FUNCTION PAGE	X
003	(DISP)	V93X0044X	10	1		4.0																UI	DISPLAY FUNCTION PAGE	X
004	(UL)	V92X5032X	34	1		2.0	UL							X								UI	UPLINK ACTIVITY IND	X
005	(GPC)	V93X0048X	36	1		2.0																UI	GPC DRIVER	X
006	(MT)	V91W1990C	39	1		12.0																FCOS	MISSION ELAPSED TIME	X
007	(CRT TIMER)	V91W1987C	39	2		12.0																FCOS	DISPLAY CRT TIMER.GNC	X
008*	RCS FWD 1	V95U8494C	10	3		1.0	*													A	RCS SPEC	POD SELECTION ID	X	
009*	RCS L 2	V95U8494C	10	4		1.0	*													A	RCS SPEC	POD SELECTION ID	X	
010*	RCS R 3	V95U8494C	10	5		1.0	*													A	RCS SPEC	POD SELECTION ID	X	
011*	PRI JET FAIL LIMIT	V95J8743C	22	4		2.0																RCS SPEC	SEL PRI RCS JET FAIL LIMIT FLAG 4	X
012	LOMS TO AFT RCS 5	V93X5100X	31	4		1.0	*													N	KYBD	LOMS TO AFT RCS PRESS ENA	X	
013	ROMS TO AFT RCS 6	V93X5101X	39	4		1.0	*													N	KYBD	ROMS TO AFT RCS PRESS ENA	X	
014	OMS PRESS ENA OFF 7	V93X5102X	35	6		1.0	*															KYBD	OMS PRESS ENA OFF	X
015	L OMS-RCS QTY 49	V90Q8535C	44	5		6.2														O	OMS/RCS GAUG, KYBD	LT OMS TOTAL QUANTITY USED(%)	X	
016	R OMS-RCS QTY 50	V90Q8536C	44	6		6.2														P	OMS/RCS GAUG, KYBD	RT OMS TOTAL QUANTITY USED(%)	X	
017	L OMS-RCS QTY (S)	V90X8531X	50	5		1.0														2	OMS/RCS GAUG	LT OMS PROP USED EXCEEDS LIMIT	X	
018	R OMS-RCS QTY (S)	V90X8532X	50	6		1.0														2	OMS/RCS GAUG	RT OMS PROP USED EXCEEDS LIMIT	X	
019	(RCS POD ID)	V95U8494C	2	9		1.0														C	RCS SPEC	POD SELECTION ID	X	
020*	(JET EXHAUST DIR)	V95U8494C	4	9		1.0														D	RCS SPEC	POD SELECTION ID	X	
021*	(JET EXHAUST DIR)	V95U8494C	4	10		1.0														D	RCS SPEC	POD SELECTION ID	X	
022*	(JET EXHAUST DIR)	V95U8494C	4	11		1.0														D	RCS SPEC	POD SELECTION ID	X	
023	(RCS POD ID)	V95U8494C	2	13		1.0														C	RCS SPEC	POD SELECTION ID	X	
024*	(JET EXHAUST DIR)	V95U8494C	4	12		1.0														D	RCS SPEC	POD SELECTION ID	X	
025	(RCS POD ID)	V95U8494C	2	16		1.0														C	RCS SPEC	POD SELECTION ID	X	
026*	(JET EXHAUST DIR)	V95U8494C	4	16		1.0														D	RCS SPEC	POD SELECTION ID	X	
027	(RCS POD ID)	V95U8494C	2	20		1.0														D	RCS SPEC	POD SELECTION ID	X	
028*	(JET EXHAUST DIR)	V95U8494C	4	20		1.0														D	RCS SPEC	POD SELECTION ID	X	
029*	(JET EXHAUST DIR)	V95U8494C	4	21		1.0														D	RCS SPEC	POD SELECTION ID	X	
030*	(JET EXHAUST DIR)	V95U8494C	4	22		1.0														D	RCS SPEC	POD SELECTION ID	X	
031	(RCS POD ID)	V95U8494C	2	23		1.0														C	RCS SPEC	POD SELECTION ID	X	
032*	(JET EXHAUST DIR)	V95U8494C	4	23		1.0														D	RCS SPEC	POD SELECTION ID	X	
033*	(JET EXHAUST DIR)	V95U8494C	4	24		1.0														D	RCS SPEC	POD SELECTION ID	X	
034*	YJET 1 FAIL	V95J8570C	7	9		3.0														E G	RCS SPEC	SELECTED JET 1 ON/LK/OFF FLAG	X	
035*	YJET 2 FAIL	V95J8571C	7	10		3.0														E G	RCS SPEC	SELECTED JET 2 ON/LK/OFF FLAG	X	

Table 4.2.13-2a. RCS (PFS) CRT DISPLAY PROCESSING (STS-114 Only)

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T		
			X	Y		CHAR	BILEVEL																	TYPE	
							1	0																	
036*	YJET 3 FAIL	V95J8572C	7	11		3.0															EG	RCS SPEC	SELECTED JET 3 ON/LK/OFF FLAG	X	
037*	YJET 4 FAIL	V95J8573C	7	12		3.0																EG	RCS SPEC	SELECTED JET 4 ON/LK/OFF FLAG	X
038*	ZJET 1 FAIL	V95J8574C	7	13		3.0																EG	RCS SPEC	SELECTED JET 5 ON/LK/OFF FLAG	X
039*	ZJET 2 FAIL	V95J8575C	7	14		3.0																EG	RCS SPEC	SELECTED JET 6 ON/LK/OFF FLAG	X
040*	ZJET 3 FAIL	V95J8576C	7	15		3.0																EG	RCS SPEC	SELECTED JET 7 ON/LK/OFF FLAG	X
041*	ZJET 4 FAIL	V95J8577C	7	16		3.0																EG	RCS SPEC	SELECTED JET 8 ON/LK/OFF FLAG	X
042*	ZJET 5 FAIL	V95J8578C	7	17		3.0																EG	RCS SPEC	SELECTED JET 9 ON/LK/OFF FLAG	X
043*	ZJET 6 FAIL	V95J8579C	7	18		3.0																EG	RCS SPEC	SELECTED JET 10 ON/LK/OFF FLAG	X
044*	ZJET 7 FAIL	V95J8580C	7	19		3.0																EG	RCS SPEC	SELECTED JET 11 ON/LK/OFF FLAG	X
045*	XJET 1 FAIL	V95J8581C	7	20		3.0																EG	RCS SPEC	SELECTED JET 12 ON/LK/OFF FLAG	X
046*	XJET 2 FAIL	V95J8582C	7	21		3.0																EG	RCS SPEC	SELECTED JET 13 ON/LK/OFF FLAG	X
047*	XJET 3 FAIL	V95J8583C	7	22		3.0																EG	RCS SPEC	SELECTED JET 14 ON/LK/OFF FLAG	X
048*	VJET 1 FAIL	V95J8584C	7	23		3.0																EG	RCS SPEC	SELECTED JET 15 ON/LK/OFF FLAG	X
049*	VJET 2 FAIL	V95J8585C	7	24		3.0																EG	RCS SPEC	SELECTED JET 16 ON/LK/OFF FLAG	X
050*	YJET 1 DES INH	V95X8525X	13	9		1.0	*																RCS SPEC	SEL JET 1 DES INH FLAG	X
051*	YJET 2 DES INH	V95X8526X	13	10		1.0	*																RCS SPEC	SEL JET 2 DES INH FLAG	X
052*	YJET 3 DES INH	V95X8527X	13	11		1.0	*																RCS SPEC	SEL JET 3 DES INH FLAG	X
053*	YJET 4 DES INH	V95X8528X	13	12		1.0	*																RCS SPEC	SEL JET 4 DES INH FLAG	X
054*	ZJET 1 DES INH	V95X8529X	13	13		1.0	*																RCS SPEC	SEL JET 5 DES INH FLAG	X
055*	ZJET 2 DES INH	V95X8530X	13	14		1.0	*																RCS SPEC	SEL JET 6 DES INH FLAG	X
056*	ZJET 3 DES INH	V95X8531X	13	15		1.0	*																RCS SPEC	SEL JET 7 DES INH FLAG	X
057*	ZJET 4 DES INH	V95X8532X	13	16		1.0	*																RCS SPEC	SEL JET 8 DES INH FLAG	X
058*	ZJET 5 DES INH	V95X8533X	13	17		1.0	*																RCS SPEC	SEL JET 9 DES INH FLAG	X
059*	ZJET 6 DES INH	V95X8534X	13	18		1.0	*																RCS SPEC	SEL JET 10 DES INH FLAG	X
060*	ZJET 7 DES INH	V95X8535X	13	19		1.0	*																RCS SPEC	SEL JET 11 DES INH FLAG	X
061*	XJET 1 DES INH	V95X8536X	13	20		1.0	*																RCS SPEC	SEL JET 12 DES INH FLAG	X
062*	XJET 2 DES INH	V95X8537X	13	21		1.0	*																RCS SPEC	SEL JET 13 DES INH FLAG	X
063*	XJET 3 DES INH	V95X8538X	13	22		1.0	*																RCS SPEC	SEL JET 14 DES INH FLAG	X
064*	VJET 1 DES INH	V95X8539X	13	23		1.0	*																RCS SPEC	SEL JET 15 DES INH FLAG	X
065*	VJET 2 DES INH	V95X8540X	13	24		1.0	*																RCS SPEC	SEL JET 16 DES INH FLAG	X

Table 4.2.13-2a. RCS (PFS) CRT DISPLAY PROCESSING (STS-114 Only)

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T		
			X	Y		CHAR	BILEVEL																	TYPE	
							1	0																	
101*	MANF P 3 FU	V95P8736C	45	15		4.0			DEC	PSIA														X	
102*	MANF P 4 FU	V95P8740C	45	16		4.0			DEC	PSIA	X														X
103	HE P OX (S)	V95J8671C	43	9		1.0			STAT																X
104	PRPLT TK P OX (S)	V95J8679C	43	10		1.0			STAT										1	RCS SPEC	SEL MODULE HE PRESS 1 OX STATUS			X	
105	PRPLT TK T OX (S)	V95J8683C	43	11		1.0			STAT										1	RCS SPEC	SEL MODULE PROP PRESS- OX STATUS			X	
106	PRPLT QTY OX (S)	V95J8691C	43	12		1.0			STAT										3	RCS SPEC	SEL MODULE PROP-QTY OX STATUS			X	
107*	MANF P 1 OX (S)	V95J8726C	43	13		1.0			STAT										7	RCS SPEC	SEL MANIFOLD 1 OX PRESS STATUS			X	
108*	MANF P 2 OX (S)	V95J8730C	43	14		1.0			STAT										7	RCS SPEC	SEL MANIFOLD 2 OX PRESS STATUS			X	
109*	MANF P 3 OX (S)	V95J8735C	43	15		1.0			STAT		X								7	RCS SPEC	SEL MANIFOLD 3 OX PRESS STATUS			X	
110*	MANF P 4 OX (S)	V95J8739C	43	16		1.0			STAT		X								7	RCS SPEC	SEL MANIFOLD 4 OX PRESS STATUS			X	
111	MANF VLVS 1 STAT (S)	V95J8767C	43	18		1.0			STAT										H 9	RCS SPEC	SELECTED RCS MANF 1 OP/CL I/O STAT			X	
112	MANF VLVS 2 STAT (S)	V95J8768C	43	19		1.0			STAT										H 9	RCS SPEC	SELECTED RCS MANF 2 OP/CL I/O STAT			X	
113	MANF VLVS 3 STAT (S)	V95J8769C	43	20		1.0			STAT										H 9	RCS SPEC	SELECTED RCS MANF 3 OP/CL I/O STAT			X	
114	MANF VLVS 4 STAT (S)	V95J8770C	43	21		1.0			STAT										H 9	RCS SPEC	SELECTED RCS MANF 4 OP/CL I/O STAT			X	
115	MANF VLVS 5 STAT (S)	V95J8771C	43	22		1.0			STAT										H 9	RCS SPEC	SELECTED RCS MANF 5 OP/CL I/O STAT			X	
116	HE P FU (S)	V95J8675C	49	9		1.0			STAT											RCS SPEC	SEL MODULE HE PRESS 1 FU STATUS			X	
117	PRPLT TK P FU (S)	V95J8681C	49	10		1.0			STAT										1	RCS SPEC	SEL MODULE PROP PRESS- FU STATUS			X	
118	PRPLT TK T FU (S)	V95J8685C	49	11		1.0			STAT										1	RCS SPEC	SEL MODULE PROP TEMP- FU STATUS			X	
119	PRPLT QTY FU (S)	V95J8693C	49	12		1.0			STAT										3	RCS SPEC	SEL MODULE PROP-QTY FU STATUS			X	
120*	MANF P 1 FU (S)	V95J8728C	49	13		1.0			STAT										7	RCS SPEC	SEL MANIFOLD 1 FU PRESS STATUS			X	
121*	MANF P 2 FU (S)	V95J8732C	49	14		1.0			STAT										7	RCS SPEC	SEL MANIFOLD 2 FU PRESS STATUS			X	
122*	MANF P 3 FU (S)	V95J8737C	49	15		1.0			STAT		X								7	RCS SPEC	SEL MANIFOLD 3 FU PRESS STATUS			X	
123*	MANF P 4 FU (S)	V95J8741C	49	16		1.0			STAT		X								7	RCS SPEC	SEL MANIFOLD 4 FU PRESS STATUS			X	
124	JET 1 PTY	V95U8778C	19	9		2.0			DEC	N/D									1	RCS SPEC	SELECTED JET 1 PRIORITY				
125	JET 2 PTY	V95U8779C	19	10		2.0			DEC	N/D									1	RCS SPEC	SELECTED JET 2 PRIORITY				

Table 4.2.13-2a. RCS (PFS) CRT DISPLAY PROCESSING (STS-114 Only)

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
126	JET 3 PTY	V95U8780C	19	11		2.0			DEC	N/D										I	RCS SPEC	SELECTED JET 3 PRIORITY		
127	JET 4 PTY	V95U8781C	19	12		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 4 PRIORITY	
128	JET 5 PTY	V95U8782C	19	13		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 5 PRIORITY	
129	JET 6 PTY	V95U8783C	19	14		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 6 PRIORITY	
130	JET 7 PTY	V95U8784C	19	15		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 7 PRIORITY	
131	JET 8 PTY	V95U8785C	19	16		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 8 PRIORITY	
132	JET 9 PTY	V95U8786C	19	17		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 9 PRIORITY	
133	JET 10 PTY	V95U8787C	19	18		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 10 PRIORITY	
134	JET 11 PTY	V95U8788C	19	19		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 11 PRIORITY	
135	JET 12 PTY	V95U8789C	19	20		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 12 PRIORITY	
136	JET 13 PTY	V95U8790C	19	21		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 13 PRIORITY	
137	JET 14 PTY	V95U8791C	19	22		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 14 PRIORITY	
138	JET 15 PTY	V95U8792C	19	23		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 15 PRIORITY	
139	JET 16 PTY	V95U8793C	19	24		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 16 PRIORITY	
140*	YJET 1 MANF ID	V95U8494C	3	9		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
141*	YJET 2 MANF ID	V95U8494C	3	10		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
142*	YJET 3 MANF ID	V95U8494C	3	11		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
143*	YJET 4 MANF ID	V95U8494C	3	12		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
144*	ZJET 1 MANF ID	V95U8494C	3	13		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
145*	ZJET 2 MANF ID	V95U8494C	3	14		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
146*	ZJET 3 MANF ID	V95U8494C	3	15		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
147*	ZJET 4 MANF ID	V95U8494C	3	16		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
148*	ZJET 5 MANF ID	V95U8494C	3	17		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
149*	ZJET 7 MANF ID	V95U8494C	3	19		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
150*	XJET 1 MANF ID	V95U8494C	3	20		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
151*	XJET 2 MANF ID	V95U8494C	3	21		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
152*	XJET 3 MANF ID	V95U8494C	3	22		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
153	AFT XFD P OXID	V95P8794C	39	23		4.0			DEC	PSIA					X						K	RCS SPEC	AFT XFD PRESS OX	X
154	AFT XFD P FU	V95P8795C	45	23		4.0			DEC	PSIA					X						K	RCS SPEC	AFT XFD PRESS FU	X
155	AFT XFD P OXID (S)	V95J8796C	43	23		1.0			STAT												7	RCS SPEC	AFT XFD PRESS OX STATUS	X
156	AFT XFD P FU (S)	V95J8797C	49	23		1.0			STAT												7	RCS SPEC	AFT XFD PRESS FU STATUS	X
157	(MSG LINE)	V93X0050X	1	25		44.0			CHAR								G					UI	MESSAGE LINE	X
158	(BUFFER MSG)	V93X0054X	45	25		4.0			CHAR								G					UI	BUFFER MESSAGE INDICATOR	X
159	(SPL)	V93X0056X	2	26		49.0			CHAR								G					UI	SCRATCH PAD LINE	X
160	FWD XFD P OXID	V95P8318C	39	23		4.0			DEC	PSIA					X						L	RCS SPEC	FWD XFD PRESS OX	X
161	FWD XFD P FU	V95P8316C	45	23		4.0			DEC	PSIA					X						L	RCS SPEC	FWD XFD PRESS FU	X
162	FWD XFD P OXID (S)	V95J8319C	43	23		1.0			STAT												7, L	RCS SPEC	FWD XFD PRESS OX STATUS	X
163	FWD XFD P FU (S)	V95J8317C	49	23		1.0			STAT												7, L	RCS SPEC	FWD XFD PRESS FU STATUS	X
164	LOMS TO FWD RCS 46	V93X5114X	31	5		1.0	*		BLVL													KYBD	LOMS TO FWD RCS PRESS ENA	X
165	ROMS TO FWD RCS 47	V93X5115X	39	5		1.0	*		BLVL													KYBD	ROMS TO FWD RCS PRESS ENA	X
166	OMS PRESS ENA INH 48	ADDENDUM	35	7		3.0			RTXT												M	KYBD	OMS PRESS ENA INHIBIT	X
167	AFT XFD P	ADDENDUM	28	23		3.0			RTXT												K	RCS SPEC	XFD SELECTION ID	X
168	FWD XFD P	ADDENDUM	28	23		3.0			RTXT												L	RCS SPEC	XFD SELECTION ID	X
169	AUTO MANF CL ENA 51	V93X1068X	23	6		1.0	*		BLVL													KYBD, RCS RM	AUTO MANF CLOSE ENABLE	X

Table 4.2.13-2b. RCS (PFS) CRT DISPLAY PROCESSING (Post STS-114)

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T		
			X	Y		CHAR	BILEVEL																	TYPE	
							1	0																	
036*	YJET 3 FAIL	V95J8572C	7	11		3.0															E G	RCS SPEC	SELECTED JET 3 ON/LK/OFF FLAG	X	
037*	YJET 4 FAIL	V95J8573C	7	12		3.0																E G	RCS SPEC	SELECTED JET 4 ON/LK/OFF FLAG	X
038*	ZJET 1 FAIL	V95J8574C	7	13		3.0																E G	RCS SPEC	SELECTED JET 5 ON/LK/OFF FLAG	X
039*	ZJET 2 FAIL	V95J8575C	7	14		3.0																E G	RCS SPEC	SELECTED JET 6 ON/LK/OFF FLAG	X
040*	ZJET 3 FAIL	V95J8576C	7	15		3.0																E G	RCS SPEC	SELECTED JET 7 ON/LK/OFF FLAG	X
041*	ZJET 4 FAIL	V95J8577C	7	16		3.0																E G	RCS SPEC	SELECTED JET 8 ON/LK/OFF FLAG	X
042*	ZJET 5 FAIL	V95J8578C	7	17		3.0																E G	RCS SPEC	SELECTED JET 9 ON/LK/OFF FLAG	X
043*	ZJET 6 FAIL	V95J8579C	7	18		3.0																E G	RCS SPEC	SELECTED JET 10 ON/LK/OFF FLAG	X
044*	ZJET 7 FAIL	V95J8580C	7	19		3.0																E G	RCS SPEC	SELECTED JET 11 ON/LK/OFF FLAG	X
045*	XJET 1 FAIL	V95J8581C	7	20		3.0																E G	RCS SPEC	SELECTED JET 12 ON/LK/OFF FLAG	X
046*	XJET 2 FAIL	V95J8582C	7	21		3.0																E G	RCS SPEC	SELECTED JET 13 ON/LK/OFF FLAG	X
047*	XJET 3 FAIL	V95J8583C	7	22		3.0																E G	RCS SPEC	SELECTED JET 14 ON/LK/OFF FLAG	X
048*	VJET 1 FAIL	V95J8584C	7	23		3.0																E G	RCS SPEC	SELECTED JET 15 ON/LK/OFF FLAG	X
049*	VJET 2 FAIL	V95J8585C	7	24		3.0																E G	RCS SPEC	SELECTED JET 16 ON/LK/OFF FLAG	X
050*	YJET 1 DES INH	V95X8525X	13	9		1.0	*																RCS SPEC	SEL JET 1 DES INH FLAG	X
051*	YJET 2 DES INH	V95X8526X	13	10		1.0	*																RCS SPEC	SEL JET 2 DES INH FLAG	X
052*	YJET 3 DES INH	V95X8527X	13	11		1.0	*																RCS SPEC	SEL JET 3 DES INH FLAG	X
053*	YJET 4 DES INH	V95X8528X	13	12		1.0	*																RCS SPEC	SEL JET 4 DES INH FLAG	X
054*	ZJET 1 DES INH	V95X8529X	13	13		1.0	*																RCS SPEC	SEL JET 5 DES INH FLAG	X
055*	ZJET 2 DES INH	V95X8530X	13	14		1.0	*																RCS SPEC	SEL JET 6 DES INH FLAG	X
056*	ZJET 3 DES INH	V95X8531X	13	15		1.0	*																RCS SPEC	SEL JET 7 DES INH FLAG	X
057*	ZJET 4 DES INH	V95X8532X	13	16		1.0	*																RCS SPEC	SEL JET 8 DES INH FLAG	X
058*	ZJET 5 DES INH	V95X8533X	13	17		1.0	*																RCS SPEC	SEL JET 9 DES INH FLAG	X
059*	ZJET 6 DES INH	V95X8534X	13	18		1.0	*																RCS SPEC	SEL JET 10 DES INH FLAG	X
060*	ZJET 7 DES INH	V95X8535X	13	19		1.0	*																RCS SPEC	SEL JET 11 DES INH FLAG	X
061*	XJET 1 DES INH	V95X8536X	13	20		1.0	*																RCS SPEC	SEL JET 12 DES INH FLAG	X
062*	XJET 2 DES INH	V95X8537X	13	21		1.0	*																RCS SPEC	SEL JET 13 DES INH FLAG	X
063*	XJET 3 DES INH	V95X8538X	13	22		1.0	*																RCS SPEC	SEL JET 14 DES INH FLAG	X
064*	VJET 1 DES INH	V95X8539X	13	23		1.0	*																RCS SPEC	SEL JET 15 DES INH FLAG	X
065*	VJET 2 DES INH	V95X8540X	13	24		1.0	*																RCS SPEC	SEL JET 16 DES INH FLAG	X

Table 4.2.13-2b. RCS (PFS) CRT DISPLAY PROCESSING (Post STS-114)

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T		
			X	Y		CHAR	BILEVEL																	TYPE	
							1	0																	
066*	YJET 1 JET DES	V95X8500X	17	9		1.0	*														G	RCS SPEC	SEL JET 1 AVAIL FLAG	X	
067*	YJET 2 JET DES	V95X8501X	17	10		1.0	*															G	RCS SPEC	SEL JET 2 AVAIL FLAG	X
068*	YJET 3 JET DES	V95X8502X	17	11		1.0	*															G	RCS SPEC	SEL JET 3 AVAIL FLAG	X
069*	YJET 4 JET DES	V95X8503X	17	12		1.0	*															G	RCS SPEC	SEL JET 4 AVAIL FLAG	X
070*	ZJET 1 JET DES	V95X8504X	17	13		1.0	*															G	RCS SPEC	SEL JET 5 AVAIL FLAG	X
071*	ZJET 2 JET DES	V95X8505X	17	14		1.0	*															G	RCS SPEC	SEL JET 6 AVAIL FLAG	X
072*	ZJET 3 JET DES	V95X8506X	17	15		1.0	*															G	RCS SPEC	SEL JET 7 AVAIL FLAG	X
073*	ZJET 4 JET DES	V95X8507X	17	16		1.0	*															G	RCS SPEC	SEL JET 8 AVAIL FLAG	X
074*	ZJET 5 JET DES	V95X8508X	17	17		1.0	*															G	RCS SPEC	SEL JET 9 AVAIL FLAG	X
075*	ZJET 6 JET DES	V95X8509X	17	18		1.0	*															G	RCS SPEC	SEL JET 10 AVAIL FLAG	X
076*	ZJET 7 JET DES	V95X8510X	17	19		1.0	*															G	RCS SPEC	SEL JET 11 AVAIL FLAG	X
077*	XJET 1 JET DES	V95X8511X	17	20		1.0	*															G	RCS SPEC	SEL JET 12 AVAIL FLAG	X
078*	XJET 2 JET DES	V95X8512X	17	21		1.0	*															G	RCS SPEC	SEL JET 13 AVAIL FLAG	X
079*	XJET 3 JET DES	V95X8513X	17	22		1.0	*															G	RCS SPEC	SEL JET 14 AVAIL FLAG	X
080*	VJET 1 JET DES	V95X8514X	17	23		1.0	*															G	RCS SPEC	SEL JET 15 AVAIL FLAG	X
081*	VJET 2 JET DES	V95X8515X	17	24		1.0	*															G	RCS SPEC	SEL JET 16 AVAIL FLAG	X
082	HE P OXID	V95P8670C	38	9		5.0			PSIA														RCS SPEC	SEL MODULE HE PRESS 1 OX	X
083	PRPLT TK P OXID	V95P8678C	39	10		4.0			PSIA														RCS SPEC	SEL MODULE PROP PRESS-OX	X
084	PRPLT TK T OXID	V95T8682C	39	11		4.0			DEC	DEG F													RCS SPEC	SEL MODULE PROP TEMP-OX	X
085	PRPLT QTY OXID	V95Q8690C	39	12		4.0			DEC	PCT													RCS SPEC	SEL MODULE PROP-QTY OX	X
086*	MANF P 1 OX	V95P8725C	39	13		4.0			DEC	PSIA													RCS SPEC	SEL MANIFOLD 1 OX PRESS	X
087*	MANF P 2 OX	V95P8729C	39	14		4.0			DEC	PSIA													RCS SPEC	SEL MANIFOLD 2 OX PRESS	X
088*	MANF P 3 OX	V95P8734C	39	15		4.0			DEC	PSIA	X												RCS SPEC	SEL MANIFOLD 3 OX PRESS	X
089*	MANF P 4 OX	V95P8738C	39	16		4.0			DEC	PSIA	X												RCS SPEC	SEL MANIFOLD 4 OX PRESS	X
090	MANF VLVS 1 STATUS	V95X8762X	41	18		2.0	OP	CL	BLVL												H	RCS SPEC	SELECTED RCS MANF 1 OP/CL STATUS	X	
091	MANF VLVS 2 STATUS	V95X8763X	41	19		2.0	OP	CL	BLVL													H	RCS SPEC	SELECTED RCS MANF 2 OP/CL STATUS	X
092	MANF VLVS 3 STATUS	V95X8764X	41	20		2.0	OP	CL	BLVL													H	RCS SPEC	SELECTED RCS MANF 3 OP/CL STATUS	X
093	MANF VLVS 4 STATUS	V95X8765X	41	21		2.0	OP	CL	BLVL													H	RCS SPEC	SELECTED RCS MANF 4 OP/CL STATUS	X
094	MANF VLVS 5 STATUS	V95X8766X	41	22		2.0	OP	CL	BLVL													H	RCS SPEC	SELECTED RCS MANF 5 OP/CL STATUS	X
095	HE P FU	V95P8674C	44	9		5.0			DEC	PSIA													RCS SPEC	SEL MODULE HE PRESS 1 FU	X
096	PRPLT TK P FU	V95P8680C	45	10		4.0			DEC	PSIA													RCS SPEC	SEL MODULE PROP PRESS-FU	X
097	PRPLT TK T FU	V95T8684C	45	11		4.0			DEC	DEG F													RCS SPEC	SEL MODULE PROP TEMP-FU	X
098	PRPLT QTY FU	V95Q8692C	45	12		4.0			DEC	PCT													RCS SPEC	SEL MODULE PROP-QTY FU	X
099*	MANF P 1 FU	V95P8727C	45	13		4.0			DEC	PSIA													RCS SPEC	SEL MANIFOLD 1 FU PRESS	X
100*	MANF P 2 FU	V95P8731C	45	14		4.0			DEC	PSIA													RCS SPEC	SEL MANIFOLD 2 FU PRESS	X

Table 4.2.13-2b. RCS (PFS) CRT DISPLAY PROCESSING (Post STS-114)

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T		
			X	Y		CHAR	BILEVEL																	TYPE	
							1	0																	
101*	MANF P 3 FU	V95P8736C	45	15		4.0			DEC	PSIA														X	
102*	MANF P 4 FU	V95P8740C	45	16		4.0			DEC	PSIA	X														X
103	HE P OX (S)	V95J8671C	43	9		1.0			STAT																X
104	PRPLT TK P OX (S)	V95J8679C	43	10		1.0			STAT										1	RCS SPEC	SEL MODULE HE PRESS 1 OX STATUS			X	
105	PRPLT TK T OX (S)	V95J8683C	43	11		1.0			STAT										1	RCS SPEC	SEL MODULE PROP PRESS-OX STATUS			X	
106	PRPLT QTY OX (S)	V95J8691C	43	12		1.0			STAT										3	RCS SPEC	SEL MODULE PROP-QTY OX STATUS			X	
107*	MANF P 1 OX (S)	V95J8726C	43	13		1.0			STAT										7	RCS SPEC	SEL MANIFOLD 1 OX PRESS STATUS			X	
108*	MANF P 2 OX (S)	V95J8730C	43	14		1.0			STAT										7	RCS SPEC	SEL MANIFOLD 2 OX PRESS STATUS			X	
109*	MANF P 3 OX (S)	V95J8735C	43	15		1.0			STAT		X								7	RCS SPEC	SEL MANIFOLD 3 OX PRESS STATUS			X	
110*	MANF P 4 OX (S)	V95J8739C	43	16		1.0			STAT		X								7	RCS SPEC	SEL MANIFOLD 4 OX PRESS STATUS			X	
111	MANF VLVS 1 STAT (S)	V95J8767C	43	18		1.0			STAT										H 9	RCS SPEC	SELECTED RCS MANF 1 OP/CL I/O STAT			X	
112	MANF VLVS 2 STAT (S)	V95J8768C	43	19		1.0			STAT										H 9	RCS SPEC	SELECTED RCS MANF 2 OP/CL I/O STAT			X	
113	MANF VLVS 3 STAT (S)	V95J8769C	43	20		1.0			STAT										H 9	RCS SPEC	SELECTED RCS MANF 3 OP/CL I/O STAT			X	
114	MANF VLVS 4 STAT (S)	V95J8770C	43	21		1.0			STAT										H 9	RCS SPEC	SELECTED RCS MANF 4 OP/CL I/O STAT			X	
115	MANF VLVS 5 STAT (S)	V95J8771C	43	22		1.0			STAT										H 9	RCS SPEC	SELECTED RCS MANF 5 OP/CL I/O STAT			X	
116	HE P FU (S)	V95J8675C	49	9		1.0			STAT											RCS SPEC	SEL MODULE HE PRESS 1 FU STATUS			X	
117	PRPLT TK P FU (S)	V95J8681C	49	10		1.0			STAT										1	RCS SPEC	SEL MODULE PROP PRESS-FU STATUS			X	
118	PRPLT TK T FU (S)	V95J8685C	49	11		1.0			STAT										1	RCS SPEC	SEL MODULE PROP TEMP-FU STATUS			X	
119	PRPLT QTY FU (S)	V95J8693C	49	12		1.0			STAT										3	RCS SPEC	SEL MODULE PROP-QTY FU STATUS			X	
120*	MANF P 1 FU (S)	V95J8728C	49	13		1.0			STAT										7	RCS SPEC	SEL MANIFOLD 1 FU PRESS STATUS			X	
121*	MANF P 2 FU (S)	V95J8732C	49	14		1.0			STAT										7	RCS SPEC	SEL MANIFOLD 2 FU PRESS STATUS			X	
122*	MANF P 3 FU (S)	V95J8737C	49	15		1.0			STAT		X								7	RCS SPEC	SEL MANIFOLD 3 FU PRESS STATUS			X	
123*	MANF P 4 FU (S)	V95J8741C	49	16		1.0			STAT		X								7	RCS SPEC	SEL MANIFOLD 4 FU PRESS STATUS			X	
124	JET 1 PTY	V95U8778C	19	9		2.0			DEC	N/D									1	RCS SPEC	SELECTED JET 1 PRIORITY				
125	JET 2 PTY	V95U8779C	19	10		2.0			DEC	N/D									1	RCS SPEC	SELECTED JET 2 PRIORITY				

Table 4.2.13-2b. RCS (PFS) CRT DISPLAY PROCESSING (Post STS-114)

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
126	JET 3 PTY	V95U8780C	19	11		2.0			DEC	N/D										I	RCS SPEC	SELECTED JET 3 PRIORITY		
127	JET 4 PTY	V95U8781C	19	12		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 4 PRIORITY	
128	JET 5 PTY	V95U8782C	19	13		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 5 PRIORITY	
129	JET 6 PTY	V95U8783C	19	14		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 6 PRIORITY	
130	JET 7 PTY	V95U8784C	19	15		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 7 PRIORITY	
131	JET 8 PTY	V95U8785C	19	16		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 8 PRIORITY	
132	JET 9 PTY	V95U8786C	19	17		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 9 PRIORITY	
133	JET 10 PTY	V95U8787C	19	18		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 10 PRIORITY	
134	JET 11 PTY	V95U8788C	19	19		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 11 PRIORITY	
135	JET 12 PTY	V95U8789C	19	20		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 12 PRIORITY	
136	JET 13 PTY	V95U8790C	19	21		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 13 PRIORITY	
137	JET 14 PTY	V95U8791C	19	22		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 14 PRIORITY	
138	JET 15 PTY	V95U8792C	19	23		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 15 PRIORITY	
139	JET 16 PTY	V95U8793C	19	24		2.0			DEC	N/D											I	RCS SPEC	SELECTED JET 16 PRIORITY	
140*	YJET 1 MANF ID	V95U8494C	3	9		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
141*	YJET 2 MANF ID	V95U8494C	3	10		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
142*	YJET 3 MANF ID	V95U8494C	3	11		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
143*	YJET 4 MANF ID	V95U8494C	3	12		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
144*	ZJET 1 MANF ID	V95U8494C	3	13		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
145*	ZJET 2 MANF ID	V95U8494C	3	14		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
146*	ZJET 3 MANF ID	V95U8494C	3	15		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
147*	ZJET 4 MANF ID	V95U8494C	3	16		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
148*	ZJET 5 MANF ID	V95U8494C	3	17		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
149*	ZJET 7 MANF ID	V95U8494C	3	19		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
150*	XJET 1 MANF ID	V95U8494C	3	20		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
151*	XJET 2 MANF ID	V95U8494C	3	21		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
152*	XJET 3 MANF ID	V95U8494C	3	22		1.0			RTXT												J	RCS SPEC	POD SELECTION ID	X
153	AFT XFD P OXID	V95P8794C	39	23		4.0			DEC	PSIA											K	RCS SPEC	AFT XFD PRESS OX	X
154	AFT XFD P FU	V95P8795C	45	23		4.0			DEC	PSIA											K	RCS SPEC	AFT XFD PRESS FU	X
155	AFT XFD P OXID (S)	V95J8796C	43	23		1.0			STAT												7	RCS SPEC	AFT XFD PRESS OX STATUS	X
156	AFT XFD P FU (S)	V95J8797C	49	23		1.0			STAT												7	RCS SPEC	AFT XFD PRESS FU STATUS	X
157	(MSG LINE)	V93X0050X	1	25		44.0			CHAR													UI	MESSAGE LINE	X
158	(BUFFER MSG)	V93X0054X	45	25		4.0			CHAR													UI	BUFFER MESSAGE INDICATOR	X
159	(SPL)	V93X0056X	2	26		49.0			CHAR													UI	SCRATCH PAD LINE	X
160	OMS PRESS ENA INH 48	ADDENDUM	35	7		3.0			RTXT												M	KYBD	OMS PRESS ENA INHIBIT	X
161	AFT XFD P	ADDENDUM	28	23		3.0			RTXT												K	RCS SPEC	XFD SELECTION ID	X
162	FWD XFD P	ADDENDUM	28	23		3.0			RTXT												K	RCS SPEC	XFD SELECTION ID	X
163	51 AUT MANF CL XXX	V93X1068X	21	5		3.0	ENA	INH	BLVL													KYBD, RCS RM	AUTO MANF CLOSE ENABLE	X

TABLE 4.2.13-5. INPUT FUNCTIONAL PARAMETERS FOR RM/RCS DISPLAY (REF 5.16 SPEC.) (G6.7)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
AUTO_MANF_CL_ENA	V93X1068X	AUTO MANF CLOSE ENABLE	RCS RM		BD		92887A	
AUTO_MANF_CL_ENA	V93X1068XA	AUTO MANF CLOSE ENABLE	RM RCS DISP		BD		92887A	
	V90Q8535CA	LT OMS TOTAL QUANTITY USED(%)	OMS/RCS GAUGING	PCT	SPL		93017G	*
	V90Q8535CB	LT OMS TOTAL QUANTITY USED(%)	RM RCS DISP	PCT	SPL		93017G	*
	V90Q8536CA	RT OMS TOTAL QUANTITY USED(%)	OMS/RCS GAUGING	PCT	SPL		93017G	*
	V90Q8536CB	RT OMS TOTAL QUANTITY USED(%)	RM RCS DISP	PCT	SPL		93017G	*
	V90X8531X	LT OMS PROP USED EXCEEDS LIMIT	OMS/RCS GAUGING		BD			
	V90X8532X	RT OMS PROP USED EXCEEDS LIMIT	OMS/RCS GAUGING		BD			
	V93J5113C	SELECTED RCS JET FAIL LIMIT CMD	RM RCS DISP		VAR			
	V93X5100X	LOMS TO AFT RCS PRESS ENA	RM RCS DISP		BD		92320D	
	V93X5101X	ROMS TO AFT RCS PRESS ENA	RM RCS DISP		BD		92320D	
	V93X5102X	OMS PRESS ENA OFF	RM RCS DISP		BD		92320D	
	V93X5110X	RCS-FWD RCS MODULE DSPL REQ	RM RCS DISP		BD			
	V93X5111X	RCS-LEFT RCS MODULE DSPL REQ	RM RCS DISP		BD			
	V93X5112X	RCS-RIGHT RCS MODULE DSPL REQ	RM RCS DISP		BD			
	V93X5116X	OMS PRESS ENA INHIBIT	RM RCS DISP		BD		92320D	
	V93X5120X	RCS-SEL JET 1 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5121X	RCS-SEL JET 2 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5122X	RCS-SEL JET 3 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5123X	RCS-SEL JET 4 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5124X	RCS-SEL JET 5 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5125X	RCS-SEL JET 6 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5126X	RCS-SEL JET 7 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5127X	RCS-SEL JET 8 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5128X	RCS-SEL JET 9 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5129X	RCS-SEL JET 10 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5130X	RCS-SEL JET 11 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5131X	RCS-SEL JET 12 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5132X	RCS-SEL JET 13 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5133X	RCS-SEL JET 14 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5134X	RCS-SEL JET 15 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5135X	RCS-SEL JET 16 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5150X	RCS-SEL JET 1 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5151X	RCS-SEL JET 2 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5152X	RCS-SEL JET 3 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5153X	RCS-SEL JET 4 SEL/DES FLAG	RM RCS DISP		BD			

TABLE 4.2.13-5. INPUT FUNCTIONAL PARAMETERS FOR RM/RCS DISPLAY (REF 5.16 SPEC.) (G6.7)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V93X5154X	RCS-SEL JET 5 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5155X	RCS-SEL JET 6 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5156X	RCS-SEL JET 7 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5157X	RCS-SEL JET 8 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5158X	RCS-SEL JET 9 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5159X	RCS-SEL JET 10 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5160X	RCS-SEL JET 11 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5161X	RCS-SEL JET 12 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5162X	RCS-SEL JET 13 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5163X	RCS-SEL JET 14 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5164X	RCS-SEL JET 15 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5165X	RCS-SEL JET 16 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5167X	SELECTED RCS MANF1 OP/CL STAT OVRD	RM RCS DISP		BD			
	V93X5168X	SELECTED RCS MANF2 OP/CL STAT OVRD	RM RCS DISP		BD			
	V93X5169X	SELECTED RCS MANF3 OP/CL STAT OVRD	RM RCS DISP		BD			
	V93X5170X	SELECTED RCS MANF4 OP/CL STAT OVRD	RM RCS DISP		BD			
	V93X5171X	SELECTED RCS MANF5 OP/CL STAT OVRD	RM RCS DISP		BD			
	V93X5173X	RCS JET RESET	RM RCS DISP		BD			
	V94X4808X	ILLEGAL ENTRY MSG(RCS)	UI					
	V95J8671C	SEL MODULE HE PRESS 1 OX STATUS	RM RCS DIP				90897D	
	V95J8675C	SEL MODULE HE PRESS 1 FU STATUS	RM RCS DIP				90897D	
	V95J8679C	SEL MODULE PROP PRESS-OX STATUS	RM RCS DIP				90897D	
	V95J8681C	SEL MODULE PROP PRESS-FU STATUS	RM RCS DIP				90897D	
	V95J8683C	SEL MODULE PROP TEMP-OX STATUS	RM RCS DIP				90897D	
	V95J8685C	SEL MODULE PROP TEMP-FU STATUS	RM RCS DIP				90897D	
	V95J8691C	SEL MODULE PROP QTY OX STATUS	RM RCS DIP				90897D	
	V95J8693C	SEL MODULE PROP QTY FU STATUS	RM RCS DIP				90897D	
	V95J8726C	SEL MANIFOLD 1 OX PRESS STATUS	RM RCS DIP				90897D	
	V95J8728C	SEL MANIFOLD 1 FU PRESS STATUS	RM RCS DIP				90897D	
	V95J8730C	SEL MANIFOLD 2 OX PRESS STATUS	RM RCS DIP				90897D	
	V95J8732C	SEL MANIFOLD 2 FU PRESS STATUS	RM RCS DIP				90897D	
	V95J8735C	SEL MANIFOLD 3 OX PRESS STATUS	RM RCS DIP				90897D	
	V95J8737C	SEL MANIFOLD 3 FU PRESS STATUS	RM RCS DIP				90897D	
	V95J8739C	SEL MANIFOLD 4 OX PRESS STATUS	RM RCS DIP				90897D	
	V95J8741C	SEL MANIFOLD 4 FU PRESS STATUS	RM RCS DIP				90897D	
	V95J8743C	SELECTED PRI RCS JET FAIL LIM FLAG	RM RCS DIP		VAR			
	V95J8767C	SELECTED RCS MANF 1 OP/CL I/O STAT	RM RCS DIP				90897D	
	V95J8768C	SELECTED RCS MANF 2 OP/CL I/O STAT	RM RCS DIP				90897D	
	V95J8769C	SELECTED RCS MANF 3 OP/CL I/O STAT	RM RCS DIP				90897D	
	V95J8770C	SELECTED RCS MANF 4 OP/CL I/O STAT	RM RCS DIP				90897D	
	V95J8771C	SELECTED RCS MANF 5 OP/CL I/O STAT	RM RCS DIP				90897D	
	V95J8796C	AFT XFD PRESS OX STATUS	RM RCS DIP				92320D	
	V95J8797C	AFT XFD PRESS FU STATUS	RM RCS DIP				92320D	
	V95P8670C	SEL MODULE HE PRESS 1 OX	RM RCS DIP	PSIA	VAR			
	V95P8674C	SEL MODULE HE PRESS 1 FU	RM RCS DIP	PSIA	VAR			
	V95P8678C	SEL MODULE PROP PRESS-OX	RM RCS DIP	PSIA	VAR			

TABLE 4.2.13-5. INPUT FUNCTIONAL PARAMETERS FOR RM/RCS DISPLAY (REF 5.16 SPEC.) (G6.7)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V95P8680C	SEL MODULE PROP PRESS-FU	RM RCS DIP	PSIA	VAR			
	V95P8725C	SEL MANIFOLD 1 OX PRESS	RM RCS DIP	PSIA	VAR			
	V95P8727C	SEL MANIFOLD 1 FU PRESS	RM RCS DIP	PSIA	VAR			
	V95P8729C	SEL MANIFOLD 2 OX PRESS	RM RCS DIP	PSIA	VAR			
	V95P8731C	SEL MANIFOLD 2 FU PRESS	RM RCS DIP	PSIA	VAR			
	V95P8734C	SEL MANIFOLD 3 OX PRESS	RM RCS DIP	PSIA	VAR			
	V95P8736C	SEL MANIFOLD 3 FU PRESS	RM RCS DIP	PSIA	VAR			
	V95P8738C	SEL MANIFOLD 4 OX PRESS	RM RCS DIP	PSIA	VAR			
	V95P8740C	SEL MANIFOLD 4 FU PRESS	RM RCS DIP	PSIA	VAR			
	V95P8794C	AFT XFD PRESS OX	RM RCS DIP	PSIA	SPL		92320D	
	V95P8795C	AFT XFD PRESS FU	RM RCS DIP	PSIA	SPL		92320D	
	V95Q8690C	SEL MODULE PROP-QTY OX	RM RCS DIP	PCT	VAR			
	V95Q8692C	SEL MODULE PROP-QTY FU	RM RCS DIP	PCT	VAR			
	V95T8682C	SEL MODULE PROP TEMP-OX	RM RCS DIP	DEG F	VAR			
	V95T8684C	SEL MODULE PROP TEMP-FU	RM RCS DIP	DEG F	VAR			
	V95U8778C	SELECTED JET 1 PRIORITY	RM RCS DIP		VAR			
	V95U8779C	SELECTED JET 2 PRIORITY	RM RCS DIP		VAR			
	V95U8780C	SELECTED JET 3 PRIORITY	RM RCS DIP		VAR			
	V95U8781C	SELECTED JET 4 PRIORITY	RM RCS DIP		VAR			
	V95U8782C	SELECTED JET 5 PRIORITY	RM RCS DIP		VAR			
	V95U8783C	SELECTED JET 6 PRIORITY	RM RCS DIP		VAR			
	V95U8784C	SELECTED JET 7 PRIORITY	RM RCS DIP		VAR			
	V95U8785C	SELECTED JET 8 PRIORITY	RM RCS DIP		VAR			
	V95U8786C	SELECTED JET 9 PRIORITY	RM RCS DIP		VAR			
	V95U8787C	SELECTED JET 10 PRIORITY	RM RCS DIP		VAR			
	V95U8788C	SELECTED JET 11 PRIORITY	RM RCS DIP		VAR			
	V95U8789C	SELECTED JET 12 PRIORITY	RM RCS DIP		VAR			
	V95U8790C	SELECTED JET 13 PRIORITY	RM RCS DIP		VAR			
	V95U8791C	SELECTED JET 14 PRIORITY	RM RCS DIP		VAR			
	V95U8792C	SELECTED JET 15 PRIORITY	RM RCS DIP		VAR			
	V95U8793C	SELECTED JET 16 PRIORITY	RM RCS DIP		VAR			
	V95X8500X	SEL JET 1 AVAIL FLAG	RM RCS DIP		BD			
	V95X8501X	SEL JET 2 AVAIL FLAG	RM RCS DIP		BD			
	V95X8502X	SEL JET 3 AVAIL FLAG	RM RCS DIP		BD			
	V95X8503X	SEL JET 4 AVAIL FLAG	RM RCS DIP		BD			
	V95X8504X	SEL JET 5 AVAIL FLAG	RM RCS DIP		BD			
	V95X8505X	SEL JET 6 AVAIL FLAG	RM RCS DIP		BD			
	V95X8506X	SEL JET 7 AVAIL FLAG	RM RCS DIP		BD			
	V95X8507X	SEL JET 8 AVAIL FLAG	RM RCS DIP		BD			
	V95X8508X	SEL JET 9 AVAIL FLAG	RM RCS DIP		BD			
	V95X8509X	SEL JET 10 AVAIL FLAG	RM RCS DIP		BD			
	V95X8510X	SEL JET 11 AVAIL FLAG	RM RCS DIP		BD			
	V95X8511X	SEL JET 12 AVAIL FLAG	RM RCS DIP		BD			
	V95X8512X	SEL JET 13 AVAIL FLAG	RM RCS DIP		BD			
	V95X8513X	SEL JET 14 AVAIL FLAG	RM RCS DIP		BD			
	V95X8514X	SEL JET 15 AVAIL FLAG	RM RCS DIP		BD			

TABLE 4.2.13-5. INPUT FUNCTIONAL PARAMETERS FOR RM/RCS DISPLAY (REF 5.16 SPEC.) (G6.7)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V95X8515X	SEL JET 16 AVAIL FLAG	RM RCS DIP		BD			
	V95X8525X	SEL JET 1 RM INH FLAG	RM RCS DIP		BD			
	V95X8526X	SEL JET 2 RM INH FLAG	RM RCS DIP		BD			
	V95X8527X	SEL JET 3 RM INH FLAG	RM RCS DIP		BD			
	V95X8528X	SEL JET 4 RM INH FLAG	RM RCS DIP		BD			
	V95X8529X	SEL JET 5 RM INH FLAG	RM RCS DIP		BD			
	V95X8530X	SEL JET 6 RM INH FLAG	RM RCS DIP		BD			
	V95X8531X	SEL JET 7 RM INH FLAG	RM RCS DIP		BD			
	V95X8532X	SEL JET 8 RM INH FLAG	RM RCS DIP		BD			
	V95X8533X	SEL JET 9 RM INH FLAG	RM RCS DIP		BD			
	V95X8534X	SEL JET 10 RM INH FLAG	RM RCS DIP		BD			
	V95X8535X	SEL JET 11 RM INH FLAG	RM RCS DIP		BD			
	V95X8536X	SEL JET 12 RM INH FLAG	RM RCS DIP		BD			
	V95X8537X	SEL JET 13 RM INH FLAG	RM RCS DIP		BD			
	V95X8538X	SEL JET 14 RM INH FLAG	RM RCS DIP		BD			
	V95X8539X	SEL JET 15 RM INH FLAG	RM RCS DIP		BD			
	V95X8540X	SEL JET 16 RM INH FLAG	RM RCS DIP		BD			
	V95X8570X	SELECTED JET 1 ON/LK/OFF FLAG	RM RCS DIP					
	V95X8571X	SELECTED JET 2 ON/LK/OFF FLAG	RM RCS DIP					
	V95X8572X	SELECTED JET 3 ON/LK/OFF FLAG	RM RCS DIP					
	V95X8573X	SELECTED JET 4 ON/LK/OFF FLAG	RM RCS DIP					
	V95X8574X	SELECTED JET 5 ON/LK/OFF FLAG	RM RCS DIP					
	V95X8575X	SELECTED JET 6 ON/LK/OFF FLAG	RM RCS DIP					
	V95X8576X	SELECTED JET 7 ON/LK/OFF FLAG	RM RCS DIP					
	V95X8577X	SELECTED JET 8 ON/LK/OFF FLAG	RM RCS DIP					
	V95X8578X	SELECTED JET 9 ON/LK/OFF FLAG	RM RCS DIP					
	V95X8579X	SELECTED JET 10 ON/LK/OFF FLAG	RM RCS DIP					
	V95X8580X	SELECTED JET 11 ON/LK/OFF FLAG	RM RCS DIP					
	V95X8581X	SELECTED JET 12 ON/LK/OFF FLAG	RM RCS DIP					
	V95X8582X	SELECTED JET 13 ON/LK/OFF FLAG	RM RCS DIP					
	V95X8583X	SELECTED JET 14 ON/LK/OFF FLAG	RM RCS DIP					
	V95X8584X	SELECTED JET 15 ON/LK/OFF FLAG	RM RCS DIP					
	V95X8585X	SELECTED JET 16 ON/LK/OFF FLAG	RM RCS DIP					
	V95X8762X	SELECTED RCS MANF 1 OP/CL STATUS	RM RCS DIP		BD			
	V95X8763X	SELECTED RCS MANF 2 OP/CL STATUS	RM RCS DIP		BD			
	V95X8764X	SELECTED RCS MANF 3 OP/CL STATUS	RM RCS DIP		BD			
	V95X8765X	SELECTED RCS MANF 4 OP/CL STATUS	RM RCS DIP		BD			
	V95X8766X	SELECTED RCS MANF 5 OP/CL STATUS	RM RCS DIP		BD			

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.13-6. OUTPUT FUNCTIONAL PARAMETERS FROM RM/RCS DISPLAY (REF 5.16 SPEC.) (G6.7)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
AUTO_MANF_CL_ENA	V93X1068XA	AUTO MANF CLOSE ENABLE	RCS RM RM RCS DISP		BD		92887A	
RCS_NORM	V93X5117X	RCS NORM	ORB DAP		BD		92320D	
UPD_L_OMS_USG	V90X0432X	CREW UPDATE OF OMS L USAGE FLAG	OMS/RCS GAUGING		BD		92870A	
UPD_R_OMS_USG	V90X0433X	CREW UPDATE OF OMS R USAGE FLAG	OMS/RCS GAUGING		BD		92870A	
	V90Q8455C	NEW OMS L USAGE IN LBS	OMS/RCS GAUGING	LBS	SPL		92320D	
	V90Q8456C	NEW OMS R USAGE IN LBS	OMS/RCS GAUGING	LBS	SPL		92320D	
	V90Q8535CB	LT OMS TOTAL QUANTITY USED(%)	DL FMT 22/A DL FMT 32/1 RM RCS DISP	PCT	SPL		93017G	*
	V90Q8536CB	RT OMS TOTAL QUANTITY USED(%)	DL FMT 22/A DL FMT 32/1 RM RCS DISP	PCT	SPL		93017G	*
	V93J5113C	SELECTED RCS JET FAIL LIMIT CMD	RM RCS DIP RM RCS DISP		VAR			
	V93X5100X	LOMS TO AFT RCS PRESS ENA	MSC OMS/RCS GAUGING ORB OMS/RCS CONN ORB RCS CMD SOP RM RCS DISP		BD		92320D	
	V93X5101X	ROMS TO AFT RCS PRESS ENA	MSC OMS/RCS GAUGING ORB OMS/RCS CONN ORB RCS CMD SOP RM RCS DISP		BD		92320D	
	V93X5102X	OMS PRESS ENA OFF	MSC RM RCS DISP		BD		92320D	
	V93X5110X	RCS-FWD RCS MODULE DSPL REQ	RM RCS DIP RM RCS DISP		BD			
	V93X5111X	RCS-LEFT RCS MODULE DSPL REQ	RM RCS DIP RM RCS DISP		BD			
	V93X5112X	RCS-RIGHT RCS MODULE DSPL REQ	RM RCS DIP RM RCS DISP		BD			
	V93X5116X	OMS PRESS ENA INHIBIT	ORB OMS/RCS CONN RM RCS DISP		BD		92320D	
	V93X5120X	RCS-SEL JET 1 RM AUTO/INH FLAG	RM RCS DIP RM RCS DISP		BD			
	V93X5121X	RCS-SEL JET 2 RM AUTO/INH FLAG	RM RCS DIP RM RCS DISP		BD			
	V93X5122X	RCS-SEL JET 3 RM AUTO/INH FLAG	RM RCS DIP RM RCS DISP		BD			
	V93X5123X	RCS-SEL JET 4 RM AUTO/INH FLAG	RM RCS DIP RM RCS DISP		BD			
	V93X5124X	RCS-SEL JET 5 RM AUTO/INH FLAG	RM RCS DIP RM RCS DISP		BD			

TABLE 4.2.13-6. OUTPUT FUNCTIONAL PARAMETERS FROM RM/RCS DISPLAY (REF 5.16 SPEC.) (G6.7)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V93X5125X	RCS-SEL JET 6 RM AUTO/INH FLAG	RM RCS DIP		BD			
	V93X5126X	RCS-SEL JET 7 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5127X	RCS-SEL JET 8 RM AUTO/INH FLAG	RM RCS DIP		BD			
	V93X5128X	RCS-SEL JET 9 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5129X	RCS-SEL JET 10 RM AUTO/INH FLAG	RM RCS DIP		BD			
	V93X5130X	RCS-SEL JET 11 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5131X	RCS-SEL JET 12 RM AUTO/INH FLAG	RM RCS DIP		BD			
	V93X5132X	RCS-SEL JET 13 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5133X	RCS-SEL JET 14 RM AUTO/INH FLAG	RM RCS DIP		BD			
	V93X5134X	RCS-SEL JET 15 RM AUTO/INH FLAG	RM RCS DISP		BD			
	V93X5135X	RCS-SEL JET 16 RM AUTO/INH FLAG	RM RCS DIP		BD			
	V93X5150X	RCS-SEL JET 1 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5151X	RCS-SEL JET 2 SEL/DES FLAG	RM RCS DIP		BD			
	V93X5152X	RCS-SEL JET 3 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5153X	RCS-SEL JET 4 SEL/DES FLAG	RM RCS DIP		BD			
	V93X5154X	RCS-SEL JET 5 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5155X	RCS-SEL JET 6 SEL/DES FLAG	RM RCS DIP		BD			
	V93X5156X	RCS-SEL JET 7 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5157X	RCS-SEL JET 8 SEL/DES FLAG	RM RCS DIP		BD			
	V93X5158X	RCS-SEL JET 9 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5159X	RCS-SEL JET 10 SEL/DES FLAG	RM RCS DIP		BD			
	V93X5160X	RCS-SEL JET 11 SEL/DES FLAG	RM RCS DISP		BD			
	V93X5161X	RCS-SEL JET 12 SEL/DES FLAG	RM RCS DIP		BD			

TABLE 4.2.13-6. OUTPUT FUNCTIONAL PARAMETERS FROM RM/RCS DISPLAY (REF 5.16 SPEC.) (G6.7)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V93X5162X	RCS-SEL JET 13 SEL/DES FLAG	RM RCS DIP		BD			
			RM RCS DISP					
	V93X5163X	RCS-SEL JET 14 SEL/DES FLAG	RM RCS DIP		BD			
			RM RCS DISP					
	V93X5164X	RCS-SEL JET 15 SEL/DES FLAG	RM RCS DIP		BD			
			RM RCS DISP					
	V93X5165X	RCS-SEL JET 16 SEL/DES FLAG	RM RCS DIP		BD			
			RM RCS DISP					
	V93X5167X	SELECTED RCS MANF1 OP/CL STAT OVRD	RM RCS DIP		BD			
			RM RCS DISP					
	V93X5168X	SELECTED RCS MANF2 OP/CL STAT OVRD	RM RCS DIP		BD			
			RM RCS DISP					
	V93X5169X	SELECTED RCS MANF3 OP/CL STAT OVRD	RM RCS DIP		BD			
			RM RCS DISP					
	V93X5170X	SELECTED RCS MANF4 OP/CL STAT OVRD	RM RCS DIP		BD			
			RM RCS DISP					
	V93X5171X	SELECTED RCS MANF5 OP/CL STAT OVRD	RM RCS DIP		BD			
			RM RCS DISP					
	V93X5173X	RCS JET RESET	RM RCS DIP		BD			
			RM RCS DISP					

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
(HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

TABLE 4.2.13-7. RM/RCS DISPLAY (REF 5.16 SPEC.) (G6.7) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.13-8. RM/RCS DISPLAY (REF 5.16 SPEC.) (G6.7) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.13-9. RM/RCS DISPLAY (REF 5.16 SPEC.) (G6.7) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
--------------------------	------	----	----------------	-----------	----	--------	---	---------	---------	-------------

NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.14 CONTROLS (PFS)

TITLE: CONTROLS

TYPE: SPEC/053

AVAILABILITY: GN&C OPS 1,3,6

4.2.14.1 Purpose, Operation, and Organization

This display allows the crew to perform the aerosurface secondary actuator check in OPS 3. Also, it allows the crew to monitor the status of the aerosurface and SSME actuator secondary ports in OPS 1,3, and 6. The ability to control: AA, RGA, and surface feedback RM. Figure 4.2.14-1 is the CONTROLS display format.

1. SEC ACT CK

Item 1 through 5 allows selective initiation of the secondary actuator checks. Items 1 through 4 are used to select one of the actuator channels for testing. An '*' is displayed next to the item for the selected channel. Execution of item 5 (START) will cause a hardover command to be issued on the corresponding actuator channel to the appropriate aerosurfaces. An '*' will be displayed next to item 5 upon its execution. If another channel is selected, the '*' displayed for the previously selected channel will be blanked as well as the '*' displayed by item 5 (START) and an '*' will be displayed by Item 6 (STOP). Execution of item 6 (STOP) will terminate the check and blank any '*'s displayed by items 1 through 5. Execution of item 5 (START) without first selecting a channel, '*' by one of items 1-4, will cause an "ILLEGAL ENTRY" to be generated.

The port status for each channel on all appropriate aerosurfaces is displayed to the right of the controls. The output values will be blank (NO BYPASS), a down arrow (BYPASS), and M (DATA INVALID). If the crew observes that not all ports bypass in response to selection of the corresponding channel, the appropriate FCS channel switch (S1, S2, S3, or S4) on panel C3 may be placed in the off position. This should cause all ports in that channel to bypass and show down arrows on the display. With the FCS channel switch in the off position, the down arrows will remain displayed even though another secondary actuator check selection is made. The only way the down arrows (which were displayed as a result of an FCS channel switch being in the off position) can be made to disappear is to place the FCS channel switch back in the auto or override position. Item 7 defines whether a positive or negative polarity secondary actuator check is performed when item 5 is executed. Item 7 acts as a 'FLIP-FLOP' changing the polarity of the secondary actuator check with each subsequent entry. An '*' will indicate negative polarity; a 'blank' will indicate positive polarity. The display is initialized each time it is called from mass memory with positive polarity selected.

Items 1-7 are legal in MM301, MM302, and MM303 only. Execution in any other MM will cause an "ILLEGAL ENTRY" message to be generated. Items 5 and 6 are mutually exclusive, execution of one will cause an '*' displayed by the other to be blanked. The display is initialized with the item 1-5 and 7 feedbacks blanked and an '*' displayed by item 6.

2. AEROSURFACE PORT STATUS

Item 8 'XY' enters the ID of an aerosurface secondary actuator port and causes a command to be issued to bypass that port. The port ID is defined as 'XY' where 'X' is the desired actuator, and 'Y' is the FCS channel number according to formats below.

Entry of a first digit other than 1–6 or entry of a second digit other than 1–4 shall generate an operator error.

Item 9 'XY' enters the ID of an aerosurface secondary actuator port and causes a command to be issued to reset that port. The port is defined in the same way as for Item 8.

The display will be initialized with items 8 and 9 equal to zero. Items 8 and 9 shall be mutually exclusive, i.e., if item 8 is executed then item 9 is zeroed, and if item 9 is executed then item 8 is zeroed. Items 8 and 9 are legal in OPS 1, 3 and 6.

SECONDARY ACTUATOR SINGLE
PORT SELECT IDENTIFICATION

	FCS CHANNEL Y			
	1	2	3	4
ACTUATOR X				
LOB ELEVON 1	11	12	13	14
LIB ELEVON 2	21	22	23	24
RIB ELEVON 3	31	32	33	34
ROB ELEVON 4	41	42	43	44
RUDDER 5	51	52	53	54
SPEEDBRAKE 6	61	62	63	64

3. SSME PORT STATUS

The port status for each channel on the SSME TVC actuators shall be displayed in OPS 1, 3 and 6. The status output indicators shall be blank (NO BYPASS), down arrow (BYPASS) and 'M' (INVALID DATA).

4. Items 10 through 17 allow deselection/reselection of the AA's and RGA's as candidates for the selection filter. An '*' is displayed next to each item to indicate that the corresponding LRU has been deselected by RM failure detection or by manual crew input. If the '*' is displayed, execution of the item reselects the LRU. A status parameter for each LRU displays an 'M' when FCOS declares a commfault for that LRU and is blank otherwise. Items 10 through 17 are legal in OPS 1, 3 and 6.

The deselect status for these items shall be carried across a transition from OPS 1 to OPS 6 or OPS 1 to OPS 3.

5. Items 18 through 21 allow manual deselection/reselection of the aerosurface position feedback transducer strings as selection filter candidates. An ‘*’ is displayed next to each item to indicate that the crew has deselected the corresponding string. A status parameter for each string displays a down arrow when RM declares one or more of the transducers in the string to be failed, an ‘M’ when a commfault is declared, and is blank otherwise. Items 18 through 21 are legal in OPS 1, 3 and 6.

The deselect status for these items shall be carried across a transition from OPS 1 to OPS 6 or OPS 1 to OPS 3. Since ELEVEN, RUDDER, and SPEEDBRAKE PFB FDIR do not run in MM101 through MM106 or MM601, in these major modes Items 18 through 21 SELECT/DESELECT body flap transducers only.

4.2.14.2 Controls Keyboard Processing Addendum

- A. The destinations for this signal are AA FDIR (4.76), CRT (6.46) and TLM.
- B. The destinations for this signal are ORB RG FDIR (4.74), ORB RGA SMRD RM (4.257), CRT (6.46) and TLM.
- C. Additional destinations for this signal are ELVN PFB FDIR (4.81), RUD PFB FDIR (4.82), SB PFB FDIR (4.83), BF PFB FDIR (4.84) and TLM.

4.2.14.3 Controls CRT Display Processing Addendum

Processing for dynamic symbols of this display are defined in Section B.5.25 of this FSSR.

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word “STAT” being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT Display Processing Table 4.2.14-2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the “M” PSI is displayed (for commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)			
Blank (default)	↓		M	∅
1	↓	↑	M	∅
2		↑	M	∅
3	↓			∅
4		↑		∅
5	↓		?	∅
6	↓	↑		∅
7			M	∅
8	↓		?	M ∅
9			?	M ∅

∅ = blank

- A. The sources for this signal are ORB RG FDIR (4.74), ORB RGA SMRD RM (4.257) and CRT (6.46).

4.2.14.4 Controls Figure/Table References

Figure 4.1.14-1	Controls
Table 4.2.14-1	Keyboard Processing Table
Table 4.2.14-2	CRT Display Processing Table
Table 4.2.14-3	CRT Display Processing Background Requirements N/A
Table 4.2.14-4	Mission Design Background Constants N/A
Table 4.2.14-5	Input Functional Parameters
Table 4.2.14-6	Output Functional Parameters
Table 4.2.14-7	I-Loads
Table 4.2.14-8	K-Loads
Table 4.2.14-9	Constants

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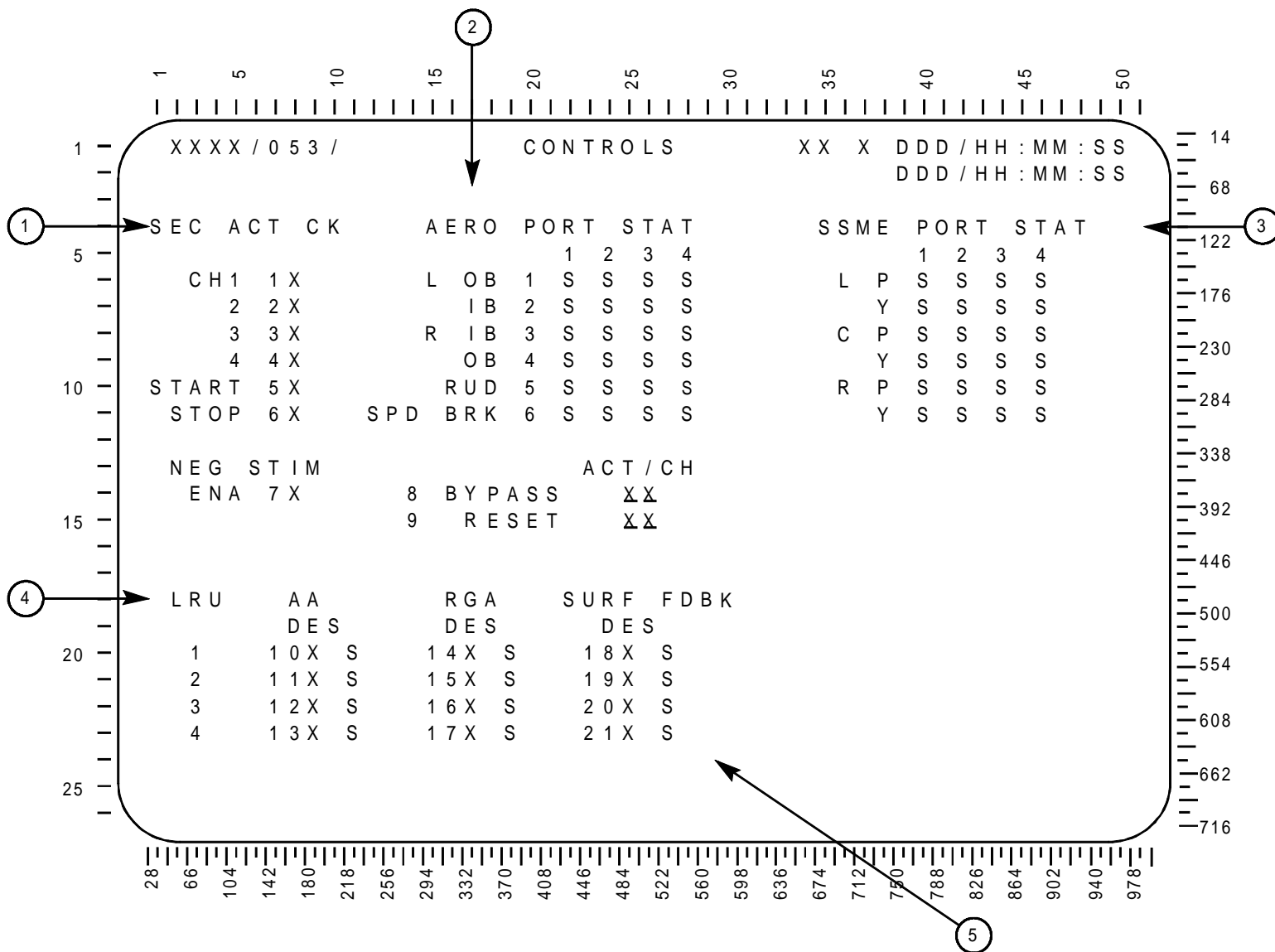


FIGURE 4.2.14-1. Controls Display (PFS)

Table 4.2.14-1. CONTROLS (PFS) KEYBOARD PROCESSING													
Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
001*	SEC ACT CH1 1	V93X3995X	0.0	CTRL			1				5.25	CHAN 1 SEC ACT CHECK ENA	X
002*	SEC ACT CH2 2	V93X3996X	0.0	CTRL			2				5.25	CHAN 2 SEC ACT CHECK ENA	X
003*	SEC ACT CH3 3	V93X3997X	0.0	CTRL			3				5.25	CHAN 3 SEC ACT CHECK ENA	X
004*	SEC ACT CH4 4	V93X3998X	0.0	CTRL			4				5.25	CHAN 4 SEC ACT CHECK ENA	X
005*	SEC ACT START 5	V93X3994X	0.0	CTRL			5				5.25	SEC ACT CHECK INITIATE	X
006*	SEC ACT STOP 6	V93X3999X	0.0	CTRL			6				5.25	SEC ACT CHECK TERMINATE	X
007*	SEC ACT NEG ENA 7	V93X3979X	0.0	CTRL			7				5.25, CRT	NEG STIM ENA ITEM ENTRY	X
008*	SEC ACT 8 BYPASS	V93J3973C	3.0	DEC			8	11	64		5.25, CRT	SEC ACT BYPASS IND	X
009*	SEC ACT 9 RESET	V93J3974C	3.0	DEC			9	11	64		5.25, CRT	SEC ACT RESET IND	X
010*	AA 1 DES 10	V93X4435X	0.0	CTRL			10			A	AA FDIR	AA 1 DES CMD/FAIL	X
011*	AA 2 DES 11	V93X4436X	0.0	CTRL			11			A	AA FDIR	AA 2 DES CMD/FAIL	X
012*	AA 3 DES 12	V93X4437X	0.0	CTRL			12			A	AA FDIR	AA 3 DES CMD/FAIL	X
013*	AA 4 DES 13	V93X4438X	0.0	CTRL			13			A	AA FDIR	AA 4 DES CMD/FAIL	X
014*	RGA 1 DES 14	V93X4516X	0.0	CTRL			14			B	ORB RG FDIR	RGA 1 DES CMD/FAIL	X
015*	RGA 2 DES 15	V93X4518X	0.0	CTRL			15			B	ORB RG FDIR	RGA 2 DES CMD/FAIL	X
016*	RGA 3 DES 16	V93X4520X	0.0	CTRL			16			B	ORB RG FDIR	RGA 3 DES CMD/FAIL	X
017*	RGA 4 DES 17	V93X4522X	0.0	CTRL			17			B	ORB RG FDIR	RGA 4 DES CMD/FAIL	X
018*	SURF 1 DES 18	V93X4761X	0.0	CTRL			18			C	CRT	FCS FDBK XDUCER 1 DES CMD	X
019*	SURF 2 DES 19	V93X4763X	0.0	CTRL			19			C	CRT	FCS FDBK XDUCER 2 DES CMD	X
020*	SURF 3 DES 20	V93X4765X	0.0	CTRL			20			C	CRT	FCS FDBK XDUCER 3 DES CMD	X
021*	SURF 4 DES 21	V93X4767X	0.0	CTRL			21			C	CRT	FCS FDBK XDUCER 4 DES CMD	X

Table 4.2.14-2. CONTROLS (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	STATUS	BLANK	SIZE	INTENS	FLASH	RATE	SIGN	LEADER	BRANCH	DWNLS	Add Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
001	(OPS)	V93X0040X	2	1		5.0														UI	OPS FUNCTION PAGE	X		
002	(SPEC)	V93X0042X	7	1		4.0														UI	SPEC FUNCTION PAGE	X		
003	(DISP)	V93X0044X	10	1		4.0														UI	DISPLAY FUNCTION PAGE	X		
004	(UL)	V92X5032X	34	1		2.0	UL							X						UI	UPLINK ACTIVITY IND	X		
005	(GPC)	V93X0048X	36	1		2.0														UI	GPC DRIVER	X		
006	(MT)	V91W1990C	39	1		12.0														FCOS	MISSION ELAPSED TIME	X		
007	(CRT TIMER)	V91W1987C	39	2		12.0														FCOS	DISPLAY CRT TIMER.GNC	X		
008*	SEC ACT CH1 1	V99X4401X	8	6		1.0	*													5.25	CH 1 SEC ACT ITEM ENTRY IND	X		
009*	SEC ACT CH2 2	V99X4402X	8	7		1.0	*													5.25	CH 2 SEC ACT ITEM ENTRY IND	X		
010*	SEC ACT CH3 3	V99X4403X	8	8		1.0	*													5.25	CH 3 SEC ACT ITEM ENTRY IND	X		
011*	SEC ACT CH4 4	V99X4404X	8	9		1.0	*													5.25	CH 4 SEC ACT ITEM ENTRY IND	X		
012*	SEC ACT STOP 6	V99X4405X	8	11		1.0	*													5.25	SEC ACT TERM ITEM ENTRY IND	X		
013*	SEC ACT NEG ENA 7	V93X3979X	8	14		1.0		*												KYBD	NEG STIM ENA ITEM ENTRY	X		
014*	SEC ACT BYPASS	V93J3973C	24	14		3.0														KYBD	SEC ACT BYPASS IND	X		
015*	SEC ACT RESET	V93J3974C	24	15		3.0														KYBD	SEC ACT RESET IND	X		
016*	ELEV L OB 1 (S)	V95X6501X	22	6		1.0				X		X								5.25	L OTBOARD ELEVON ACTR 1 STATUS			
017*	ELEV L OB 2 (S)	V95X6502X	24	6		1.0				X		X								5.25	L OTBOARD ELEVON ACTR 2 STATUS			
018*	ELEV L OB 3 (S)	V95X6503X	26	6		1.0				X		X								5.25	L OTBOARD ELEVON ACTR 3 STATUS			
019*	ELEV L OB 4 (S)	V95X6504X	28	6		1.0				X		X								5.25	L OTBOARD ELEVON ACTR 4 STATUS			
020*	ELEV L IB 1 (S)	V95X6510X	22	7		1.0				X		X								5.25	L INBOARD ELEVON ACTR 1 STATUS			
021*	ELEV L IB 2 (S)	V95X6511X	24	7		1.0				X		X								5.25	L INBOARD ELEVON ACTR 2 STATUS			
022*	ELEV L IB 3 (S)	V95X6512X	26	7		1.0				X		X								5.25	L INBOARD ELEVON ACTR 3 STATUS			
023*	SEC ACT START 5	V93X3994X	8	10		1.0	*								E					5.25	SEC ACT INITIATE ITEM ENTRY IND			
024*	ELEV L IB 4 (S)	V95X6513X	28	7		1.0				X		X								5.25	L INBOARD ELEVON ACTR 4 STATUS			
025*	ELEV R IB 1 (S)	V95X6515X	22	8		1.0				X		X								5.25	R INBOARD ELEVON ACTR 1 STATUS			
026*	ELEV R IB 2 (S)	V95X6516X	24	8		1.0				X		X								5.25	R INBOARD ELEVON ACTR 2 STATUS			
027*	ELEV R IB 3 (S)	V95X6517X	26	8		1.0				X		X								5.25	R INBOARD ELEVON ACTR 3 STATUS			
028*	ELEV R IB 4 (S)	V95X6518X	28	8		1.0				X		X								5.25	R INBOARD ELEVON ACTR 4 STATUS			
029*	ELEV R OB 1 (S)	V95X6520X	22	9		1.0				X		X								5.25	R OTBOARD ELEVON ACTR 1 STATUS			
030*	ELEV R OB 2 (S)	V95X6521X	24	9		1.0				X		X								5.25	R OTBOARD ELEVON ACTR 2 STATUS			

Table 4.2.14-2. CONTROLS (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T		
			X	Y		CHAR	BILEVEL																	TYPE	
							1	0																	
071*	R SSME Y PORT 3 (S)	V95X6586X	44	11		1.0																			
072*	R SSME Y PORT 4 (S)	V95X6587X	46	11		1.0																			
073*	RGA 1 DES 14	V93X4516X	17	20		1.0														A	KYBD,4.74	RGA 1 DES CMD/FAIL	X		
074*	RGA 2 DES 15	V93X4518X	17	21		1.0														A	KYBD,4.74	RGA 2 DES CMD/FAIL	X		
075*	RGA 3 DES 16	V93X4520X	17	22		1.0														A	KYBD,4.74	RGA 3 DES CMD/FAIL	X		
076*	RGA 4 DES 17	V93X4522X	17	23		1.0														A	KYBD,4.74	RGA 4 DES CMD/FAIL	X		
077*	RGA 1 (S)	V95X6555X	19	20		1.0				X			X							7	5.25	RGA 1 I/O STATUS			
078*	RGA 2 (S)	V95X6556X	19	21		1.0				X			X							7	5.25	RGA 2 I/O STATUS			
079*	RGA 3 (S)	V95X6557X	19	22		1.0				X			X							7	5.25	RGA 3 I/O STATUS			
080*	RGA 4 (S)	V95X6558X	19	23		1.0				X			X							7	5.25	RGA 4 I/O STATUS			
081*	SURF 1 DES 18	V93X4761X	25	20		1.0															KYBD	FCS FDBK XDUCER 1 DES CMD	X		
082*	SURF 2 DES 19	V93X4763X	25	21		1.0															KYBD	FCS FDBK XDUCER 2 DES CMD	X		
083*	SURF 3 DES 20	V93X4765X	25	22		1.0															KYBD	FCS FDBK XDUCER 3 DES CMD	X		
084*	SURF 4 DES 21	V93X4767X	25	23		1.0															KYBD	FCS FDBK XDUCER 4 DES CMD	X		
085*	SURF 1 (S)	V95X6560X	27	20		1.0															5.25	SURF 1 XDUCER STATUS			
086*	SURF 2 (S)	V95X6561X	27	21		1.0				X			X								5.25	SURF 2 XDUCER STATUS			
087*	SURF 3 (S)	V95X6562X	27	22		1.0				X			X								5.25	SURF 3 XDUCER STATUS			
088*	SURF 4 (S)	V95X6563X	27	23		1.0				X			X								5.25	SURF 4 XDUCER STATUS			
089	(MSG LINE)	V93X0050X	1	25		44.0															UI	MESSAGE LINE	X		
090	(BUFFER MSG)	V93X0054X	45	25		4.0															UI	BUFFER MESSAGE INDICATOR	X		
091	(SPL)	V93X0056X	2	26		49.0															UI	SCRATCH PAD LINE	X		

TABLE 4.2.14-5. INPUT FUNCTIONAL PARAMETERS FOR CONTROLS DISPLAY (REF 5.25 SPEC.) (G6.46)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
DELIBM(1)	V58H0806C	L INBD ELEVON POSN FDBK-1	ASA 1	VDC	AMB		93017G	*
DELIBM(2)	V58H0807C	L INBD ELEVON POSN FDBK-2	ASA 2	VDC	AMB		93017G	*
DELIBM(3)	V58H0808C	L INBD ELEVON POSN FDBK-3	ASA 3	VDC	AMB		93017G	*
DELIBM(4)	V58H0809C	L INBD ELEVON POSN FDBK-4	ASA 4	VDC	AMB		93017G	*
DELOBM(1)	V58H0856C	L OUTBD ELEVON POSN FDBK-1	ASA 1	VDC	AMB		93017G	*
DELOBM(2)	V58H0857C	L OUTBD ELEVON POSN FDBK-2	ASA 2	VDC	AMB		93017G	*
DELOBM(3)	V58H0858C	L OUTBD ELEVON POSN FDBK-3	ASA 3	VDC	AMB		93017G	*
DELOBM(4)	V58H0859C	L OUTBD ELEVON POSN FDBK-4	ASA 4	VDC	AMB		93017G	*
DERIBM(1)	V58H0906C	R INBD ELEVON POSN FDBK-1	ASA 1	VDC	AMB		93017G	*
DERIBM(2)	V58H0907C	R INBD ELEVON POSN FDBK-2	ASA 2	VDC	AMB		93017G	*
DERIBM(3)	V58H0908C	R INBD ELEVON POSN FDBK-3	ASA 3	VDC	AMB		93017G	*
DERIBM(4)	V58H0909C	R INBD ELEVON POSN FDBK-4	ASA 4	VDC	AMB		93017G	*
DEROBM(1)	V58H0956C	R OUTBD ELEVON POSN FDBK-1	ASA 1	VDC	AMB		93017G	*
DEROBM(2)	V58H0957C	R OUTBD ELEVON POSN FDBK-2	ASA 2	VDC	AMB		93017G	*
DEROBM(3)	V58H0958C	R OUTBD ELEVON POSN FDBK 3	ASA 3	VDC	AMB		93017G	*
DEROBM(4)	V58H0959C	R OUTBD ELEVON POSN FDBK-4	ASA 4	VDC	AMB		93017G	*
DRM(1)	V57H0101C	RUDDER POSN FDBK-1	ASA 1	VDC	AMB		93017G	*
DRM(2)	V57H0102C	RUDDER POSN FDBK-2	ASA 2	VDC	AMB		93017G	*
DRM(3)	V57H0103C	RUDDER POSN FDBK-3	ASA 3	VDC	AMB		93017G	*
DRM(4)	V57H0104C	RUDDER POSN FDBK-4	ASA 4	VDC	AMB		93017G	*
DSBM(1)	V57H0201C	SPEED BRAKE POSN FDBK-1	ASA 1	VDC	AMB		93017G	*
DSBM(2)	V57H0202C	SPEED BRAKE POSN FDBK-2	ASA 2	VDC	AMB		93017G	*
DSBM(3)	V57H0203C	SPEED BRAKE POSN FDBK-3	ASA 3	VDC	AMB		93017G	*
DSBM(4)	V57H0204C	SPEED BRAKE POSN FDBK-4	ASA 4	VDC	AMB		93017G	*
	V93J3973CA	SEC ACT BYPASS ITEM ENTRY	CNTLS DISP				79556D	
	V93J3974CA	SEC ACT RESET ITEM ENTRY	CNTLS DISP				79556D	
	V93X3979XA	NEG STIM ENA ITEM ENTRY	CNTLS DISP				79556D	
	V93X3994XA	SEC ACT INITIATE ITEM ENTRY IND	CNTLS DISP				79556D	
	V93X3994XB	SEC ACT INITIATE ITEM ENTRY IND	CNTL SPEC				79556D	
	V93X3995X	CHAN 1 SEC ACT CHECK ENA	CNTLS DISP		BD		79556D	
	V93X3996X	CHAN 2 SEC ACT CHECK ENA	CNTLS DISP		BD		79556D	
	V93X3997X	CHAN 3 SEC ACT CHECK ENA	CNTLS DISP		BD		79556D	
	V93X3998X	CHAN 4 SEC ACT CHECK ENA	CNTLS DISP		BD		79556D	
	V93X3999X	SEC ACT CHECK TERMINATE	CNTLS DISP		BD		79556D	
	V93X4435XA	AA 1 DES CMD/FAIL	CNTLS DISP				93017G	*
	V93X4435XC	AA 1 DES CMD/FAIL	AA FDIR				93017G	*

TABLE 4.2.14-5. INPUT FUNCTIONAL PARAMETERS FOR CONTROLS DISPLAY (REF 5.25 SPEC.) (G6.46)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V93X4436XA	AA 2 DES CMD/FAIL	CNTLS DISP				93017G	*
	V93X4436XC	AA 2 DES CMD/FAIL	AA FDIR				93017G	*
	V93X4437XA	AA 3 DES CMD/FAIL	CNTLS DISP				93017G	*
	V93X4437XC	AA 3 DES CMD/FAIL	AA FDIR				93017G	*
	V93X4438XA	AA 4 DES CMD/FAIL	CNTLS DISP				93017G	*
	V93X4438XC	AA 4 DES CMD/FAIL	AA FDIR				93017G	*
	V93X4516XA	RGA 1 DES CMD/FAIL	CNTLS DISP	EVENT	BD		93017G	*
	V93X4516XC	RGA 1 DES CMD/FAIL	ORB RG FDIR	EVENT	BD		93017G	*
	V93X4516XD	RGA 1 DES CMD/FAIL	ORB RGA SMRD RM	EVENT	BD		93017G	*
	V93X4518XA	RGA 2 DES CMD/FAIL	CNTLS DISP	EVENT	BD		93017G	*
	V93X4518XC	RGA 2 DES CMD/FAIL	ORB RG FDIR	EVENT	BD		93017G	*
	V93X4518XD	RGA 2 DES CMD/FAIL	ORB RGA SMRD RM	EVENT	BD		93017G	*
	V93X4520XA	RGA 3 DES CMD/FAIL	CNTLS DISP	EVENT	BD		93017G	*
	V93X4520XC	RGA 3 DES CMD/FAIL	ORB RG FDIR	EVENT	BD		93017G	*
	V93X4520XD	RGA 3 DES CMD/FAIL	ORB RGA SMRD RM	EVENT	BD		93017G	*
	V93X4522XA	RGA 4 DES CMD/FAIL	CNTLS DISP	EVENT	BD		93017G	*
	V93X4522XC	RGA 4 DES CMD/FAIL	ORB RG FDIR	EVENT	BD		93017G	*
	V93X4522XD	RGA 4 DES CMD/FAIL	ORB RGA SMRD RM	EVENT	BD		93017G	*
	V93X4761XA	FCS FDBK XDUCER 1 DES CMD	CNTLS DISP				93017G	*
	V93X4763XA	FCS FDBK XDUCER 2 DES CMD	CNTLS DISP				93017G	*
	V93X4765XA	FCS FDBK XDUCER 3 DES CMD	CNTLS DISP				93017G	*
	V93X4767XA	FCS FDBK XDUCER 4 DES CMD	CNTLS DISP				93017G	*
	V94X4818X	ILLEGAL ENTRY MSG(CONTROLS)	UI				79556D	
	V95X6501X	L OTBOARD ELEVON ACTR 1 STATUS	CNTL SPEC		BD		79556D	
	V95X6502X	L OTBOARD ELEVON ACTR 2 STATUS	CNTL SPEC		BD		79556D	
	V95X6503X	L OTBOARD ELEVON ACTR 3 STATUS	CNTL SPEC		BD		79556D	
	V95X6504X	L OTBOARD ELEVON ACTR 4 STATUS	CNTL SPEC		BD		79556D	
	V95X6510X	L INBOARD ELEVON ACTR 1 STATUS	CNTL SPEC		BD		79556D	
	V95X6511X	L INBOARD ELEVON ACTR 2 STATUS	CNTL SPEC		BD		79556D	
	V95X6512X	L INBOARD ELEVON ACTR 3 STATUS	CNTL SPEC		BD		79556D	
	V95X6513X	L INBOARD ELEVON ACTR 4 STATUS	CNTL SPEC		BD		79556D	
	V95X6515X	R INBOARD ELEVON ACTR 1 STATUS	CNTL SPEC		BD		79556D	
	V95X6516X	R INBOARD ELEVON ACTR 2 STATUS	CNTL SPEC		BD		79556D	
	V95X6517X	R INBOARD ELEVON ACTR 3 STATUS	CNTL SPEC		BD		79556D	
	V95X6518X	R INBOARD ELEVON ACTR 4 STATUS	CNTL SPEC		BD		79556D	
	V95X6520X	R OTBOARD ELEVON ACTR 1 STATUS	CNTL SPEC		BD		79556D	
	V95X6521X	R OTBOARD ELEVON ACTR 2 STATUS	CNTL SPEC		BD		79556D	
	V95X6522X	R OTBOARD ELEVON ACTR 3 STATUS	CNTL SPEC		BD		79556D	
	V95X6523X	R OTBOARD ELEVON ACTR 4 STATUS	CNTL SPEC		BD		79556D	
	V95X6530X	RUDDER ACTR 1 STATUS	CNTL SPEC		BD		79556D	
	V95X6531X	RUDDER ACTR 2 STATUS	CNTL SPEC		BD		79556D	
	V95X6532X	RUDDER ACTR 3 STATUS	CNTL SPEC		BD		79556D	
	V95X6533X	RUDDER ACTR 4 STATUS	CNTL SPEC		BD		79556D	
	V95X6535X	SPD BRK ACTR 1 STATUS	CNTL SPEC		BD		79556D	
	V95X6536X	SPD BRK ACTR 2 STATUS	CNTL SPEC		BD		79556D	
	V95X6537X	SPD BRK ACTR 3 STATUS	CNTL SPEC		BD		79556D	

TABLE 4.2.14-5. INPUT FUNCTIONAL PARAMETERS FOR CONTROLS DISPLAY (REF 5.25 SPEC.) (G6.46)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V95X6538X	SPD BRK ACTR 4 STATUS	CNTL SPEC		BD		79556D	
	V95X6550X	AA 1 I/O STATUS	CNTL SPEC		BD		79556D	
	V95X6551X	AA 2 I/O STATUS	CNTL SPEC		BD		79556D	
	V95X6552X	AA 3 I/O STATUS	CNTL SPEC		BD		79556D	
	V95X6553X	AA 4 I/O STATUS	CNTL SPEC		BD		79556D	
	V95X6555X	RGA 1 I/O STATUS	CNTL SPEC		BD		79556D	
	V95X6556X	RGA 2 I/O STATUS	CNTL SPEC		BD		79556D	
	V95X6557X	RGA 3 I/O STATUS	CNTL SPEC		BD		79556D	
	V95X6558X	RGA 4 I/O STATUS	CNTL SPEC		BD		79556D	
	V95X6560X	SURF 1 XDUCER STATUS	CNTL SPEC		BD		79556D	
	V95X6561X	SURF 2 XDUCER STATUS	CNTL SPEC		BD		79556D	
	V95X6562X	SURF 3 XDUCER STATUS	CNTL SPEC		BD		79556D	
	V95X6563X	SURF 4 XDUCER STATUS	CNTL SPEC		BD		79556D	
	V95X6564X	L SSME PITCH ACTR 1 STATUS	CNTL SPEC		BD		79556D	
	V95X6565X	L SSME PITCH ACTR 2 STATUS	CNTL SPEC		BD		79556D	
	V95X6566X	L SSME PITCH ACTR 3 STATUS	CNTL SPEC		BD		79556D	
	V95X6567X	L SSME PITCH ACTR 4 STATUS	CNTL SPEC		BD		79556D	
	V95X6568X	L SSME YAW ACTR 1 STATUS	CNTL SPEC		BD		79556D	
	V95X6569X	L SSME YAW ACTR 2 STATUS	CNTL SPEC		BD		79556D	
	V95X6570X	L SSME YAW ACTR 3 STATUS	CNTL SPEC		BD		79556D	
	V95X6571X	L SSME YAW ACTR 4 STATUS	CNTL SPEC		BD		79556D	
	V95X6572X	C SSME PITCH ACTR 1 STATUS	CNTL SPEC		BD		79556D	
	V95X6573X	C SSME PITCH ACTR 2 STATUS	CNTL SPEC		BD		79556D	
	V95X6574X	C SSME PITCH ACTR 3 STATUS	CNTL SPEC		BD		79556D	
	V95X6575X	C SSME PITCH ACTR 4 STATUS	CNTL SPEC		BD		79556D	
	V95X6576X	C SSME YAW ACTR 1 STATUS	CNTL SPEC		BD		79556D	
	V95X6577X	C SSME YAW ACTR 2 STATUS	CNTL SPEC		BD		79556D	
	V95X6578X	C SSME YAW ACTR 3 STATUS	CNTL SPEC		BD		79556D	
	V95X6579X	C SSME YAW ACTR 4 STATUS	CNTL SPEC		BD		79556D	
	V95X6580X	R SSME PITCH ACTR 1 STATUS	CNTL SPEC		BD		79556D	
	V95X6581X	R SSME PITCH ACTR 2 STATUS	CNTL SPEC		BD		79556D	
	V95X6582X	R SSME PITCH ACTR 3 STATUS	CNTL SPEC		BD		79556D	
	V95X6583X	R SSME PITCH ACTR 4 STATUS	CNTL SPEC		BD		79556D	
	V95X6584X	R SSME YAW ACTR 1 STATUS	CNTL SPEC		BD		79556D	
	V95X6585X	R SSME YAW ACTR 2 STATUS	CNTL SPEC		BD		79556D	
	V95X6586X	R SSME YAW ACTR 3 STATUS	CNTL SPEC		BD		79556D	
	V95X6587X	R SSME YAW ACTR 4 STATUS	CNTL SPEC		BD		79556D	
	V99X4401X	CH 1 SEC ACT ITEM ENTRY IND	CNTL SPEC		BD		79556D	
	V99X4402X	CH 2 SEC ACT ITEM ENTRY IND	CNTL SPEC		BD		79556D	
	V99X4403X	CH 3 SEC ACT ITEM ENTRY IND	CNTL SPEC		BD		79556D	
	V99X4404X	CH 4 SEC ACT ITEM ENTRY IND	CNTL SPEC		BD		79556D	
	V99X4405X	SEC ACT TERM ITEM ENTRY IND	CNTL SPEC		BD		79556D	

TABLE 4.2.14-5. INPUT FUNCTIONAL PARAMETERS FOR CONTROLS DISPLAY (REF 5.25 SPEC.) (G6.46)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
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NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.14-6. OUTPUT FUNCTIONAL PARAMETERS FROM CONTROLS DISPLAY (REF 5.25 SPEC.) (G6.46)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90M2892PA	CGRB_STATUS_2\$(21:)	DL FMT 23/1				93017G	*
	V90M2904PA	CGRB_STATUS_2\$(24:)	DL FMT 23/1				93017G	*
	V93J3973CA	SEC ACT BYPASS ITEM ENTRY	CNTL SPEC				79556D	
	V93J3974CA	SEC ACT RESET ITEM ENTRY	CNTLS DISP				79556D	
	V93M0506PA	CGRB_RM_SW_DISPLAY	DL FMT 23/1				93017G	*
	V93X3979XA	NEG STIM ENA ITEM ENTRY	CNTL SPEC				79556D	
	V93X3994XA	SEC ACT INITIATE ITEM ENTRY IND	CNTLS DISP				79556D	
	V93X3995X	CHAN 1 SEC ACT CHECK ENA	CNTL SPEC		BD		79556D	
	V93X3996X	CHAN 2 SEC ACT CHECK ENA	CNTLS DISP		BD		79556D	
	V93X3997X	CHAN 3 SEC ACT CHECK ENA	CNTL SPEC		BD		79556D	
	V93X3998X	CHAN 4 SEC ACT CHECK ENA	CNTLS DISP		BD		79556D	
	V93X3999X	SEC ACT CHECK TERMINATE	CNTL SPEC		BD		79556D	
	V93X4435XA	AA 1 DES CMD/FAIL	AA FDIR				93017G	*
	V93X4436XA	AA 2 DES CMD/FAIL	CNTLS DISP				93017G	*
	V93X4437XA	AA 3 DES CMD/FAIL	DL FMT 23/1				93017G	*
	V93X4438XA	AA 4 DES CMD/FAIL	AA FDIR				93017G	*
	V93X4516XA	RG 1 DES CMD/FAIL	CNTLS DISP		BD		93017G	*
	V93X4518XA	RG 2 DES CMD/FAIL	DL FMT 23/1	EVENT			93017G	*
	V93X4520XA	RG 3 DES CMD/FAIL	ORB RG FDIR	EVENT	BD		93017G	*
			ORB RGA SMRD RM					
			CNTLS DISP					
			DL FMT 23/1					
			ORB RG FDIR					
			ORB RGA SMRD RM					
			CNTLS DISP					
			DL FMT 23/1					
			ORB RG FDIR					
			ORB RGA SMRD RM					

TABLE 4.2.14-6. OUTPUT FUNCTIONAL PARAMETERS FROM CONTROLS DISPLAY (REF 5.25 SPEC.) (G6.46)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V93X4522XA	RGA 4 DES CMD/FAIL	CNTLS DISP DL FMT 23/1 ORB RG FDIR ORB RGA SMRD RM	EVENT	BD		93017G	*
	V93X4761XA	FCS FDBK XDUCER 1 DES CMD	BF PFB FDIR CNTLS DISP DL FMT 23/1 ELVN PFB FDIR RUD PFB FDIR SB PFB FDIR				93017G	*
	V93X4763XA	FCS FDBK XDUCER 2 DES CMD	BF PFB FDIR CNTLS DISP DL FMT 23/1 ELVN PFB FDIR RUD PFB FDIR SB PFB FDIR				93017G	*
	V93X4765XA	FCS FDBK XDUCER 3 DES CMD	BF PFB FDIR CNTLS DISP DL FMT 23/1 ELVN PFB FDIR RUD PFB FDIR SB PFB FDIR				93017G	*
	V93X4767XA	FCS FDBK XDUCER 4 DES CMD	BF PFB FDIR CNTLS DISP DL FMT 23/1 ELVN PFB FDIR RUD PFB FDIR SB PFB FDIR				93017G	*

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
(HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

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TABLE 4.2.14-7. CONTROLS DISPLAY (REF 5.25 SPEC.) (G6.46) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
-----------	------	-----------	----	----	---	---	---------	----	-----	---------	-------------

NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.14-8. CONTROLS DISPLAY (REF 5.25 SPEC.) (G6.46) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
ADT_LIE_DELTA	V99U5580C	00	+103	PCM	I	S	P	G6.46	90109D	
ADT_LIE_DELTA VALUE								V4.19		
ADT_LOE_DELTA	V99U5581C	00	+103	PCM	I	S	P	G6.46	90109D	
ADT_LOE_DELTA VALUE								V4.19		
ADT_RIE_DELTA	V99U5582C	00	+103	PCM	I	S	P	G6.46	90109D	
ADT_RIE_DELTA VALUE								V4.19		
ADT_ROE_DELTA	V99U5583C	00	+103	PCM	I	S	P	G6.46	90109D	
ADT_ROE_DELTA VALUE								V4.19		
ADT_RUD_DELTA	V99U5584C	00	+217	PCM	I	S	P	G6.46	90109D	
ADT_RUD_DELTA VALUE								V4.19		
ADT_SB_DELTA	V99U5585C	00	+147	PCM	I	S	P	G6.46	90109D	
ADT_SB_DELTA VALUE								V4.19		

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.14-9. CONTROLS DISPLAY (REF 5.25 SPEC.) (G6.46) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.15 GNC SYSTEMS SUMMARY 1 (PFS)

TITLE: GNC SYS SUMM 1

TYPE: DISP/018 OR SYS SUMM KEY

AVAILABILITY: OPS 1, 2, 3, 6 and 8

4.2.15.1 Purpose, Operation, and Organization

The GNC SYS SUMM 1 Display, Figure 4.2.15–1, shall be the primary format for monitoring of the Orbiter GN&C systems operational status during the prelaunch, ascent, orbit, entry and RTLS phases. The parameters common to these phases shall be displayed on a single display page. (See 4.2.18 GNC SYSTEMS SUMMARY 2 for a display page containing orbit unique parameters.) The displayed parameters were selected to support the caution and warning function. The status information presented provides sufficient detail for a crew member to respond to a GN&C C&W alarm. The display shall present the aerosurfaces positions and hinge moments and status for the following subsystem elements; RCS manifold jets, RCS manifold isolation valve position and I/O status, body flap pilot valves, GPC/string, FCS SRB/MPS/AERO channels, hand controllers and navigation sensors.

A. Functional requirements:

- (1) Parameters presented during all OPS for the RCS propulsion system shall be the jet manifold status indicators. The manifolds shall be listed by two-character identifiers. The first digit shall reflect the RCS Pod F (forward), L (left) or R (right) and the second digit shall be the manifold number (1 through 5). The jet failure status and type for each manifold shall be displayed as “ON” (failed on), “LK” (detected leak), “OFF” (failure to fire), or blank (no failures). The jet failure status output shall be the logical “OR” of the state of all jets on a manifold. The manifold number 5 jet status for each pod shall be displayed only during OPS 2 and 8. The position of the RCS manifold isolation valves shall be displayed as “OP” for open and “CL” for closed, and shall reflect the position as determined by the software. The I/O status of the valves shall be displayed as “M” for an MDM or BCE commfault, as “?” for a RCS manifold isolation valve dilemma detected by the software or blank for normal operation. Whenever an “M” is displayed, the current valve status (OP or CL) will continue to be displayed.
- (2) The computed aerosurface positions and loading status shall be displayed during OPS 3 and 6. The surface positions shall be displayed in degrees for elevons, aileron, and rudder. Position feedback data with plus (+) and minus (–) signs shall be converted to display the following:

Elevon – As “U” (up) or “D” (down) for the trailing edge surface position.

Aileron – As “R” (right) when trailing edges of right elevons are positioned up and left elevons are positioned down or “L” (left) when trailing edges of right elevons are positioned down and left elevons are positioned up.

Rudder – As “R” (right) or “L” (left) for pressure on the right or left pedal.

Positions for the speedbrake and body flap shall be displayed in percent during OPS 3 & 6. For the speedbrake position, 100 percent equals full deflection. For the body flap position, 0 percent equals –11.71 degrees and 100 percent equals +22.55 degrees. A position saturation status shall be output for the elevons as a down arrow (↓) in the row corresponding to the

surface which is below the low limit and up arrow (↑) when the upper limit is exceeded. The current hinge moment (MOM) on the elevons shall be displayed as percent of maximum allowed. A hinge moment status indicator shall be output as an up arrow (↑) when the hinge moment exceeds the maximum limit and shall be blank otherwise. The body flap pilot valve status as determined by the BF CMD RM is displayed under the body flap position data. The status will be blank for normal operation. "HOLD 2" is displayed when no body flap command from flight control is present and RM detects a change in body flap position. (HOLD 2 reflects that channel 2 is commanded in the opposite direction of the "ON" failure). "HOLD 1" is displayed when "HOLD 2" fails to correct the change in body flap position (When this occurs the channel 2 commands are removed and channel 1 is commanded in the opposite direction of the "ON" failure). If neither "HOLD 1" or "HOLD 2" fixes the problem, "CYCLE" will be displayed. If a body flap command from flight control is present and the body flap direction is not following the command and no "HOLD" exists on channel 1 or 2, "FAIL" will be displayed. If a "HOLD" exists, the hold direction is compared to the body flap motion, and if it is the same, the "HOLD" is removed; if it is opposite "FAIL" will be displayed.

- (3) The Data Processing system (DPS) shall provide failure indications for each GPC (1–5) and data path (MDM FF 1–4, FA 1–4). For any failure a down arrow (↓) shall be displayed. The GPC line shall indicate, by GPC, any one of five failure conditions which are identical to those driving the FAIL line on the GPC/BUS STATUS display. The two string (MDM FF, FA) lines shall provide a summary status of any flight critical data path for the forward and aft half. The status displayed shall be the logical "OR" of any data path fail charged against a string when a participating GPC faults a protected transaction. The status shall be output against the FF or FA MDM half of the string where the fault occurred.
- (4) For each of the four Flight Control Channels (FCS CH), I/O errors and failure status indicators shall be displayed. For each channel, the display output shall represent the logical "OR" of the individual status discrettes as follows:
 - During OPS 1: "SRB" (rock and tilt actuators), "MPS" (main engine pitch and yaw actuators) and "AERO" (aerosurfaces–elevons, rudder and speedbrake actuators).
 - During OPS 3 and 6: "AERO" only.

The status shall normally be blank and a down arrow (↓) shall be output for failures (port bypass). If the data for any channel is missing (I/O error), the commfault shall be reflected by the output of an "M" status indicator.

- (5) The status for the RHC, THC and SBTC hand controllers shall be supported as follows:
 - During OPS 1: None of the seven handcontrollers
 - During OPS 2 and 8: RHC–left, right, aft
 THC–left, aft
 - During OPS 3 and 6: RHC–left, right
 THC–left
 SBTC–left, right

For each of the three hand controller channels, I/O errors, failure, manual deselection and dilemma status indicators shall be displayed. For each RHC controller channel, the pitch, yaw and roll failure discrettes shall be “OR”ed. For each THC controller channel, the $\pm X$, $\pm Y$, and $\pm Z$ discrettes shall be “OR”ed. For each RHC, THC and SBTC, the display output shall normally be blank. For failures detected by RM or manual deselections, down arrows (\downarrow) shall be output. Question marks (?) shall be output for each LRU in the voting logic if a dilemma is declared. If the data for any channel are missing (I/O error), the Commfault shall be reflected by the output of an “M” status indicator.

- (6) The status for the Inertial Measurement Unit (IMU), Accelerometer (ACC), Rate Gyro Assembly (RGA), Microwave Scan Beam Landing System (MLS), and Air Data Transducer Assembly (ADTA) navigation sensors shall be supported as follows:

- During OPS 1 : IMU 1, 2, 3
ACC 1, 2, 3, 4
RGA 1, 2, 3, 4
- During OPS 2 and 8 : IMU 1, 2, 3
- During OPS 3 and 6 : IMU 1, 2, 3
ACC 1, 2, 3, 4
RGA 1, 2, 3, 4
MLS 1, 2, 3
ADTA 1, 2, 3, 4

For each LRU, I/O errors, failure, manual deselection, and dilemma status indicators shall be displayed. For the IMU, disagrees and fault detects shall be “OR”ed. For the ACC, normal and lateral acceleration discrettes shall be “OR”ed for I/O errors and disagrees. For the RGA; roll, pitch and yaw rate parameters shall be “OR”ed for I/O errors and disagrees. For the MLS, range, elevation and azimuth parameters shall be “OR”ed for I/O errors and disagrees. For all LRU’s, failure and manual deselects shall be “OR”ed. The status output for each LRU shall normally be blank. For failures detected by RM or manual deselects, down arrows (\downarrow) shall be output. Question marks (?) shall be output for each LRU in the voting logic if a dilemma (disagree and/or fault detect) is declared. If the data for any sensor is missing (I/O error and/or loss of lock), the commfault shall be reflected by the output of an “M” status indicator.

- (7) The status for the Tactical Air Navigation (TAC) or Global Positioning System (GPS) shall be supported based on the vehicle hardware configuration as determined by I-Loads GPS_INSTALLED(1), GPS_INSTALLED(2) and GPS_INSTALLED(3).

For (GPS_INSTALLED(1) = ON and GPS_INSTALLED(2) = ON and GPS_INSTALLED(3) = ON), then

- GPS navigation system shall be supported in OPS 1, 2, 3, 6, and 8.
- For the GPS, the status output indicator is driven by GAX output GPS “X” I/O, FAIL STATUS. The status output for GPS shall normally be blank. Down arrows (\downarrow) shall be displayed for manual deselects and receiver processing unit failures. Question marks (?) shall be output for a dilemma condition when the QA 4 assessment test detects a failure but

cannot identify which GPS has failed. A commfault shall be reflected by the output of an “M” status indicator.

- Dynamic background text at X Coord = 37 to 39, Y Coord = 18 shall be “GPS”.

For not (GPS_INSTALLED(1) = ON and GPS_INSTALLED(2) = ON and GPS_INSTALLED(3) = ON), then

- TAC navigation sensors shall be supported in OPS 3 and 6.
- For each LRU, I/O errors, failures, manual deselection, and dilemma status indicators shall be displayed. For all LRU’s, failure and manual deselects shall be “OR”ed. The status output for each LRU shall normally be blank. For failures detected by RM or manual deselects, down arrows (↓) shall be output. Question marks (?) shall be output for each LRU in the voting logic if a dilemma (disagree and/or fault detect) is declared. If the data for any sensor is missing (I/O error and/or loss of lock), the commfault shall be reflected by the output of an “M” status indicator.
- For the TAC, range and bearing parameters shall be “OR”ed for I/O errors.
- Dynamic background text at X Coord = 37 to 39, Y Coord = 18 shall be “TAC”.

- (8) The display shall be called via dedicated key (SYS SUMM) or by the SPEC key sequence. The display page shall be available in OPS 1, 2, 3, 6 and 8 with that data which is not supported in a particular OPS being blanked. The data presented are monitored in conjunction with the C&W matrix, fault message line and other dedicated displays.

Table 4.2.15–1 GNC Systems Summary 1 Keyboard Processing

Not applicable

4.2.15.2 GNC Systems Summary 1 Keyboard Processing Addendum

Not applicable

4.2.15.3 GNC Systems Summary 1 CRT Display Processing Addendum

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word “STAT” being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT Display Processing Table 4.2.15–2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the “M” PSI is displayed (for Commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)			
Blank (default)	↓		M	∅
1	↓	↑	M	∅
2		↑	M	∅
3	↓			∅
4		↑		∅
5	↓		?	∅
6	↓	↑		∅
7			M	∅
8	↓		?	M ∅
9			?	M ∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.2.15–2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. RCS JET FAIL Status and Type. The remote texts (RTXT) displayed in this field are as follows:

ON (runaway jet)
LK (leak)
OFF (failure to fire)
∅ (blank indicates no failures–normal state)

- B. Display Parameter Support. Parameters for the following elements are not supported for display in the OPS as indicated and the data/status fields shall be blank:

For OPS 1

RCS Manifold Jet Fail – F5, L5, R5

Flight control surfaces Position/Hinge Moment – Elevons, Aileron, Rudder, Speed Brake, Body Flap and Body Flap Status

Controllers status – RHC L, R, A; THC L, A; SBTC L, R (all channels)

Navigation sensors status – Tacan, MLS, ADTA (all LRU's)

For OPS 2 and 8

Flight control surfaces Position/Hinge Moment – Elevons, Aileron, Rudder, Speed Brake, Body Flap and Body Flap Status

Flight Control System Channel status – all channels

Controllers status – SBTC L, R (all channels)

Navigation sensors status – Accelerometer, RGA, Tacan, MLS and ADTA (all LRU's)

For OPS 3 and 6

RCS Manifold Jet Fail – F5, L5, R5

Controllers status – RHC A, THC A

For OPS 6 (MM601)

Navigation sensors status – For TACAN, ADTA and MLS

- C. Elevon Directional Symbol. The position data will be multiplied by a scale factor of “-1” and a “U” or “D” for the trailing edge of an elevon “up” or “down” is displayed in place of the suppressed plus (+) or minus (-) sign.
- D. Aileron Directional Symbol. When the aileron position is such that the right elevons are positioned with their trailing edges up (negative feedback signals) and the left elevons are positioned with their trailing edges down (positive feedback signals), the aileron direction is displayed as “R”. When the right elevons have their trailing edges down (positive feedback signals) and the left elevons have their trailing edges up (negative feedback signals), the aileron direction is displayed as “L”.
- E. Rudder Directional Symbol. The position data will be multiplied by a scale factor of “-1” and a “R” or “L” for pressure on the right or left pedal, respectively, is displayed in place of the suppressed plus (+) or minus (-) sign.
- F. BDY FLP Alert Status. The Body Flap alert status indication is defined by one signal (V90J6420C) with five states which identifies the character string to be displayed as follows:

STATE	CHARACTER STRING
0	(blank)
1	(blank)
2	(blank)
3	CYCLE
4	FAIL

- G. BDY FLP Pilot Valve Hold Command Enable Status. The Body Flap pilot valve hold command enable status indication is defined by two discrete signals which identify the character string to be displayed as follows:

DISCRETE SIGNAL	STATE	CHARACTER STRING
V90X6422X	0	blank
	1	HOLD 1
V90X6423X	0	blank
	1	HOLD 2

Note: If either V90X6422X or V90X6423X is set to 1 while V90J6420C is set to 3, the display of character strings will be prioritized as follows:

HOLD 1
 HOLD 2
 CYCLE

- H. Either TAC or GPS data shall be displayed at X Coord = 42, 44 and 46, Y Coord = 18 depending on I-Loads GPS_INSTALLED(1), and GPS_INSTALLED(2) and GPS_INSTALLED(3).

Vehicle configuration is determined as follows:

- If (GPS_INSTALLED(1) = ON and GPS_INSTALLED(2) = ON and GPS_INSTALLED(3) = ON), then configuration equals GPS.
- If not (GPS_INSTALLED(1) = ON and GPS_INSTALLED(2) = ON and GPS_INSTALLED(3) = ON), then configuration equals TAC.

Location	Parameter Displayed if Vehicle Configuration = TAC	Parameter Displayed if Vehicle Configuration = GPS
X Coord = 42, Y Coord =18	V94J4190C, TACAN 1 I/O, FAIL STATUS	V94J6001C, GPS 1 I/O, FAIL STATUS
X Coord = 44, Y Coord =18	V94J4191C, TACAN 2 I/O, FAIL STATUS	V94J6002C, GPS 2 I/O, FAIL STATUS
X Coord = 46, Y Coord =18	V94J4192C, TACAN 3 I/O, FAIL STATUS	V94J6003C, GPS 3 I/O, FAIL STATUS

- I. The background label “TAC” or “GPS” shall be displayed based on the vehicle hardware configuration as determined by the I-Loads GPS_INSTALLED(1), GPS_INSTALLED(2), and GPS_INSTALLED(3), at display coordinates X = 37 - 39, Y = 18.

If (GPS_INSTALLED(1) = ON and GPS_INSTALLED(2) = ON and GPS_INSTALLED(3) = ON)

Then display “GPS”

Else display “TAC”

4.2.15.4 GNC Systems Summary 1 Figure/Table References

Figure 4.2.15-1	GNC SYS SUMM 1 Display (PFS)
Table 4.2.15-1	Keyboard Processing Table N/A
Table 4.2.15-2	CRT Display Processing Table
Table 4.2.15-3	CRT Display Processing Background Requirements N/A
Table 4.2.15-4	Mission Design Background Constants N/A
Table 4.2.15-5	Input Functional Parameters
Table 4.2.15-6	Output Functional Parameters
Table 4.2.15-7	I-Loads
Table 4.2.15-8	K-Loads
Table 4.2.15-9	Constants

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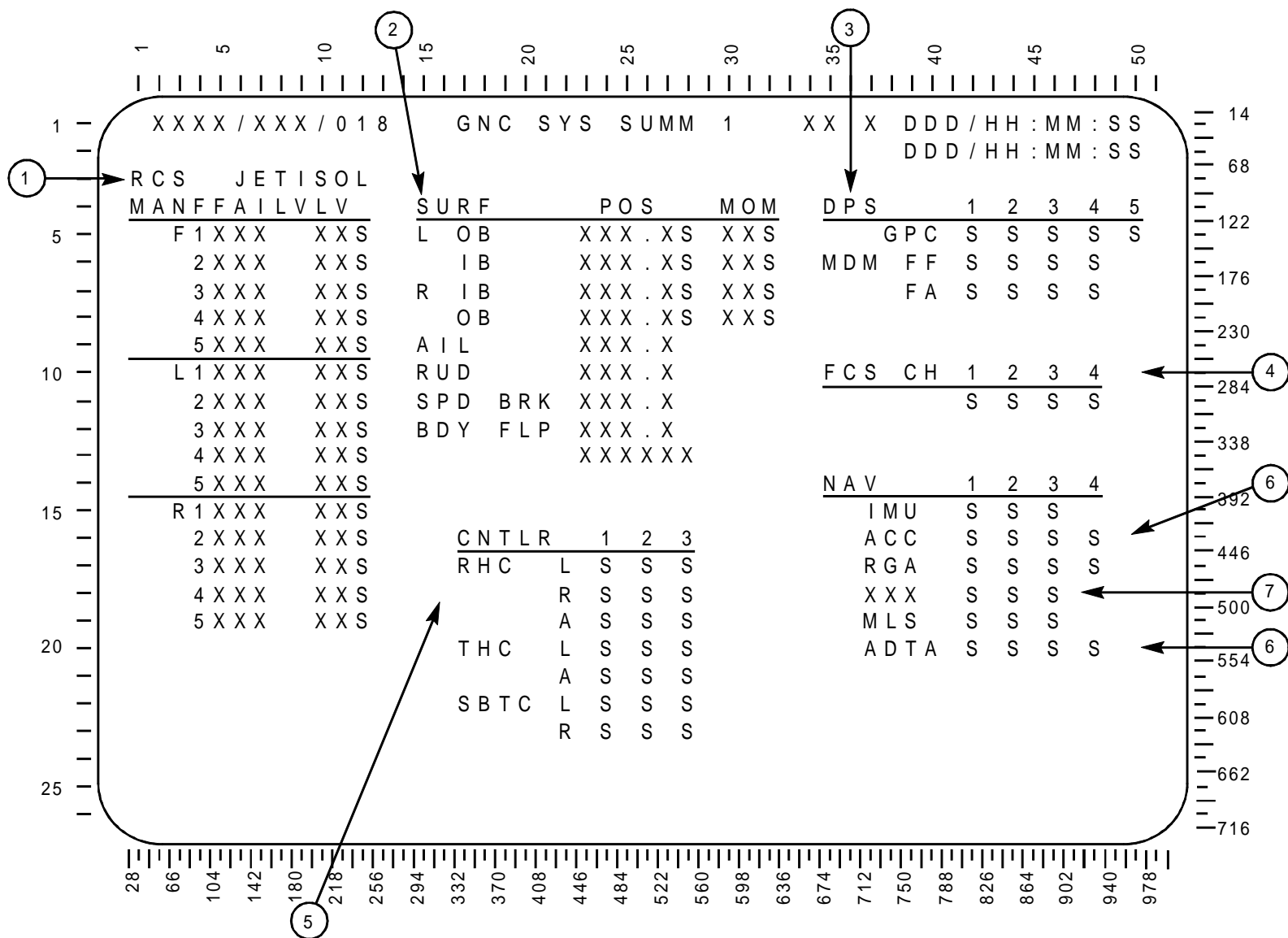


FIGURE 4.2.15-1.GNC SYS SUMM 1 Display (PFS)

Table 4.2.15-2. GNC SYS SUMM 1 (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T		
			X	Y		CHAR	BILEVEL																	TYPE	
							1	0																	
001	(OPS)	V93X0040X	2	1		5.0															UI	OPS FUNCTION PAGE	X		
002	(SPEC)	V93X0042X	7	1		4.0																UI	SPEC FUNCTION PAGE	X	
003	(DISP)	V93X0044X	10	1		4.0																UI	DISPLAY FUNCTION PAGE	X	
004	(UL)	V92X5032X	34	1		2.0	UL							X								UI	UPLINK ACTIVITY IND	X	
005	(GPC)	V93X0048X	36	1		2.0																UI	GPC DRIVER	X	
006	(MT)	V91W1990C	39	1		12.0			DHMS													FCOS	MISSION ELAPSED TIME	X	
007	(CRT TIMER)	V91W1987C	39	2		12.0			DHMS													FCOS	DISPLAY CRT TIMER,GNC	X	
008	RCS F1 JET FAIL	V94J4260C	5	5		3.0															A	GAX	F1 JET FAIL ON,LK,OFF	X	
009	RCS F2 JET FAIL	V94J4261C	5	6		3.0															A	GAX	F2 JET FAIL ON,LK,OFF	X	
010	RCS F3 JET FAIL	V94J4262C	5	7		3.0															A	GAX	F3 JET FAIL ON,LK,OFF	X	
011	RCS F4 JET FAIL	V94J4263C	5	8		3.0															A	GAX	F4 JET FAIL ON,LK,OFF	X	
012	RCS F5 JET FAIL	V94J4272C	5	9		3.0															A B	GAX	F5 JET FAIL ON,LK,OFF	X	
013	RCS L1 JET FAIL	V94J4264C	5	10		3.0															A	GAX	L1 JET FAIL ON,LK,OFF	X	
014	RCS L2 JET FAIL	V94J4265C	5	11		3.0															A	GAX	L2 JET FAIL ON,LK,OFF	X	
015	RCS L3 JET FAIL	V94J4266C	5	12		3.0															A	GAX	L3 JET FAIL ON,LK,OFF	X	
016	RCS L4 JET FAIL	V94J4267C	5	13		3.0															A	GAX	L4 JET FAIL ON,LK,OFF	X	
017	RCS L5 JET FAIL	V94J4274C	5	14		3.0															A B	GAX	L5 JET FAIL ON,LK,OFF	X	
018	RCS R1 JET FAIL	V94J4268C	5	15		3.0															A	GAX	R1 JET FAIL ON,LK,OFF	X	
019	RCS R2 JET FAIL	V94J4269C	5	16		3.0															A	GAX	R2 JET FAIL ON,LK,OFF	X	
020	RCS R3 JET FAIL	V94J4270C	5	17		3.0															A	GAX	R3 JET FAIL ON,LK,OFF	X	
021	RCS R4 JET FAIL	V94J4271C	5	18		3.0															A	GAX	R4 JET FAIL ON,LK,OFF	X	
022	RCS R5 JET FAIL	V94J4273C	5	19		3.0															A B	GAX	R5 JET FAIL ON,LK,OFF	X	
023	RCS MANF F1 ISO VLV	V90X4420X	10	5		2.0	OP	CL														RCS RM	RCS MANIFOLD F1 OP/CL STATUS	X	
024	RCS MANF F2 ISO VLV	V90X4421X	10	6		2.0	OP	CL															RCS RM	RCS MANIFOLD F2 OP/CL STATUS	X
025	RCS MANF F3 ISO VLV	V90X4422X	10	7		2.0	OP	CL															RCS RM	RCS MANIFOLD F3 OP/CL STATUS	X
026	RCS MANF F4 ISO VLV	V90X4423X	10	8		2.0	OP	CL															RCS RM	RCS MANIFOLD F4 OP/CL STATUS	X
027	RCS MANF F5 ISO VLV	V90X4424X	10	9		2.0	OP	CL															RCS RM	RCS MANIFOLD F5 OP/CL STATUS	X
028	RCS MANF L1 ISO VLV	V90X4425X	10	10		2.0	OP	CL															RCS RM	RCS MANIFOLD L1 OP/CL STATUS	X
029	RCS MANF L2 ISO VLV	V90X4426X	10	11		2.0	OP	CL															RCS RM	RCS MANIFOLD L2 OP/CL STATUS	X
030	RCS MANF L3 ISO VLV	V90X4427X	10	12		2.0	OP	CL															RCS RM	RCS MANIFOLD L3 OP/CL STATUS	X

Table 4.2.15-2. GNC SYS SUMM 1 (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
031	RCS MANF L4 ISO VLV	V90X4428X	10	13		2.0	OP	CL	BLVL												RCS RM	RCS MANIFOLD L4 OP/CL STATUS	X	
032	RCS MANF L5 ISO VLV	V90X4429X	10	14		2.0	OP	CL	BLVL													RCS RM	RCS MANIFOLD L5 OP/CL STATUS	X
033	RCS MANF R1 ISO VLV	V90X4430X	10	15		2.0	OP	CL	BLVL													RCS RM	RCS MANIFOLD R1 OP/CL STATUS	X
034	RCS MANF R2 ISO VLV	V90X4431X	10	16		2.0	OP	CL	BLVL													RCS RM	RCS MANIFOLD R2 OP/CL STATUS	X
035	RCS MANF R3 ISO VLV	V90X4432X	10	17		2.0	OP	CL	BLVL													RCS RM	RCS MANIFOLD R3 OP/CL STATUS	X
036	RCS MANF R4 ISO VLV	V90X4433X	10	18		2.0	OP	CL	BLVL													RCS RM	RCS MANIFOLD R4 OP/CL STATUS	X
037	RCS MANF R5 ISO VLV	V90X4434X	10	19		2.0	OP	CL	BLVL													RCS RM	RCS MANIFOLD R5 OP/CL STATUS	X
038	RCS MANF F1 VLV (S)	V94J4300C	12	5		1.0			STAT											9	GAX	RCS F1 MANF ISLN VLV OP/CL IO STAT	X	
039	RCS MANF F2 VLV (S)	V94J4301C	12	6		1.0			STAT											9	GAX	RCS F2 MANF ISLN VLV OP/CL IO STAT	X	
040	RCS MANF F3 VLV (S)	V94J4302C	12	7		1.0			STAT											9	GAX	RCS F3 MANF ISLN VLV OP/CL IO STAT	X	
041	RCS MANF F4 VLV (S)	V94J4303C	12	8		1.0			STAT											9	GAX	RCS F4 MANF ISLN VLV OP/CL IO STAT	X	
042	RCS MANF F5 VLV (S)	V94J4541C	12	9		1.0			STAT											9	GAX	RCS F5 MANF ISLN VLV OP/CL IO STAT	X	
043	RCS MANF L1 VLV (S)	V94J4304C	12	10		1.0			STAT											9	GAX	RCS L1 MANF ISLN VLV OP/CL IO STAT	X	
044	RCS MANF L2 VLV (S)	V94J4305C	12	11		1.0			STAT											9	GAX	RCS L2 MANF ISLN VLV OP/CL IO STAT	X	
045	RCS MANF L3 VLV (S)	V94J4306C	12	12		1.0			STAT											9	GAX	RCS L3 MANF ISLN VLV OP/CL IO STAT	X	
046	RCS MANF L4 VLV (S)	V94J4307C	12	13		1.0			STAT											9	GAX	RCS L4 MANF ISLN VLV OP/CL IO STAT	X	
047	RCS MANF L5 VLV (S)	V94J4543C	12	14		1.0			STAT											9	GAX	RCS L5 MANF ISLN VLV OP/CL IO STAT	X	
048	RCS MANF R1 VLV (S)	V94J4308C	12	15		1.0			STAT											9	GAX	RCS R1 MANF ISLN VLV OP/CL IO STAT	X	
049	RCS MANF R2 VLV (S)	V94J4309C	12	16		1.0			STAT											9	GAX	RCS R2 MANF ISLN VLV OP/CL IO STAT	X	
050	RCS MANF R3 VLV (S)	V94J4310C	12	17		1.0			STAT											9	GAX	RCS R3 MANF ISLN VLV OP/CL IO STAT	X	
051	RCS MANF R4 VLV (S)	V94J4311C	12	18		1.0			STAT											9	GAX	RCS R4 MANF ISLN VLV OP/CL IO STAT	X	
052	RCS MANF R5 VLV (S)	V94J4545C	12	19		1.0			STAT											9	GAX	RCS R5 MANF ISLN VLV OP/CL IO STAT	X	
053	L OB POS	V95H8060C	23	5		5.1			DEC	DEG						U				B C	ELVN PFB SOP	COMP LOB ELEVON POS	X	
054	L IB POS	V95H8010C	23	6		5.1			DEC	DEG						U				B C	ELVN PFB SOP	COMP LIB ELEVON POS	X	
055	R IB POS	V95H8110C	23	7		5.1			DEC	DEG						U				B C	ELVN PFB SOP	COMP RIB ELEVON POS	X	

Table 4.2.15-2. GNC SYS SUMM 1 (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T		
			X	Y		CHAR	BILEVEL																	TYPE	
							1	0																	
056	R OB POS	V95H8160C	23	8		5.1			DEC	DEG											B C	ELVN PFB SOP	COMP ROB ELEVON POS	X	
057	AIL POS	V96H2045C	23	9		5.1			DEC	DEG											B D	SPI PROC	AILERON POSITION	X	
058	RUD POS	V95H8210C	23	10		5.1			DEC	DEG											B E	RUD PFB SOP	COMP RUDDER POS	X	
059*	SPD BRK POS	V95H8250C	22	11		6.1			DEC	PCT													SB PFB SOP	PERCENTAGE OF MAX SPEEDBRAKE POS	X
060	BDY FLP POS	V96H2047C	22	12		6.1			DEC	PCT													SPI PROC	BODY FLAP POSN PCT CRT	X
061	BDY FLP XXXXXX	V90J6420C	23	13		6.0			CHAR												F	BF CMD RM	BODY FLAP ALERT	X	
062	BDY FLP XXXXXX	V90X6422X	23	13		6.0			BLVL												G	BF CMD RM	BODY FLAP PILOT VLV 1 HOLD CMD ENA	X	
063	BDY FLP XXXXXX	V90X6423X	23	13		6.0			BLVL												G	BF CMD RM	BODY FLAP PILOT VLV 2 HOLD CMD ENA	X	
064	L OB MOM	V94U4125C	29	5		3.0			DEC	PCT											B	GAX	LT OTBD ELVN HINGE MOM PCT	X	
065	L IB MOM	V94U4126C	29	6		3.0			DEC	PCT											B	GAX	LT INBD ELVN HINGE MOM PCT	X	
066	R IB MOM	V94U4128C	29	7		3.0			DEC	PCT											B	GAX	RT INBD ELVN HINGE MOM PCT	X	
067	R OB MOM	V94U4127C	29	8		3.0			DEC	PCT											B	GAX	RT OTBD ELVN HINGE MOM PCT	X	
068	L OB POS (S)	V94J4136C	28	5		1.0			STAT												B 6	GAX	LOB HI/LO SATURATION STATUS	X	
069	L IB POS (S)	V94J4135C	28	6		1.0			STAT												B 6	GAX	LIB HI/LO SATURATION STATUS	X	
070	R IB POS (S)	V94J4137C	28	7		1.0			STAT												B 6	GAX	RIB HI/LO SATURATION STATUS	X	
071	R OB POS (S)	V94J4138C	28	8		1.0			STAT												B 6	GAX	ROB HI/LO SATURATION STATUS	X	
072	L OB MOM (S)	V94J4676C	32	5		1.0			STAT												B 4	GAX	LOB HINGE MOMENT EXCEED STATUS	X	
073	L IB MOM (S)	V94J4677C	32	6		1.0			STAT												B 4	GAX	LIB HINGE MOMENT EXCEED STATUS	X	
074	R IB MOM (S)	V94J4678C	32	7		1.0			STAT												B 4	GAX	RIB HINGE MOMENT EXCEED STATUS	X	
075	R OB MOM (S)	V94J4679C	32	8		1.0			STAT												B 4	GAX	ROB HINGE MOMENT EXCEED STATUS	X	
076	RHC L 1	V94J4140C	24	17		1.0			STAT												B 8	GAX	L RHC CH 1 I/O, FAIL STATUS	X	
077	RHC L 2	V94J4141C	26	17		1.0			STAT												B 8	GAX	L RHC CH 2 I/O, FAIL STATUS	X	
078	RHC L 3	V94J4142C	28	17		1.0			STAT												B 8	GAX	L RHC CH 3 I/O, FAIL STATUS	X	
079	RHC R 1	V94J4143C	24	18		1.0			STAT												B 8	GAX	R RHC CH 1 I/O, FAIL STATUS	X	
080	RHC R 2	V94J4144C	26	18		1.0			STAT												B 8	GAX	R RHC CH 2 I/O, FAIL STATUS	X	
081	RHC R 3	V94J4145C	28	18		1.0			STAT												B 8	GAX	R RHC CH 3 I/O, FAIL STATUS	X	
082	RHC A 1	V94J4590C	24	19		1.0			STAT												B 8	GAX	AFT RHC CH 1 I/O, FAIL STATUS	X	
083	RHC A 2	V94J4591C	26	19		1.0			STAT												B 8	GAX	AFT RHC CH 2 I/O, FAIL STATUS	X	
084	RHC A 3	V94J4592C	28	19		1.0			STAT												B 8	GAX	AFT RHC CH 3 I/O, FAIL STATUS	X	
085	THC L 1	V94J4593C	24	20		1.0			STAT												B 8	GAX	FWD THC 1 I/O, FAIL STATUS	X	
086	THC L 2	V94J4594C	26	20		1.0			STAT												B 8	GAX	FWD THC 2 I/O, FAIL STATUS	X	
087	THC L 3	V94J4595C	28	20		1.0			STAT												B 8	GAX	FWD THC 3 I/O, FAIL STATUS	X	
088	THC A 1	V94J4596C	24	21		1.0			STAT												B 8	GAX	AFT THC 1 I/O, FAIL STATUS	X	
089	THC A 2	V94J4597C	26	21		1.0			STAT												B 8	GAX	AFT THC 2 I/O, FAIL STATUS	X	
090	THC A 3	V94J4598C	28	21		1.0			STAT												B 8	GAX	AFT THC 3 I/O, FAIL STATUS	X	

Table 4.2.15-2. GNC SYS SUMM 1 (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
091	SBTC L 1	V94J4146C	24	22		1.0			STAT											B 8	GAX	L SBTC CH 1 I/O, FAIL STATUS	X	
092	SBTC L 2	V94J4147C	26	22		1.0			STAT												B 8	GAX	L SBTC CH 2 I/O, FAIL STATUS	X
093	SBTC L 3	V94J4148C	28	22		1.0			STAT												B 8	GAX	L SBTC CH 3 I/O, FAIL STATUS	X
094	SBTC R 1	V94J4149C	24	23		1.0			STAT												B 8	GAX	R SBTC CH 1 I/O, FAIL STATUS	X
095	SBTC R 2	V94J4150C	26	23		1.0			STAT												B 8	GAX	R SBTC CH 2 I/O, FAIL STATUS	X
096	SBTC R 3	V94J4151C	28	23		1.0			STAT												B 8	GAX	R SBTC CH 3 I/O, FAIL STATUS	X
097	GPC 1 STATUS	V91X1561X	42	5		1.0			STAT													FCOS	GPC 1 FAIL STATUS OF GPC 1-DISC	X
098	GPC 2 STATUS	V91X1567X	44	5		1.0			STAT													FCOS	GPC 2 FAIL STATUS OF GPC 2-DISC	X
099	GPC 3 STATUS	V91X1573X	46	5		1.0			STAT													FCOS	GPC 3 FAIL STATUS OF GPC 3-DISC	X
100	GPC 4 STATUS	V91X1579X	48	5		1.0			STAT													FCOS	GPC 4 FAIL STATUS OF GPC 4-DISC	X
101	GPC 5 STATUS	V91X1668X	50	5		1.0			STAT													FCOS	GPC 5 FAIL STATUS OF GPC 5-DISC	X
102	MDM FF 1	V91X2011X	42	6		1.0			STAT													FCOS	FF 1 MDM FAIL	X
103	MDM FF 2	V91X2012X	44	6		1.0			STAT													FCOS	FF 2 MDM FAIL	X
104	MDM FF 3	V91X2013X	46	6		1.0			STAT													FCOS	FF 3 MDM FAIL	X
105	MDM FF 4	V91X2014X	48	6		1.0			STAT													FCOS	FF 4 MDM FAIL	X
106	MDM FA 1	V91X2015X	42	7		1.0			STAT													FCOS	FA 1 MDM FAIL	X
107	MDM FA 2	V91X2016X	44	7		1.0			STAT													FCOS	FA 2 MDM FAIL	X
108	MDM FA 3	V91X2017X	46	7		1.0			STAT													FCOS	FA 3 MDM FAIL	X
109	MDM FA 4	V91X2018X	48	7		1.0			STAT													FCOS	FA 4 MDM FAIL	X
110	FCS CH 1	V94J4210C	42	11		1.0			STAT													GAX	FCS CH 1 I/O, FAIL STATUS	X
111	FCS CH 2	V94J4211C	44	11		1.0			STAT													GAX	FCS CH 2 I/O, FAIL STATUS	X
112	FCS CH 3	V94J4212C	46	11		1.0			STAT													GAX	FCS CH 3 I/O, FAIL STATUS	X
113	FCS CH 4	V94J4213C	48	11		1.0			STAT													GAX	FCS CH 4 I/O, FAIL STATUS	X
114	IMU 1	V94J4160C	42	15		1.0			STAT												8	GAX	IMU 1 I/O, FAIL STATUS	X
115	IMU 2	V94J4161C	44	15		1.0			STAT												8	GAX	IMU 2 I/O, FAIL STATUS	X
116	IMU 3	V94J4162C	46	15		1.0			STAT												8	GAX	IMU 3 I/O, FAIL STATUS	X
117	ACC 1	V94J4165C	42	16		1.0			STAT												B 8	GAX	AA 1 I/O, FAIL STATUS	X
118	ACC 2	V94J4166C	44	16		1.0			STAT												B 8	GAX	AA 2 I/O, FAIL STATUS	X
119	ACC 3	V94J4167C	46	16		1.0			STAT												B 8	GAX	AA 3 I/O, FAIL STATUS	X
120	ACC 4	V94J4168C	48	16		1.0			STAT												B 8	GAX	AA 4 I/O, FAIL STATUS	X
121	RGA 1	V94J4180C	42	17		1.0			STAT												B 8	GAX	RGA 1 I/O, FAIL STATUS	X
122	RGA 2	V94J4181C	44	17		1.0			STAT												B 8	GAX	RGA 2 I/O, FAIL STATUS	X
123	RGA 3	V94J4182C	46	17		1.0			STAT												B 8	GAX	RGA 3 I/O, FAIL STATUS	X
124	RGA 4	V94J4183C	48	17		1.0			STAT												B 8	GAX	RGA 4 I/O, FAIL STATUS	X
125	TAC 1	V94J4190C	42	18		1.0			STAT												B H 8	GAX	TACAN 1 I/O, FAIL STATUS	X
126	TAC 2	V94J4191C	44	18		1.0			STAT												B H 8	GAX	TACAN 2 I/O, FAIL STATUS	X
127	TAC 3	V94J4192C	46	18		1.0			STAT												B H 8	GAX	TACAN 3 I/O, FAIL STATUS	X
128	GPS 1	V94J6001C	42	18		1.0			STAT												H 8	GAX	GPS 1 I/O, FAIL STATUS	X
129	GPS 2	V94J6002C	44	18		1.0			STAT												H 8	GAX	GPS 2 I/O, FAIL STATUS	X
130	GPS 3	V94J6003C	46	18		1.0			STAT												H 8	GAX	GPS 3 I/O, FAIL STATUS	X

Table 4.2.15-2. GNC SYS SUMM 1 (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
131	TAC/GPS XXX	ADDENDUM	37	18		3.0														I	GNC SYS SUMM 1 DISP	BACKGROUND TEXT, TAC OR GPS	X	
132	MLS 1	V94J4193C	42	19		1.0														B 8	GAX	MSBLS 1 I/O, FAIL STATUS	X	
133	MLS 2	V94J4194C	44	19		1.0														B 8	GAX	MSBLS 2 I/O, FAIL STATUS	X	
134	MLS 3	V94J4195C	46	19		1.0														B 8	GAX	MSBLS 3 I/O, FAIL STATUS	X	
135	ADTA 1	V94J4200C	42	20		1.0														B 8	GAX	ADTA 1 I/O, FAIL STATUS	X	
136	ADTA 2	V94J4201C	44	20		1.0														B 8	GAX	ADTA 2 I/O, FAIL STATUS	X	
137	ADTA 3	V94J4202C	46	20		1.0														B 8	GAX	ADTA 3 I/O, FAIL STATUS	X	
138	ADTA 4	V94J4203C	48	20		1.0														B 8	GAX	ADTA 4 I/O, FAIL STATUS	X	
139	(MSG LINE)	V93X0050X	1	25		44.0								G							UI	MESSAGE LINE	X	
140	(BUFFER MSG)	V93X0054X	45	25		4.0								G							UI	BUFFER MESSAGE INDICATOR	X	
141	(SPL)	V93X0056X	2	26		49.0								G							UI	SCRATCH PAD LINE	X	

TABLE 4.2.15-5. INPUT FUNCTIONAL PARAMETERS FOR GNC SYSTEMS SUMMARY 1 DISPLAY (G6.31)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(TITLE)	V93X0046X	CRT TITLE	UI		BD			
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
BFALRT	V90J6420C	BODY FLAP ALERT	BF CMD RM		VAR			
BFHLD(1)	V90X6422X	BODY FLAP PILOT VLV 1 HOLD CMD ENA	BF CMD RM		BD			
BFHLD(2)	V90X6423X	BODY FLAP PILOT VLV 2 HOLD CMD ENA	BF CMD RM		BD			
BFP_CRT	V96H2047C	BODY FLAP POSN PCT CRT		PCT	VAR			
DAILERON	V96H2045C	AILERON POSITION	SPI PROC	DEG	SPL		93017G	*
DELIBOFB	V95H8010C	COMP LIB ELEVON POS	ELVN PFB SOP	DEG	BSS			
DELOBOFB	V95H8060C	COMP LOB ELEVON POS	ELVN PFB SOP	DEG	BSS			
DERIBOFB	V95H8110C	COMP RIB ELEVON POS	ELVN PFB SOP	DEG	BSS		92230F	
DEROBOFB	V95H8160C	COMP ROB ELEVON POS	ELVN PFB SOP	DEG	BSS			
DROFB	V95H8210C	COMP RUDDER POS	RUD PFB SOP	DEG	BSS			
DSBFBP	V95H8250C	PERCENTAGE OF MAX SPEEDBRAKE POS	SB PFB SOP	PCT	BSS			
	V90X4420X	RCS MANIFOLD F1 OP/CL STATUS	RCS RM		EVENT	BD	93017G	*
	V90X4421X	RCS MANIFOLD F2 OP/CL STATUS	RCS RM		EVENT	BD	93017G	*
	V90X4422X	RCS MANIFOLD F3 OP/CL STATUS	RCS RM		EVENT	BD	93017G	*
	V90X4423X	RCS MANIFOLD F4 OP/CL STATUS	RCS RM		EVENT	BD	93017G	*
	V90X4424X	RCS MANIFOLD F5 OP/CL STATUS	RCS RM		EVENT	BD	93017G	*
	V90X4425X	RCS MANIFOLD L1 OP/CL STATUS	RCS RM		EVENT	BD	93017G	*
	V90X4426X	RCS MANIFOLD L2 OP/CL STATUS	RCS RM		EVENT	BD	93017G	*
	V90X4427X	RCS MANIFOLD L3 OP/CL STATUS	RCS RM		EVENT	BD	93017G	*
	V90X4428X	RCS MANIFOLD L4 OP/CL STATUS	RCS RM		EVENT	BD	93017G	*
	V90X4429X	RCS MANIFOLD L5 OP/CL STATUS	RCS RM		EVENT	BD	93017G	*
	V90X4430X	RCS MANIFOLD R1 OP/CL STATUS	RCS RM		EVENT	BD	93017G	*
	V90X4431X	RCS MANIFOLD R2 OP/CL STATUS	RCS RM		EVENT	BD	93017G	*
	V90X4432X	RCS MANIFOLD R3 OP/CL STATUS	RCS RM		EVENT	BD	93017G	*
	V90X4433X	RCS MANIFOLD R4 OP/CL STATUS	RCS RM		EVENT	BD	93017G	*
	V90X4434X	RCS MANIFOLD R5 OP/CL STATUS	RCS RM		EVENT	BD	93017G	*
	V91X1561X	GPC 1 FAIL STATUS OF GPC 1-DISC	FCOS				93017G	*
	V91X1567X	GPC 2 FAIL STATUS OF GPC 2-DISC	FCOS				93017G	*
	V91X1573X	GPC 3 FAIL STATUS OF GPC 3-DISC	FCOS				93017G	*
	V91X1579X	GPC 4 FAIL STATUS OF GPC 4-DISC	FCOS				93017G	*
	V91X1668X	GPC 5 FAIL STATUS OF GPC 5-DISC	SYS S/W				93017G	*
	V91X2011X	FF 1 MDM FAIL	FCOS		BD			
	V91X2012X	FF 2 MDM FAIL	FCOS		BD			
	V91X2013X	FF 3 MDM FAIL	FCOS		BD			
	V91X2014X	FF 4 MDM FAIL	FCOS		BD			

TABLE 4.2.15-5. INPUT FUNCTIONAL PARAMETERS FOR GNC SYSTEMS SUMMARY 1 DISPLAY (G6.31)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V91X2015X	FA 1 MDM FAIL	FCOS		BD			
	V91X2016X	FA 2 MDM FAIL	FCOS		BD			
	V91X2017X	FA 3 MDM FAIL	FCOS		BD			
	V91X2018X	FA 4 MDM FAIL	FCOS		BD			
	V94J4135C	LIB HI/LO SATURATION STATUS	GAX		VAR			
	V94J4136C	LOB HI/LO SATURATION STATUS	GAX		VAR			
	V94J4137C	RIB HI/LO SATURATION STATUS	GAX		VAR			
	V94J4138C	ROB HI/LO SATURATION STATUS	GAX		VAR			
	V94J4140C	L RHC CH 1 I/O, FAIL STATUS	GAX		VAR			
	V94J4141C	L RHC CH 2 I/O, FAIL STATUS	GAX		VAR			
	V94J4142C	L RHC CH 3 I/O, FAIL STATUS	GAX		VAR			
	V94J4143C	R RHC CH 1 I/O, FAIL STATUS	GAX		VAR			
	V94J4144C	R RHC CH 2 I/O, FAIL STATUS	GAX		VAR			
	V94J4145C	R RHC CH 3 I/O, FAIL STATUS	GAX		VAR			
	V94J4146C	L SBTC CH 1 I/O, FAIL STATUS	GAX		VAR			
	V94J4147C	L SBTC CH 2 I/O, FAIL STATUS	GAX		VAR			
	V94J4148C	L SBTC CH 3 I/O, FAIL STATUS	GAX		VAR			
	V94J4149C	R SBTC CH 1 I/O, FAIL STATUS	GAX		VAR			
	V94J4150C	R SBTC CH 2 I/O, FAIL STATUS	GAX		VAR			
	V94J4151C	R SBTC CH 3 I/O, FAIL STATUS	GAX		VAR			
	V94J4160C	IMU 1 I/O, FAIL STATUS	GAX		VAR			
	V94J4161C	IMU 2 I/O, FAIL STATUS	GAX		VAR			
	V94J4162C	IMU 3 I/O, FAIL STATUS	GAX		VAR			
	V94J4165C	AA 1 I/O, FAIL STATUS	GAX		VAR			
	V94J4166C	AA 2 I/O, FAIL STATUS	GAX		VAR			
	V94J4167C	AA 3 I/O, FAIL STATUS	GAX		VAR			
	V94J4168C	AA 4 I/O, FAIL STATUS	GAX		VAR			
	V94J4180C	RGA 1 I/O, FAIL STATUS	GAX		VAR			
	V94J4181C	RGA 2 I/O, FAIL STATUS	GAX		VAR			
	V94J4182C	RGA 3 I/O, FAIL STATUS	GAX		VAR			
	V94J4183C	RGA 4 I/O, FAIL STATUS	GAX		VAR			
	V94J4190C	TACAN 1 I/O, FAIL STATUS	GAX		VAR			
	V94J4191C	TACAN 2 I/O, FAIL STATUS	GAX		VAR			
	V94J4192C	TACAN 3 I/O, FAIL STATUS	GAX		VAR			
	V94J4193C	MSBLS 1 I/O, FAIL STATUS	GAX		VAR			
	V94J4194C	MSBLS 2 I/O, FAIL STATUS	GAX		VAR			
	V94J4195C	MSBLS 3 I/O, FAIL STATUS	GAX		VAR			
	V94J4200C	ADTA 1 I/O, FAIL STATUS	GAX		VAR			
	V94J4201C	ADTA 2 I/O, FAIL STATUS	GAX		VAR			
	V94J4202C	ADTA 3 I/O, FAIL STATUS	GAX		VAR			
	V94J4203C	ADTA 4 I/O, FAIL STATUS	GAX		VAR			
	V94J4210C	FCS CH 1 I/O, FAIL STATUS	GAX		VAR		92230F	
	V94J4211C	FCS CH 2 I/O, FAIL STATUS	GAX		VAR		92230F	
	V94J4212C	FCS CH 3 I/O, FAIL STATUS	GAX		VAR		92230F	
	V94J4213C	FCS CH 4 I/O, FAIL STATUS	GAX		VAR		92230F	
	V94J4260C	F1 JET FAIL ON,LK,OFF	GAX		VAR			

TABLE 4.2.15-5. INPUT FUNCTIONAL PARAMETERS FOR GNC SYSTEMS SUMMARY 1 DISPLAY (G6.31)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V94J4261C	F2 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4262C	F3 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4263C	F4 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4264C	L1 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4265C	L2 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4266C	L3 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4267C	L4 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4268C	R1 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4269C	R2 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4270C	R3 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4271C	R4 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4272C	F5 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4273C	R5 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4274C	L5 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4300C	RCS F1 MANF ISLN VLV OP/CL IO STAT	GAX		VAR		92230F	
	V94J4301C	RCS F2 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4302C	RCS F3 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4303C	RCS F4 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4304C	RCS L1 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4305C	RCS L2 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4306C	RCS L3 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4307C	RCS L4 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4308C	RCS R1 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4309C	RCS R2 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4310C	RCS R3 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4311C	RCS R4 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4541C	RCS F5 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4543C	RCS L5 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4545C	RCS R5 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4590C	AFT RHC CH 1 I/O,FAIL STATUS	GAX		VAR			
	V94J4591C	AFT RHC CH 2 I/O,FAIL STATUS	GAX		VAR			
	V94J4592C	AFT RHC CH 3 I/O,FAIL STATUS	GAX		VAR			
	V94J4593C	FWD THC 1 I/O,FAIL STATUS	GAX		VAR			
	V94J4594C	FWD THC 2 I/O,FAIL STATUS	GAX		VAR			
	V94J4595C	FWD THC 3 I/O,FAIL STATUS	GAX		VAR			
	V94J4596C	AFT THC 1 I/O,FAIL STATUS	GAX		VAR			
	V94J4597C	AFT THC 2 I/O,FAIL STATUS	GAX		VAR			
	V94J4598C	AFT THC 3 I/O,FAIL STATUS	GAX		VAR			
	V94J4676C	LOB HINGE MOMENT EXCEED STATUS	GAX		VAR			
	V94J4677C	LIB HINGE MOMENT EXCEED STATUS	GAX		VAR			
	V94J4678C	RIB HINGE MOMENT EXCEED STATUS	GAX		VAR			
	V94J4679C	ROB HINGE MOMENT EXCEED STATUS	GAX		VAR			
	V94J6001C	GPS 1 I/O, FAIL STATUS	GAX		VAR		92067D	
	V94J6002C	GPS 2 I/O, FAIL STATUS	GAX		VAR		92067D	
	V94J6003C	GPS 3 I/O, FAIL STATUS	GAX		VAR		92067D	
	V94U4125C	LT OTBD ELVN HINGE MOM PCT	GAX	PCT	VAR			

TABLE 4.2.15-5. INPUT FUNCTIONAL PARAMETERS FOR GNC SYSTEMS SUMMARY 1 DISPLAY (G6.31)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V94U4126C	LT INBD ELVN HINGE MOM PCT	GAX	PCT	VAR			
	V94U4127C	RT OTBD ELVN HINGE MOM PCT	GAX	PCT	VAR			
	V94U4128C	RT INBD ELVN HINGE MOM PCT	GAX	PCT	VAR			

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.15-6. OUTPUT FUNCTIONAL PARAMETERS FROM GNC SYSTEMS SUMMARY 1 DISPLAY (G6.31)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
 (HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

TABLE 4.2.15-7. GNC SYSTEMS SUMMARY 1 DISPLAY (G6.31) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
GPS_INSTALLED(1)	V97U2924C	ND	D		M	X	G4.17 G4.20 G4.21 G4.23 G4.24 G4.25 G6.11 G6.21 G6.31 G6.51 V5.1.4	00	GPI	92292B	
GPS_INSTALLED(2)	V97U2831C	ND	D		M	X	G4.17 G4.20 G4.21 G4.23 G4.24 G4.25 G6.11 G6.21 G6.31 G6.51 V5.1.4	00	GPI	92292B	
GPS_INSTALLED(3)	V97U2925C	ND	D		M	X	G4.17 G4.20 G4.21 G4.23 G4.24 G4.25 G6.11 G6.21 G6.31 G6.51 V5.1.4	00	GPI	92292B	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.15-8. GNC SYSTEMS SUMMARY 1 DISPLAY (G6.31) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.15-9. GNC SYSTEMS SUMMARY 1 DISPLAY (G6.31) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.16 ASCENT TRAJECTORY 1 (BFS)

TITLE: XXXXXX TRAJ 1 – The title of this display is partially dynamic to indicate the major mode in which the display is requested. The XXXXXX is driven LAUNCH for MM101. For MM102, it is driven ASCENT except when an abort mode has been selected. When an abort mode is selected, it reflects the abort mode, (i.e., ATO, and RTLS).

TYPE: OPS/1011, 1021

AVAILABILITY: BFS, OPS 1

4.2.16.1 Purpose, Operation, and Organization

The XXXXXX TRAJ 1 display provides the trajectory information following the SSME start command. The display will be up as LAUNCH TRAJ 1 during OPS 1 prior to liftoff and as ASCENT TRAJ 1 until SRB staging, when it will be replaced by ASCENT TRAJ 2 unless an abort mode is selected. The display will be changed to an appropriate display upon transition to the abort mode. The display format is presented in Figure 4.2.16-1.

1. The central plot (curved line) is an altitude (H) vs. velocity profile relative to the launch site (VR) from the mission trajectory. No scale appears on the CRT. A horizontal line intersects the curved line at a I-loaded altitude which indicates the highest ejection altitude. Tick marks on the curved line correspond to LVLH ADI-ball angles of 70, 60, 50, and 40 degrees. Background data for this display are the design-dependent requirements presented in Table 4.2.16-3 and mission-dependent parameter (Table 4.2.16-7) defined in the STS Flight Software Initialization Load (JSC-19350). The current vehicle state from navigation is shown by a moving, overbright, and large size triangle with an update rate of once per 1920 MS. The predicted state for 20 seconds in the future is indicated by an overbright circle and updated at a rate of once per 1920 MS.
2. "PC < 50" (SRB chamber pressure less than 50 psi) is displayed double over bright and flashing whenever that discrete is set by the SRB SEP Sequencer.
3. A digital readout throttle command "T" (in percent), to the engines, shall be displayed with an update rate of 960ms.
4. "SEP INH" shall be displayed, double overbright and flashing, at the XXX XXX position below "T" if the SRB SEP inhibit discrete is set by the SRB SEP sequencer.
5. The scale on the left is Equivalent Airspeed in Knots (KEAS) with a moving, overbright, oversize triangle indicating the current EAS. A tick mark at a mission-dependent value indicates safe staging EAS. Update rate is 320 MS. The moving indicator will flash if EAS exceeds a mission-dependent value (V97U6729C).
6. Prior to BFS ENGAGE the ADI errors in roll, pitch and yaw computed by BFS software shall be displayed for comparison with the PASS driven ADI error needles. These parameters and their text labels shall be dynamically driven. Signs of the error values shall be driven U, D, L, R to indicate fly-to errors, e.g., the action required to null these errors is:

R roll error, roll right
U pitch error, pitch up
R yaw error, yaw right

If the computed value of R roll error is 100 degrees or greater in either direction, then the roll error display shall show an overflow indicator of “R>>” for a right fly-to roll error or “L>>” for a left fly-to roll error. When the value of R roll error returns to the normal display range of 99 degrees or less, the overflow indicator shall be replaced by the sign and value of roll error as defined above.

Update rate shall be once every 960 ms.

These parameters shall not be displayed post BFS ENGAGE.

Table 4.2.16–1. ASCENT TRAJECTORY 1 Keyboard Processing

Not Applicable.

4.2.16.2 Ascent Trajectory 1 Keyboard Processing Addendum.

Not applicable.

4.2.16.3 Ascent Trajectory 1 CRT Display Processing Addendum.

All necessary processing for dynamic symbols on this display are defined in the Appendix B.4.206 (Ascent Traj DIP) of this FSSR. The overbright symbols (referenced by following addenda B, D, & E) are displayed at the intensity level of 43 overwritten twice (equivalent intensity of 86) with the exception of the circle which is at 21.

- A. Chamber Pressure. When a discrete from the SRB separation sequencer is set, a character string “PC < 50” is to be displayed double overbright and flashing at the specified field on the CRT.
- B. Flash Flag for EAS Symbol. If this discrete, V94X3901X, is set, display the symbol flashing on the CRT field. If the discrete is reset, display the symbol without flashing.
- C. Dynamic Display Title. The title of this display is defined by the integer value of Display Title ID (V94J3910C) as follows:

Value	Title
1	LAUNCH TRAJ 1
2	ASCENT TRAJ 1
3	RTLS TRAJ 1
5	ATO TRAJ 1

- D. Vehicle Predicted Position. Display a circle with a radius of 5 AUs at the location specified by dynamic data.

- E. Vehicle Current Position. Display the up-pointing triangle (symbol, 7F) at the location specified by dynamic data.
- F. ADI Error Data. This data will not be displayed post BFS engage.
- G. Throttle Setting. This field shall be blank until MM 102.

NOTES: Maximum number of mission-dependent constants are as follows:

- (a) 11 solid lines
- (b) 0 dashed lines
- (c) 14 character strings

4.2.16.4 Ascent Trajectory 1 Figure/Table References

Figure 4.2.16-1	Ascent Trajectory 1 Display (BFS) Generic
Table 4.2.16-1	Keyboard Processing Table N/A
Table 4.2.16-2	CRT Display Processing Table
Table 4.2.16-3	CRT Display Processing Background Requirements
Table 4.2.16-4	Mission Design Background Constants N/A
Table 4.2.16-5	Input Functional Parameters N/A
Table 4.2.16-6	Output Functional Parameters N/A
Table 4.2.16-7	I-Loads
Table 4.2.16-8	K-Loads
Table 4.2.16-9	Constants N/A

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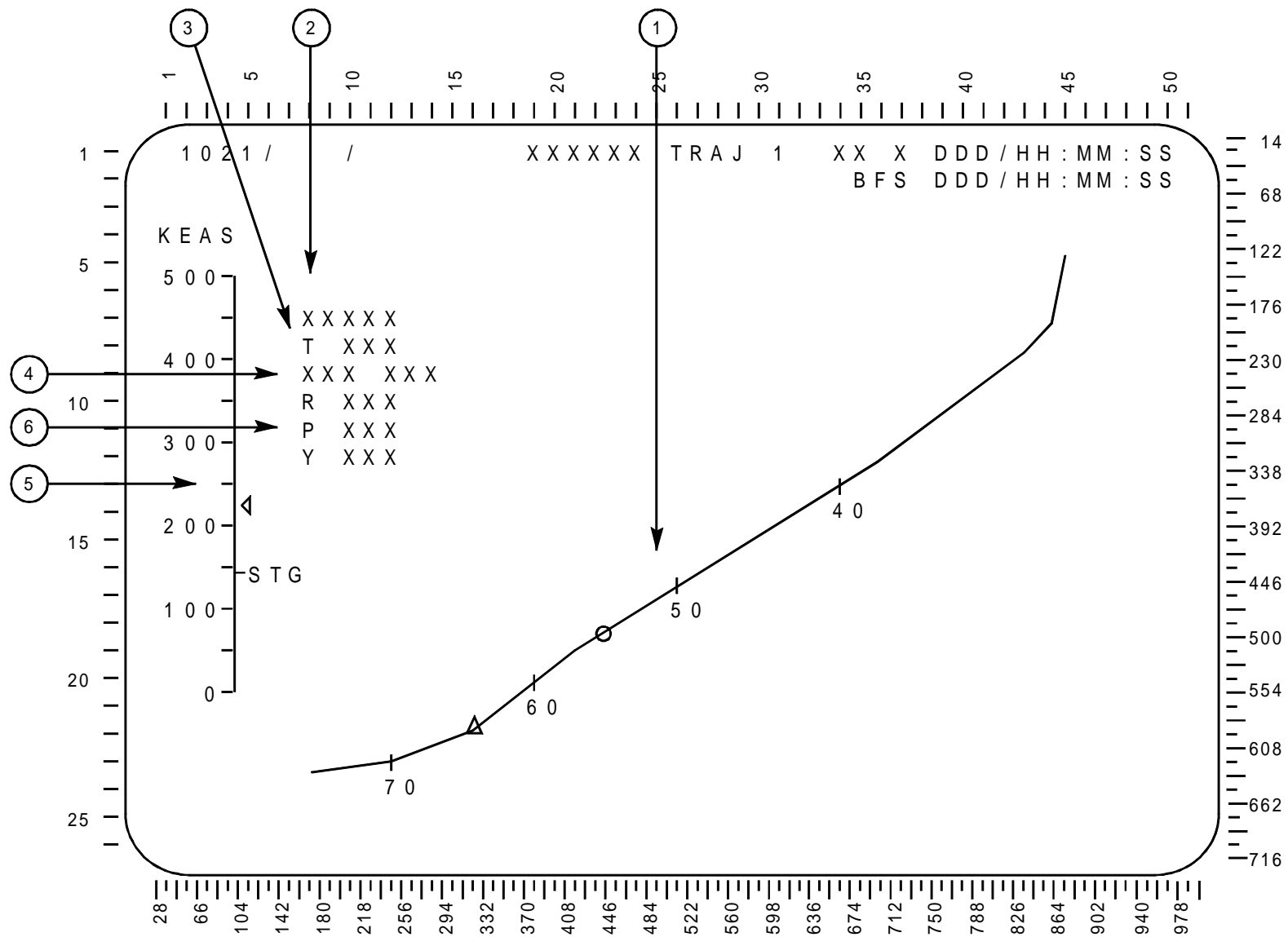


FIGURE 4.2.16-1. Ascent Trajectory 1 Display (BFS)

Table 4.2.16-2. ASCENT TRAJECTORY 1 (BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T				
			X	Y		CHAR	BILEVEL																	TYPE			
							1	0																			
001	(OPS)	V93X0040X	2	1		5.0																					
002	(SPEC)	V93X0042X	7	1		4.0																					
003	(DISP)	V93X0044X	10	1		4.0																					
004	(TITLE)	V93X0046X	19	1		17.0															C	MI			CRT TITLE	X	
005	(UL)	V92X5032X	34	1		2.0	UL							X	G							MI				UPLINK ACTIVITY IND	X
006	(GPC)	V93X0048X	36	1		2.0																MI				GPC DRIVER	X
007	(MT)	V91W1990C	39	1		12.0			DHMS													BOS				MISSION ELAPSED TIME	X
008	(CRT TIMER)	V91W1987C	39	2		12.0			DHMS													BOS				DISPLAY CRT TIMER,GNC	X
009	XXXXX (PC<50)	V90X8332X	8	7		5.0						X	X								A	SRB SP				LH/RH SRB PC 50 PSI FLAG	X
010	T	V90U1948C	9	8		4.0			PCT												G	PF GD				COMMANDED SSME THROTTLE SETTING	X
011	(CUR X POS)	V94L3881C																				DOP 5				ASC TRAJ ALT/VEL X COORD	
012	(CUR VEH STATE)	V94L3882C			*							X									E	DOP 5				ASC TRAJ ALT/VEL Y COORD	
013	(PRED X POS)	V94L3884C																				DOP 5				ASC TRAJ ALT/VEL PRED X COORD	
014	(PRED Y POS)	V94L3896C										X									D	DOP 5				ASC TRAJ ALT/VEL PRED Y COORD	
015	(EAS Y POS)	V94U3895C			*							X	X	F							B	DOP 5				ASC TRAJ 1 Y COORD OF EAS	
016	XXX	V90X8340X	8	9		3.0	SEP						X	X	B							SRB SP				SRB AUTO SEP INHIBIT CREW ALERT	X
017	XXX	V90X8340X	12	9		3.0	INH						X	X	B							SRB SP				SRB AUTO SEP INHIBIT CREW ALERT	X
018	(R)	V98U0017C	8	10		1.0															F	MI				ADI ROLL ERROR LABEL BFS	X
019	(P)	V98U0018C	8	11		1.0															F	MI				ADI PITCH ERROR LABEL BFS	X
020	(Y)	V98U0019C	8	12		1.0															F	MI				ADI YAW ERROR LABEL BFS	X

Table 4.2.16-2. ASCENT TRAJECTORY 1 (BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	STATUS	BLOCK	SIZE	INTELS	FLASHS	RATE	SIGN	LEADER	BRANCH	DWNLS	Add Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
021	R	V90H2234C	10	10		3.0			DEC	DEG					A	R				F	A DAP	BODY ROLL ATTITUDE ERROR	X	
022	P	V90H2233C	10	11		3.0			DEC	DEG					A	U				F	A DAP	BODY PITCH ATTITUDE ERROR	X	
023	Y	V90H2235C	10	12		3.0			DEC	DEG					A	R				F	A DAP	BODY YAW ATTITUDE ERROR	X	
100	(MSG LINE)	V93X0050X	2	25		46.0			CHAR						G						MI	MESSAGE LINE	X	
101	(BUFFER MSG)	V93X0054X	48	25		4.0			CHAR						G						MI	BUFFER MESSAGE INDICATOR	X	
102	(SPL)	V93X0056X	2	26		49.0			CHAR						G						MI	SCRATCH PAD LINE	X	
103	(BFS)	V98X0015X	35	2		3.0			CHAR				X		G						MI	BFS IDENTIFIER	BFS	X

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Table 4.2.16-3. ASCENT TRAJECTORY 1 CRT DISPLAY PROCESSING DESIGN-DEPENDENT BACKGROUND REQUIREMENTS				
VECTORS				
VECTOR ID	ORIGIN		TERMINAL	
	X (AU)	Y (AU)	X (AU)	Y (AU)
KEAS	101	150	101	550
CHARACTER STRINGS				
Character ID	ORIGIN			
	X(AU)	Y(AU)		
0	75		550	
100	37		470	
200	37		390	
300	37		310	
400	37		230	
500	37		150	
KEAS	37		120	
<p>Minus sign symbol (2D) used for tick marks located @ X=94, 150, 190, 230, 270, 310, 350, 390, 430, 470, 510, 550.</p> <p>Design dependent location of dynamic symbols:</p> <p>Left pointing triangle (symbol, 0C) KEAS scale centered at X = 107</p> <p>NOTE: X, Y position data for design dependent parameters are with respect to the upper left corner of the CRT.</p>				

TABLE 4.2.16-7. BFS ASCENT TRAJECTORY 1 (4.2.16) I-LOADS

BFS NAME	MSID	ENG UNITS	DT	PR	D	S	PARA	MC	CAT	LAST CR	R E V
A1_CHAR_STRING(01,1)	V97U7102C	ND	SY		M	C	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(01,2)	V97U7103C	AU	I	S	M	C	4.2.16	00	DAG	93012D	
A1_CHAR_STRING(01,3)	V97U7104C	AU	I	S	M	C	4.2.16	00	DAG	93012D	
A1_CHAR_STRING(02,1)	V97U7105C	ND	CH		M	C	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(02,2)	V97U7106C	AU	I	S	M	C	4.2.16	00	DAG	93012D	
A1_CHAR_STRING(02,3)	V97U7107C	AU	I	S	M	C	4.2.16	00	DAG	93012D	
A1_CHAR_STRING(03,1)	V97U7108C	ND	SY		M	C	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(03,2)	V97U7109C	AU	I	S	M	C	4.2.16	00	DAG	93012D	
A1_CHAR_STRING(03,3)	V97U7110C	AU	I	S	M	C	4.2.16	00	DAG	93012D	
A1_CHAR_STRING(04,1)	V97U7111C	ND	CH		M	C	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(04,2)	V97U7112C	AU	I	S	M	C	4.2.16	00	DAG	93012D	
A1_CHAR_STRING(04,3)	V97U7113C	AU	I	S	M	C	4.2.16	00	DAG	93012D	
A1_CHAR_STRING(05,1)	V97U7114C	ND	SY		M	C	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(05,2)	V97U7115C	AU	I	S	M	C	4.2.16	00	DAG	93012D	
A1_CHAR_STRING(05,3)	V97U7116C	AU	I	S	M	C	4.2.16	00	DAG	93012D	
A1_CHAR_STRING(06,1)	V97U7117C	ND	CH		M	C	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(06,2)	V97U7118C	AU	I	S	M	C	4.2.16	00	DAG	93012D	
A1_CHAR_STRING(06,3)	V97U7119C	AU	I	S	M	C	4.2.16	00	DAG	93012D	
A1_CHAR_STRING(07,1)	V97U7120C	ND	SY		M	C	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(07,2)	V97U7121C	AU	I	S	M	C	4.2.16	00	DAG	93012D	
A1_CHAR_STRING(07,3)	V97U7122C	AU	I	S	M	C	4.2.16	00	DAG	93012D	
A1_CHAR_STRING(08,1)	V97U7123C	ND	CH	S	M	C	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(08,2)	V97U7124C	AU	I	S	M	C	4.2.16	00	DAG	93012D	
A1_CHAR_STRING(08,3)	V97U7125C	AU	I	S	M	C	4.2.16	00	DAG	93012D	
A1_CHAR_STRING(09,1)	V97U7126C	ND	CH		M	B	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(09,2)	V97U7127C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(09,3)	V97U7128C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(10,1)	V97U7129C	ND	CH		M	B	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(10,2)	V97U7130C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(10,3)	V97U7131C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(11,1)	V97U7132C	ND	SY		M	B	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(11,2)	V97U7133C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(11,3)	V97U7134C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(12,1)	V97U7135C	ND	CH		M	B	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(12,2)	V97U7136C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(12,3)	V97U7137C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(13,1)	V97U7138C	ND	CH		M	B	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(13,2)	V97U7139C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(13,3)	V97U7140C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(14,1)	V97U7141C	ND	CH		M	B	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(14,2)	V97U7142C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_CHAR_STRING(14,3)	V97U7143C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_SOLID_LINE(01,1)	V97U7149C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(01,2)	V97U7150C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(01,3)	V97U7151C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(01,4)	V97U7152C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(02,1)	V97U7153C	AU	I	S	M	C	4.2.16	00	DAM	93012D	

TABLE 4.2.16-7. BFS ASCENT TRAJECTORY 1 (4.2.16) I-LOADS

BFS NAME	MSID	ENG UNITS	DT	PR	D	S	PARA	MC	CAT	LAST CR	R E V
A1_SOLID_LINE(02,2)	V97U7154C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(02,3)	V97U7155C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(02,4)	V97U7156C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(03,1)	V97U7157C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(03,2)	V97U7158C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(03,3)	V97U7159C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(03,4)	V97U7160C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(04,1)	V97U7161C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(04,2)	V97U7162C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(04,3)	V97U7163C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(04,4)	V97U7164C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(05,1)	V97U7165C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(05,2)	V97U7166C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(05,3)	V97U7167C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(05,4)	V97U7168C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(06,1)	V97U7169C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(06,2)	V97U7170C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(06,3)	V97U7171C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(06,4)	V97U7172C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(07,1)	V97U7173C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(07,2)	V97U7174C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(07,3)	V97U7175C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(07,4)	V97U7176C	AU	I	S	M	C	4.2.16	00	DAM	93012D	
A1_SOLID_LINE(08,1)	V97U7177C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_SOLID_LINE(08,2)	V97U7178C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_SOLID_LINE(08,3)	V97U7179C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_SOLID_LINE(08,4)	V97U7180C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_SOLID_LINE(09,1)	V97U7181C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_SOLID_LINE(09,2)	V97U7182C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_SOLID_LINE(09,3)	V97U7183C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_SOLID_LINE(09,4)	V97U7184C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_SOLID_LINE(10,1)	V97U7185C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_SOLID_LINE(10,2)	V97U7186C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_SOLID_LINE(10,3)	V97U7187C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_SOLID_LINE(10,4)	V97U7188C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_SOLID_LINE(11,1)	V97U7189C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_SOLID_LINE(11,2)	V97U7190C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_SOLID_LINE(11,3)	V97U7191C	AU	I	S	M	B	4.2.16	00	DF1	93012D	
A1_SOLID_LINE(11,4)	V97U7192C	AU	I	S	M	B	4.2.16	00	DF1	93012D	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

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TABLE 4.2.16-8. BFS ASCENT TRAJECTORY 1 (4.2.16) K-LOADS

BFS NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PARA	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.17 ASCENT TRAJECTORY 2 (BFS)

TITLE: XXXXXX TRAJ 2 – The title of this display is dynamic and will be ASCENT TRAJ 2 unless an abort is initiated. At abort mode initiation, it will indicate the abort mode selected, (i.e., ATO or TAL).

TYPE: OPS 1031

AVAILABILITY: BFS, OPS 1

4.2.17.1 Purpose, Operation, and Organization

The XXXXXX TRAJ 2 display provides the trajectory information during the second-stage boost. The display comes up automatically at SRB separation and stays up until the crew selection of a transition to major mode 104 or 303. The display format is presented in Figure 4.2.17-1.

1. The central plot (solid line) displays inertial velocity (IV) vs altitude (H) above the ellipsoid for nominal ascent and TAL. No scale appears on the CRT. Abort regions may be indicated along the plot as RTLS, GO, etc. Raster counts of line segments of these lines are mission-dependent parameters (Table 4.2.17-7) defined in the STS Flight Software Initialization Load (JSC-19350). The abort boundaries are only shown as a crew aid and do not imply BFS abort software implementation. The current vehicle state from navigation is shown by a moving, overbright, and large size right pointing triangle and with an update rate of 1920 ms. Predicted states for 30 and 60 seconds in the future are indicated by moving and overbright circles, with update rates of 1920 ms.
2. "H DOT" is a digital readout of the present radius rate from navigation in fps. Update rate is 960 ms.
3. The scale across the top is an inertial velocity (IV) scale. The limits are mission dependent but are 1000 FPS apart. A nominal cutoff (CO) mark will be indicated on it. For a TAL abort, the scale represents ΔV to go biased between the mission dependent limits. The CO tick mark represents a zero ΔV to go and will be the TAL MECO indicator. Present V from navigation and TAL ΔV to go are indicated by a moving, overbright, and large size down pointing triangle. Update rate is 320 ms.
4. A digital readout throttle command "T" (in percent), to the engines, shall be displayed with an update rate of 960 ms.
5. A digital readout of predicted MECO time (TMECO) is provided. This quantity comes from guidance. Update rate is 1920 ms.
6. "SEP INH" shall be displayed, double overbright and flashing, at the XXX XXX position below "TMECO" if the ET SEP inhibit discrete is set by the ET SEP sequencer.
7. The g's scale is total load factor in g's. The current load factor is indicated by an oversize, overbright, moving left pointing triangle which will flash if it exceeds an I-LOADED value. Update rate is once every 960 ms.
8. The ΔH DOT scale on the left is actual radius rate from navigation minus the nominal radius rate for the present velocity. Present ΔH DOT is indicated by a moving, oversize, overbright

left pointing triangle which flashes if off-scale. Update rate is once every 960 ms. If a TAL abort is initiated, the nominal radius rate will be different if the AOA target is different from nominal.

9. Prior to BFS ENGAGE the ADI errors in roll, pitch and yaw computed by BFS software shall be displayed for comparison with the PASS driven ADI error needles. These parameters and their text labels shall be dynamically driven. Signs of the error values shall be driven U, D, L, R to indicate fly-to errors, e.g., the action required to null these errors is:

R roll error,	roll right
U pitch error,	pitch up
R yaw error,	yaw right

If the computed value of R roll error is 100 degrees or greater in either direction, then the roll error display shall show an overflow indicator of “R>>” for a right fly-to roll error or “L>>” for a left fly-to roll error. When the value of R roll error returns to the normal display range of 99 degrees or less, the overflow indicator shall be replaced by the sign and value of roll error as defined above.

Update rate shall be 960 ms.
These parameters shall not be displayed during post BFS ENGAGE.

Table 4.2.17-1 Ascent Trajectory 2 Keyboard Processing

Not applicable

4.2.17.2 Ascent Trajectory 2 Keyboard Processing Addendum

Not applicable

4.2.17.3 Ascent Trajectory 2 CRT Display Processing Addendum

All necessary processing for dynamic symbols on this display are defined in the Appendix B.4.206 (Ascent Traj DIP) of this FSSR. The overbright symbols (referenced by following addenda A, C, D, G, & H) are displayed at the intensity level of 43 overwritten twice (equivalent intensity of 86) with the exception of the circle which is at 21.

- A. VI Scale. Display the “down pointing triangle” symbol (06) on the CRT field specified by the variable X position data and the constant Y position data (see Table 4.2.17-3).
- B. ADI Error Data. This data will not be displayed post BFS engage.
- C. Flash Flag for Δ H DOT Symbol. If the discrete (V94X3898X) is set, display the “left pointing triangle” symbol (0C) flashing on the CRT field. If the discrete is reset, display the symbol without flashing.
- D. Flash Flag for G Symbol. If the discrete (V94X3900X) is set, display the “left pointing triangle” symbol (0C) flashing on the CRT field. If the discrete is reset, display the symbol without flashing.

- E. Dynamic Display Title. The title of this display is defined by the integer value of the Display Title ID (V94J3910C) as follows:

Value	Title
6	ASCENT TRAJ 2
7	TAL TRAJ 2
8	ATO TRAJ 2

- F. Time of MECO. Time of MECO in seconds, input from the GNC module Powered Flight Guidance, is converted and displayed in minutes and seconds from liftoff.
- G. Current Vehicle State. Display current vehicle position using symbol (0B).
- H. Predicted Vehicle State. Display predicted vehicle position using a circle with a radius of 5 AUs.

NOTES: Maximum number of mission dependent constants are as follows:

- (a) 15 solid lines
- (b) 4 dashed lines
- (c) 10 character strings

4.2.17.4 Ascent Trajectory 2 Figure/Table References

Figure 4.2.17-1	Ascent Trajectory 2 Display (BFS) Generic
Table 4.2.17-1	Keyboard Processing Table N/A
Table 4.2.17-2	CRT Display Processing Table
Table 4.2.17-3	CRT Display Processing Background Requirements
Table 4.2.17-4	Mission Design Background Constants N/A
Table 4.2.17-5	Input Functional Parameters N/A
Table 4.2.17-6	Output Functional Parameters N/A
Table 4.2.17-7	I-Loads
Table 4.2.17-8	K-Loads
Table 4.2.17-9	Constants N/A

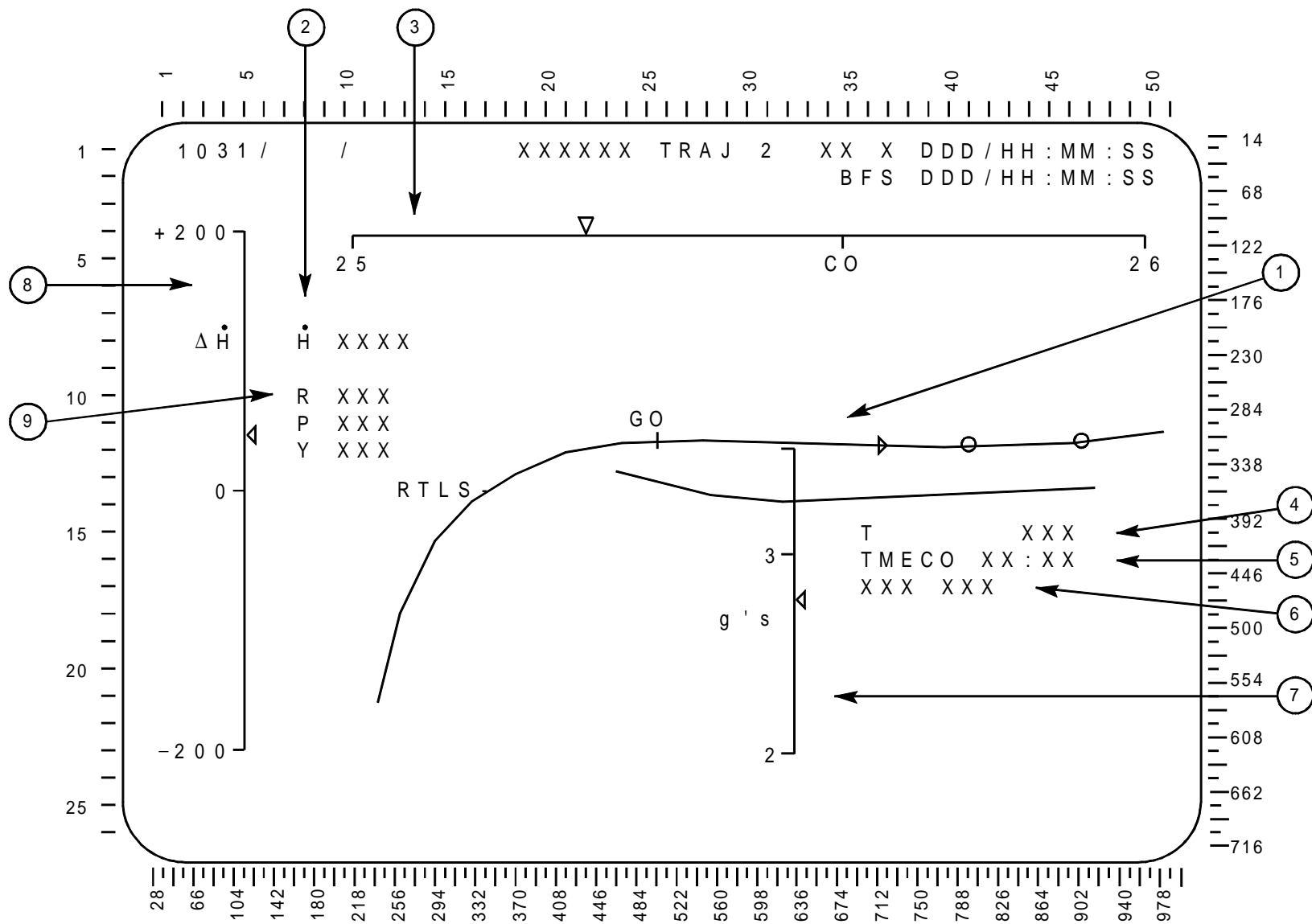


FIGURE 4.2.17-1. Ascent Trajectory 2 Display (BFS)

Table 4.2.17-2. ASCENT TRAJECTORY 2 (BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	STATUS	BLANK	SIZE	INTENS	FLASH	RATE	SIGN	LEADER	BRANCH	DWLIST	Add Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
021	(DEL H DOT Y POS)	V94U3894C			*						X		X	A					C	DOP 5	ASC TRAJ 2 Y COORD OF DELTA H-DOT			
022	(G Y POS)	V94U3893C			*						X		X	A					D	DOP 5	ASC TRAJ 2 Y COORD OF G-LOAD			
023	(R)	V98U0017C	8	10		1.0													B	MI	ADI ROLL ERROR LABEL BFS	X		
024	(P)	V98U0018C	8	11		1.0													B	MI	ADI PITCH ERROR LABEL BFS	X		
025	(Y)	V98U0019C	8	12		1.0													B	MI	ADI YAW ERROR LABEL BFS	X		
026	R	V90H2234C	10	10		3.0			DEG					A	R				B	A DAP	BODY ROLL ATTITUDE ERROR	X		
027	P	V90H2233C	10	11		3.0			DEG					A	U				B	A DAP	BODY PITCH ATTITUDE ERROR	X		
028	Y	V90H2235C	10	12		3.0			DEG					A	R				B	A DAP	BODY YAW ATTITUDE ERROR	X		
100	(MSG LINE)	V93X0050X	2	25		46.0								G						MI	MESSAGE LINE	X		
101	(BUFFER MSG)	V93X0054X	48	25		4.0								G						MI	BUFFER MESSAGE INDICATOR	X		
102	(SPL)	V93X0056X	2	26		49.0								G						MI	SCRATCH PAD LINE	X		
103	(BFS)	V98X0015X	35	2		3.0						X		G						MI	BFS IDENTIFIER BFS	X		

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Table 4.2.17-3. ASCENT TRAJECTORY 2 CRT DISPLAY PROCESSING DESIGN-DEPENDENT BACKGROUND REQUIREMENTS				
VECTORS				
	ORIGIN		TERMINAL	
VECTOR ID	X (AU)	Y (AU)	X (AU)	Y (AU)
DELTA H DOT scale	123	110	123	622
VI scale	213	110	963	110
g's scale	636	322	636	622
CHARACTER STRINGS				
	ORIGIN			
Character ID	X(AU)		Y(AU)	
+200	37		110	
0	94		366	
-200	37		622	
ΔH	75		217	
•	94		203	
3	610		422	
2	610		622	
g's	569		514	
Minus sign symbol (2D) used for tick marks DELTA H DOT scale ticks located at X=116, Y=110, 366, 622 g's scale ticks at X=629, Y=322, 422, 622				
Symbol (18) used for the following tick marks: VI scale ticks at Y = 119, X = 213, and 963				
Design dependent location of dynamic symbols: Left pointing triangle (symbol, 0C) DELTA H DOT scale centered at X = 129 g's scale centered at X = 642 Down-pointing triangle (symbol 06) VI scale centered at Y = 101.				
NOTE: X, Y position data for design dependent parameters are with respect to the upper left corner of the CRT.				

TABLE 4.2.17-7. BFS ASCENT TRAJECTORY 2 (4.2.17) I-LOADS

BFS NAME	MSID	ENG UNITS	DT	PR	D	S	PARA	MC	CAT	LAST CR	R E V
A2_CHAR_STRING(01,1)	V97U7309C	ND	CH		M	C	4.2.17	00	DF2	93012D	
A2_CHAR_STRING(01,2)	V97U7310C	AU	I	S	M	C	4.2.17	00	DAF	93012D	
A2_CHAR_STRING(01,3)	V97U7311C	AU	I	S	M	C	4.2.17	00	DAF	93012D	
A2_CHAR_STRING(02,1)	V97U7312C	ND	CH		M	C	4.2.17	00	DF2	93012D	
A2_CHAR_STRING(02,2)	V97U7313C	AU	I	S	M	C	4.2.17	00	DAF	93012D	
A2_CHAR_STRING(02,3)	V97U7314C	AU	I	S	M	C	4.2.17	00	DAF	93012D	
A2_CHAR_STRING(03,1)	V97U7315C	ND	CH		M	C	4.2.17	00	DF2	93012D	
A2_CHAR_STRING(03,2)	V97U7316C	AU	I	S	M	C	4.2.17	00	DAI	93012D	
A2_CHAR_STRING(03,3)	V97U7317C	AU	I	S	M	C	4.2.17	00	DF2	93012D	
A3_CHAR_STRING(04,1)	V97U7318C	ND	SY		M	C	4.2.17	00	DF2	93012D	
A2_CHAR_STRING(04,2)	V97U7319C	AU	I	S	M	C	4.2.17	00	DAI	93012D	
A2_CHAR_STRING(04,3)	V97U7320C	AU	I	S	M	C	4.2.17	00	DF2	93012D	
A2_CHAR_STRING(05,1)	V97U7321C	ND	CH		M	C	4.2.17	00	DAI	93012D	
A2_CHAR_STRING(05,2)	V97U7322C	AU	I	S	M	C	4.2.17	00	DF2	93012D	
A2_CHAR_STRING(05,3)	V97U7323C	AU	I	S	M	C	4.2.17	00	DF2	93012D	
A2_CHAR_STRING(06,1)	V97U7324C	ND	CH		M	C	4.2.17	00	DAI	93012D	
A2_CHAR_STRING(06,2)	V97U7325C	AU	I	S	M	C	4.2.17	00	DAI	93012D	
A2_CHAR_STRING(06,3)	V97U7326C	AU	I	S	M	C	4.2.17	00	DF2	93012D	
A2_CHAR_STRING(07,1)	V97U7327C	ND	SY		M	C	4.2.17	00	DF2	93012D	
A2_CHAR_STRING(07,2)	V97U7328C	AU	I	S	M	C	4.2.17	00	DAF	93012D	
A2_CHAR_STRING(07,3)	V97U7329C	AU	I	S	M	C	4.2.17	00	DAF	93012D	
A2_CHAR_STRING(08,1)	V97U7330C	ND	CH		M	B	4.2.17	00	DF2	93012D	
A2_CHAR_STRING(08,2)	V97U7331C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_CHAR_STRING(08,3)	V97U7332C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_DASH_LINE(01,1)	V97U7333C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_DASH_LINE(01,2)	V97U7334C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_DASH_LINE(01,3)	V97U7335C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_DASH_LINE(01,4)	V97U7336C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_DASH_LINE(02,1)	V97U7337C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_DASH_LINE(02,2)	V97U7338C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_DASH_LINE(02,3)	V97U7339C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_DASH_LINE(02,4)	V97U7340C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_DASH_LINE(03,1)	V97U7341C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_DASH_LINE(03,2)	V97U7342C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_DASH_LINE(03,3)	V97U7343C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_DASH_LINE(03,4)	V97U7344C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_DASH_LINE(04,1)	V97U7345C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_DASH_LINE(04,2)	V97U7346C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_DASH_LINE(04,3)	V97U7347C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_DASH_LINE(04,4)	V97U7348C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_SOLID_LINE(01,1)	V97U7369C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(01,2)	V97U7370C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(01,3)	V97U7371C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(01,4)	V97U7372C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(02,1)	V97U7373C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(02,2)	V97U7374C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(02,3)	V97U7375C	AU	I	S	M	C	4.2.17	00	DAN	93012D	

TABLE 4.2.17-7. BFS ASCENT TRAJECTORY 2 (4.2.17) I-LOADS

BFS NAME	MSID	ENG UNITS	DT	PR	D	S	PARA	MC	CAT	LAST CR	R E V
A2_SOLID_LINE(02,4)	V97U7376C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(03,1)	V97U7377C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(03,2)	V97U7378C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(03,3)	V97U7379C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(03,4)	V97U7380C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(04,1)	V97U7381C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(04,2)	V97U7382C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(04,3)	V97U7383C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(04,4)	V97U7384C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(05,1)	V97U7385C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(05,2)	V97U7386C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(05,3)	V97U7387C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(05,4)	V97U7388C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(06,1)	V97U7389C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(06,2)	V97U7390C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(06,3)	V97U7391C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(06,4)	V97U7392C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(07,1)	V97U7393C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(07,2)	V97U7394C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(07,3)	V97U7395C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(07,4)	V97U7396C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(08,1)	V97U7397C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(08,2)	V97U7398C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(08,3)	V97U7399C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(08,4)	V97U7400C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(09,1)	V97U7401C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(09,2)	V97U7402C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(09,3)	V97U7403C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(09,4)	V97U7404C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(10,1)	V97U7405C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(10,2)	V97U7406C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(10,3)	V97U7407C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(10,4)	V97U7408C	AU	I	S	M	C	4.2.17	00	DAN	93012D	
A2_SOLID_LINE(11,1)	V97U7409C	AU	I	S	M	C	4.2.17	00	DAO	93012D	
A2_SOLID_LINE(11,2)	V97U7410C	AU	I	S	M	C	4.2.17	00	DAO	93012D	
A2_SOLID_LINE(11,3)	V97U7411C	AU	I	S	M	C	4.2.17	00	DAO	93012D	
A2_SOLID_LINE(11,4)	V97U7412C	AU	I	S	M	C	4.2.17	00	DAO	93012D	
A2_SOLID_LINE(12,1)	V97U7413C	AU	I	S	M	C	4.2.17	00	DAO	93012D	
A2_SOLID_LINE(12,2)	V97U7414C	AU	I	S	M	C	4.2.17	00	DAO	93012D	
A2_SOLID_LINE(12,3)	V97U7415C	AU	I	S	M	C	4.2.17	00	DAO	93012D	
A2_SOLID_LINE(12,4)	V97U7416C	AU	I	S	M	C	4.2.17	00	DAO	93012D	
A2_SOLID_LINE(13,1)	V97U7417C	AU	I	S	M	C	4.2.17	00	DAO	93012D	
A2_SOLID_LINE(13,2)	V97U7418C	AU	I	S	M	C	4.2.17	00	DAO	93012D	
A2_SOLID_LINE(13,3)	V97U7419C	AU	I	S	M	C	4.2.17	00	DAO	93012D	
A2_SOLID_LINE(13,4)	V97U7420C	AU	I	S	M	C	4.2.17	00	DAO	93012D	
A2_SOLID_LINE(14,1)	V97U7421C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_SOLID_LINE(14,2)	V97U7422C	AU	I	S	M	B	4.2.17	00	DF2	93012D	

TABLE 4.2.17-7. BFS ASCENT TRAJECTORY 2 (4.2.17) I-LOADS

BFS NAME	MSID	ENG UNITS	DT	PR	D	S	PARA	MC	CAT	LAST CR	R E V
A2_SOLID_LINE(14,3)	V97U7423C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_SOLID_LINE(14,4)	V97U7424C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_SOLID_LINE(15,1)	V97U7425C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_SOLID_LINE(15,2)	V97U7426C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_SOLID_LINE(15,3)	V97U7427C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_SOLID_LINE(15,4)	V97U7428C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_CHAR_STRING(09,1)	V97U8405C	ND	CH		M	B	4.2.17	00	DF2	93012D	
A2_CHAR_STRING(09,2)	V97U8406C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_CHAR_STRING(09,3)	V97U8407C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_CHAR_STRING(10,1)	V97U8408C	ND	SY		M	B	4.2.17	00	DF2	93012D	
A2_CHAR_STRING(10,2)	V97U8409C	AU	I	S	M	B	4.2.17	00	DF2	93012D	
A2_CHAR_STRING(10,3)	V97U8410C	AU	I	S	M	B	4.2.17	00	DF2	93012D	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.17-8. BFS ASCENT TRAJECTORY 2 (4.2.17) K-LOADS

BFS NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PARA	LAST CR	R E V
-------------------------	------	----	-------------	-----------	----	--------	---	------	---------	-------------

NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.18 GNC SYSTEMS SUMMARY 2 (PFS/BFS)

TITLE: GNC SYS SUMM 2

TYPE: DISP/019 or SYS SUMM KEY

AVAILABILITY: GNC OPS 2 and 8, BFS GNC OPS 1, 3 and 6

4.2.18.1 Purpose, Operation, and Organization

This display is the principal format for monitoring of Orbiter RCS and OMS system performance. The displayed parameters were selected to support the caution and warning (C&W) function. The data and status information presented allows sufficient detail for a crewman to determine the required response to a GNC C&W alarm. The display shall present RCS consumables data and its status; the manifold jet statuses and the RCS manifold isolation valve position and I/O status; the OMS consumables data and its status. The display format is presented in Figure 4.2.18-1.

A. Functional requirements:

- (1) Parameters for the RCS propulsion system shall be displayed. Helium pressure, tank pressure, and manifold pressures in PSIA and propellant quantity in percent shall be displayed for both oxidizer and fuel in each of the forward (F), left (L), and right (R) RCS pods. Parameter status indicators for these RCS data shall include limit sensing, commfault, and blank (normal state) which shall be output as follows:

Helium pressure – Down arrow (↓) for pressure below the lower limit, “M” for missing data, or blank.

Tank pressure – Down arrow (↓) for pressure below the lower limit, up arrow (↑) for pressure above the upper limit or blank.

Manifold pressures – “M” for missing data or blank.

Propellant quantity – Down arrow (↓) for leak flag or quantity alert or blank.

The RCS jet manifold status indicators shall be presented for manifolds 1 through 5. The manifolds shall be listed by two-character identifiers. The first digit shall reflect the RCS Pod F (forward), L (left) or R (right), and the second digit shall be the manifold number. The jet fail status and type for each manifold shall be displayed as “ON” (failed on), “LK” (detected leak), “OFF” (failure to fire), or blank (no failures). The jet failure status output shall be the logical “OR” of the state of all jets on a manifold. The position of the RCS manifold isolation valves shall be displayed as “OP” for open and “CL” for closed, and shall reflect the position as determined by the software. The I/O status of the valves shall be displayed as “M” for an MDM or BCE commfault or as question mark (?) for a RCS manifold isolation valve dilemma detected by the software or blank for normal operation. Whenever an “M” is displayed the current valve status (OP or CL) will continue to be displayed.

- (2) Parameters for the OMS propulsion system shall be displayed. AFT quantities of oxidizer and fuel shall be displayed in percent remaining. Helium, oxidizer, and fuel tank pressures, nitrogen regulator and tank pressures, engine oxidizer and fuel inlet pressures shall be displayed in PSIA for the left and right pods. The position of the left and right engine nitrogen pressure valves shall be displayed as open or closed. The left and right one and two engine bi-propellant valve

positions shall be displayed in percent open. Parameter status indicators for each of these OMS data shall include limit sensing, commfault, and blank (normal state) which shall be output as follows:

{ OMS AFT Oxidizer quantity OMS Aft Fuel quantity }	down arrow (↓) for quantity below the lower limit, “M” for missing data, or blank.
Helium tank pressure Nitrogen tank pressure }	down arrow (↓) for quantity below the lower limit, “M” for missing data, or blank.
Oxidizer tank pressure Fuel tank pressure Nitrogen regulator pressure }	down arrow (↓) for pressure below the lower limit, an up arrow (↑) for pressure above the upper limit, “M” for missing data, or blank.
Engine oxidizer inlet pressure Engine fuel inlet pressure Engine nitrogen pressure valve position Engine bi-propellant valve 1 position Engine bi-propellant valve 2 position }	“M” for missing data, or blank.

4.2.18.2 BFS Supplemental Description

- (1) The JET FAIL status indication shall be ON, OFF or BLANK; LK is not supported.
- (2) RCS MANF 5 (Vernier Jets) status is not supported in BFS.
- (3) Pre-engage, BFS does not support display (OP,CL) of RCS manifold isolation valve positions (blanked). BFS does not support display of the question mark (?) for the RCS manifold isolation valve position status indicators.
- (4) If an “M” is displayed next to a displayed parameter, BFS will continue to display that parameter.
- (5) The Helium Pressure (He P) status indicator for forward, left and right RCS shall be:
 - a down arrow (↓) for out-of-limit low,
 - “L” for out-of-range low,
 - “H” for out-of-range high,
 - “M” for missing data/commfault,
 - blank for normal operation.

- (6) The Tank Pressure (TK P) status indicator for forward, left and right RCS shall be:
 - down arrow (↓) for out-of-limit low,
 - “L” for out-of-range low,
 - up arrow (↑) for out-of-limit high,
 - “H” for out-of-range high,
 - “M” for missing data/commfault,
 - blank for normal operation.
- (7) The propellant QTY status indication for forward, left, and right RCS shall be a down arrow (↓) for LEAK, “M” for missing data (with a static display of the last value of quantity remaining), or blank.
- (8) Data shown over a stippled background on the display generic format signifies background nomenclature and data fields supported and driven only by BFS.
- (9) For the BFS only, the left (L) and right (R) OMS Fuel Injector Temperatures (OMS FU INJ T) shall be displayed. The parameter status indicators for these measurements shall be supported as follows:
 - a) Up arrow (↑) whenever the temperature exceeds a high limit value (I-Load V96U9051C),
 - b) An “M” for missing data/commfault or,
 - c) Shall be blank (⌀) for normal operations.
- (10) BFS shall display ‘OMS AFT OX/FU QTY’ status as an ‘M’ for missing data/commfault, or shall be blank (⌀) for normal operation.

Table 4.2.18-1 GNC Systems Summary 2 Keyboard Processing

Not applicable

4.2.18.3 GNC Systems Summary 2 Keyboard Processing Addendum

Not applicable

4.2.18.4 GNC Systems Summary 2 CRT Display Processing Addendum

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word “STAT” being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT Display Processing Tables 4.2.18-2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the “M” PSI is displayed (for commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)			
Blank (default)	↓		M	∅
1	↓	↑	M	∅
2		↑	M	∅
3	↓			∅
4		↑		∅
5	↓		?	∅
6	↓	↑		∅
7			M	∅
8	↓		?	M ∅
9			?	M ∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.2.18–2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. RCS JET FAIL Status and Type. The remote texts (RTXT) displayed in this field are as follows:

ON	(runaway jet)
LK	(leak)
OFF	(failure to fire)
∅	(blank indicates no failures–normal state)

- B. In the event of a BCE or MDM commfault, the last valid valve position will continue to be displayed.
- C. For a commfault or I/O Error (resulting in missing data) the last valid ‘OMS AFT QTY’ value will continue to be displayed until the condition is cleared (BFS software only).
- D. The OMS AFT QTY LO/IO status will be displayed as follows:
- | | |
|---|---|
| ∅ | Blank indicates OMS QTY valid low level sensor ‘OFF’. |
| M | OMS QTY commfaulted, low level sensor ‘OFF’. |
| ↓ | Low level sensor ‘ON’, OMS QTY valid or commfaulted. |
- E. In the event of a LOW LEVEL commfault, the last valid OMS LOW LEVEL sensor status will continue to be displayed until the condition is cleared.

4.2.18.5 GNC Systems Summary 2 Figure/Table References

Figure 4.2.18-1	GNC System Summary 2 Display (PFS/BFS)
Table 4.2.18-1	Keyboard Processing Table N/A
Table 4.2.18-2	CRT Display Processing Table
Table 4.2.18-3	CRT Display Processing Background Requirements N/A
Table 4.2.18-4	Mission Design Background Constants N/A
Table 4.2.18-5	Input Functional Parameters
Table 4.2.18-6	Output Functional Parameters
Table 4.2.18-7	I-Loads
Table 4.2.18-8	K-Loads
Table 4.2.18-9	Constants

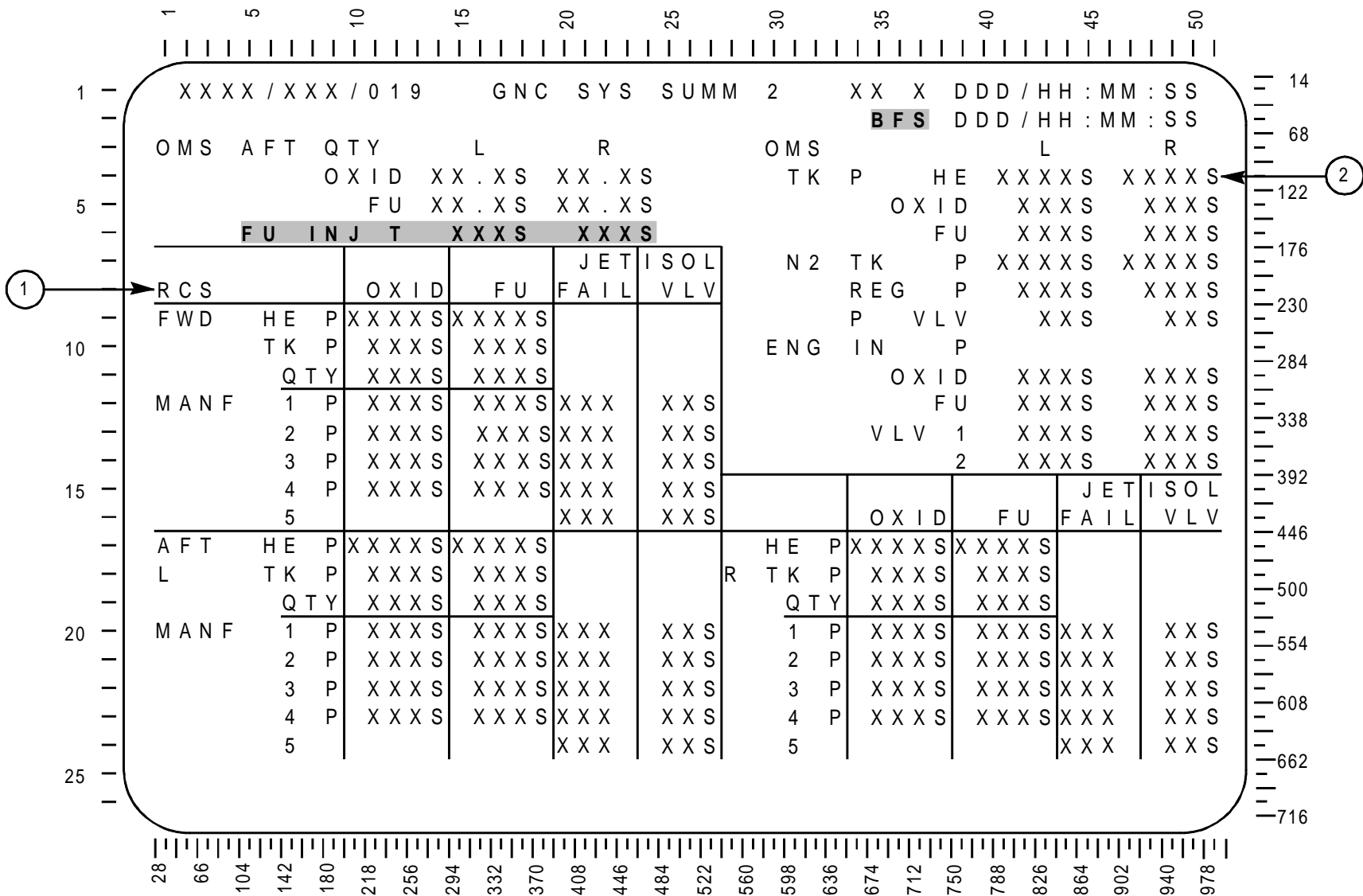


FIGURE 4.2.18-1.GNC SYS SUMM 2 Display (PFS/BFS)

Table 4.2.18-2. GNC SYS SUMM 2 (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format				U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source		Nomenclature	C R T	
			X	Y		CHAR	BILEVEL		TYPE													PFS	BFS			
							1	0																		
001	(OPS)	V93X0040X	2	1		5.0																UI	N/S	OPS FUNCTION PAGE	X	
002	(OPS)	V93X0040X	2	1		5.0																	N/S	MI	OPS FUNCTION PAGE	X
003	(SPEC)	V93X0042X	7	1		4.0																	UI	MI	SPEC FUNCTION PAGE	X
004	(DISP)	V93X0044X	10	1		4.0																	UI	MI	DISPLAY FUNCTION PAGE	X
005	(UL)	V92X5032X	34	1		2.0	UL							X	G								UI	MI	UPLINK ACTIVITY IND	X
006	(GPC)	V93X0048X	36	1		2.0																	UI	N/S	GPC DRIVER	X
007	(GPC)	V93X0048X	36	1		2.0																	N/S	MI	GPC DRIVER	X
008	(MT)	V91W1990C	39	1		12.0																	FCOS	BOS	MISSION ELAPSED TIME	X
009	(CRT TIMER)	V91W1987C	39	2		12.0																	FCOS	BOS	DISPLAY CRT TIMER.GNC	X
010	RCS F HE P OXID	V94P4320C	9	9		5.0																	4.110	RCS Q	RCS FWD HE PRESS OX	X
011	RCS F TK P OXID	V94P4322C	10	10		4.0																	4.110	RCS Q	RCS FWD TK PRESS OX	X
012	RCS F QTY OXID	V90Q2360C	10	11		4.0																	4.102	RCS Q	RCS FWD OX QUANTITY REMAINING DISP	X
013	OMS L AFT OX QTY	V94Q4629C	13	4		5.1																C	4.110	GAX	OMS-L AFT OX QTY PERCENT DISP	X
014	OMS L AFT FU QTY	V94Q4631C	13	5		5.1																C	4.110	GAX	OMS-L AFT FU QTY PERCENT DISP	X
015	RCS F HE P FU	V94P4321C	14	9		5.0																	4.110	RCS Q	RCS FWD HE PRESS FU	X
016	RCS F TK P FU	V94P4323C	15	10		4.0																	4.110	RCS Q	RCS FWD TK PRESS FU	X
017	RCS F QTY FU	V90Q2361C	15	11		4.0																	4.102	RCS Q	RCS FWD FU QUANTITY REMAINING DISP	X
018	RCS F HE P OX (S)	V94J4340C	14	9		1.0																	4.110	RCS Q	RCS FWD HE PRESS OX LO/IO STATUS	X
019	RCS F TK P OX (S)	V94J4342C	14	10		1.0																1	4.110	RCS Q	RCS FWD TK PRESS OX HI/LO/IO STAT	X
020	RCS F QTY OX (S)	V94J4361C	14	11		1.0																3	4.110	RCS Q	FWD RCS QTY OX IO/LK STATUS	X

Table 4.2.18-2. GNC SYS SUMM 2 (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S	Add Ref	Source		Nomenclature	C R T		
			X	Y		CHAR	BILEVEL														TYPE	PFS			BFS	
							1	0																		
021	OMS L AFT OX QTY(S)	V94J4633C	18	4		1.0															D,E	4.110	GAX	OMS-L AFT OX QTY LO/IO STAT	X	
022	OMS L AFT FU QTY(S)	V94J4635C	18	5		1.0																D,E	4.110	GAX	OMS-L AFT FU QTY LO/IO STAT	X
023	OMS R AFT OX QTY	V94Q4630C	19	4		5.1																D,E	4.110	GAX	OMS-R AFT OX QTY PERCENT DISP	X
024	OMS R AFT FU QTY	V94Q4632C	19	5		5.1																D,E	4.110	GAX	OMS-R AFT FU QTY PERCENT DISP	X
025	RCS F HE P FU (S)	V94J4341C	19	9		1.0																	4.110	RCS Q	RCS FWD HE PRESS FU LO/IO STATUS	X
026	RCS F TK P FU (S)	V94J4343C	19	10		1.0																1	4.110	RCS Q	RCS FWD TK PRESS FU HI/LO/IO STAT	X
027	RCS F QTY FU (S)	V94J4360C	19	11		1.0																3	4.110	RCS Q	FWD RCS QTY FU IO/LK STATUS	X
028	OMS R AFT OX QTY(S)	V94J4634C	24	4		1.0																	4.110	GAX	OMS-R AFT OX QTY LO/IO STAT	X
029	OMS R AFT FU QTY(S)	V94J4636C	24	5		1.0																	4.110	GAX	OMS-R AFT FU QTY LO/IO STAT	X
030	RCS L HE P OXID	V94P4324C	9	17		5.0																	4.110	RCS Q	RCS L HE PRESS OX	X
031	RCS L TK P OXID	V94P4326C	10	18		4.0																	4.110	RCS Q	RCS L TK PRESS OX	X
032	RCS L QTY OXID	V90Q2362C	10	19		4.0																	4.102	RCS Q	RCS-L AFT OX QTY REMAINING DISP	X
033	RCS L 1 P OXID	V94P4770C	10	20		4.0																	4.110	GAX	RCS L OX MANF 1 PRESS	X
034	RCS L 2 P OXID	V94P4771C	10	21		4.0																	4.110	GAX	RCS L OX MANF 2 PRESS	X
035	RCS L 3 P OXID	V94P4772C	10	22		4.0																	4.110	GAX	RCS L OX MANF 3 PRESS	X
036	RCS L 4 P OXID	V94P4773C	10	23		4.0																	4.110	GAX	RCS L OX MANF 4 PRESS	X
037	RCS F 1 P OXID	V94P4852C	10	12		4.0																	4.110	GAX	RCS F OX MANF 1 PRESS	X
038	RCS F 2 P OXID	V94P4853C	10	13		4.0																	4.110	GAX	RCS F OX MANF 2 PRESS	X
039	RCS F 3 P OXID	V94P4854C	10	14		4.0																	4.110	GAX	RCS F OX MANF 3 PRESS	X
040	RCS F 4 P OXID	V94P4855C	10	15		4.0																	4.110	GAX	RCS F OX MANF 4 PRESS	X
041	RCS F 1 P FU	V94P4856C	15	12		4.0																	4.110	GAX	RCS F FU MANF 1 PRESS	X
042	RCS F 2 P FU	V94P4857C	15	13		4.0																	4.110	GAX	RCS F FU MANF 2 PRESS	X
043	RCS F 3 P FU	V94P4858C	15	14		4.0																	4.110	GAX	RCS F FU MANF 3 PRESS	X
044	RCS F 4 P FU	V94P4859C	15	15		4.0																	4.110	GAX	RCS F FU MANF 4 PRESS	X
045	RCS L HE P FU	V94P4325C	14	17		5.0																	4.110	RCS Q	RCS L HE PRESS FU	X

Table 4.2.18-2. GNC SYS SUMM 2 (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S	Add Ref	Source		Nomenclature	C R T	
			X	Y		CHAR	BILEVEL														TYPE	PFS			BFS
							1	0																	
046	RCS L TK P FU	V94P4327C	15	18		4.0			DEC	PSIA											4.110	RCS Q	RCS L TK PRESS FU	X	
047	RCS L QTY FU	V90Q2363C	15	19		4.0			DEC	PCT											4.102	RCS Q	RCS-L AFT FUEL QTY REMAINING DISP	X	
048	RCS L 1 P FU	V94P4774C	15	20		4.0			DEC	PSIA											4.110	GAX	RCS L FU MANF 1 PRESS	X	
049	RCS L 2 P FU	V94P4775C	15	21		4.0			DEC	PSIA											4.110	GAX	RCS L FU MANF 2 PRESS	X	
050	RCS L 3 P FU	V94P4776C	15	22		4.0			DEC	PSIA											4.110	GAX	RCS L FU MANF 3 PRESS	X	
051	RCS L 4 P FU	V94P4777C	15	23		4.0			DEC	PSIA											4.110	GAX	RCS L FU MANF 4 PRESS	X	
052	RCS L HE P OX (S)	V94J4344C	14	17		1.0			STAT												4.110	RCS Q	RCS L HE PRESS OX LO/IO STATUS	X	
053	RCS L TK P OX (S)	V94J4346C	14	18		1.0			STAT										1	4.110	RCS Q	RCS L TK PRESS OX HI/LO/IO STATUS	X		
054	RCS L QTY OX (S)	V94J4363C	14	19		1.0			STAT										3	4.110	RCS Q	L RCS QTY OX IO/LK STATUS	X		
055	RCS L 1 P OX (S)	V91X5252X	14	20		1.0			STAT										7	FCOS	GAX	RCS L AFT OX MANF P1 COMMFLT	X		
056	RCS L 2 P OX (S)	V91X5253X	14	21		1.0			STAT										7	FCOS	GAX	RCS L AFT OX MANF P2 COMMFLT	X		
057	RCS L 3 P OX (S)	V91X5254X	14	22		1.0			STAT										7	FCOS	GAX	RCS L AFT OX MANF P3 COMMFLT	X		
058	RCS L 4 P OX (S)	V91X5255X	14	23		1.0			STAT										7	FCOS	GAX	RCS L AFT OX MANF P4 COMMFLT	X		
059	RCS F 1 P OX (S)	V91X2283X	14	12		1.0			STAT										7	FCOS	GAX	FF1 INPUT PROM SEG 1,2 STATUS(MFE)	X		
060	RCS F 2 P OX (S)	V91X2284X	14	13		1.0			STAT										7	FCOS	GAX	FF2 INPUT PROM SEG 1,2 STATUS(MFE)	X		

Table 4.2.18-2. GNC SYS SUMM 2 (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format				U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source		Nomenclature	C R T		
			X	Y		CHAR	BILEVEL		TYPE													PFS	BFS				
							1	0																			
061	RCS F 3 P OX (S)	V91X2287X	14	14		1.0															7	FCOS	GAX	FF4 INPUT PROM SEG 1,2 STATUS(MFE)	X		
062	RCS F 4 P OX (S)	V91X2285X	14	15		1.0																7	FCOS	GAX	FF3 INPUT PROM SEG 1,2 STATUS(MFE)	X	
063*	RCS F 1 P FU (S)	V91X2283X	19	12		1.0																7	FCOS	GAX	FF1 INPUT PROM SEG 1,2 STATUS(MFE)	X	
064*	RCS F 2 P FU (S)	V91X2284X	19	13		1.0																7	FCOS	GAX	FF2 INPUT PROM SEG 1,2 STATUS(MFE)	X	
065*	RCS F 3 P FU (S)	V91X2287X	19	14		1.0																7	FCOS	GAX	FF4 INPUT PROM SEG 1,2 STATUS(MFE)	X	
066*	RCS F 4 P FU (S)	V91X2285X	19	15		1.0																7	FCOS	GAX	FF3 INPUT PROM SEG 1,2 STATUS(MFE)	X	
067	RCS L HE P FU (S)	V94J4345C	19	17		1.0																4.110	RCS Q		RCS L HE PRESS FU LO/IO STATUS	X	
068	RCS L TK P FU (S)	V94J4347C	19	18		1.0																1	4.110	RCS Q		RCS L TK PRESS FU HI/LO/IO STATUS	X
069	RCS L QTY FU (S)	V94J4362C	19	19		1.0																3	4.110	RCS Q		L RCS QTY FU IO/LK STATUS	X
070	RCS L 1 P FU (S)	V91X5256X	19	20		1.0																7	FCOS	GAX	RCS L AFT FU MANF P1 COMMFLT	X	
071	RCS L 2 P FU (S)	V91X5257X	19	21		1.0																7	FCOS	GAX	RCS L AFT FU MANF P2 COMMFLT	X	
072	RCS L 3 P FU (S)	V91X5258X	19	22		1.0																7	FCOS	GAX	RCS L AFT FU MANF P3 COMMFLT	X	
073	RCS L 4 P FU (S)	V91X5259X	19	23		1.0																7	FCOS	GAX	RCS L AFT FU MANF P4 COMMFLT	X	
074	RCS R HE P OXID	V94P4328C	33	17		5.0																4.110	RCS Q		RCS R HE PRESS OX	X	
075	RCS R TK P OXID	V94P4330C	34	18		4.0																4.110	RCS Q		RCS R TK PRESS OX	X	

Table 4.2.18-2. GNC SYS SUMM 2 (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format				U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source		Nomenclature	C R T
			X	Y		CHAR	BILEVEL		TYPE													PFS	BFS		
							1	0																	
076	RCS R QTY OXID	V90Q2364C	34	19		4.0			DEC	PCT											4.102	RCS Q	RCS-R AFT OX QTY REMAINING DISP	X	
077	RCS R 1 P OXID	V94P4778C	34	20		4.0			DEC	PSIA											4.110	GAX	RCS R OX MANF 1 PRESS	X	
078	RCS R 2 P OXID	V94P4779C	34	21		4.0			DEC	PSIA											4.110	GAX	RCS R OX MANF 2 PRESS	X	
079	RCS R 3 P OXID	V94P4780C	34	22		4.0			DEC	PSIA											4.110	GAX	RCS R OX MANF 3 PRESS	X	
080	RCS R 4 P OXID	V94P4781C	34	23		4.0			DEC	PSIA											4.110	GAX	RCS R OX MANF 4 PRESS	X	
081	RCS R HE P FU	V94P4329C	38	17		5.0			DEC	PSIA											4.110	RCS Q	RCS R HE PRESS FU	X	
082	RCS R TK P FU	V94P4331C	39	18		4.0			DEC	PSIA											4.110	RCS Q	RCS R TK PRESS FU	X	
083	RCS R QTY FU	V90Q2365C	39	19		4.0			DEC	PCT											4.102	RCS Q	RCS-R AFT FUEL QTY REMAINING DISP	X	
084	RCS R 1 P FU	V94P4782C	39	20		4.0			DEC	PSIA											4.110	GAX	RCS R FU MANF 1 PRESS	X	
085	RCS R 2 P FU	V94P4783C	39	21		4.0			DEC	PSIA											4.110	GAX	RCS R FU MANF 2 PRESS	X	
086	RCS R 3 P FU	V94P4784C	39	22		4.0			DEC	PSIA											4.110	GAX	RCS R FU MANF 3 PRESS	X	
087	RCS R 4 P FU	V94P4785C	39	23		4.0			DEC	PSIA											4.110	GAX	RCS R FU MANF 4 PRESS	X	
088	RCS R HE P OX (S)	V94J4348C	38	17		1.0			STAT												4.110	RCS Q	RCS R HE PRESS OX LO/IO STATUS	X	
089	RCS R TK P OX (S)	V94J4350C	38	18		1.0			STAT											1	4.110	RCS Q	RCS R TK PRESS OX HI/LO/IO STATUS	X	
090	RCS R QTY OX (S)	V94J4365C	38	19		1.0			STAT											3	4.110	RCS Q	R RCS QTY OX IO/LK STATUS	X	
091	RCS R 1 P OX (S)	V91X5260X	38	20		1.0			STAT											7	FCOS	GAX	RCS R AFT OX MANF P1 COMMFLT	X	
092	RCS R 2 P OX (S)	V91X5261X	38	21		1.0			STAT											7	FCOS	GAX	RCS R AFT OX MANF P2 COMMFLT	X	
093	RCS R 3 P OX (S)	V91X5262X	38	22		1.0			STAT											7	FCOS	GAX	RCS R AFT OX MANF P3 COMMFLT	X	
094	RCS R 4 P OX (S)	V91X5263X	38	23		1.0			STAT											7	FCOS	GAX	RCS R AFT OX MANF P4 COMMFLT	X	
095	RCS R HE P FU (S)	V94J4349C	43	17		1.0			STAT												4.110	RCS Q	RCS R HE PRESS FU LO/IO STATUS	X	

Table 4.2.18-2. GNC SYS SUMM 2 (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format				U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S	Add Ref	Source		Nomenclature	C R T
			X	Y		CHAR	BILEVEL		TYPE													PFS	BFS		
							1	0																	
096	RCS R TK P FU (S)	V94J4351C	43	18		1.0															1	4.110	RCS Q	RCS R TK PRESS FU HI/LO/IO STATUS	X
097	RCS R QTY FU (S)	V94J4364C	43	19		1.0															3	4.110	RCS Q	R RCS QTY FU IO/LK STATUS	X
098	RCS R 1 P FU (S)	V91X5264X	43	20		1.0															7	FCOS	GAX	RCS R AFT FU MANF P1 COMMFLT	X
099	RCS R 2 P FU (S)	V91X5265X	43	21		1.0															7	FCOS	GAX	RCS R AFT FU MANF P2 COMMFLT	X
100	RCS R 3 P FU (S)	V91X5266X	43	22		1.0															7	FCOS	GAX	RCS R AFT FU MANF P3 COMMFLT	X
101	RCS R 4 P FU (S)	V91X5267X	43	23		1.0															7	FCOS	GAX	RCS R AFT FU MANF P4 COMMFLT	X
102	RCS F1 JET FAIL	V94J4260C	20	12		3.0															A	4.110	RCS P	F1 JET FAIL ON,LK,OFF	X
103	RCS F2 JET FAIL	V94J4261C	20	13		3.0															A	4.110	RCS P	F2 JET FAIL ON,LK,OFF	X
104	RCS F3 JET FAIL	V94J4262C	20	14		3.0															A	4.110	RCS P	F3 JET FAIL ON,LK,OFF	X
105	RCS F4 JET FAIL	V94J4263C	20	15		3.0															A	4.110	RCS P	F4 JET FAIL ON,LK,OFF	X
106	RCS F5 JET FAIL	V94J4272C	20	16		3.0															A	4.110	N/S	F5 JET FAIL ON,LK,OFF	X
107	RCS L1 JET FAIL	V94J4264C	20	20		3.0															A	4.110	RCS P	L1 JET FAIL ON,LK,OFF	X
108	RCS L2 JET FAIL	V94J4265C	20	21		3.0															A	4.110	RCS P	L2 JET FAIL ON,LK,OFF	X
109	RCS L3 JET FAIL	V94J4266C	20	22		3.0															A	4.110	RCS P	L3 JET FAIL ON,LK,OFF	X
110	RCS L4 JET FAIL	V94J4267C	20	23		3.0															A	4.110	RCS P	L4 JET FAIL ON,LK,OFF	X
111	RCS L5 JET FAIL	V94J4274C	20	24		3.0															A	4.110	N/S	L5 JET FAIL ON,LK,OFF	X
112	RCS R1 JET FAIL	V94J4268C	44	20		3.0															A	4.110	RCS P	R1 JET FAIL ON,LK,OFF	X
113	RCS R2 JET FAIL	V94J4269C	44	21		3.0															A	4.110	RCS P	R2 JET FAIL ON,LK,OFF	X
114	RCS R3 JET FAIL	V94J4270C	44	22		3.0															A	4.110	RCS P	R3 JET FAIL ON,LK,OFF	X
115	RCS R4 JET FAIL	V94J4271C	44	23		3.0															A	4.110	RCS P	R4 JET FAIL ON,LK,OFF	X

Table 4.2.18-2. GNC SYS SUMM 2 (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source		Nomenclature	C R T	
			X	Y		CHAR	BILEVEL														TYPE	PFS			BFS
							1	0																	
116	RCS R5 JET FAIL	V94J4273C	44	24		3.0															A	4.110	N/S	R5 JET FAIL ON,LK.OFF	X
117	RCS MANF F1 ISO VLV	V90X4420X	25	12		2.0	OP	CL	BLVL													4.91	RCS P	RCS MANIFOLD F1 OP/CL STATUS	X
118	RCS MANF F2 ISO VLV	V90X4421X	25	13		2.0	OP	CL	BLVL													4.91	RCS P	RCS MANIFOLD F2 OP/CL STATUS	X
119	RCS MANF F3 ISO VLV	V90X4422X	25	14		2.0	OP	CL	BLVL													4.91	RCS P	RCS MANIFOLD F3 OP/CL STATUS	X
120	RCS MANF F4 ISO VLV	V90X4423X	25	15		2.0	OP	CL	BLVL													4.91	RCS P	RCS MANIFOLD F4 OP/CL STATUS	X
121	RCS MANF F5 ISO VLV	V90X4424X	25	16		2.0	OP	CL	BLVL													4.91	N/S	RCS MANIFOLD F5 OP/CL STATUS	X
122	RCS MANF L1 ISO VLV	V90X4425X	25	20		2.0	OP	CL	BLVL													4.91	RCS P	RCS MANIFOLD L1 OP/CL STATUS	X
123	RCS MANF L2 ISO VLV	V90X4426X	25	21		2.0	OP	CL	BLVL													4.91	RCS P	RCS MANIFOLD L2 OP/CL STATUS	X
124	RCS MANF L3 ISO VLV	V90X4427X	25	22		2.0	OP	CL	BLVL													4.91	RCS P	RCS MANIFOLD L3 OP/CL STATUS	X
125	RCS MANF L4 ISO VLV	V90X4428X	25	23		2.0	OP	CL	BLVL													4.91	RCS P	RCS MANIFOLD L4 OP/CL STATUS	X
126	RCS MANF L5 ISO VLV	V90X4429X	25	24		2.0	OP	CL	BLVL													4.91	N/S	RCS MANIFOLD L5 OP/CL STATUS	X
127	RCS MANF R1 ISO VLV	V90X4430X	49	20		2.0	OP	CL	BLVL													4.91	RCS P	RCS MANIFOLD R1 OP/CL STATUS	X
128	RCS MANF R2 ISO VLV	V90X4431X	49	21		2.0	OP	CL	BLVL													4.91	RCS P	RCS MANIFOLD R2 OP/CL STATUS	X
129	RCS MANF R3 ISO VLV	V90X4432X	49	22		2.0	OP	CL	BLVL													4.91	RCS P	RCS MANIFOLD R3 OP/CL STATUS	X
130	RCS MANF R4 ISO VLV	V90X4433X	49	23		2.0	OP	CL	BLVL													4.91	RCS P	RCS MANIFOLD R4 OP/CL STATUS	X

Table 4.2.18-2. GNC SYS SUMM 2 (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format				U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source		Nomenclature	C R T
			X	Y		CHAR	BILEVEL		TYPE													PFS	BFS		
							1	0																	
131	RCS MANF R5 ISO VLV	V90X4434X	49	24		2.0	OP	CL	BLVL												4.91	N/S	RCS MANIFOLD R5 OP/CL STATUS	X	
132	RCS MANF F1 VLV (S)	V94J4300C	27	12		1.0			STAT												9	4.110	GAX	RCS F1 MANF ISLN VLV OP/CL IO STAT	X
133	RCS MANF F2 VLV (S)	V94J4301C	27	13		1.0			STAT												9	4.110	GAX	RCS F2 MANF ISLN VLV OP/CL IO STAT	X
134	RCS MANF F3 VLV (S)	V94J4302C	27	14		1.0			STAT												9	4.110	GAX	RCS F3 MANF ISLN VLV OP/CL IO STAT	X
135	RCS MANF F4 VLV (S)	V94J4303C	27	15		1.0			STAT												9	4.110	GAX	RCS F4 MANF ISLN VLV OP/CL IO STAT	X
136	RCS MANF F5 VLV (S)	V94J4541C	27	16		1.0			STAT												9	4.110	N/S	RCS F5 MANF ISLN VLV OP/CL IO STAT	X
137	RCS MANF L1 VLV (S)	V94J4304C	27	20		1.0			STAT												9	4.110	GAX	RCS L1 MANF ISLN VLV OP/CL IO STAT	X
138	RCS MANF L2 VLV (S)	V94J4305C	27	21		1.0			STAT												9	4.110	GAX	RCS L2 MANF ISLN VLV OP/CL IO STAT	X
139	RCS MANF L3 VLV (S)	V94J4306C	27	22		1.0			STAT												9	4.110	GAX	RCS L3 MANF ISLN VLV OP/CL IO STAT	X
140	RCS MANF L4 VLV (S)	V94J4307C	27	23		1.0			STAT												9	4.110	GAX	RCS L4 MANF ISLN VLV OP/CL IO STAT	X
141	RCS MANF L5 VLV (S)	V94J4543C	27	24		1.0			STAT												9	4.110	N/S	RCS L5 MANF ISLN VLV OP/CL IO STAT	X
142	RCS MANF R1 VLV (S)	V94J4308C	51	20		1.0			STAT												9	4.110	GAX	RCS R1 MANF ISLN VLV OP/CL IO STAT	X
143	RCS MANF R2 VLV (S)	V94J4309C	51	21		1.0			STAT												9	4.110	GAX	RCS R2 MANF ISLN VLV OP/CL IO STAT	X
144	RCS MANF R3 VLV (S)	V94J4310C	51	22		1.0			STAT												9	4.110	GAX	RCS R3 MANF ISLN VLV OP/CL IO STAT	X
145	RCS MANF R4 VLV (S)	V94J4311C	51	23		1.0			STAT												9	4.110	GAX	RCS R4 MANF ISLN VLV OP/CL IO STAT	X

Table 4.2.18-2. GNC SYS SUMM 2 (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format				U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source		Nomenclature	C R T
			X	Y		CHAR	BILEVEL		TYPE													PFS	BFS		
							1	0																	
146	RCS MANF R5 VLV (S)	V94J4545C	51	24		1.0				STAT											9	4.110	N/S	RCS R5 MANF ISLN VLV OP/CL IO STAT	X
147	OMS L TK P HE	V94P4220C	40	4		5.0				DEC	PSIA											4.110	GAX	OMS HE TK PRESS L	X
148	OMS L TK P OXID	V94P4224C	41	5		4.0				DEC	PSIA											4.110	GAX	OMS OX TK PRESS L	X
149	OMS L TK P FU	V94P4222C	41	6		4.0				DEC	PSIA											4.110	GAX	OMS FU TK PRESS L	X
150	OMS L N2 TK P	V94P4604C	40	7		5.0				DEC	PSIA											4.110	GAX	OMS ENG PNEU PRESS 2 LEFT	X
151	OMS L N2 REG P	V94P4230C	41	8		4.0				DEC	PSIA											4.110	GAX	OMS N2 REG PRESS L	X
152	OMS L N2 P VLV	V43X4552X	43	9		2.0	OP	CL		BLVL												HDWR	GAX	OMS-L ENG PRESS VLV POSN OP	X
153	OMS L ENG IN P OXID	V94P4639C	41	11		4.0				DEC	PSIA											4.110	GAX	OMS ENG OX INLET PRESS LEFT	X
154	OMS L ENG IN P FU	V94P4641C	41	12		4.0				DEC	PSIA											4.110	GAX	OMS ENG FU INLET PRESS LEFT	X
155	OMS L ENG VLV 1	V94Q4645C	41	13		4.0				DEC	PCT											4.110	GAX	OMS L ENG BI-PROP VLV 1 POS PCT OP	X
156	OMS L ENG VLV 2	V94Q4647C	41	14		4.0				DEC	PCT											4.110	GAX	OMS L ENG BI-PROP VLV 2 POS PCT OP	X
157	OMS R TK P HE	V94P4221C	46	4		5.0				DEC	PSIA											4.110	GAX	OMS HE TK PRESS R	X
158	OMS R TK P OXID	V94P4225C	47	5		4.0				DEC	PSIA											4.110	GAX	OMS OX TK PRESS R	X
159	OMS R TK P FU	V94P4223C	47	6		4.0				DEC	PSIA											4.110	GAX	OMS FU TK PRESS R	X
160	OMS R N2 TK P	V94P4605C	46	7		5.0				DEC	PSIA											4.110	GAX	OMS ENG PNEU PRESS 2 RIGHT	X
161	OMS R N2 REG P	V94P4231C	47	8		4.0				DEC	PSIA											4.110	GAX	OMS N2 REG PRESS R	X
162	OMS R N2 P VLV	V43X5552X	49	9		2.0	OP	CL		BLVL												HDWR	GAX	OMS-R ENG PRESS VLV POSN OP	X
163	OMS R ENG IN P OXID	V94P4640C	47	11		4.0				DEC	PSIA											4.110	GAX	OMS ENG OX INLET PRESS RIGHT	X
164	OMS R ENG IN P FU	V94P4642C	47	12		4.0				DEC	PSIA											4.110	GAX	OMS ENG FU INLET PRESS RIGHT	X
165	OMS R ENG VLV 1	V94Q4646C	47	13		4.0				DEC	PCT											4.110	GAX	OMS R ENG BI-PROP VLV 1 POS PCT OP	X

Table 4.2.18-2. GNC SYS SUMM 2 (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source		Nomenclature	C R T	
			X	Y		CHAR	BILEVEL														TYPE	PFS			BFS
							1	0																	
166	OMS R ENG VLV 2	V94Q4648C	47	14		4.0			DEC	PCT											4.110	GAX	OMS R ENG BI-PROP VLV 2 POS PCT OP	X	
167	OMS L TK P HE (S)	V94J4240C	45	4		1.0			STAT											9	4.110	GAX	OMS HE TK PRESS L LO/IO STATUS	X	
168	OMS L TK P OX (S)	V94J4244C	45	5		1.0			STAT											1	4.110	GAX	OMS OX TK PRESS L HI/LO/IO STATUS	X	
169	OMS L TK P FU (S)	V94J4242C	45	6		1.0			STAT											1	4.110	GAX	OMS FU TK PRESS L HI/LO/IO STATUS	X	
170	OMS L N2 TK P (S)	V94J4644C	45	7		1.0			STAT												4.110	GAX	OMS L ENG PNEU PRESS 2 LO/IO STAT	X	
171	OMS L N2 REG P (S)	V94J4250C	45	8		1.0			STAT											1	4.110	GAX	OMS N2 REG PRESS L HI/LO/IO STATUS	X	
172	OMS L N2 P VLV (S)	V91X5110X	45	9		1.0			STAT											7	FCOS	GAX	OMS-L ENG PRESS VLV POSN OP CF	X	
173	OMS L ENG IN P OX(S)	V91X2603X	45	11		1.0			STAT											7	FCOS	GAX	OMS ENG OX INLET PRESS LEFT CF	X	
174	OMS L ENG IN P FU(S)	V91X2604X	45	12		1.0			STAT											7	FCOS	GAX	OMS ENG FU INLET PRESS LEFT CF	X	
175	OMS L ENG VLV 1 (S)	V91X5112X	45	13		1.0			STAT											7	FCOS	GAX	OMS-L ENG VLV 1 POSN OP COMMFault	X	
176	OMS L ENG VLV 2 (S)	V91X5114X	45	14		1.0			STAT											7	FCOS	GAX	OMS-L ENG VLV 2 POSN OP COMMFault	X	
177	OMS R TK P HE (S)	V94J4241C	51	4		1.0			STAT												4.110	GAX	OMS HE TK PRESS R LO/IO STATUS	X	
178	OMS R TK P OX (S)	V94J4245C	51	5		1.0			STAT											1	4.110	GAX	OMS OX TK PRESS R HI/LO/IO STATUS	X	
179	OMS R TK P FU (S)	V94J4243C	51	6		1.0			STAT											1	4.110	GAX	OMS FU TK PRESS R HI/LO/IO STATUS	X	
180	OMS R N2 TK P (S)	V94J4643C	51	7		1.0			STAT												4.110	GAX	OMS R ENG PNEU PRESS 2 LO/IO STAT	X	

Table 4.2.18-2. GNC SYS SUMM 2 (PFS/BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format				U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source		Nomenclature	C R T		
			X	Y		CHAR	BILEVEL		TYPE													PFS	BFS				
							1	0																			
181	OMS R N2 REG P (S)	V94J4251C	51	8		1.0															1	4.110	GAX	OMS N2 REG PRESS R HI/LO/IO STATUS	X		
182	OMS R N2 P VLV (S)	V91X5111X	51	9		1.0															7	FCOS	GAX	OMS-R ENG PRESS VLV POSN OP CF	X		
183	OMS R ENG IN P OX(S)	V91X2606X	51	11		1.0															7	FCOS	GAX	OMS ENG OX INLET PRESS RIGHT CF	X		
184	OMS R ENG IN P FU(S)	V91X2607X	51	12		1.0															7	FCOS	GAX	OMS ENG FU INLET PRESS RIGHT CF	X		
185	OMS R ENG VLV 1 (S)	V91X5113X	51	13		1.0															7	FCOS	GAX	OMS-R ENG VLV 1 POSN OP COMMFault	X		
186	OMS T FU INJ L	V94T4252C	14	6		4.0				DEG F												N/S	GAX	OMS L ENG FUEL INJECTOR TEMP	X		
187	OMS T FU INJ R	V94T4253C	20	6		4.0				DEG F												N/S	GAX	OMS R ENG FUEL INJECTOR TEMP	X		
188	OMS T FU INJ L (S)	V94J4254C	18	6		1.0															2	N/S	GAX	OMS L ENG FU INJ HI/IO STATUS	X		
189	OMS T FU INJ R (S)	V94J4255C	24	6		1.0															2	N/S	GAX	OMS R ENG FU INJ HI/IO STATUS	X		
190	OMS R ENG VLV 2 (S)	V91X5115X	51	14		1.0															7	FCOS	GAX	OMS-R ENG VLV 2 POSN OP COMMFault	X		
191	(MSG LINE)	V93X0050X	1	25		44.0																UI	N/S		MESSAGE LINE	X	
192	(MSG LINE)	V93X0050X	2	25		46.0																N/S	MI		MESSAGE LINE	X	
193	(BUFFER MSG)	V93X0054X	45	25		4.0																UI	N/S		BUFFER MESSAGE INDICATOR	X	
194	(BUFFER MSG)	V93X0054X	48	25		4.0																N/S	MI		BUFFER MESSAGE INDICATOR	X	
195	(SPL)	V93X0056X	2	26		49.0																UI	MI		SCRATCH PAD LINE	X	
200	(BFS)	V98X0015X	35	2		3.0							X									N/S	MI		BFS IDENTIFIER	BFS	X

TABLE 4.2.18-5. INPUT FUNCTIONAL PARAMETERS FOR GNC SYSTEMS SUMMARY 2 DISPLAY (G6.32)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(TITLE)	V93X0046X	CRT TITLE	UI		BD			
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
RWFD(1)	V90Q2360C	RCS FWD OX QUANTITY REMAINING DISP	RCS QTY MON		PCT	VAR	92354	
RWFD(2)	V90Q2361C	RCS FWD FU QUANTITY REMAINING DISP	RCS QTY MON		PCT	VAR	92354	
RWFD(3)	V90Q2362C	RCS-L AFT OX QTY REMAINING DISP	RCS QTY MON		PCT	VAR	92354	
RWFD(4)	V90Q2363C	RCS-L AFT FUEL QTY REMAINING DISP	RCS QTY MON		PCT	VAR	92354	
RWFD(5)	V90Q2364C	RCS-R AFT OX QTY REMAINING DISP	RCS QTY MON		PCT	VAR	92354	
RWFD(6)	V90Q2365C	RCS-R AFT FUEL QTY REMAINING DISP	RCS QTY MON		PCT	VAR	92354	
	V43X4552X	OMS-L ENG PRESS VLV POSN OP	HDWR		BD		93017G	*
	V43X5552X	OMS-R ENG PRESS VLV POSN OP	HDWR		BD		93017G	*
	V90X4420X	RCS MANIFOLD F1 OP/CL STATUS	RCS RM	EVENT	BD		93017G	*
	V90X4421X	RCS MANIFOLD F2 OP/CL STATUS	RCS RM	EVENT	BD		93017G	*
	V90X4422X	RCS MANIFOLD F3 OP/CL STATUS	RCS RM	EVENT	BD		93017G	*
	V90X4423X	RCS MANIFOLD F4 OP/CL STATUS	RCS RM	EVENT	BD		93017G	*
	V90X4424X	RCS MANIFOLD F5 OP/CL STATUS	RCS RM	EVENT	BD		93017G	*
	V90X4425X	RCS MANIFOLD L1 OP/CL STATUS	RCS RM	EVENT	BD		93017G	*
	V90X4426X	RCS MANIFOLD L2 OP/CL STATUS	RCS RM	EVENT	BD		93017G	*
	V90X4427X	RCS MANIFOLD L3 OP/CL STATUS	RCS RM	EVENT	BD		93017G	*
	V90X4428X	RCS MANIFOLD L4 OP/CL STATUS	RCS RM	EVENT	BD		93017G	*
	V90X4429X	RCS MANIFOLD L5 OP/CL STATUS	RCS RM	EVENT	BD		93017G	*
	V90X4430X	RCS MANIFOLD R1 OP/CL STATUS	RCS RM	EVENT	BD		93017G	*
	V90X4431X	RCS MANIFOLD R2 OP/CL STATUS	RCS RM	EVENT	BD		93017G	*
	V90X4432X	RCS MANIFOLD R3 OP/CL STATUS	RCS RM	EVENT	BD		93017G	*
	V90X4433X	RCS MANIFOLD R4 OP/CL STATUS	RCS RM	EVENT	BD		93017G	*
	V90X4434X	RCS MANIFOLD R5 OP/CL STATUS	RCS RM	EVENT	BD		93017G	*
	V91X2283X	FF1 INPUT PROM SEG 1,2 STATUS(MFE)	FCOS		BD			
	V91X2284X	FF2 INPUT PROM SEG 1,2 STATUS(MFE)	FCOS		BD			
	V91X2285X	FF3 INPUT PROM SEG 1,2 STATUS(MFE)	FCOS		BD			
	V91X2287X	FF4 INPUT PROM SEG 1,2 STATUS(MFE)	FCOS		BD			
	V91X2603X	OMS ENG OX INLET PRESS LEFT CF	FCOS		BD			
	V91X2604X	OMS ENG FU INLET PRESS LEFT CF	FCOS		BD			
	V91X2606X	OMS ENG OX INLET PRESS RIGHT CF	FCOS		BD			
	V91X2607X	OMS ENG FU INLET PRESS RIGHT CF	FCOS		BD			
	V91X5110X	OMS-L ENG PRESS VLV POSN OP CF	FCOS		BD			
	V91X5111X	OMS-R ENG PRESS VLV POSN OP CF	FCOS		BD			
	V91X5112X	OMS-L ENG VLV 1 POSN OP COMMFAULT	FCOS		BD			
	V91X5113X	OMS-R ENG VLV 1 POSN OP COMMFAULT	FCOS		BD			

TABLE 4.2.18-5. INPUT FUNCTIONAL PARAMETERS FOR GNC SYSTEMS SUMMARY 2 DISPLAY (G6.32)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V91X5114X	OMS-L ENG VLV 2 POSN OP COMMFAULT	FCOS		BD			
	V91X5115X	OMS-R ENG VLV 2 POSN OP COMMFAULT	FCOS		BD			
	V91X5252X	RCS L AFT OX MANF P1 COMMFAULT	FCOS		BD		90897D	
	V91X5253X	RCS L AFT OX MANF P2 COMMFAULT	FCOS		BD		90897D	
	V91X5254X	RCS L AFT OX MANF P3 COMMFAULT	FCOS		BD		90897D	
	V91X5255X	RCS L AFT OX MANF P4 COMMFAULT	FCOS		BD		90897D	
	V91X5256X	RCS L AFT FU MANF P1 COMMFAULT	FCOS		BD		90897D	
	V91X5257X	RCS L AFT FU MANF P2 COMMFAULT	FCOS		BD		90897D	
	V91X5258X	RCS L AFT FU MANF P3 COMMFAULT	FCOS		BD		90897D	
	V91X5259X	RCS L AFT FU MANF P4 COMMFAULT	FCOS		BD		90897D	
	V91X5260X	RCS R AFT OX MANF P1 COMMFAULT	FCOS		BD		90897D	
	V91X5261X	RCS R AFT OX MANF P2 COMMFAULT	FCOS		BD		90897D	
	V91X5262X	RCS R AFT OX MANF P3 COMMFAULT	FCOS		BD		90897D	
	V91X5263X	RCS R AFT OX MANF P4 COMMFAULT	FCOS		BD		90897D	
	V91X5264X	RCS R AFT FU MANF P1 COMMFAULT	FCOS		BD		90897D	
	V91X5265X	RCS R AFT FU MANF P2 COMMFAULT	FCOS		BD		90897D	
	V91X5266X	RCS R AFT FU MANF P3 COMMFAULT	FCOS		BD		90897D	
	V91X5267X	RCS R AFT FU MANF P4 COMMFAULT	FCOS		BD		90897D	
	V94J4240C	OMS HE TK PRESS L LO/IO STATUS	GAX		VAR			
	V94J4241C	OMS HE TK PRESS R LO/IO STATUS	GAX		VAR			
	V94J4242C	OMS FU TK PRESS L HI/LO/IO STATUS	GAX		VAR			
	V94J4243C	OMS FU TK PRESS R HI/LO/IO STATUS	GAX		VAR			
	V94J4244C	OMS OX TK PRESS L HI/LO/IO STATUS	GAX		VAR			
	V94J4245C	OMS OX TK PRESS R HI/LO/IO STATUS	GAX		VAR			
	V94J4250C	OMS N2 REG PRESS L HI/LO/IO STATUS	GAX		VAR			
	V94J4251C	OMS N2 REG PRESS R HI/LO/IO STATUS	GAX		VAR			
	V94J4260C	F1 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4261C	F2 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4262C	F3 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4263C	F4 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4264C	L1 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4265C	L2 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4266C	L3 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4267C	L4 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4268C	R1 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4269C	R2 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4270C	R3 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4271C	R4 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4272C	F5 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4273C	R5 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4274C	L5 JET FAIL ON,LK,OFF	GAX		VAR			
	V94J4300C	RCS F1 MANF ISLN VLV OP/CL IO STAT	GAX		VAR		92230F	
	V94J4301C	RCS F2 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4302C	RCS F3 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4303C	RCS F4 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4304C	RCS L1 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			

TABLE 4.2.18-5. INPUT FUNCTIONAL PARAMETERS FOR GNC SYSTEMS SUMMARY 2 DISPLAY (G6.32)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V94J4305C	RCS L2 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4306C	RCS L3 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4307C	RCS L4 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4308C	RCS R1 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4309C	RCS R2 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4310C	RCS R3 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4311C	RCS R4 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4340C	RCS FWD HE PRESS OX LO/IO STATUS	GAX		VAR			
	V94J4341C	RCS FWD HE PRESS FU LO/IO STATUS	GAX		VAR			
	V94J4342C	RCS FWD TK PRESS OX HI/LO/IO STAT	GAX		VAR			
	V94J4343C	RCS FWD TK PRESS FU HI/LO/IO STAT	GAX		VAR			
	V94J4344C	RCS L HE PRESS OX LO/IO STATUS	GAX		VAR			
	V94J4345C	RCS L HE PRESS FU LO/IO STATUS	GAX		VAR			
	V94J4346C	RCS L TK PRESS OX HI/LO/IO STATUS	GAX		VAR			
	V94J4347C	RCS L TK PRESS FU HI/LO/IO STATUS	GAX		VAR			
	V94J4348C	RCS R HE PRESS OX LO/IO STATUS	GAX		VAR			
	V94J4349C	RCS R HE PRESS FU LO/IO STATUS	GAX		VAR			
	V94J4350C	RCS R TK PRESS OX HI/LO/IO STATUS	GAX		VAR			
	V94J4351C	RCS R TK PRESS FU HI/LO/IO STATUS	GAX		VAR			
	V94J4360C	FWD RCS QTY FU IO/LK STATUS	GAX		VAR			
	V94J4361C	FWD RCS QTY OX IO/LK STATUS	GAX		VAR			
	V94J4362C	L RCS QTY FU IO/LK STATUS	GAX		VAR			
	V94J4363C	L RCS QTY OX IO/LK STATUS	GAX		VAR			
	V94J4364C	R RCS QTY FU IO/LK STATUS	GAX		VAR			
	V94J4365C	R RCS QTY OX IO/LK STATUS	GAX		VAR			
	V94J4541C	RCS F5 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4543C	RCS L5 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4545C	RCS R5 MANF ISLN VLV OP/CL IO STAT	GAX		VAR			
	V94J4633C	OMS-L AFT OX QTY LO/IO STATUS	GAX		VAR			
	V94J4634C	OMS-R AFT OX QTY LO/IO STATUS	GAX		VAR			
	V94J4635C	OMS-L AFT FU QTY LO/IO STATUS	GAX		VAR			
	V94J4636C	OMS-R AFT FU QTY LO/IO STATUS	GAX		VAR			
	V94J4643C	OMS R ENG PNEU PRESS 2 LO/IO STAT	GAX		VAR			
	V94J4644C	OMS L ENG PNEU PRESS 2 LO/IO STAT	GAX		VAR			
	V94P4220C	OMS HE TK PRESS L	GAX	PSIA	VAR			
	V94P4221C	OMS HE TK PRESS R	GAX	PSIA	VAR			
	V94P4222C	OMS FU TK PRESS L	GAX	PSIA	VAR			
	V94P4223C	OMS FU TK PRESS R	GAX	PSIA	VAR			
	V94P4224C	OMS OX TK PRESS L	GAX	PSIA	VAR			
	V94P4225C	OMS OX TK PRESS R	GAX	PSIA	VAR			
	V94P4230C	OMS N2 REG PRESS L	GAX	PSIA	VAR			
	V94P4231C	OMS N2 REG PRESS R	GAX	PSIA	VAR			
	V94P4320C	RCS FWD HE PRESS OX	GAX	PSIA	VAR			
	V94P4321C	RCS FWD HE PRESS FU	GAX	PSIA	VAR			
	V94P4322C	RCS FWD TK PRESS OX	GAX	PSIA	VAR			
	V94P4323C	RCS FWD TK PRESS FU	GAX	PSIA	VAR			

TABLE 4.2.18-5. INPUT FUNCTIONAL PARAMETERS FOR GNC SYSTEMS SUMMARY 2 DISPLAY (G6.32)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V94P4324C	RCS L HE PRESS OX	GAX	PSIA	VAR			
	V94P4325C	RCS L HE PRESS FU	GAX	PSIA	VAR			
	V94P4326C	RCS L TK PRESS OX	GAX	PSIA	VAR			
	V94P4327C	RCS L TK PRESS FU	GAX	PSIA	VAR			
	V94P4328C	RCS R HE PRESS OX	GAX	PSIA	VAR			
	V94P4329C	RCS R HE PRESS FU	GAX	PSIA	VAR			
	V94P4330C	RCS R TK PRESS OX	GAX	PSIA	VAR			
	V94P4331C	RCS R TK PRESS FU	GAX	PSIA	VAR			
	V94P4604C	OMS ENG PNEU PRESS 2 LEFT	GAX	PSIA	VAR			
	V94P4605C	OMS ENG PNEU PRESS 2 RIGHT	GAX	PSIA	VAR			
	V94P4639C	OMS ENG OX INLET PRESS LEFT	GAX	PSIA	VAR			
	V94P4640C	OMS ENG OX INLET PRESS RIGHT	GAX	PSIA	VAR			
	V94P4641C	OMS ENG FU INLET PRESS LEFT	GAX	PSIA	VAR			
	V94P4642C	OMS ENG FU INLET PRESS RIGHT	GAX	PSIA	VAR			
	V94P4770C	RCS L OX MANF 1 PRESS	GAX	PSIA	VAR			
	V94P4771C	RCS L OX MANF 2 PRESS	GAX	PSIA	VAR			
	V94P4772C	RCS L OX MANF 3 PRESS	GAX	PSIA	VAR			
	V94P4773C	RCS L OX MANF 4 PRESS	GAX	PSIA	VAR			
	V94P4774C	RCS L FU MANF 1 PRESS	GAX	PSIA	VAR			
	V94P4775C	RCS L FU MANF 2 PRESS	GAX	PSIA	VAR			
	V94P4776C	RCS L FU MANF 3 PRESS	GAX	PSIA	VAR			
	V94P4777C	RCS L FU MANF 4 PRESS	GAX	PSIA	VAR			
	V94P4778C	RCS R OX MANF 1 PRESS	GAX	PSIA	VAR			
	V94P4779C	RCS R OX MANF 2 PRESS	GAX	PSIA	VAR			
	V94P4780C	RCS R OX MANF 3 PRESS	GAX	PSIA	VAR			
	V94P4781C	RCS R OX MANF 4 PRESS	GAX	PSIA	VAR			
	V94P4782C	RCS R FU MANF 1 PRESS	GAX	PSIA	VAR			
	V94P4783C	RCS R FU MANF 2 PRESS	GAX	PSIA	VAR			
	V94P4784C	RCS R FU MANF 3 PRESS	GAX	PSIA	VAR			
	V94P4785C	RCS R FU MANF 4 PRESS	GAX	PSIA	VAR			
	V94P4852C	RCS FWD OX MANIF 1 PRESS	GAX	PSIA	VAR			
	V94P4853C	RCS FWD OX MANIF 2 PRESS	GAX	PSIA	VAR			
	V94P4854C	RCS FWD OX MANIF 3 PRESS	GAX	PSIA	VAR			
	V94P4855C	RCS FWD OX MANIF 4 PRESS	GAX	PSIA	VAR			
	V94P4856C	RCS FWD FU MANIF 1 PRESS	GAX	PSIA	VAR			
	V94P4857C	RCS FWD FU MANIF 2 PRESS	GAX	PSIA	VAR			
	V94P4858C	RCS FWD FU MANIF 3 PRESS	GAX	PSIA	VAR			
	V94P4859C	RCS FWD FU MANIF 4 PRESS	GAX	PSIA	VAR			
	V94Q4629C	OMS-L AFT OX QTY PERCENT DISP	GAX	PCT	VAR			
	V94Q4630C	OMS-R AFT OX QTY PERCENT DISP	GAX	PCT	VAR			
	V94Q4631C	OMS-L AFT FU QTY PERCENT DISP	GAX	PCT	VAR			
	V94Q4632C	OMS-R AFT FU QTY PERCENT DISP	GAX	PCT	VAR			
	V94Q4645C	OMS L ENG BI-PROP VLV 1 POS PCT OP	GAX	PCT	VAR			
	V94Q4646C	OMS R ENG BI-PROP VLV 1 POS PCT OP	GAX	PCT	VAR			
	V94Q4647C	OMS L ENG BI-PROP VLV 2 POS PCT OP	GAX	PCT	VAR			
	V94Q4648C	OMS R ENG BI-PROP VLV 2 POS PCT OP	GAX	PCT	VAR			

TABLE 4.2.18-5. INPUT FUNCTIONAL PARAMETERS FOR GNC SYSTEMS SUMMARY 2 DISPLAY (G6.32)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
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NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

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TABLE 4.2.18-6. OUTPUT FUNCTIONAL PARAMETERS FROM GNC SYSTEMS SUMMARY 2 DISPLAY (G6.32)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
-----------	--------	--------------	-------------	-------	-----------	------------------	---------	-------------

NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
 (HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

TABLE 4.2.18-7. GNC SYSTEMS SUMMARY 2 DISPLAY (G6.32) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.18-8. GNC SYSTEMS SUMMARY 2 DISPLAY (G6.32) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.18-9. GNC SYSTEMS SUMMARY 2 DISPLAY (G6.32) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.19 DELETED.

4.2.20 STAR TRACKER/COAS CONTROL (PFS)

TITLE: S TRK/COAS CNTL

TYPE: SPEC/022

AVAILABILITY: PFS: GNC OPS 2, 3

4.2.20.1 Purpose, Operation, and Organization

- (1) The purpose of this display is to monitor and control the star tracker operation and moding. The display also provides data and controls necessary to perform COAS sightings and calibration.
- (2) The upper left-hand portion of the display contains the controls necessary to mode the star trackers into the various submodes. Items 1 and 2 allow selection of the self-test (SELF-TEST) mode for the -Y and -Z star trackers, respectively. An asterisk (*) will be displayed after each item number to indicate that the self-test mode is active for that tracker. The self-test mode will remain active until completed and will be restarted each time Item 1 or 2 is executed if self-test is complete. The results of self-test will be shown elsewhere on the display.
- (3) Items 3 and 4 provide the crew with the means to select the star track (STAR TRK) mode of operation. This mode is selected to accomplish star tracking whenever the vehicle's attitude is known within 0.5 degree. Stars in both the -Y and -Z trackers may be tracked simultaneously. Items 5 and 6 are used to select the target track (TGT TRK) submode. This mode is used to perform target tracking with the star tracker for rendezvous. The program will allow a star to be tracked by one star tracker and the target by the other. An asterisk (*) is displayed after each of these item numbers to indicate the current active mode. The asterisks (*'s) will remain until the appropriate submode is terminated by the selection of another submode.
- (4) Items 7 and 8 are crew controls used to force the star tracker to break track (BREAK TRK). When this command is executed, the appropriate star tracker will break lock with the star currently being tracked and will resume tracking the next star encountered in the search pattern. Execution of a break track command will not change the selected submode.
- (5) Items 9 and 10 are the controls used to select the terminate/idle (TERM/IDLE) submode. Selection of this mode will cause all star tracker processing to be terminated except that required for BITE processing and will terminate any other submode in progress. An asterisk (*) will be displayed after each item number to indicate when the TERM/IDLE mode is selected.
- (6) Below the submode controls, in the lower left-hand portion of the display, are data and controls to monitor and control the star tracker (S TRK) functions. Identical data and controls are provided for each star tracker independently. Items 11 and 12 are the inputs used to enter the ID (REQD ID) of a desired star to be tracked. This input may be used in conjunction with the star track or target track modes to select the desired source. Entering zero into the ID location causes the software to compute its own stars based on availability.

The Required ID data field shall be zeroed upon completion of the star tracker manual mode processing. The star ID (TRK ID) outputs a code indicating which star or target is currently

being tracked. The output code corresponds to any of the 100 catalogue stars as well as for a rendezvous target. In the absence of a valid star or target ID, the ID field shall be zeroed. The TRK ID data field shall be zeroed upon completion of the star tracker manual mode processing. The star present (S PRES) location outputs an asterisk (*) whenever a star is being tracked by the star tracker.

- (7) Below the star ID and star present parameters are displays of the star position in the star tracker field of view. The delta angle (Δ ANG) output displays the angle between the expected star line-of-sight and the actual measured line-of-sight. For stars, expected line-of-sight is based on vehicle attitude and star tracker SOP-computed line-of-sight. For targets, expected line-of-sight is based on vehicle attitude and NAV estimates for the rendezvous target. This parameter, (Δ ANG), is a measure of how well the vehicle's attitude is known and may be used to indicate if an alignment is required when a star is being tracked.
- (8) Items 13 and 14 are the control inputs used to enter a magnitude threshold for star or target tracking. Valid inputs are 0, 1, 2, or 3.
- (9) Below the threshold inputs are locations indicating the (SHUTTER) position for each star tracker. The display will show either "OP" (for open) or "CL" (for closed) to represent the current shutter position. Items 15 and 16 are controls that allow the crew to select the manual operating mode (MAN OP) of the shutter. Nominally, the shutter will operate in the automatic mode. Entry of either Items 15 or 16 will inhibit the automatic shutter mode for the appropriate star tracker and cause the shutter to be commanded and held in the open position. An asterisk (*) will be displayed next to the appropriate item number to indicate that the shutter is being forced open. The automatic mode may be reselected by reexecuting the appropriate item number. This action will return control of the shutter to the hardware/software system, and simultaneously cause the associated asterisk (*) to be blanked.
- (10) Below the shutter controls, the display contains (STATUS) information from both star trackers. The location displays any of the following as appropriate: "ST FAIL" to indicate that a star tracker has failed self-test; "ST PASS" if self-test is passed; "FALSE TRK" if a star or target fails to pass position or rate reasonableness tests; "OUT FOV" if the input star or target is determined to be outside the star tracker field-of-view; "HI RATE" if the IMU-derived body rate exceeds 0.2 deg/sec (which results in degraded star tracker operations); "NO TARGET" if a target or a star is in the field-of-view but has not been acquired; and blank, which is the normal status state.
- (11) Directly below the status display is the BITE output location. This location displays "BITE" when any of the built-in test equipment discretes indicates that a failure has been detected. The output indication will be driven double overbright. If no BITE discrete indicates a failure, the display locations will be blanked.
- (12) The outputs and item entries to monitor and control the star table (S TABLE) are shown on the upper right-hand portion of the display. These data are presented in three columns where the left-most column (1) represents the current or most recent data. Columns 2 and 3 represent progressively older data. The track ID (TRK ID) shows the star ID code associated with each star in the table. Below the star ID is an output (Δ MIN) showing how old each input is in minutes. The clock starts incrementing from the time tag associated with the saved data.
- (13) The angular difference (ANG DIF) output displays the measured separation angle between the two stars. For example, the ANG DIF output in Column 1 shows the angular difference

between the line-of-sight vectors of the stars in Columns 1 and 2. The same relationship applies to the angle difference of Columns 2 and 3. Column 3 “wraps around” to show the difference between Table Locations 3 and 1. Angle error (ANG ERR) is defined as the difference between the ANG DIF computed from the star catalogue and the ANG DIF computed from the star tracker measurements.

- (14) Items 17, 18 and 19 are controls used to select which star pair is to be used by the software to compute the alignment data. Nominally, the alignment software picks the best star pair based on predefined criteria. The two automatically selected stars will be indicated by asterisks (*'s) alongside the item numbers in the associated star table column. The crew has the capability to modify the automatic pair selection by executing the appropriate item entries. The item numbers will act as flip-flops; i.e., each subsequent item entry will cause the selection logic to change states. For example, if the software logic had selected Star Table Entries 1 and 3 and the crew wanted to force Entries 2 and 3, the initial display would show asterisks (*'s) alongside Items 17 and 19. The crew would first execute Item 17, which would deselect Entry 1 and blank the displayed asterisk (*). The next step would be to execute Item 18 which, since the column was previously deselected, would cause the Table Entry 2 data to be selected and would cause an asterisk (*) to appear next to Item 18. Therefore, Column 1 has been deselected and Columns 2 and 3 (which were previously selected) are used to compute the alignment. The selection will remain in force until a new star is tracked and input to the table, at which time the system reverts to automatic selection. Item 20 clears all data from the star table for both star tracker and COAS sightings.
- (15) The lower right-hand portion of the display contains the controls and data necessary to accomplish COAS sightings and calibration. Item 21 (REQD ID) allows the crew the means to input the star or target on which COAS marks are to be made. The star/target codes used are identical to those used in Items 11 and 12.
- (16) The Δ DEG X and Y output parameters display the equivalent $-Z$ COAS offsets of a star or target being tracked by the $-Z$ star tracker. These parameters allow the crew to visually locate in the $-Z$ COAS the same object currently being tracked by the star tracker.

Item 22 is the input used to select the COAS (SIGHT MODE). In this mode, the ADI ATT REF button performs the COAS mark function. Star data obtained via COAS sightings and marks go directly into the star table. An asterisk (*) is displayed alongside the item number to indicate that the sight mode is active. When the ADI REF pushbutton is used to take COAS marks, the computation of a new ADI reference is inhibited. Item 6 for the target track submode and Item 22 for the COAS SIGHT mode (with the $-Z$ POS selected) are mutually exclusive; i.e., the selection of any single optical instrument (ST or COAS) deselects the other optical instrument and changes the asterisk (*) configuration accordingly. Item 23 (ACCEPT) accepts the last COAS mark and allows processing of the “mark” data. As long as the ACCEPT command has not been executed, subsequent marks will override the previous marks. The ACCEPT command applies to the COAS star sight mode only and not when the COAS is being used for marking on a rendezvous target. This display is driven from the STAR TRACKER Hardware and is valid for all STAR TRACKER or COAS submodes.

- (17) Item 24 is used to select the COAS calibration mode (CAL MODE). Selection of this mode also reassigns the function of the ATT REF button as a COAS mark. Marks taken in this mode are used to update the COAS line-of-sight in NAV-base coordinates. An asterisk (*) is output alongside the item number to indicate that the calibration mode has been selected. When the

ADI REF pushbutton is used to take COAS marks, the computation of a new ADI reference is inhibited. Items 22, 24, and 25 are mutually exclusive.

- (18) Item 25 (DES) is used to deselect the COAS. When the COAS is deselected, an asterisk (*) appears beside Item 25. Either Item 22 or 24 removes the COAS from the deselect state and blanks the deselect asterisk (*). Items 26 and 27 are controls used by the crew to specify the mounting position (POS) of the COAS, either +X or -Z, respectively. An asterisk (*) is displayed alongside the appropriate item number to indicate which location has been selected.
- (19) The calibration (Δ BIAS) output displays the angular difference between the loaded COAS line-of-sight and the measured calibration COAS line-of-sight in NAV-base coordinates. The crew uses this information to determine the reasonability of the latest calibration mark and also to ascertain the magnitude of the desired update. Items 28 and 29 (UPDATE) are used to incorporate the new COAS Δ BIAS for the associated mounting position (POS +X or -Z). Incorporation of the data may be verified by noting that the Δ BIAS output is zeroed.

4.2.20.2 Star Tracker/COAS Control Keyboard Processing Addendum

- A. COAS SEL/DES CMD. The destinations for this signal (V93X6647X) are the STAR TRCK SOP (4.66), ORB ATT PROC (4.97) and the A/E ATT Proc (4.226).

4.2.20.3 Star Tracker/COAS Control (PFS) CRT Display Processing Addendum

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word "STAT" being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT display processing Table 4.2.20-2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the "M" PSI is displayed (for Commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)
Blank (default)	↓ M ∅
1	↓ ↑ M ∅
2	↑ M ∅
3	↓ ∅
4	↑ ∅
5	↓ ? ∅
6	↓ ↑ ∅
7	M ∅
8	↓ ? M ∅
9	? M ∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.2.20–2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. The following character strings for –Y and –Z star trackers are displayed for STATUS:
 - (blank)
 - ST FAIL
 - ST PASS
 - FALSE TRK
 - NO TARGET
 - OUT FOV
 - HI RATE
- B. Upon incorporation of the COAS Δ bias via Items 28 or 29, the Δ bias values will be zeroed.
- C. The following logic can be used to define whether Item 22, 24, or 25 is selected by displaying an asterisk (*).

V95X496_X		Item 22	Item 24	Item 25
3	4			
1	0	*	∅	∅
0	1	∅	*	∅
0	0	∅	∅	*
1	1	NA	NA	NA

4.2.20.4 Star Tracker/COAS Control Figure/Table References

- Figure 4.2.20–1 Star Tracker/COAS Control Display (PFS)
- Table 4.2.20–1 Keyboard Processing Table
- Table 4.2.20–2 CRT Display Processing Table
- Table 4.2.20–3 CRT Display Processing Background Requirements N/A
- Table 4.2.20–4 Mission Design Background Constants N/A
- Table 4.2.20–5 Input Functional Parameters
- Table 4.2.20–6 Output Functional Parameters
- Table 4.2.20–7 I–Loads
- Table 4.2.20–8 K–Loads
- Table 4.2.20–9 Constants

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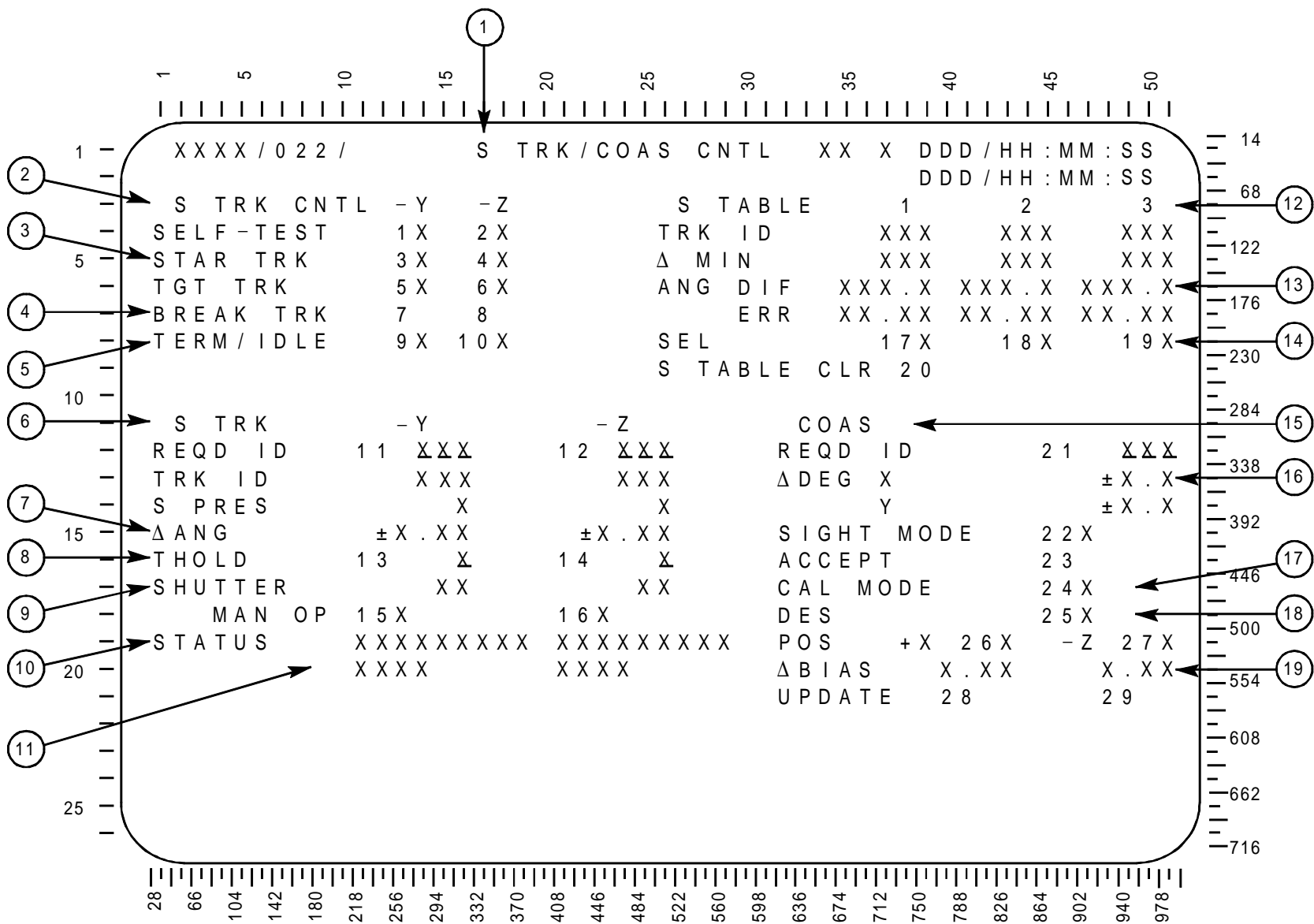


FIGURE 4.2.20-1. Star Tracker/COAS Control Display (PFS)

Table 4.2.20-1. S TRK/COAS CNTL (PFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
001	SELF TEST -Y 1	V93X6601X	0.0	CTRL			1				ST SOP	Y SLF TST MODE CMD	X
002	SELF TEST -Z 2	V93X6602X	0.0	CTRL			2				ST SOP	Z SLF TST MODE CMD	X
003	STAR TRK -Y 3	V93X6604X	0.0	CTRL			3				ST SOP	Y STAR TRACKER CMD	X
004	STAR TRK -Z 4	V93X6605X	0.0	CTRL			4				ST SOP	Z STAR TRACKER CMD	X
005	TGT TRK -Y 5	V93X6610X	0.0	CTRL			5				ST SOP	Y TARGET TRACK CMD	X
006	TGT TRK -Z 6	V93X6611X	0.0	CTRL			6				ST SOP	Z TARGET TRACK CMD	X
007	BREAK TRK -Y 7	V93X6614X	0.0	CTRL			7				ST SOP	Y BREAK TRACK CMD	X
008	BREAK TRK -Z 8	V93X6615X	0.0	CTRL			8				ST SOP	Z BREAK TRACK CMD	X
009	TERM/IDLE -Y 9	V93X6618X	0.0	CTRL			9				ST SOP	Y TERM IDLE CMD	X
010	TERM/IDLE -Z 10	V93X6619X	0.0	CTRL			10				ST SOP	Z TERM IDLE CMD	X
011	S TRK REQD ID -Y 11	V93Q6622C	4.0	DEC			11	0	110		ST SOP, CRT	Y SELECT STAR ID	X
012	S TRK REQD ID -Z 12	V93Q6623C	4.0	DEC			12	0	110		ST SOP, CRT	Z SELECT STAR ID	X
013	S TRK THOLD -Y 13	V93Q6625C	2.0	DEC			13	0	3		ST SOP, CRT	Y STAR MAGNITUDE THLD	X
014	S TRK THOLD -Z 14	V93Q6626C	2.0	DEC			14	0	3		ST SOP, CRT	Z STAR MAGNITUDE THLD	X
015	SHUTTER MAN OP-Y 15	V93X6629X	0.0	CTRL			15				ST SOP, CRT	Y A/F SHUTTER OPEN CMD	X
016	SHUTTER MAN OP-Z 16	V93X6630X	0.0	CTRL			16				ST SOP, CRT	Z A/F SHUTTER OPEN CMD	X
017	S TABLE SEL 1 17	V93X6633X	0.0	CTRL			17				ST SOP	TABLE 1 ALIGN SEL	X
018	S TABLE SEL 2 18	V93X6634X	0.0	CTRL			18				ST SOP	TABLE 2 ALIGN SEL	X
019	S TABLE SEL 3 19	V93X6635X	0.0	CTRL			19				ST SOP	TABLE 3 ALIGN SEL	X
020	S TABLE CLR 20	V93X6636X	0.0	CTRL			20				ST SOP	S TABLE CLEAR CMD	X
021	COAS REQD ID 21	V93Q6638C	4.0	DEC			21	1	110		ST SOP, CRT	COAS TRACK ID	X
022	SIGHT MODE 22	V93X6643X	0.0	CTRL			22				ST SOP	COAS SIGHT MODE	X
023	ACCEPT 23	V93X6644X	0.0	CTRL			23				ST SOP	COAS ACCEPT CMD	X
024	CAL MODE 24	V93X6645X	0.0	CTRL			24				ST SOP	COAS CALIBRATION MODE CMD	X
025*	COAS DES 25	V93X6647X	0.0	CTRL			25			A	ST SOP	COAS DES CMD	X
026	COAS POS +X 26	V93X6640X	0.0	CTRL			26				ST SOP	COAS +X LOC CMD	X
027	COAS POS -Z 27	V93X6641X	0.0	CTRL			27				ST SOP	COAS -Z LOC CMD	X
028	UPDATE 28	V93X6649X	0.0	CTRL			28				ST SOP	COAS +X CALIBRATE UPDATE	X
029	UPDATE 29	V93X6650X	0.0	CTRL			29				ST SOP	COAS -Z CALIBRATE UPDATE	X

Table 4.2.20-2. S TRK/COAS CNTL (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
001	(OPS)	V93X0040X	2	1		5.0															UI	OPS FUNCTION PAGE	X	
002	(SPEC)	V93X0042X	7	1		4.0																UI	SPEC FUNCTION PAGE	X
003	(DISP)	V93X0044X	10	1		4.0																UI	DISPLAY FUNCTION PAGE	X
004	(UL)	V92X5032X	34	1		2.0	UL							X								UI	UPLINK ACTIVITY IND	X
005	(GPC)	V93X0048X	36	1		2.0																UI	GPC DRIVER	X
006	(MT)	V91W1990C	39	1		12.0																FCOS	MISSION ELAPSED TIME	X
007	(CRT TIMER)	V91W1987C	39	2		12.0																FCOS	DISPLAY CRT TIMER,GNC	X
008	SELF TEST -Y 1	V95X4913X	14	4		1.0	*															ST SOP	-Y ST SELF TEST INDICATION	X
009	SELF TEST -Z 2	V95X4912X	18	4		1.0	*															ST SOP	-Z ST SELF TEST INDICATION	X
010	STAR TRK -Y 3	V95X4903X	14	5		1.0	*															ST SOP	-Y ST STAR TRACK INDICATION	X
011	STAR TRK -Z 4	V95X4902X	18	5		1.0	*															ST SOP	-Z ST STAR TRACK INDICATION	X
012	TGT TRK -Y 5	V95X4915X	14	6		1.0	*															ST SOP	-Y ST TARGET TRACK INDICATION	X
013	TGT TRK -Z 6	V95X4914X	18	6		1.0	*															ST SOP	-Z ST TARGET TRACK INDICATION	X
014	TERM/IDLE -Y 9	V95X4901X	14	8		1.0	*															ST SOP	-Y ST TERM/IDLE INDICATION	X
015	TERM/IDLE -Z 10	V95X4900X	18	8		1.0	*															ST SOP	-Z ST TERM/IDLE INDICATION	X
016	S TRK REQD ID -Y 11	V93Q6622C	13	12		4.0																KYBD	Y SELECT STAR ID	X
017	S TRK REQD ID -Z 12	V93Q6623C	23	12		4.0																KYBD	Z SELECT STAR ID	X
018	S TRK-TRK ID -Y	V95J4926C	13	13		4.0																ST SOP	-Y ST STAR IDENT INDICATION	X
019	S TRK-TRK ID -Z	V95J4925C	23	13		4.0																ST SOP	-Z ST STAR IDENT INDICATION	X
020	S TRK-S PRES -Y	V95X4907X	16	14		1.0	*															ST SOP	-Y ST STAR PRESENT INDICATION	X
021	S TRK-S PRES -Z	V95X4906X	26	14		1.0	*															ST SOP	-Z ST STAR PRESENT INDICATION	X
022	S TRK-DELTA ANG -Y	V95U4961C	12	15		5.2																ST SOP	-Y ST OUTPUT DELTA ANGLE	X
023	S TRK-DELTA ANG -Z	V95U4960C	22	15		5.2																ST SOP	-Z ST OUTPUT DELTA ANGLE	X
024	S TRK THOLD -Y 13	V93Q6625C	15	16		2.0																KYBD	Y STAR MAGNITUDE THLD	X
025	S TRK THOLD -Z 14	V93Q6626C	25	16		2.0																KYBD	Z STAR MAGNITUDE THLD	X
026	SHUTTER POS -Y	V95X4936X	15	17		2.0	OP	CL														ST SOP	-Y ST SHUTTER CLOSE INDICATION	X
027	SHUTTER POS -Z	V95X4935X	25	17		2.0	OP	CL														ST SOP	-Z ST SHUTTER CLOSE INDICATION	X
028	SHUTTER MAN OP-Y 15	V93X6629X	13	18		1.0	*															ST SOP,KYBD	Y A/F SHUTTER OPEN CMD	X
029	SHUTTER MAN OP-Z 16	V93X6630X	23	18		1.0	*															ST SOP,KYBD	Z A/F SHUTTER OPEN CMD	X
030	S TRK-STATUS 1-Y	V95J4930C	11	19		9.0																ST SOP	-Y ST STATUS INDICATION	X
031	S TRK-STATUS 1-Z	V95J4929C	21	19		9.0																ST SOP	-Z ST STATUS INDICATION	X
032	S TRK-STATUS 2-Y	V95X4928X	11	20		4.0	BITE															ST SOP	-Y ST BITE INDICATION	X
033	S TRK-STATUS 2-Z	V95X4927X	21	20		4.0	BITE															ST SOP	-Z ST BITE INDICATION	X
034	S TRACK-TRK ID 1	V95U4942C	36	4		4.0																ST SOP	STAR 1 ID FROM SIGHTING TABLE	X
035	S TRACK-TRK ID 2	V95U4943C	42	4		4.0																ST SOP	STAR 2 ID FROM SIGHTING TABLE	X

TABLE 4.2.20-5. INPUT FUNCTIONAL PARAMETERS FOR STAR TRACKER/CREW OPTICAL ALIGN SIGHT CNTL DISPLAY (G6.44)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
ANGDIF1	V95U4949C	STAR 1 ANGULAR DIFFERENCE	STAR TRCK SOP		DEG		93017G	*
ANGDIF2	V95U4950C	STAR 2 ANGULAR DIFFERENCE	STAR TRCK SOP		DEG		93017G	*
ANGDIF3	V95U4951C	STAR 3 ANGULAR DIFFERENCE	STAR TRCK SOP		DEG		93017G	*
ANGERR1	V95U4952C	STAR 1 ANGULAR ERROR	STAR TRCK SOP		DEG		93017G	*
ANGERR2	V95U4953C	STAR 2 ANGULAR ERROR	STAR TRCK SOP		DEG		93017G	*
ANGERR3	V95U4954C	STAR 3 ANGULAR ERROR	STAR TRCK SOP		DEG		93017G	*
BIAS(1)	V95U4966C	-Z COAS ANG DIFF-OLD TO NEW AXIS	STAR TRCK SOP		DEG		93017G	*
BIAS(2)	V95U4965C	+X COAS ANG DIFF-OLD TO NEW AXIS	STAR TRCK SOP		DEG		93017G	*
BITE_I(1)	V95X4927X	-Z ST BITE INDICATION	STAR TRCK SOP		BD			
BITE_I(2)	V95X4928X	-Y ST BITE INDICATION	STAR TRCK SOP		BD			
CAL_I	V95X4964X	CALIB MODE INDICATION	STAR TRCK SOP		BD		93017G	*
D_ANG(1)	V95U4960C	-Z ST OUTPUT DELTA ANGLE	STAR TRCK SOP		DEG		93017G	*
D_ANG(2)	V95U4961C	-Y ST OUTPUT DELTA ANGLE	STAR TRCK SOP		DEG		93017G	*
D_TIME1	V95W4946C	STAR 1 DELTA TIME	STAR TRCK SOP		MIN		93017G	*
D_TIME2	V95W4947C	STAR 2 DELTA TIME	STAR TRCK SOP		MIN		93017G	*
D_TIME3	V95W4948C	STAR 3 DELTA TIME	STAR TRCK SOP		MIN		93017G	*
H_COAS	V95H4941C	HORIZ OFFSET OF -Z COAS IND	STAR TRCK SOP		DEG		93017G	*
REQD_ID	V93Q6638C	COAS TRACK ID	STAR TRKR/COAS DISP		VAR			
SELF_T_I(1)	V95X4912X	-Z ST SELF TEST INDICATION	STAR TRCK SOP		BD			
SELF_T_I(2)	V95X4913X	-Y ST SELF TEST INDICATION	STAR TRCK SOP		BD			
SEL_I1	V95X4955X	STAR 1 SELECT INDICATION	STAR TRCK SOP		BD		93017G	*
SEL_I2	V95X4956X	STAR 2 SELECT INDICATION	STAR TRCK SOP		BD		93017G	*
SEL_I3	V95X4957X	STAR 3 SELECT INDICATION	STAR TRCK SOP		BD		93017G	*
SEL_ID	V93Q6622C	Y SELECT STAR ID	STAR TRKR/COAS DISP		VAR			
SEL_ID	V93Q6623C	Z SELECT STAR ID	STAR TRKR/COAS DISP		VAR			
SHUTR_MAN_IND_Y	V93X6629XB	Y A/F SHTR OP CMD	STAR TRCK SOP					
SHUTR_MAN_IND_Z	V93X6630XB	Z A/F SHTR OP CMD	STAR TRCK SOP					
SHUTY	V93X6629XA	Y A/F SHTR OP CMD	STAR TRKR/COAS DISP					
SHUTZ	V93X6630XA	Z A/F SHTR OP CMD	STAR TRKR/COAS DISP					
SHUT_CLOS(1)	V71X5024B	-Z ST SHUTTER CLOSED	WD1 B3 ST 1		BD		93017G	*
SHUT_CLOS(2)	V71X5524B	-Y ST SHUTTER CLOSED	WD1 B3 ST 2		BD		93017G	*
SHUT_IND(1)	V95X4935X	-Z ST SHUTTER CLOSE INDICATION	STAR TRCK SOP		BD		92354	
SHUT_IND(2)	V95X4936X	-Y ST SHUTTER CLOSE INDICATION	STAR TRCK SOP		BD		92354	
SIGHT_I	V95X4963X	SIGHT MODE INDICATION	STAR TRCK SOP		BD		93017G	*
STAR_I(1)	V95X4906X	-Z ST STAR PRESENT INDICATION	STAR TRCK SOP		BD		92354	
STAR_I(2)	V95X4907X	-Y ST STAR PRESENT INDICATION	STAR TRCK SOP		BD		92354	

TABLE 4.2.20-5. INPUT FUNCTIONAL PARAMETERS FOR STAR TRACKER/CREW OPTICAL ALIGN SIGHT CNTL DISPLAY (G6.44)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
STAR_ID_I(1)	V95J4925C	-Z ST STAR IDENT INDICATION	STAR TRCK SOP		HXS		93017G	*
STAR_ID_I(2)	V95J4926C	-Y ST STAR IDENT INDICATION	STAR TRCK SOP		HXS		93017G	*
STAR_PRES(1)	V71X5026B	-Z ST STAR PRESENT	WD1 B5 ST 1		BD		93017G	*
STAR_PRES(2)	V71X5526B	-Y ST STAR PRESENT	WD1 B5 ST 2		BD		93017G	*
STAR_T_I(1)	V95X4902X	-Z ST STAR TRACK INDICATION	STAR TRCK SOP		BD			
STAR_T_I(2)	V95X4903X	-Y ST STAR TRACK INDICATION	STAR TRCK SOP		BD			
STATUS(1)	V95J4929C	-Z ST STATUS INDICATION	STAR TRCK SOP		HXS		93017G	*
STATUS(2)	V95J4930C	-Y ST STATUS INDICATION	STAR TRCK SOP		HXS		93017G	*
TAR_T_I(1)	V95X4914X	-Z ST TARGET TRACK INDICATION	STAR TRCK SOP		BD			
TAR_T_I(2)	V95X4915X	-Y ST TARGET TRACK INDICATION	STAR TRCK SOP		BD			
TERM_I(1)	V95X4900X	-Z ST TERM/IDLE INDICATION	STAR TRCK SOP		BD			
TERM_I(2)	V95X4901X	-Y ST TERM/IDLE INDICATION	STAR TRCK SOP		BD		89673B	
THOLDY	V93Q6625C	Y STAR MAGNITUDE THLD	STAR TRKR/COAS DISP		VAR			
THOLDZ	V93Q6626C	Z STAR MAGNITUDE THLD	STAR TRKR/COAS DISP		VAR			
TRK_ID1	V95U4942C	STAR 1 ID FROM SIGHTING TABLE	STAR TRCK SOP		HXS		93017G	*
TRK_ID2	V95U4943C	STAR 2 ID FROM SIGHTING TABLE	STAR TRCK SOP		HXS		93017G	*
TRK_ID3	V95U4944C	STAR 3 ID FROM SIGHTING TABLE	STAR TRCK SOP		HXS		93017G	*
V_COAS	V95H4940C	VERTICAL OFFSET OF -Z COAS IND	STAR TRCK SOP	DEG	SPL		93017G	*
XZPOS_I	V95X4962X	COAS POSITION INDICATION X OR -Z	STAR TRCK SOP		BD			
	V94X4806X	ILLEGAL ENTRY MSG(STRK/COAS CNTL)	UI					

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.20-6. OUTPUT FUNCTIONAL PARAMETERS FROM STAR TRACKER/CREW OPTICAL ALIGN SIGHT CNTL DISPLAY
(G6.44)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ACCEPT	V93X6644X	COAS ACCEPT CMD	STAR TRCK SOP		BD		89673B	
BREAKCOMY	V93X6614X	Y BREAK TRACK CMD	STAR TRCK SOP		BD			
BREAKCOMZ	V93X6615X	Z BREAK TRACK CMD	STAR TRCK SOP		BD			
CALSEL	V93X6645X	COAS CALIBRATE MODE CMD	STAR TRCK SOP		BD			
DESEL	V93X6647X	COAS DES CMD	A/E ATT PROC ORB ATT PROC STAR TRCK SOP		BD			
REQD_ID	V93Q6638C	COAS TRACK ID	STAR TRCK SOP		VAR			
SEL_ID	V93Q6622C	Y SELECT STAR ID	STAR TRKR/COAS DISP STAR TRCK SOP		VAR			
SEL_ID	V93Q6623C	Z SELECT STAR ID	STAR TRKR/COAS DISP STAR TRCK SOP		VAR			
SHUTY	V93X6629XA	Y A/F SHTR OP CMD	STAR TRKR/COAS DISP STAR TRCK SOP					
SHUTZ	V93X6630XA	Z A/F SHTR OP CMD	STAR TRKR/COAS DISP STAR TRCK SOP					
SIGHTSEL	V93X6643X	COAS SIGHT MODE	STAR TRKR/COAS DISP STAR TRCK SOP		BD			
SLCT1	V93X6633X	TABLE 1 ALIGN SEL	STAR TRCK SOP		BD			
SLCT2	V93X6634X	TABLE 2 ALIGN SEL	STAR TRCK SOP		BD			
SLCT3	V93X6635X	TABLE 3 ALIGN SEL	STAR TRCK SOP		BD			
STARCOMY	V93X6604X	Y STAR TRACK CMD	STAR TRCK SOP		BD		89673B	
STARCOMZ	V93X6605X	Z STAR TRACK CMD	STAR TRCK SOP		BD		89673B	
STSELFCOMY	V93X6601X	Y SLF TST MODE CMD	STAR TRCK SOP		BD			
STSELFCOMZ	V93X6602X	Z SLF TST MODE CMD	STAR TRCK SOP		BD			
STTARCOMY	V93X6610X	Y TARGET TRACK CMD	STAR TRCK SOP		BD			
STTARCOMZ	V93X6611X	Z TARGET TRACK CMD	STAR TRCK SOP		BD			
STTERMCOMY	V93X6618X	Y TERM IDLE CMD	STAR TRCK SOP		BD			
STTERMCOMZ	V93X6619X	Z TERM IDLE CMD	STAR TRCK SOP		BD			
S_TBLE_CLR	V93X6636X	S TABLE CLEAR CMD	STAR TRCK SOP		BD			
THOLDY	V93Q6625C	Y STAR MAGNITUDE THLD	STAR TRCK SOP		VAR			
THOLDZ	V93Q6626C	Z STAR MAGNITUDE THLD	STAR TRKR/COAS DISP STAR TRCK SOP		VAR			
UPDATE(1)	V93X6650X	COAS -Z CALIBRATE UPDATE	STAR TRKR/COAS DISP STAR TRCK SOP		BD		89673B	
UPDATE(2)	V93X6649X	COAS +X CALIBRATE UPDATE	STAR TRCK SOP		BD		89673B	
XPOS	V93X6640X	COAS +X LOC CMD	STAR TRCK SOP		BD			
YPOS	V93X6641X	COAS -Z LOC CMD	STAR TRCK SOP		BD			

TABLE 4.2.20-6. OUTPUT FUNCTIONAL PARAMETERS FROM STAR TRACKER/CREW OPTICAL ALIGN SIGHT CNTL DISPLAY
(G6.44)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
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NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
(HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

TABLE 4.2.20-7. STAR TRACKER/CREW OPTICAL ALIGN SIGHT CNTL DISPLAY (G6.44) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.20-8. STAR TRACKER/CREW OPTICAL ALIGN SIGHT CNTL DISPLAY (G6.44) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.20-9. STAR TRACKER/CREW OPTICAL ALIGN SIGHT CNTL DISPLAY (G6.44) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.21 IMU ALIGNMENT (PFS)

TITLE: IMU ALIGN

TYPE: SPEC/021

AVAILABILITY: PFS: (GNC OPS 2, 3 and OPS 3 (MM 301))

4.2.21.1 Purpose, Operation, and Organization

- (1) This display provides the capability for the crew to monitor and control the on-orbit and entry IMU hardware and software mode status, and alignment submode.
- (2) The upper left-hand portion of the display contains the status information and mode controls necessary to monitor and control each IMU (1,2,3). A status parameter is displayed for each IMU. An "M" will be output whenever IMU data are missing and will be blanked when valid data returns. When an "M" is displayed for an IMU its associated terms, BITE summary word, angle data, and delta angles shall be blanked. A down arrow (↓) is output whenever RM declares an IMU failed or when an IMU is deselected. The down arrow (↓) may be reset by the crew reselecting an IMU. A question mark (?) is displayed by the No. of each IMU participating in the voting logic for an RM dilemma. The question mark (?) will be reset when the dilemma is resolved. The status will be blank when the above conditions are not met.
- (3) The status (STAT) location outputs BITE to show the presence of either a hardware or software Built-in-Test-Equipment indication, OFF to indicate that power has been removed from a unit, or is blank (the normal status condition). The BITE status output will be driven double overbright. The TEMP location will display OK if all temperature status discretetes indicate that all temperatures are within tolerance, LO if any temperature is out of tolerance low, and HI (double overbright) if any temperature is out of tolerance high. The HI indication takes precedence.
- (4) Items 21-23 provide the capability to select the standby (STBY) mode of operations. In this mode, only the IMU heater circuits are energized. No other IMU circuits are powered or active. Items 4-6 provide the capability to select the operate (OPER) mode. When this mode is commanded, power is applied to all IMU circuits energizing the gyro wheels, servo loops and input/output electronics. Accelerometer and resolver data as well as gyro torquing data are available in the operate mode. An asterisk (*) is displayed next to the item number for whichever mode is currently active. The modes are mutually exclusive in that selection of either mode causes the other mode to be deselected.
- (5) Items 7-9 provide crew controls for IMU selection filter status. Execution of any of these item numbers will cause the associated IMU to be deselected (DES) as an input to the selection filter. An asterisk (*) by the item number and down arrows (↓'s) in the status columns are displayed to show that deselection has occurred. The selection filter status may also be changed automatically by redundancy management (RM). If an IMU is declared failed or deselected by RM, that IMU will be automatically removed from the selection filter and the appropriate deselect asterisk (*) and down arrows (↓'s) will be driven. The crew also has the capability to manually put an IMU back in the selection filter after it has been deselected by reexecution of the DES item numbers. This action will also cause the asterisk (*) and down arrows (↓'s) to be blanked.

- (6) Below the IMU status information and mode controls are displayed the IMU accelerations (ACC) in feet per second squared in M50 system coordinates. This provides the crew with the capability to compare accelerometer outputs between IMU's even if the clusters are skewed.
- (7) The lower left portion of the display contains Euler angle (ANG X, Y, Z) data. The angles displayed represent the body-to-M50 Euler angles (in degrees as computed for each IMU). This allows manual attitude comparison even for skewed IMU's.
- (8) Below the angle data are output parameters showing the delta IMU angles (ANG ΔX , ΔY , ΔZ). These locations display the IMU misalignment angles (degrees) between the desired or last known cluster-to-M50 orientation and the present cluster-to-M50 orientation as determined by the IMU alignment function. These angles are computed cyclically for display and downlink.
- (9) The upper right-hand portion of the display contains the data entry and controls necessary to perform IMU on-orbit alignments. ENA will be driven after the word ALIGN when the star tracker module has determined that sufficient data are available to accomplish an alignment option requiring star sighting data. Items 10-12 are inputs used to select or deselect the IMU's to be aligned. An asterisk (*) is driven next to the option (1, 2, 3,) currently selected. The display shall be initialized the first time with no IMU's selected and shall thereafter reflect crew selection. An attempt to change the IMU to-be-aligned while alignment is in progress will result in the "ILLEGAL ENTRY" message display.
- (10) Item 13 (STAR) is used to select star data (obtained with either Star Tracker or COAS sightings) as reference (REF) data for IMU alignment. Item 13 is the default data source. Item 13 will be active whenever the display is first called, an alignment is completed, or an alignment is terminated (with Item 17). When Item 13 is active, an asterisk (*) is driven next to it. Item 13 supports two modes of alignment. If Item 13 is active and Item 15 (TYPE) indicates TORQUE, a command to align (Item 16) will utilize Star Tracker/COAS data to reposition IMU platforms (selected by Items 10-12) to their desired orientation. Item 13 may also be used in conjunction with Item 15 to perform a matrix alignment based on star data. If Item 13 is active and Item 15 indicates MATRIX, execution of Item 16 will recompute the selected IMU's platform orientations without physical repositioning. Item 13 will be reset off (asterisk blanked) whenever Item 14 is activated (by the entry of a reference IMU number).
- (11) Item 14 (IMU) is used to designate an IMU as the source of alignment reference (REF) data. The designated reference number (1, 2, or 3) is displayed to the right of the item label. Item 14 also supports two modes of alignment. If Item 14 indicates a reference IMU and Item 15 (TYPE) indicates TORQUE, a command to align (Item 16) will reposition the selected IMUs (Items 10-12) to the desired orientation. If Item 14 indicates a reference IMU and Item 15 indicates MATRIX, a command to align (Item 16) will compute platform orientations in a similar fashion to the matrix alignment associated with Item 13, i.e. orientations of the selected IMUs are computed, without repositioning. Items 13 and 14 are mutually exclusive. Entering a value for Item 14 will blank the asterisk adjacent to Item 13. Item 14 will be reset (data entry blanked) whenever an asterisk is indicated for Item 13.
- (12) Item 15 (TYPE), as described above, selects the alignment type (MATRIX or TORQUE alignment) in conjunction with Item 13 (reference star data selected) or Item 14 (reference IMU data selected). When matrix alignment is selected, via Item 15, "MATRIX" will be displayed in the adjacent text field. When matrix alignment is not selected, "TORQUE" will be displayed. Prior to execution of Item 16, Item 15 may be switched (i.e., it may be toggled).

The default alignment selection is TORQUE. Item 15 will display TORQUE whenever the display is first called, an alignment is completed, or an alignment is terminated (with Item 17).

- (13) If any alignment mode (Items 13–15) is in progress when the display is dropped, the alignment will continue until it is completed. Upon completion of the alignment, the STAR ALIGN mode (Item 13) will be automatically reselected whether or not the display is up. If an alignment mode other than STAR ALIGN has been selected without the alignment having been initiated (i.e., Item 16 was not executed) and the display is dropped, upon recall of the display the last selected alignment mode will be reflected. An attempt to change the alignment mode while an alignment is in progress will result in an “ILLEGAL ENTRY” message display.
- (14) Item 16 (EXEC) allows the crew to initiate the alignment modes, options, and IMU’s selected with Items 10–15. An attempt to execute this item in any of major modes 302, 303, 304, or 305 after selecting STAR ALIGN (Item 13) will result in an “ILLEGAL ENTRY” message being displayed. An asterisk (*) is output alongside the item number while the selected alignment mode is active and is automatically reset when the alignment is complete. The display shall be initialized with this item deselected when it is first called.
- If STAR ALIGN (Item 13) is selected, and there are less than two selected star sighting data sets available when Item 16 is executed, an “ILLEGAL ENTRY” message shall be displayed and the input will be rejected.
- For an IMU-to-IMU alignment mode, if the reference IMU is not in operate when Item 16 is executed, an “ILLEGAL ENTRY” message shall be displayed and the input will be rejected.
- If no IMU’s have been selected for alignment when Item 16 is executed, or if an alignment is already in progress when Item 16 is executed, an “ILLEGAL ENTRY” message shall be displayed and the input will be rejected.
- (15) Item 17 (TERM) provides the capability to terminate any selected alignment submode option that is in progress. This item shall be mutually exclusive with the execute item in that selection of either causes the other to be deselected. Execution of this item shall also automatically reselect the star align submode alignment if it was not the option that was in progress. An attempt to terminate an alignment when no alignment is in progress will result in an “ILLEGAL ENTRY” message display.
- (16) The lower right portion of the display includes Item 18 (NAV ΔV THRESH) which allows crew selection of the IMU NAV acceleration threshold (in Micro g’s) above which navigation uses IMU delta V’s for state propagation during FCS C/O, on-orbit, and rendezvous operations. An I-Loaded value is initially displayed but the threshold value reflects crew inputs thereafter. Item 18 is legal in OPS 2 only. For transitions between OPS–2 and OPS–8, the latest threshold value will be retained.
- (17) The lower right portion of the display provides for a mass memory read of calibration parameters. Execution of Item 19 initiates a mass memory read (MM READ). Selection of the read command is indicated by the presence of an asterisk (*). The asterisk (*) will be reset when the MM read is complete. No item entries are allowed during MM read, the result will be an “ILLEGAL ENTRY” message.

After this item entry, the body to roll quaternions (Q_BODY_ROLL_k) and the roll to roll quaternion (Q_ROLL_ROLL_k) must be recomputed. These computations are defined in the initialization modules of the Ascent/Entry ATT_PROC and the Orbit ATT_PROC.

- (18) Items 24, 25, and 26 allow the crew to mask the BITE conditions present on IMU's 1, 2, and 3, respectively. Execution of the mask item for a given IMU will cause the IMU SOP to compute a mask for all BITE's present on that IMU at the time of the item entry. Re-execution of the same item terminates BITE masking. If a new BITE is experienced while masking is in effect, it is not automatically masked; it can be masked by terminating and then reactivating masking. Execution of the mask item will have no effect when masking is not active and there are no BITE's on the IMU. An asterisk displayed next to the item number indicates that masking is in affect. The display is initialized with masking deselected and thereafter reflects crew input.

A BITE summary word is displayed to the left of the mask item number for each IMU. It is displayed as a four-character hexadecimal number, with "0000" and "FFFC" indicating the "no BITE" and "all BITE's" on conditions, respectively. (Note: the 14 bits of the IMU BITE summary word are arranged for display as a left-justified 16-bit word with zeroes for the two least significant bits.) The BITE summary word is not affected by execution of the mask item entry.

- (19) ILLEGAL ITEM ENTRIES. Item numbers 1 through 3 and 20 do not exist for this display. If any of these item numbers are executed, an operator error shall result and the "ILLEGAL ENTRY" CRT message will be displayed and the input rejected.

4.2.21.2 IMU Alignment (PFS) Keyboard Processing Addendum

- A. IMU Select/Deselect Command Signal Destination. This signal has multiple destinations as follows: IMU RM (4.72), GAX (4.110) and CRT.
- B. NAV Delta V Threshold Signal Destination. This signal (V93A6710C) has multiple destinations as follows: ORB/RND NAV (4.126), ORB UPP (4.22), CRT, AND TLM.
- C. Align Exec Illegal Entry (No Stars). With star data selected for alignment (V95X0600X set to 1) and the AL_ENABLE flag (V95X4995X) set FALSE, or with the star data alignment selected in MM 302-305, execution of Item 16 will cause an "Illegal Entry" message to be displayed and the input will be rejected.
- D. Align Exec Illegal Entry (No IMU's Selected). With no IMU's selected for alignment (V93X6755X and V93X6756X and V93X6757X set to 0), execution of Item 16 will cause an "ILLEGAL ENTRY" message to be displayed and the input will be rejected.
- E. Align Exec Illegal Entry (Align In Progress). With an IMU alignment in progress (V95X0583X set to 1), execution of Item 16 will cause an "ILLEGAL ENTRY" message to be displayed and the input will be rejected.
- F. Align Exec Illegal Entry (Reference IMU Not in Operate). If the designated reference IMU (V95U0603C) is not in operate mode (V71X2403XB, V71X3403XB, or V71X4403XB corresponding to the reference IMU set to 0), or is not currently commanded to operate mode (V93X6705X, V93X6706X, or V93X6707X corresponding to the reference IMU set to 0), execution of Item 16 will cause an "ILLEGAL ENTRY" message to be displayed and the input will be rejected.
- G. Align Termination Illegal Entry. With an IMU alignment not in progress (V95X0583X set to 0), execution of Item 17 will cause an "ILLEGAL ENTRY" message to be displayed and the input will be rejected.

- H. Alignment Mode Illegal Entry. With an IMU alignment in progress (V95X0583X set to 1), execution of Items 13, 14, or 15 will cause an “ILLEGAL ENTRY” message to be displayed and the input will be rejected.
- I. Select/Deselect For Alignment Illegal Entry. With an IMU alignment in progress (V95X0583X set to 1), execution of Items 10-12 will cause an “ILLEGAL ENTRY” message to be displayed and the input will be rejected.
- J. NAV Delta V Threshold Illegal Entry. Execution of Item 18 in OPS 3 will cause an “ILLEGAL ENTRY” message to be displayed and the input will be rejected.
- K. Illegal Entries. With a mass memory read in progress (V91X5080X set to 1), execution of any item entry will cause an “ILLEGAL ENTRY” message to be displayed and the input will be rejected.
- L. Alignment Data Source Switching. STAR ALIGN OPTION (V93X6765X) and IMU/IMU ALIGN OPTION (V93J6767C) indicate mutually exclusive data sources. An Item 14 entry which sets IMU/IMU ALIGN OPTION to a non-zero value (to indicate the selected IMU reference) will set STAR ALIGN OPTION to OFF. Conversely, an Item 13 entry which sets STAR ALIGN OPTION to ON will set IMU/IMU ALIGN OPTION to 0 (IMU/IMU Align Option not active).
- M. Alignment Option Defaults. When the IMU ALIGN display is first called up in an OPS, or the ALIGN IN PROGRESS flag (V95X0583X) transitions from ON to OFF, STAR ALIGN OPTION (V93X6765X) will be set ON, IMU/IMU ALIGN OPTION (V93J6767C) will be set to 0, and MATRIX ALIGN OPTION (V93X6771X) will be set to OFF.

4.2.21.3 IMU Alignment (PFS) CRT Display Processing Addendum

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word “STAT” being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT display processing Table 4.2.21–2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the “M” PSI is displayed (for Commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)			
Blank (default)	↓		M	∅
1	↓ ↑		M	∅
2	↑		M	∅
3	↓			∅
4	↑			∅
5	↓	?		∅
6	↓ ↑			∅
7			M	∅
8	↓	?	M	∅
9		?	M	∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.2.21–2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. IMU Status. The status field of each IMU unit is driven with status indicator to display the following remote texts:

OFF
BITE
blank

BITE shall be driven double overbright.

- B. IMU Temperature. The temperature field of each IMU unit is driven with a temperature indicator to display the following remote texts:

OK
HI
LO

HI is driven double overbright and takes precedence over LO.

- C. IMU Select/Deselect Command Signal. For each IMU, the deselect command for driving the asterisk (*) after the deselect item number can be reset (i.e., “0” state of the signal) either by crew execution of the deselect item number or when RM automatically deselects a commfaulted (bypassed) IMU in OPS 3, or when RM declares the IMU FAILED. The select command for blanking the asterisk(*) after the deselect item number can be set (i.e., “1” state of the signal) only by crew execution of the deselect item number.

- D. IMU M50 to Body Euler Angle Data Source. The signal source for the IMU angle data is as follows:

ON–ORB ATT PROC (4.97) during OPS 2
A/E ATT PROC (4.226) during OPS 3

- E. If the commfault bit of the IMU 1 I/O Fail Status (V94J4160C) is set, this data will be blanked.

- F. If the commfault bit of the IMU 2 I/O Fail Status (V94J4161C) is set, this data will be blanked.
- G. If the commfault bit of the IMU 3 I/O Fail Status (V94J4162C) is set, this data will be blanked.
- H. Reference IMU Blanking If the value of IMUR (V95U0603C) is zero, blank the data entry field.

4.2.21.4 IMU Alignment Figure/Table References

Figure 4.2.21-1	IMU Alignment Display (PFS)
Table 4.2.21-1	Keyboard Processing Table
Table 4.2.21-2	CRT Display Processing Table
Table 4.2.21-3	CRT Display Processing Background Requirements N/A
Table 4.2.21-4	Mission Design Background Constants N/A
Table 4.2.21-5	Input Functional Parameters
Table 4.2.21-6	Output Functional Parameters
Table 4.2.21-7	I-Loads
Table 4.2.21-8	K-Loads
Table 4.2.21-9	Constants

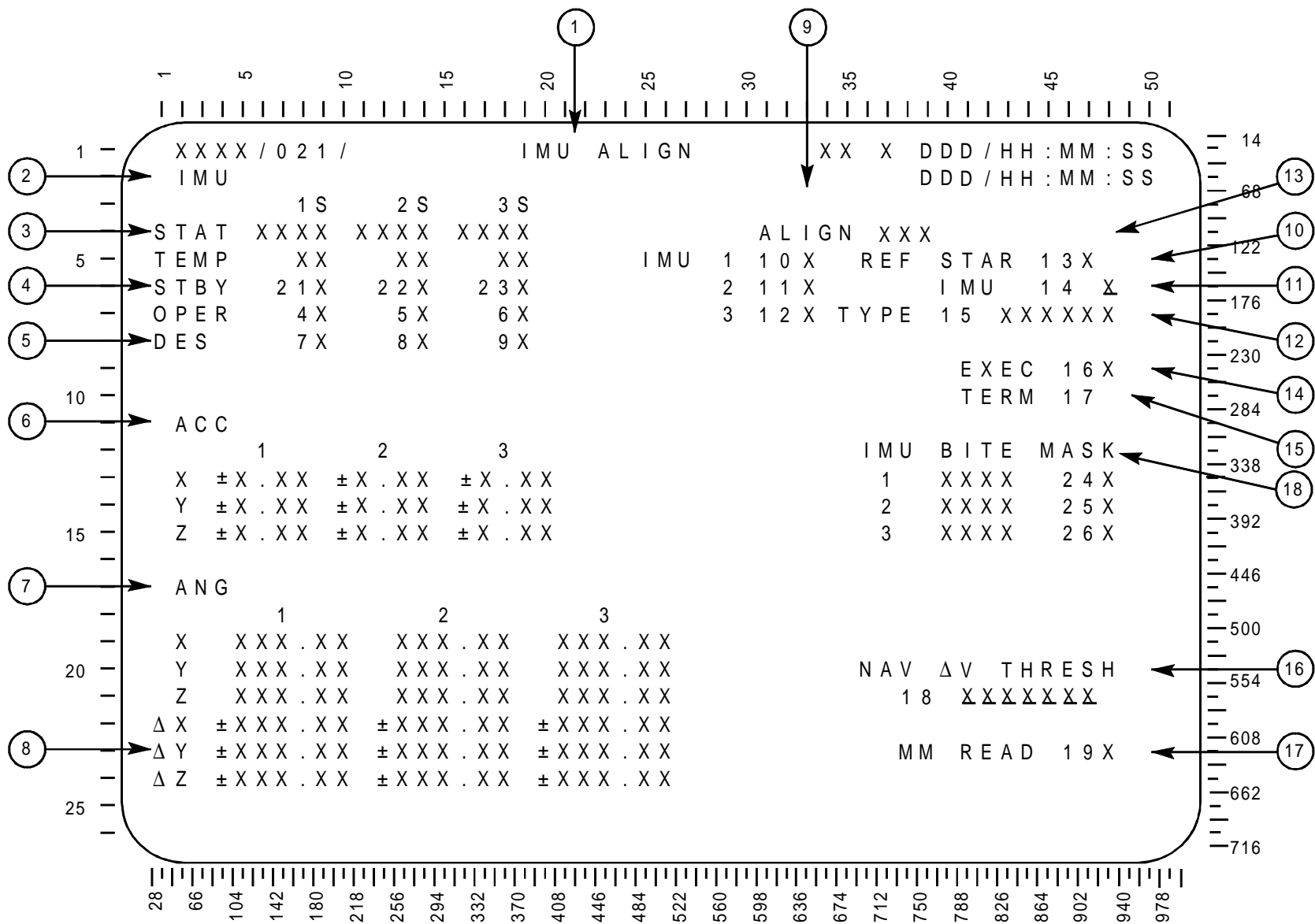


FIGURE 4.2.21-1.IMU Alignment Display (PFS)

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Table 4.2.21-1. IMU ALIGNMENT (PFS) KEYBOARD PROCESSING													
Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
001	IMU 1 STBY	V93X6701X	0.0	CTRL			21			K	IMU A/C	IMU 1 STANDBY CMD	X
002	IMU 2 STBY	V93X6702X	0.0	CTRL			22			K	IMU A/C	IMU 2 STANDBY CMD	X
003	IMU 3 STBY	V93X6703X	0.0	CTRL			23			K	IMU A/C	IMU 3 STANDBY CMD	X
004	IMU 1 OPER	V93X6705X	0.0	CTRL			4			K	IMU A/C	IMU 1 OPERATE CMD	X
005	IMU 2 OPER	V93X6706X	0.0	CTRL			5			K	IMU A/C	IMU 2 OPERATE CMD	X
006	IMU 3 OPER	V93X6707X	0.0	CTRL			6			K	IMU A/C	IMU 3 OPERATE CMD	X
007*	IMU 1 DES	V93X6711X	0.0	CTRL			7			A,K	GAX, IMU RM	IMU 1 SEL/DES CMD	X
008*	IMU 2 DES	V93X6712X	0.0	CTRL			8			A,K	GAX, IMU RM	IMU 2 SEL/DES CMD	X
009*	IMU 3 DES	V93X6713X	0.0	CTRL			9			A,K	GAX, IMU RM	IMU 3 SEL/DES CMD	X
010	IMU 1 ALIGN	V93X6755X	0.0	CTRL			10			D,I,K	IMU A/C, CRT	ALIGN IMU 1	X
011	IMU 2 ALIGN	V93X6756X	0.0	CTRL			11			D,I,K	IMU A/C, CRT	ALIGN IMU 2	X
012	IMU 3 ALIGN	V93X6757X	0.0	CTRL			12			D,I,K	IMU A/C, CRT	ALIGN IMU 3	X
013	STAR ALIGN	V93X6765X	0.0	CTRL			13			C,H,K,L,M	IMU A/C	STAR ALIGN OPTION	X
014	IMU/IMU	V93J6767C	2.0	DEC			14	1	3	F,H,K,L,M	IMU A/C	IMU/IMU ALIGN OPTION	X
015	MATRIX	V93X6771X	0.0	CTRL			15			H,K,M	IMU A/C	MATRIX ALIGN OPTION	X
016	EXEC	V93X6770X	0.0	CTRL			16			C,D,E,F,K	IMU A/C	EXEC ALIGN OPTION SEL	X
017	TERM	V93X6773X	0.0	CTRL			17			G,K	IMU A/C	TERMINATE ALIGN IN PROGRESS CMD	X
018	NAV DELTA V THR	V93A6710C	8.0	DEC	UG		18	0	9999999	B,J,K	ORB/RND NAV	IMU NAV ACCEL THRESHOLD	X
019*	MM READ	V93X6057X	0.0	CTRL			19			K	FCOS	IMU MM READ COMMAND	X
020	IMU 1 BITE MASK 24	V93X6717X	0.0	CTRL			24			K	IMU INT PROC	IMU 1 BITE MASK CMD	
021	IMU 2 BITE MASK 25	V93X6718X	0.0	CTRL			25			K	IMU INT PROC	IMU 2 BITE MASK CMD	
022	IMU 3 BITE MASK 26	V93X6719X	0.0	CTRL			26			K	IMU INT PROC	IMU 3 BITE MASK CMD	

Table 4.2.21-2. IMU ALIGNMENT (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L K	S I Z E	I N T E N S I T Y	F L A S H	R A T E	S I G N A L	L E V E L	B E C R E T	D E L E T E	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
001	(OPS)	V93X0040X	2	1		5.0															UI	OPS FUNCTION PAGE	X	
002	(SPEC)	V93X0042X	7	1		4.0																UI	SPEC FUNCTION PAGE	X
003	(DISP)	V93X0044X	10	1		4.0																UI	DISPLAY FUNCTION PAGE	X
004	(UL)	V92X5032X	34	1		2.0	UL							X								UI	UPLINK ACTIVITY IND	X
005	(GPC)	V93X0048X	36	1		2.0																UI	GPC DRIVER	X
006	(MT)	V91W1990C	39	1		12.0			DHMS													FCOS	MISSION ELAPSED TIME	X
007	(CRT TIMER)	V91W1987C	39	2		12.0			DHMS													FCOS	DISPLAY CRT TIMER,GNC	X
008	IMU 1	V94J4160C	9	3		1.0														8	GAX	IMU 1 I/O, FAIL STATUS	X	
009	IMU 2	V94J4161C	14	3		1.0														8	GAX	IMU 2 I/O, FAIL STATUS	X	
010	IMU 3	V94J4162C	19	3		1.0														8	GAX	IMU 3 I/O, FAIL STATUS	X	
011	IMU 1 STAT	V95J0615C	6	4		4.0							X							A	IMU A/C	IMU 1 PWR/BITE STATUS	X	
012	IMU 2 STAT	V95J0616C	11	4		4.0							X							A	IMU A/C	IMU 2 PWR/BITE STATUS	X	
013	IMU 3 STAT	V95J0617C	16	4		4.0							X							A	IMU A/C	IMU 3 PWR/BITE STATUS	X	
014	IMU 1 TEMP	V95J0621C	8	5		2.0							X							B	IMU A/C	IMU 1 TEMP STATUS	X	
015	IMU 2 TEMP	V95J0622C	13	5		2.0							X							B	IMU A/C	IMU 2 TEMP STATUS	X	
016	IMU 3 TEMP	V95J0623C	18	5		2.0							X							B	IMU A/C	IMU 3 TEMP STATUS	X	
017*	IMU 1 STBY 21	V71X2403X	9	6		1.0		*														HDWR	IMU-1 IN OPERATE MODE	X
018*	IMU 2 STBY 22	V71X3403X	14	6		1.0		*														HDWR	IMU-2 IN OPERATE MODE	X
019*	IMU 3 STBY 23	V71X4403X	19	6		1.0		*														HDWR	IMU-3 IN OPERATE MODE	X
020*	IMU 1 OPER 4	V71X2403X	9	7		1.0	*															HDWR	IMU-1 IN OPERATE MODE	X
021*	IMU 2 OPER 5	V71X3403X	14	7		1.0	*															HDWR	IMU-2 IN OPERATE MODE	X
022*	IMU 3 OPER 6	V71X4403X	19	7		1.0	*															HDWR	IMU-3 IN OPERATE MODE	X
023*	IMU 1 DES 7	V93X6711X	9	8		1.0		*							B					C	IMU RM, KYBD	IMU 1 SEL/DES CMD	X	
024*	IMU 2 DES 8	V93X6712X	14	8		1.0		*							B					C	IMU RM, KYBD	IMU 2 SEL/DES CMD	X	
025*	IMU 3 DES 9	V93X6713X	19	8		1.0		*							B					C	IMU RM, KYBD	IMU 3 SEL/DES CMD	X	
026	ACC 1 X	V95L0631C	4	13		5.2			FPS2		X									E	IMU A/C	IMU 1 M50 X AXIS DEL V OVER 1 SEC	X	
027	ACC 1 Y	V95L0634C	4	14		5.2			FPS2		X									E	IMU A/C	IMU 1 M50 Y AXIS DEL V OVER 1 SEC	X	
028	ACC 1 Z	V95L0637C	4	15		5.2			FPS2		X									E	IMU A/C	IMU 1 M50 Z AXIS DEL V OVER 1 SEC	X	
029	ACC 2 X	V95L0632C	10	13		5.2			FPS2		X									F	IMU A/C	IMU 2 M50 X AXIS DEL V OVER 1 SEC	X	
030	ACC 2 Y	V95L0635C	10	14		5.2			FPS2		X									F	IMU A/C	IMU 2 M50 Y AXIS DEL V OVER 1 SEC	X	

Table 4.2.21-2. IMU ALIGNMENT (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNIT S	SCALE	SIGNAL	INSTRUMENT	FUNCTION	RESET	ALIGN	LEVEL	DRAIN	Add Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL															TYPE
							1	0														
031	ACC 2 Z	V95L0638C	10	15		5.2			DEC	FPS2	X				X			F	IMU A/C	IMU 2 M50 Z AXIS DEL V OVER 1 SEC	X	
032	ACC 3 X	V95L0633C	16	13		5.2			DEC	FPS2	X				X			G	IMU A/C	IMU 3 M50 X AXIS DEL V OVER 1 SEC	X	
033	ACC 3 Y	V95L0636C	16	14		5.2			DEC	FPS2	X				X			G	IMU A/C	IMU 3 M50 Y AXIS DEL V OVER 1 SEC	X	
034	ACC 3 Z	V95L0639C	16	15		5.2			DEC	FPS2	X				X			G	IMU A/C	IMU 3 M50 Z AXIS DEL V OVER 1 SEC	X	
035	IMU ANG 1 X	V90H2317C	4	19		7.2			DEC	DEG	X					X		D, E	ATT PROC	M50 TO BODY EULER ANGLE 1 PHI	X	
036	IMU ANG 1 Y	V90H2314C	4	20		7.2			DEC	DEG	X					X		D, E	ATT PROC	M50 TO BODY EULER ANGLE 1 THETA	X	
037	IMU ANG 1 Z	V90H2311C	4	21		7.2			DEC	DEG	X					X		D, E	ATT PROC	M50 TO BODY EULER ANGLE 1 PSI	X	
038	IMU ANG 1 DELTA X	V95U0585C	4	22		7.2			DEC	DEG	X						X	E	IMU A/C	IMU 1 MISALIGN ANG ABOUT X-AXIS	X	
039	IMU ANG 1 DELTA Y	V95U0588C	4	23		7.2			DEC	DEG	X						X	E	IMU A/C	IMU 1 MISALIGN ANG ABOUT Y-AXIS	X	
040	IMU ANG 1 DELTA Z	V95U0591C	4	24		7.2			DEC	DEG	X						X	E	IMU A/C	IMU 1 MISALIGN ANG ABOUT Z-AXIS	X	
041	IMU ANG 2 X	V90H2318C	12	19		7.2			DEC	DEG	X					X		D, F	ATT PROC	M50 TO BODY EULER ANGLE 2 PHI	X	
042	IMU ANG 2 Y	V90H2315C	12	20		7.2			DEC	DEG	X					X		D, F	ATT PROC	M50 TO BODY EULER ANGLE 2 THETA	X	
043	IMU ANG 2 Z	V90H2312C	12	21		7.2			DEC	DEG	X					X		D, F	ATT PROC	M50 TO BODY EULER ANGLE 2 PSI	X	
044	IMU ANG 2 DELTA X	V95U0586C	12	22		7.2			DEC	DEG	X						X	F	IMU A/C	IMU 2 MISALIGN ANG ABOUT X-AXIS	X	
045	IMU ANG 2 DELTA Y	V95U0589C	12	23		7.2			DEC	DEG	X						X	F	IMU A/C	IMU 2 MISALIGN ANG ABOUT Y-AXIS	X	
046	IMU ANG 2 DELTA Z	V95U0592C	12	24		7.2			DEC	DEG	X						X	F	IMU A/C	IMU 2 MISALIGN ANG ABOUT Z-AXIS	X	
047	IMU ANG 3 X	V90H2319C	20	19		7.2			DEC	DEG	X					X		D, G	ATT PROC	M50 TO BODY EULER ANGLE 3 PHI	X	
048	IMU ANG 3 Y	V90H2316C	20	20		7.2			DEC	DEG	X					X		D, G	ATT PROC	M50 TO BODY EULER ANGLE 3 THETA	X	
049	IMU ANG 3 Z	V90H2313C	20	21		7.2			DEC	DEG	X					X		D, G	ATT PROC	M50 TO BODY EULER ANGLE 3 PSI	X	
050	IMU ANG 3 DELTA X	V95U0587C	20	22		7.2			DEC	DEG	X						X	G	IMU A/C	IMU 3 MISALIGN ANG ABOUT X-AXIS	X	
051	IMU ANG 3 DELTA Y	V95U0590C	20	23		7.2			DEC	DEG	X						X	G	IMU A/C	IMU 3 MISALIGN ANG ABOUT Y-AXIS	X	
052	IMU ANG 3 DELTA Z	V95U0593C	20	24		7.2			DEC	DEG	X						X	G	IMU A/C	IMU 3 MISALIGN ANG ABOUT Z-AXIS	X	
053	ALIGN XXX	V95X4995X	37	4		3.0	ENA		BLVL										ST SOP	ALIGN ENABLE FLAG	X	
054*	IMU 1 ALIGN 10	V93X6755X	33	5		1.0	*		BLVL										KYBD	ALIGN IMU 1	X	
055*	IMU 2 ALIGN 11	V93X6756X	33	6		1.0	*		BLVL										KYBD	ALIGN IMU 2	X	
056*	IMU 3 ALIGN 12	V93X6757X	33	7		1.0	*		BLVL										KYBD	ALIGN IMU 3	X	
057	REF STAR 13	V95X0600X	47	5		1.0	*		BLVL										IMU A/C	STAR ALIGN OPTION SELECTED	X	
058	REF IMU 14	V95U0603C	47	6		2.0			DEC		X							H	IMU A/C	IMU/IMU OPTION SELECTED	X	
059	ALIGN TYPE 15	V95X0645X	43	7		6.0	MATRIX	TORQUE	BLVL										IMU A/C	MATRIX UPDATE OPTION SELECTED	X	
060	EXEC 16	V95X0583X	48	9		1.0	*		BLVL										IMU A/C	ALIGN IN PROGRESS	X	

Table 4.2.21-2. IMU ALIGNMENT (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	S	B	S	I	F	R	S	L	B	D	Add Ref	Source	Nomenclature	CRT		
			X	Y		CHAR	BILEVEL																	TYPE	
							1	0																	
061*	NAV DELTA V THR 18	V93A6710C	40	21		8.0			DEC	UG															
062*	MM READ 19	V91X5080X	48	23		1.0	*		BLVL																X
063	IMU BITE STATUS 1	V95J0029B	40	13		4.0			HEX		X								E	IMU INT PROC	IMU 1 BITE STATUS WORD				
064	IMU BITE STATUS 2	V95J1029B	40	14		4.0			HEX		X								F	IMU INT PROC	IMU 2 BITE STATUS WORD				
065	IMU BITE STATUS 3	V95J2029B	40	15		4.0			HEX		X								G	IMU INT PROC	IMU 3 BITE STATUS WORD				
066	IMU 1 BITE MASK 24	V95X0026X	48	13		1.0	*		BLVL												IMU INT PROC	IMU 1 BITE MASK IN EFFECT			
067	IMU 2 BITE MASK 25	V95X1026X	48	14		1.0	*		BLVL												IMU INT PROC	IMU 2 BITE MASK IN EFFECT			
068	IMU 3 BITE MASK 26	V95X2026X	48	15		1.0	*		BLVL												IMU INT PROC	IMU 3 BITE MASK IN EFFECT			
069	(MSG LINE)	V93X0050X	1	25		44.0			CHAR												UI	MESSAGE LINE			X
070	(BUFFER MSG)	V93X0054X	45	25		4.0			CHAR												UI	BUFFER MESSAGE INDICATOR			X
071	(SPL)	V93X0056X	2	26		49.0			CHAR												UI	SCRATCH PAD LINE			X

TABLE 4.2.21-5. INPUT FUNCTIONAL PARAMETERS FOR IMU ALIGNMENT DISPLAY (G6.26)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
ALIGN_IN_PRO	V95X0583X	ALIGN IN PROGRESS	IMU ORB A/CAL		BD		93017G	*
AL_ENABLE	V95X4995X	ALIGN ENABLE FLAG	STAR TRCK SOP		BD			
AL_IMU(1)	V93X6755X	ALIGN IMU 1	IMU ALIGN DISP		BD		93017G	*
AL_IMU(2)	V93X6756X	ALIGN IMU 2	IMU ALIGN DISP		BD		93017G	*
AL_IMU(3)	V93X6757X	ALIGN IMU 3	IMU ALIGN DISP		BD		93017G	*
DVM50X(1)	V95L0631C	IMU 1 M50 X AXIS DEL V OVER 1 SEC	IMU ORB A/CAL	FT/S2	VAR			
DVM50X(2)	V95L0632C	IMU 2 M50 X AXIS DEL V OVER 1 SEC	IMU ORB A/CAL	FT/S2	VAR			
DVM50X(3)	V95L0633C	IMU 3 M50 X AXIS DEL V OVER 1 SEC	IMU ORB A/CAL	FT/S2	VAR			
DVM50Y(1)	V95L0634C	IMU 1 M50 Y AXIS DEL V OVER 1 SEC	IMU ORB A/CAL	FT/S2	VAR			
DVM50Y(2)	V95L0635C	IMU 2 M50 Y AXIS DEL V OVER 1 SEC	IMU ORB A/CAL	FT/S2	VAR			
DVM50Y(3)	V95L0636C	IMU 3 M50 Y AXIS DEL V OVER 1 SEC	IMU ORB A/CAL	FT/S2	VAR			
DVM50Z(1)	V95L0637C	IMU 1 M50 Z AXIS DEL V OVER 1 SEC	IMU ORB A/CAL	FT/S2	VAR			
DVM50Z(2)	V95L0638C	IMU 2 M50 Z AXIS DEL V OVER 1 SEC	IMU ORB A/CAL	FT/S2	VAR			
DVM50Z(3)	V95L0639C	IMU 3 M50 Z AXIS DEL V OVER 1 SEC	IMU ORB A/CAL	FT/S2	VAR			
EXEC	V93X6770X	EXEC ALIGN OPTION SEL	IMU ALIGN DISP		BD		89813B	
IMUR	V95U0603C	IMU/IMU OPTION SELECTED	IMU ORB A/CAL		HXS		93017G	*
IMU_1_DES/C_SEL_1	V93X6711XA	IMU 1 SEL/DES CMD	IMU ALIGN DISP		BD		93017G	*
IMU_1_DES/C_SEL_1	V93X6711XC	IMU 1 SEL/DES CMD	IMU RM		BD		93017G	*
IMU_1_MASK_STAT	V95X0026X	IMU-1 BITE MASK IN EFFECT	IMU INT PROC		BD		89813B	
IMU_1_STAT	V95J0615C	IMU 1 PWR/BITE STATUS	IMU ORB A/CAL		VAR			
IMU_2_DES/C_SEL_2	V93X6712XA	IMU 2 SEL/DES CMD	IMU ALIGN DISP		BD		93017G	*
IMU_2_DES/C_SEL_2	V93X6712XC	IMU 2 SEL/DES CMD	IMU RM		BD		93017G	*
IMU_2_MASK_STAT	V95X1026X	IMU-2 BITE MASK IN EFFECT	IMU INT PROC		BD		89813B	
IMU_2_STAT	V95J0616C	IMU 2 PWR/BITE STATUS	IMU ORB A/CAL		VAR			
IMU_3_DES/C_SEL_3	V93X6713XA	IMU 3 SEL/DES CMD	IMU ALIGN DISP		BD		93017G	*
IMU_3_DES/C_SEL_3	V93X6713XC	IMU 3 SEL/DES CMD	IMU RM		BD		93017G	*
IMU_3_MASK_STAT	V95X2026X	IMU-3 BITE MASK IN EFFECT	IMU INT PROC		BD		89813B	
IMU_3_STAT	V95J0617C	IMU 3 PWR/BITE STATUS	IMU ORB A/CAL		VAR			
IMU_BITE_STATUS(1)	V95J0029B	IMU-1 BITE STATUS WORD	IMU INT PROC				89813B	
IMU_BITE_STATUS(2)	V95J1029B	IMU-2 BITE STATUS WORD	IMU INT PROC				89813B	
IMU_BITE_STATUS(3)	V95J2029B	IMU-3 BITE STATUS WORD	IMU INT PROC				89813B	
IMU_NAV_ACC_THRESH	V93A6710C	IMU NAV ACCEL THRESHOLD	IMU ALIGN DISP	MICROG	VAR		89813B	
IN_OPERATE(1)	V71X2403XB	IMU-1 IN OPERATE MODE	IMU 1				93017G	*
IN_OPERATE(2)	V71X3403XB	IMU-2 IN OPERATE MODE	IMU 2				93017G	*
IN_OPERATE(3)	V71X4403XB	IMU-3 IN OPERATE MODE	IMU 3				93017G	*
MATRIX_UPDATE	V95X0645X	MATRIX UPDATE OPTION SELECTED	IMU ORB A/CAL		BD		93017G	*

TABLE 4.2.21-5. INPUT FUNCTIONAL PARAMETERS FOR IMU ALIGNMENT DISPLAY (G6.26)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
PHI_IMU(1)	V90H2317CA	M50 TO BODY EULER ANGLE 1 PHI	ORB ATT PROC	DEG			89490B	
PHI_IMU(1)	V90H2317CB	M50 TO BODY EULER ANGLE 1 PHI	A/E ATT PROC	DEG			91051K	
PHI_IMU(2)	V90H2318CA	M50 TO BODY EULER ANGLE 2 PHI	ORB ATT PROC	DEG			89490B	
PHI_IMU(2)	V90H2318CB	M50 TO BODY EULER ANGLE 2 PHI	A/E ATT PROC	DEG			89688B	
PHI_IMU(3)	V90H2319CA	M50 TO BODY EULER ANGLE 3 PHI	ORB ATT PROC	DEG			89490B	
PHI_IMU(3)	V90H2319CB	M50 TO BODY EULER ANGLE 3 PHI	A/E ATT PROC	DEG			91051K	
PSI_IMU(1)	V90H2311CA	M50 TO BODY EULER ANGLE 1 PSI	ORB ATT PROC	DEG			89490B	
PSI_IMU(1)	V90H2311CB	M50 TO BODY EULER ANGLE 1 PSI	A/E ATT PROC	DEG				
PSI_IMU(2)	V90H2312CA	M50 TO BODY EULER ANGLE 2 PSI	ORB ATT PROC	DEG			89490B	
PSI_IMU(2)	V90H2312CB	M50 TO BODY EULER ANGLE 2 PSI	A/E ATT PROC	DEG			91051K	
PSI_IMU(3)	V90H2313CA	M50 TO BODY EULER ANGLE 3 PSI	ORB ATT PROC	DEG			89490B	
PSI_IMU(3)	V90H2313CB	M50 TO BODY EULER ANGLE 3 PSI	A/E ATT PROC	DEG				
STAR_ALIGN	V95X0600X	STAR ALIGN OPTION SELECTED	IMU ORB A/CAL		BD		93017G	*
TEMP_STATUS(1)	V95J0621C	IMU 1 TEMP STATUS	IMU ORB A/CAL		VAR			
TEMP_STATUS(2)	V95J0622C	IMU 2 TEMP STATUS	IMU ORB A/CAL		VAR			
TEMP_STATUS(3)	V95J0623C	IMU 3 TEMP STATUS	IMU ORB A/CAL		VAR			
THETA(1)	V90H2314CA	M50 TO BODY EULER ANGLE 1 THETA	ORB ATT PROC	DEG				
THETA(2)	V90H2315CA	M50 TO BODY EULER ANGLE 2 THETA	ORB ATT PROC	DEG				
THETA(3)	V90H2316CA	M50 TO BODY EULER ANGLE 3 THETA	ORB ATT PROC	DEG				
THETA_IMU(1)	V90H2314CB	M50 TO BODY EULER ANGLE 1 THETA	A/E ATT PROC	DEG				
THETA_IMU(2)	V90H2315CB	M50 TO BODY EULER ANGLE 2 THETA	A/E ATT PROC	DEG				
THETA_IMU(3)	V90H2316CB	M50 TO BODY EULER ANGLE 3 THETA	A/E ATT PROC	DEG				
X_ANG(1)	V95U0585C	IMU 1 MISALIGN ANG ABOUT X-AXIS	IMU ORB A/CAL	DEG	SPL		93017G	*
X_ANG(2)	V95U0586C	IMU 2 MISALIGN ANG ABOUT X-AXIS	IMU ORB A/CAL	DEG	SPL		93017G	*
X_ANG(3)	V95U0587C	IMU 3 MISALIGN ANG ABOUT X-AXIS	IMU ORB A/CAL	DEG	SPL		93017G	*
Y_ANG(1)	V95U0588C	IMU 1 MISALIGN ANG ABOUT Y-AXIS	IMU ORB A/CAL	DEG	SPL		93017G	*
Y_ANG(2)	V95U0589C	IMU 2 MISALIGN ANG ABOUT Y-AXIS	IMU ORB A/CAL	DEG	SPL		93017G	*
Y_ANG(3)	V95U0590C	IMU 3 MISALIGN ANG ABOUT Y-AXIS	IMU ORB A/CAL	DEG	SPL		93017G	*
Z_ANG(1)	V95U0591C	IMU 1 MISALIGN ANG ABOUT Z-AXIS	IMU ORB A/CAL	DEG	SPL		93017G	*
Z_ANG(2)	V95U0592C	IMU 2 MISALIGN ANG ABOUT Z-AXIS	IMU ORB A/CAL	DEG	SPL		93017G	*
Z_ANG(3)	V95U0593C	IMU 3 MISALIGN ANG ABOUT Z-AXIS	IMU ORB A/CAL	DEG	SPL		93017G	*
	V91X5080X	IMU MM READ COMPLETE	FCOS		BD		92354	
	V94J4160C	IMU 1 I/O, FAIL STATUS	GAX		VAR			
	V94J4161C	IMU 2 I/O, FAIL STATUS	GAX		VAR			
	V94J4162C	IMU 3 I/O, FAIL STATUS	GAX		VAR			
	V94X4807X	ILLEGAL ENTRY MSG(IMU ALIGN)	UI					

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.21-6. OUTPUT FUNCTIONAL PARAMETERS FROM IMU ALIGNMENT DISPLAY (G6.26)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
AL_IMU(1)	V93X6755X	ALIGN IMU 1	DL FMT 22/1 DL FMT 23/1 IMU ALIGN DISP		BD		93017G	*
AL_IMU(2)	V93X6756X	ALIGN IMU 2	IMU ORB A/CAL DL FMT 22/1 DL FMT 23/1 IMU ALIGN DISP		BD		93017G	*
AL_IMU(3)	V93X6757X	ALIGN IMU 3	IMU ORB A/CAL DL FMT 22/1 DL FMT 23/1 IMU ALIGN DISP		BD		93017G	*
EXEC	V93X6770X	EXEC ALIGN OPTION SEL	IMU ORB A/CAL IMU ALIGN DISP		BD		89813B	
IMU_1_DES/C_SEL_1	V93X6711XA	IMU 1 SEL/DES CMD	IMU ORB A/CAL DL FMT 22/A DL FMT 23/A GAX IMU ALIGN DISP		BD		93017G	*
IMU_2_DES/C_SEL_2	V93X6712XA	IMU 2 SEL/DES CMD	IMU RM OVERRIDE DISP DL FMT 22/A DL FMT 23/A GAX IMU ALIGN DISP		BD		93017G	*
IMU_3_DES/C_SEL_3	V93X6713XA	IMU 3 SEL/DES CMD	IMU RM OVERRIDE DISP DL FMT 22/A DL FMT 23/A GAX IMU ALIGN DISP		BD		93017G	*
IMU_NAV_ACC_THRESH	V93A6710C	IMU NAV ACCEL THRESHOLD	IMU RM OVERRIDE DISP IMU ALIGN DISP	MICROG	VAR		89813B	
MASK_CMD(1)	V93X6717X	IMU-1 BITE MASK CMD	ORB UP ORB/RND NAV IMU INT PROC		BD		89813B	
MASK_CMD(2)	V93X6718X	IMU-2 BITE MASK CMD	IMU INT PROC		BD		89813B	
MASK_CMD(3)	V93X6719X	IMU-3 BITE MASK CMD	IMU INT PROC		BD		89813B	
	V93J6767C	IMU/IMU ALIGN OPTION	IMU ORB A/CAL		VAR			
	V93M0500PA	CGUB_IMU_SEL_MFE	DL FMT 22/A DL FMT 23/A				93017G	*
	V93X5085XA	FLG IND AVG PRI & SEC TGT PARMS	ENT UP					
	V93X6057XB	IMU MM READ COMMAND	FCOS					
	V93X6701X	IMU 1 STANDBY CMD	IMU ORB A/CAL		BD			
	V93X6702X	IMU 2 STANDBY CMD	IMU ORB A/CAL		BD			
	V93X6703X	IMU 3 STANDBY CMD	IMU ORB A/CAL		BD			

TABLE 4.2.21-6. OUTPUT FUNCTIONAL PARAMETERS FROM IMU ALIGNMENT DISPLAY (G6.26)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V93X6705X	IMU 1 OPERATE CMD	IMU ORB A/CAL		BD			
	V93X6706X	IMU 2 OPERATE CMD	IMU ORB A/CAL		BD			
	V93X6707X	IMU 3 OPERATE CMD	IMU ORB A/CAL		BD			
	V93X6765X	STAR ALIGN OPTION	IMU ORB A/CAL		BD			
	V93X6771X	MATRIX ALIGN OPTION	IMU ORB A/CAL		BD			
	V93X6773X	TERMINATE ALIGN IN PROGRESS CMD	IMU ORB A/CAL		BD			
	V95M2862P	CGZB_ALIGN_IMU_WD	DL FMT 22/1				93017G	*
			DL FMT 23/1					

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
(HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

TABLE 4.2.21-7. IMU ALIGNMENT DISPLAY (G6.26) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.21-8. IMU ALIGNMENT DISPLAY (G6.26) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.21-9. IMU ALIGNMENT DISPLAY (G6.26) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.22 DAP CONFIGURATION (PFS)

TITLE: DAP CONFIG

TYPE: SPEC/020

AVAILABILITY: PFS: GNC OPS 2

4.2.22.1 Purpose, Operation, and Organization

The DAP CONFIG display provides the capability to review and change On-Orbit DAP parameters. A table of 30 DAP loads is stored in GPC memory for use by the orbit DAP. This table is split into fifteen DAP A loads (A1 through A15) and fifteen DAP B loads (B1 through B15). One DAP A load and one DAP B load are designated and stored as the selected DAP loads. Each DAP load consists of nineteen parameters (rates, deadbands, pulse sizes, etc.) which produce the desired control characteristics of the orbit DAP. The parameters of the selected DAP A and DAP B loads shall be displayed on the DAP CONFIG display by items 10 through 28 and 30 through 48, respectively. The crew can modify these selected DAP load parameters, or select a different DAP load from the DAP table which is pre-flight configured via I-Loads. The crew uses the dedicated DAP A or B PBI to specify which of the selected DAP loads (A or B) is active and is actually being used by the orbit DAP.

- (1) DAP A and DAP B (Items 1 and 2) permit the two DAP loads to be selected from the DAP table and displayed. An integer value of 1 through 15 can be entered for either item to indicate the desired DAP load. A leading zero is optional but shall be displayed. Any entries outside this range will result in an illegal entry.

When transitioning from OPS 0, 1 or 3 to OPS 2, the selected DAP A and B loads shall be initialized to A1 and B1, respectively. Thereafter, the DAP load shall be determined by crew entries. When a DAP load is selected from the DAP table in GPC memory:

- a) the selected DAP load ID (integer 1–15) shall be displayed and
- b) the selected DAP load's parameter values shall be displayed by Items 10–28 or Items 30–48.

There is always a selected DAP A and DAP B load, even though Items 1 and 2 may be blank. Item 1 or 2 is blanked if Items 10 through 28, or 30 through 48 are modified, respectively. Modification of Items 10 through 28 or 30 through 48 changes the selected DAP parameters, but does not affect the DAP table parameter values stored in GPC memory.

The DAP indicator or DAP ID (DAP AXX or DAP BXX) is displayed double overbright if it is the active DAP load.

- (2) DAP A EDIT and DAP B EDIT (Items 3 and 4) are mutually exclusive items which permit the crew to review the DAP table without affecting the selected DAPs, and edit the DAP table parameters. An integer value of 1 through 15 can be entered for either item to designate the desired DAP load to be displayed. A leading zero is optional, but shall be displayed. A value of zero can be entered for either item to indicate cancellation of the editing. A value other than 0 through 15 for Items 3 or 4 shall result in an illegal entry.

At OPS 2 initialization, blanks shall be displayed for items 3 and 4 and the display fields associated with Items 50 through 68 are blanked. Only crew item entries can initiate the edit process. When Item 3 or 4 is executed with a value of 1 through 15:

- a) the designated EDIT DAP ID (integer 1–15) shall be displayed,
- b) the other EDIT DAP ID shall be blanked,
- c) the designated DAP's parameter values shall be displayed by the edit parameter set (Items 50–68).

When Items 3 or 4 is executed with a value of zero, both EDIT DAP ID's shall be blanked, the display fields associated with Items 50 through 68 shall be blanked, and the LOAD next to Item 5 shall be displayed at normal intensity and not flashing.

Once the crew has entered an EDIT DAP ID (Item 3 or 4), they can change the DAP table values by modifying Items 50 through 68. These EDIT DAP changes to the DAP table are not implemented until the LOAD (Item 5) is executed. If the EDIT DAP ID is the same as one of the selected DAP ID's, then when the EDIT DAP changes (Items 50 through 68) are implemented by executing Item 5, the selected DAP parameters (Items 10 through 28 or 30 through 48) will be set to the new EDIT DAP parameter values. If the selected DAP parameters are modified using Items 10 through 28 or 30 through 48, the EDIT DAP parameters are not affected.

- (3) LOAD (Item 5) is used to implement the EDIT DAP changes made to the DAP table via Items 50 through 68. When any of these items are modified, the LOAD shall be displayed double overbright and flashing until Item 5 is executed. The EDIT DAP changes are not stored in the DAP table and do not affect the selected DAP parameters until Item 5 is executed. If both EDIT DAP A (Item 3) and EDIT DAP B (Item 4) are blank, execution of LOAD shall result in an "ILLEGAL ENTRY" CRT message and rejection of the input.

LOAD (Item 5) shall be displayed at normal intensity and not flashing at OPS 2 initialization, after Item 5 is executed, after Item 3 or 4 is executed with a value of zero, and after Item 3 or 4 is executed with a value of 1 through 15 but before any Item 50 through 68 is executed.

- (4) The parameters defined by Items 10 through 28 for the selected DAP A and Items 30 through 48 for the selected DAP B and Items 50 through 68 for EDIT DAP A or B allow for the display and modification of the DAP load parameters as determined by the DAP item entries (Items 1 and 2) and the EDIT DAP item entries (Item 3 or 4). The jet indicator, PRI or VERN or ALT shall be displayed double overbright to indicate which jets are selected to provide control of the vehicle. A brief description of each DAP parameter is given below.

ROT RATE (PRI and VERN) – The rotation rates (also called discrete rates) for primary jets (Items 10, 30, 50) and vernier jets (Items 23, 43, 63) determine the desired rotation rates to be achieved for a DISC RATE manual command or auto maneuver. The ROT RATE values are specified in degrees/second.

ATT DB (PRI and VERN) – The attitude deadbands for primary jets (Items 11, 31, 51) and vernier jets (Items 24, 44, 64) determine the width of the Orbit DAP phase plane. The same deadband value shall be used for all attitude maneuver axes. The ATT DB values are specified in degrees.

RATE DB (PRI and VERN) – The rate deadbands for primary jets (Items 12, 32, 52) and vernier jets (Item 25, 45, 65) determine the upper and lower boundaries of the DAP phase plane. The same rate deadband value shall be used for all maneuver axes. The RATE DB values are specified in degrees/second.

ROT PLS (PRI and VERN) – The rotational pulse size for primary jets (Items 13, 33, 53) and vernier jets (Items 26, 46, 66) determine the rotational rate resulting from a single manual rotational pulse command. The ROT PLS values are specified in degrees/second.

COMP (PRI and VERN) – The rotational compensations for primary jets (Items 14, 34, 54) and vernier jets (Items 27, 47, 67) determine the allowable rotational rate for a given axis resulting from a rate command about another axis. A zero value specifies no compensation is desired. The COMP values are specified in degrees/second.

P and Y OPTION (PRI) – The pitch option (Items 15, 35, 55) and yaw option (Items 16, 36, 56) for primary jets only allow selection of one of three control modes for the pitch and yaw axes; nose and tail jets, nose jets only, or tail jets only. As any of the item numbers are executed, its display field cycles through the three mode choices (ALL, NOSE, and TAIL).

TRAN PLS (NORM) – The translational pulse size (Items 17, 37, 57) determines the desired velocity delta resulting from a single manual translational pulse command. The TRAN PLS is specified in feet/second. A zero value may not be entered.

RATE DB ALT – The rate deadband alternate (Items 18, 38, 58) determine the upper and lower boundaries of the DAP phase plane and shall be used for all axes. RATE DB ALT is specified in degrees/second.

JET OPT ALT – The jet option alternate (Items 19, 39, 59) allow for selection of one of two control modes, nose and tail jets (ALL) or tail jets only (TAIL). Selection of nose only is not available. When the items are executed, they shall toggle between the two control modes (ALL and TAIL).

JETS ALT – The number of jets alternate (Items 20, 40, 60) provide selection of the maximum number of primary jets (1, 2, or 3) allowed to be fired simultaneously while in Alternate Primary Mode.

ON TIME ALT and DELAY ALT – The on time alternate (Items 21, 41, 61) and delay time alternate (Items 22, 42, 62) determine the maximum duration of each jet firing and the minimum time delay between jet firings, respectively, while in the Alternate Primary Mode. Both the ON TIME and DELAY shall be specified in seconds.

CNTL ACC – The control acceleration (Items 28, 48, 68) is used to select one of ten sets of I-load or uplinked mass properties that will be used to calculate the mass property dependent acceleration data for the On Orbit DAP. The control acceleration is also used to select a set of notch filter parameters. The nominal or default orbiter configuration is represented by value 0, while the values 1 through 9 are used for alternate orbiter/payload configurations.

Decimal data entries for Items 10 through 28, 30 through 48 and 50 through 68 may be entered to six (6) significant digits total.

- (5) The notch filter enable function (Item 6) allows the crew to enable or disable the DAP notch filter capability, subject to possible override by the DAP, when a non-zero control acceleration is selected. An asterisk (*) is displayed when the notch filter capability is enabled. Item 6 is initialized per the state of the ENABLE_NF flag from the On Orbit DAP. The notch filter parameters control the number of filters active in the DAP state estimator and the frequencies they attenuate. The DAP initializes the notch filter capability to the enabled state each time a new, non-zero control acceleration is selected (via Items 28 and 48), provided that the associated notch filter parameters permit it (number of filters greater than zero). The crew can then disable/enable the function as desired. The DAP disables the notch filter capability if the control acceleration is zero or if the number of filters associated with the control acceleration value is zero. The crew cannot override this deselection.
- (6) The X jets enable function, Item 7 (XJETS ROT ENA), permits the crew to select or deselect the forward or aft X firing jets for use with the ALT PRCS DAP mode. An asterisk (*) shall be displayed next to Item 7 when the X jets capability has been selected.
- (7) Item numbers 8 and 9 are associated with the reboost function. Item 8 allows the crew to select one of four pre-loaded reboost configurations, 1-4. Item 9 allows entry of the reference time between successive reboost firings in seconds.
- (8) Implied Item Numbers. Item numbers 29 and 49 are implied and are not legal for use on this display. If any of these item numbers are executed, an operator error shall result, the input rejected and the “ILLEGAL ENTRY” CRT message shall be displayed.

4.2.22.2 DAP Configuration (PFS) Keyboard Processing Addendum

- A. Primary Control System JET OPT Selection. Jet option selection (normal, nose only, tail only) for pitch (Item 15 for DAP A, Item 35 for DAP B, Item 55 for EDIT DAP) and yaw (Item 16 for DAP A; Item 36 for DAP B, item 56 for EDIT DAP) are each driven by one measurement number which can have three integer values as shown in the following table:

Each time one of these item entries is executed, the integer value of its associated measurement is advanced by one step in the rotary progression [1, 2, 3, 1, 2, 3, ...].

DAP Config	Control Axis	Measurement ID	Integer Value	Jet Option
A	Pitch	V93J5750C	1	Normal
			2	Nose only
			3	Tail only
	Yaw	V93J5754C	1	Normal
			2	Nose only
			3	Tail only
B	Pitch	V93J5751C	1	Normal
			2	Nose only
			3	Tail only
	Yaw	V93J5755C	1	Normal
			2	Nose only
			3	Tail only
Edit	Pitch	V93J5752C	1	Normal
			2	Nose only
			3	Tail only
	Yaw	V93J5756C	1	Normal
			2	Nose only
			3	Tail only

- B. CNTL ACCEL Selection. The control accelerations are defined such that 0 is the nominal orbiter configuration and 1–9 are used to select notch filter parameters and alternate mass properties for calculation of the orbit DAP acceleration data.
- C. Deleted
- D. Deleted
- E. Deleted
- F. DAP Load Modification Flags. When any one of Items 10 through 28 (DAP A) or Items 30 through 48 (DAP B) is executed, the respective DAP Load Modification Flag (DAP_LOAD_MOD_A, V93X5783X or DAP_LOAD_MOD_B, V93X5784X) shall be set to one. If any of these item entries result in an “ILLEGAL ENTRY” message, then the respective flags shall not be set to one. Destination for the DAP Load Modification Flag is ORB DAP CONFIG (5.8).

- G. Alternate Primary Mode JET OPT Selection. Jet option (JET OPT ALT) selection for the Alternate Primary mode in DAP A, DAP B and DAP EDIT shall be driven by V93U1952C, V93U1957C, and V93U5699C, respectively. Each measurement number can have two integer values. When Items 19, 39, and 59 are executed, they shall toggle their respective MSID between the values of 1 and 3. A value of 1 selects nose and tail jets (ALL) and a value of 3 selects tail only jets (TAIL). Selection of nose only jets is not available.
- H. Initialization and OPS Carryover. When transitioning from OPS 0, 1, or 3 to OPS 2, Items 1 and 2 are initialized to one, Items 10 through 28 and 30 through 48 are initialized by I-Loads (via 5.8). The current values of all these items shall be carried over OPS transitions. Item 6 is initialized per the state of the ENABLE_NF flag from the On Orbit DAP. Item 7 is initialized per the state of the XJETS_ACTIVE flag from the On Orbit DAP and is carried over OPS transitions. Items 3, 4 and 50 through 68 are initialized blank and shall not be carried over OPS transitions.

The reboost configuration, Item 8, is initialized to 1 and the interval time, Item 9, is initialized to 10.00. Both items 8 and 9 shall be carried over OPS transitions.

- I. DAP Select Request Flags. When either Item 1 (DAP AXX) or Item 2 (DAP BXX) is executed, the respective DAP Select Request Flag (DAP_SEL_REQ_A, V93X5785X or DAP_SEL_REQ_B, V93X5786X) shall be set to one. Execution of Item 1 or 2 with a value other than 1 through 15 shall result in an "ILLEGAL ENTRY" message and rejection of the input. Destination for the DAP Select Request Flags is ORB DAP CONFIG (5.8).
- J. DAP Edit Request Flags. When either Item 3 (DAP A EDIT) or Item 4 (DAP B EDIT) is executed with a value of zero, the parameters DAP_EDIT_REQ_A (V93X5787X), DAP_EDIT_REQ_B (V93X5788X), DAP_EDIT_MOD (V93X3657X), DAP_LOAD_EDIT_A (V93J5781C) and DAP_LOAD_EDIT_B (V93J5782C) shall be set to zero. When Item 3 (DAP A EDIT) is executed with a value of 1 through 15, DAP_EDIT_REQ_A shall be set to 1 and DAP_EDIT_MOD, DAP_EDIT_REQ_B, and DAP_LOAD_EDIT_B shall be set to 0. When Item 4 (DAP B EDIT) is executed with a value of 1 through 15, DAP_EDIT_REQ_B shall be set to 1 and DAP_EDIT_MOD, DAP_EDIT_REQ_A, and DAP_LOAD_EDIT_A shall be set to 0. Execution of Item 3 or 4 with a value other than 0 through 15 shall result in an "ILLEGAL ENTRY" message and rejection of the input.

Parameter destinations are as follows:

Parameter Name	Destination(s)
DAP_EDIT_REQ_A	ORB DAP CONFIG (5.8)
DAP_EDIT_REQ_B	ORB DAP CONFIG (5.8)
DAP_EDIT_MOD	CRT (6.1)
DAP_LOAD_EDIT_A	ORB DAP CONFIG (5.8) and CRT (6.1)
DAP_LOAD_EDIT_B	ORB DAP CONFIG (5.8) and CRT (6.1)

- K. DAP Edit Modification Flag. When any one of Items 50 through 68 is executed, the DAP Edit Modification Flag (DAP_EDIT_MOD, V93X3657X) shall be set to one. At OPS 2 initialization, DAP_EDIT_MOD shall be initialized to zero. Destination for DAP_EDIT_MOD is CRT (6.1).
- L. DAP EDIT LOAD Flag. When Item 5 is executed, the DAP_EDIT_LOAD Flag (V93X3658X) shall be set to one. At OPS 2 initialization, DAP_EDIT_LOAD shall be initialized to zero.
- M. DAP LOAD EDIT. When both DAP_LOAD_EDIT_A and DAP_LOAD_EDIT_B are zero, execution of Items 50 through 68 shall result in an “ILLEGAL ENTRY” CRT message and rejection of the input.
- N. Enable Notch Filter Flag. Selection or deselection of Item 6 will turn the flag ENABLE_NF (V93X5344X) ON or OFF and send it to the On–Orbit DAP (4.35). Conversely, 4.35 may turn ENABLE_NF ON or OFF and send it to the CRT.
- O. DAP Data Change Flag. When Item 6 or Item 7 is executed, the DAP_DATA_CHANGE (V93X5774X) shall be set to one and sent to the On–Orbit DAP (4.35).
- P. Enable Xjets Active Flag. Selection or deselection of Item 7 (XJETS ROT ENA) shall turn the flag XJETS_ACTIVE (V93X0992X) “ON” or “OFF” where the “1” state represents “ON” and the “0” state represents “OFF”. Destinations for XJETS_ACTIVE are the ON-ORBIT DAP (4.35), CRT (6.1) and TLM.
- Q. Reboost Configuration Selection Item 8 allows entry of the desired reboost configuration, RBST_CONF (V94U0218C). Execution of Item 8 with a value not equal to 1 through 4 shall result in an “ILLEGAL ENTRY” message and rejection of the input. Changing of the reboost configuration while a reboost is in progress is not allowed and shall result in an “ILLEGAL ENTRY” message.
- R. Reboost Interval Time Item 9 REBOOST INTVL allows entry of the base time between reboost firings. This defines the variable RBST_INTERVAL_DISP (V94W0219C) which is used by the ON-ORBIT DAP(4.35). This entry is minimum value limited to 0.08 seconds to avoid a divide by zero. The maximum value is limited to 999.99. Attempts to enter values of Item 9 which are less than 0.08 or greater than 999.99 shall result in an “ILLEGAL ENTRY” message and rejection of the input.

4.2.22.3 DAP Configuration (PFS) CRT Display Processing Addendum

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word “STAT” being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT display processing Table 4.2.22–2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the “M” PSI is displayed (for Commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)			
Blank (default)	↓		M	∅
1	↓	↑	M	∅
2		↑	M	∅
3	↓			∅
4		↑		∅
5	↓		?	∅
6	↓	↑		∅
7			M	∅
8	↓		?	M ∅
9			?	M ∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.2.22–2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. Deleted
- B. DAP Indicator and Jets Overbright. To indicate the active DAP load, the text “DAP A” shall be driven double overbright when FWD_DAP_SEL_A (LIGHT)/V72X2807X has a value of one, and the text “DAP B” shall be driven double overbright when FWD_DAP_SEL_B (LIGHT)/V72X2808X has a value of one. Both DAP parameters being equal is an invalid condition and no double overbright shall be driven.

To indicate the active jets, the text “ALT” shall be driven double overbright when FWD_ALT_PRCs_MODE (LIGHT)/V72X2896X has a value of one, and the text “PRI” shall be driven double overbright when FWD_RCS_JETS_NORM (LIGHT)/V72X2855X has a value of one, and the text “VERN” shall be driven double overbright when FWD_RCS_JETS_VERNIER (LIGHT)/V72X2856X has a value of one.

- C. DAP Select Overbright. The displayed integer (if not blank) for DAP A (Item 1) or DAP B (Item 2) shall be driven double overbright based on the following table.

FWD DAP SELECT A (LIGHT) V72X2807X	FWD DAP SELECT B (LIGHT) V72X2808X	INTEGER DRIVEN DOUBLE OVERBRIGHT
1	0	DAP A (V93J5779C)
0	1	DAP B (V93J5780C)

- D. P and Y OPTION Text. The remote text for the six primary jet option items (Items 15, 16, 35, 36, 55, 56) shall be displayed according to the following table:

Jet Option Items		Display Values	
Display Item	MSID	Integer Value	Remote Text
P OPTION PRI 15 XXXX	V93J5750C	1	ALL
		2	NOSE
		3	TAIL
P OPTION PRI 35 XXXX	V93J5751C	1	ALL
		2	NOSE
		3	TAIL
P OPTION PRI 55 XXXX	V93J5752C	1	ALL
		2	NOSE
		3	TAIL
Y OPTION PRI 16 XXXX	V93J5754C	1	ALL
		2	NOSE
		3	TAIL
Y OPTION PRI 36 XXXX	V93J5755C	1	ALL
		2	NOSE
		3	TAIL
Y OPTION PRI 56 XXXX	V93J5756C	1	ALL
		2	NOSE
		3	TAIL

- E. DAP SELECT A and B Blanking. The DAP A (Item 1) or DAP B (Item 2) display field shall be blanked whenever the respective measurement, DAP_LOAD_SEL_A or B (V93J5779C or V93J5780C), has a value of zero.
- F. DAP EDIT A and B Blanking. The DAP A EDIT (Item 3) or DAP B EDIT (Item 4) display field shall be blanked whenever the respective measurement, DAP_LOAD_EDIT_A or B (V93J5781C or V93J5782C), has a value of zero.

- G. Parameter Initialization. When transitioning from OPS 0, 1 or 3 to OPS 2, the displayed values for Items 1 and 10 through 28 shall be initialized to DAP A1, and Items 2 and 30 through 48 shall be initialized to DAP B1. The current values of all these parameters shall be carried over OPS transitions. Items 3, 4 and 50 through 68 shall be blanked at OPS 2 initialization and Item 5 text “LOAD” shall be initialized at normal intensity and not flashing. The current values of these items shall not be carried over OPS transitions.
- H. Edit Field Blanking. When Item 3 and Item 4 are both blank, DAP_LOAD_EDIT_A and B (V93J5781C = 0 and V93J5782C = 0), then the display fields associated with Items 50 through 68 shall be blanked, and Item 5 text “LOAD” shall be displayed at normal intensity and not flashing.
- I. LOAD Overbright and Flashing. The text “LOAD” shall be driven double overbright and flashing when DAP_EDIT_MOD (V93X3657X) has a value of one. When DAP_EDIT_LOAD (V93X3658X) has a value of one, DAP_EDIT_MOD shall be set to zero, “LOAD” shall be displayed at normal intensity and not flashing. The source for DAP_EDIT_MOD is KYBD (6.1).
- J. ALT JET OPT Text. The remote text for the alternate primary jet option (Items 19, 39, and 59) shall be displayed as follows:

ALT Jet Option Items	Integer Value	Remote Text
ALT JET OPT 19 XXXX (V93U1952C)	1 3	ALL TAIL
ALT JET OPT 39 XXXX (V93U1957C)	1 3	ALL TAIL
ALT JET OPT 59 XXXX (V93U5699C)	1 3	ALL TAIL

4.2.22.4 DAP Configuration Figure/Table References

Figure 4.2.22-1	DAP Configuration Display (PFS)
Table 4.2.22-1	Keyboard Processing Table
Table 4.2.22-2	CRT Display Processing Table
Table 4.2.22-3	CRT Display Processing Background Requirements N/A
Table 4.2.22-4	Mission Design Background Constants N/A
Table 4.2.22-5	Input Functional Parameters
Table 4.2.22-6	Output Functional Parameters
Table 4.2.22-7	I-Loads
Table 4.2.22-8	K-Loads
Table 4.2.22-9	Constants

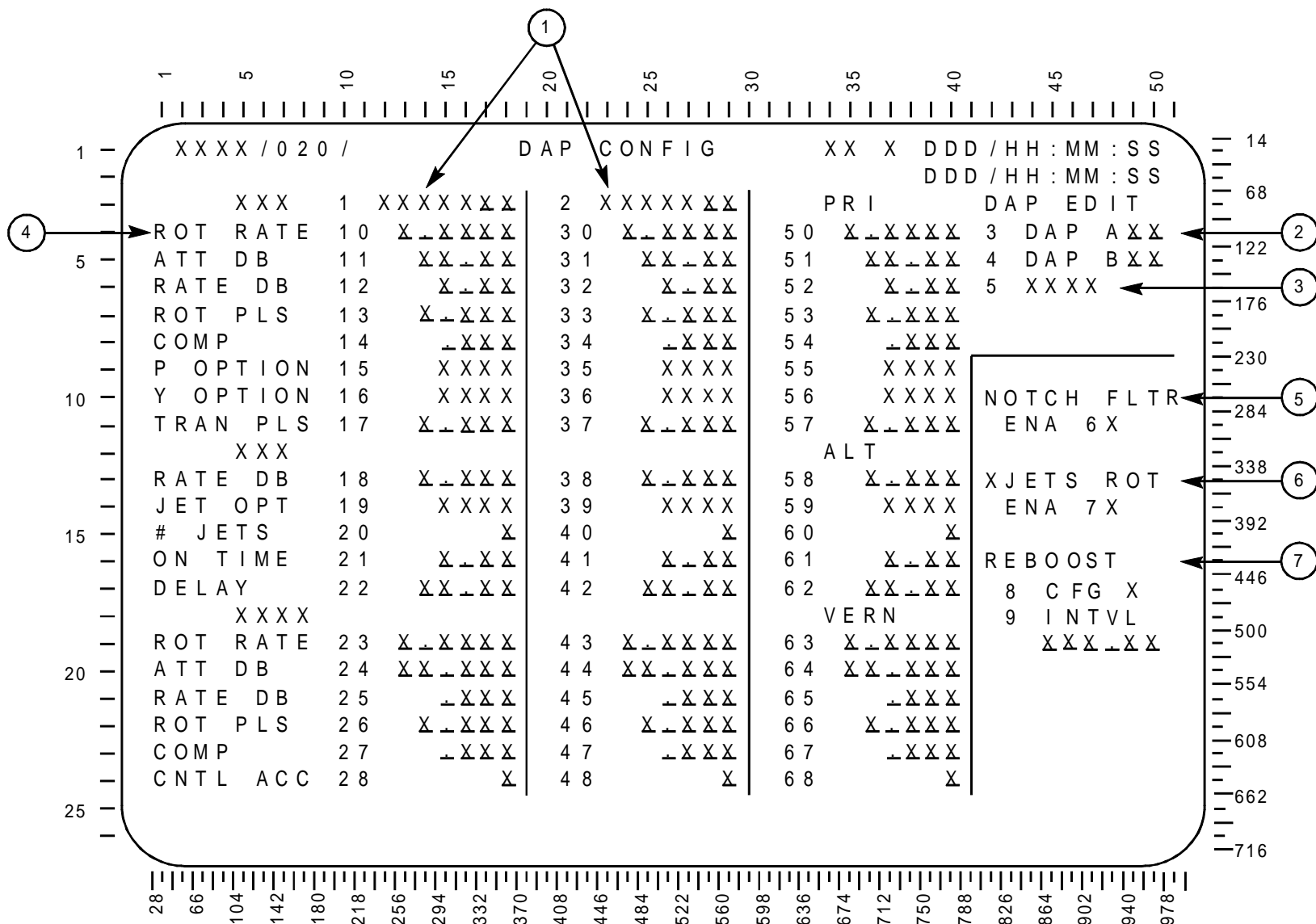


FIGURE 4.2.22-1.DAP Configuration Display (PFS)

Table 4.2.22-1. DAP CONFIGURATION (PFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
001	1 DAP A	V93J5779C	3.0	DEC			1	1	15	IH	5.8, CRT, TLM	DAP LOAD SEL A	X
002	2 DAP B	V93J5780C	3.0	DEC			2	1	15	IH	5.8, CRT, TLM	DAP LOAD SEL B	X
003	DAP EDIT 3 DAP A	V93J5781C	3.0	DEC			3	0	15	JH	5.8, CRT	DAP LOAD EDIT A	X
004	DAP EDIT 4 DAP B	V93J5782C	3.0	DEC			4	0	15	JH	5.8, CRT	DAP LOAD EDIT B	X
005	5 LOAD	V93X3658X	0.0	CTRL			5			L	5.8, CRT	DAP EDIT LOAD	X
006	NOTCH FLTR ENA 6	V93X5344X	0.0	CTRL			6			HNO	4.35, CRT, TLM	NOTCH FILTER ENABLE FLAG	X
007	XJETS ROT ENA 7	V93X0992X	0.0	CTRL			7			HPO	4.35, CRT, TLM	XJETS ACTIVE FLAG	X
008	ROT RATE PRI 10	V93R5705C	8.5	DEC	DPS		10	0.0500	2.0000	FH	4.35, CRT	NORM DISCRETE RATE A	X
009	ATT DB PRI 11	V93H5766C	8.4	DEC	DEG		11	0.10	40.00	FH	4.35, CRT	NORM ATT DEADBAND A	X
010	RATE DB PRI 12	V93R5726C	8.5	DEC	DPS		12	0.10	5.00	FH	4.35, CRT	NORM RATE LIMIT A	X
011	ROT PLS PRI 13	V93R5714C	8.5	DEC	DPS		13	0.001	1.00	FH	4.35, CRT	NORM ROT PULSE LEVEL A	X
012	COMP PRI 14	V93H5741C	8.6	DEC	DPS		14	.000	.999	FH	4.35, CRT	NORM ROT CMPNT DBD A	X
013	P OPTION PRI 15	V93J5750C	0.0	CTRL			15			AFH	4.35, CRT	P NOM/NOSE/TAIL JET A	X
014	Y OPTION PRI 16	V93J5754C	0.0	CTRL			16			AFH	4.35, CRT	Y NOM/NOSE/TAIL JET A	X
015	TRAN PLS PRI 17	V93R5700C	8.5	DEC	FPS		17	0.001	5.00	FH	4.35, CRT	TRAN PULSE LEVEL A	X
016	RATE DB ALT 18	V93R1951C	8.5	DEC	DPS		18	0.050	5.000	FH	4.35, CRT	ALT PRIMARY RATE LIMIT A	X
017	JET OPT ALT 19	V93U1952C	0.0	CTRL			19			FGH	4.35, CRT	ALT PRIMARY JET OPTION A	X
018	#JETS ALT 20	V93U1953C	2.0	DEC			20	1	3	FH	4.35, CRT	ALT PRIMARY MAX JETS A	X
019	ON TIME ALT 21	V93W1954C	8.5	DEC	SECS		21	0.08	9.99	FH	4.35, CRT	ALT PRIMARY ON TIME A	X
020	DELAY ALT 22	V93W1955C	8.4	DEC	SECS		22	0.00	99.99	FH	4.35, CRT	ALT PRIMARY DELAY TIME A	X
021	ROT RATE VERN 23	V93R5709C	8.5	DEC	DPS		23	0.0020	1.0000	FH	4.35, CRT	VERN DISCRETE RATE A	X
022	ATT DB VERN 24	V93H5768C	8.4	DEC	DEG		24	0.010	40.000	FH	4.35, CRT	VERN ATT DEADBAND A	X
023	RATE DB VERN 25	V93R5730C	8.6	DEC	DPS		25	.010	.500	FH	4.35, CRT	VERN RATE LIMIT A	X
024	ROT PLS VERN 26	V93R5718C	8.5	DEC	DPS		26	.001	.500	FH	4.35, CRT	VERN ROT PULSE LEVEL A	X
025	COMP VERN 27	V93H5745C	8.6	DEC	DPS		27	0.000	.999	FH	4.35, CRT	VERN ROT CMPNT DBD A	X
026	CNTL ACC 28	V93J5758C	2.0	DEC			28	0	9	BFH	4.35, CRT, TLM	CNTL ACCEL A	X
027	ROT RATE PRI 30	V93R5706C	8.5	DEC	DPS		30	0.0500	2.0000	FH	4.35, CRT	NORM DISCRETE RATE B	X
028	ATT DB PRI 31	V93H5767C	8.4	DEC	DEG		31	0.10	40.00	FH	4.35, CRT	NORM ATT DEADBAND B	X
029	RATE DB PRI 32	V93R5727C	8.5	DEC	DPS		32	0.10	5.00	FH	4.35, CRT	NORM RATE LIMIT B	X
030	ROT PLS PRI 33	V93R5715C	8.5	DEC	DPS		33	0.001	1.00	FH	4.35, CRT	NORM ROT PLUSE LEVEL B	X

Table 4.2.22-1. DAP CONFIGURATION (PFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
031	COMP PRI 34	V93H5742C	8.6	DEC	DPS		34	.000	.999	FH	4.35, CRT	NORM ROT CMPNT DBD B	X
032	P OPTION PRI 35	V93J5751C	0.0	CTRL			35			AFH	4.35, CRT	P NOM/NOSE/TAIL JET B	X
033	Y OPTION PRI 36	V93J5755C	0.0	CTRL			36			AFH	4.35, CRT	Y NOM/NOSE/TAIL JET B	X
034	TRAN PLS PRI 37	V93R5701C	8.5	DEC	FPS		37	0.001	5.00	FH	4.35, CRT	TRAN PULSE LEVEL B	X
035	RATE DB ALT 38	V93R1956C	8.5	DEC	DPS		38	0.05	5.000	FH	4.35, CRT	ALT PRIMARY RATE LIMIT B	X
036	JET OPT ALT 39	V93U1957C	0.0	CTRL			39			FGH	4.35, CRT	ALT PRIMARY JET OPTION B	X
037	#JETS ALT 40	V93U1958C	2.0	DEC			40	1	3	FH	4.35, CRT	ALT PRIMARY MAX JETS B	X
038	ON TIME ALT 41	V93W1959C	8.5	DEC	SECS		41	0.08	9.99	FH	4.35, CRT	ALT PRIMARY ON TIME B	X
039	DELAY ALT 42	V93W1960C	8.4	DEC	SECS		42	0.00	99.99	FH	4.35, CRT	ALT PRIMARY DELAY TIME B	X
040	ROT RATE VERN 43	V93R5710C	8.5	DEC	DPS		43	0.0020	1.0000	FH	4.35, CRT	VERN DISCRETE RATE B	X
041	ATT DB VERN 44	V93H5769C	8.4	DEC	DEG		44	0.010	40.000	FH	4.35, CRT	VERN ATT DEADBAND B	X
042	RATE DB VERN 45	V93R5731C	8.6	DEC	DPS		45	.010	.500	FH	4.35, CRT	VERN RATE LIMIT B	X
043	ROT PLS VERN 46	V93R5719C	8.5	DEC	DPS		46	.001	.500	FH	4.35, CRT	VERN ROT PULSE LEVEL B	X
044	COMP VERN 47	V93H5746C	8.6	DEC	DPS		47	0.000	.999	FH	4.35, CRT	VERN ROT CMPNT DBD B	X
045	CNTL ACC 48	V93J5759C	2.0	DEC			48	0	9	BFH	4.35, CRT, TLM	CNTL ACCEL B	X
046	ROT RATE PRI 50	V93R5707C	8.5	DEC	DPS		50	0.0500	2.0000	HKM	5.8, CRT	NORM DISCRETE RATE EDIT	X
047	ATT DB PRI 51	V93H5775C	8.4	DEC	DEG		51	0.10	40.00	HKM	5.8, CRT	NORM ATT DEADBAND EDIT	X
048	RATE DB PRI 52	V93R5728C	8.5	DEC	DPS		52	0.10	5.00	HKM	5.8, CRT	NORM RATE LIMIT EDIT	X
049	ROT PLS PRI 53	V93R5716C	8.5	DEC	DPS		53	0.001	1.00	HKM	5.8, CRT	NORM ROT PULSE LEVEL EDIT	X
050	COMP PRI 54	V93H5743C	8.6	DEC	DPS		54	.000	.999	HKM	5.8, CRT	NORM ROT CMPNT DBD EDIT	X
051	P OPTION PRI 55	V93J5752C	0.0	CTRL			55			AHKM	5.8, CRT	P NOM/NOSE/TAIL JET EDIT	X
052	Y OPTION PRI 56	V93J5756C	0.0	CTRL			56			AHKM	5.8, CRT	Y NOM/NOSE/TAIL JET EDIT	X
053	TRAN PLS PRI 57	V93R5702C	8.5	DEC	FPS		57	0.001	5.00	HKM	5.8, CRT	TRAN PULSE LEVEL EDIT	X
054	RATE DB ALT 58	V93R5698C	8.5	DEC	DPS		58	0.05	5.000	FH	5.8, CRT	ALT PRIMARY RATE LIMIT EDIT	X
055	JET OPT ALT 59	V93U5699C	0.0	CTRL			59			FGH	5.8, CRT	ALT PRIMARY JET OPTION EDIT	X
056	#JETS ALT 60	V93U5734C	2.0	DEC			60	1	3	FH	5.8, CRT	ALT PRIMARY MAX JETS EDIT	X
057	ON TIME ALT 61	V93W5740C	8.5	DEC	SECS		61	0.08	9.99	FH	5.8, CRT	ALT PRIMARY ON TIME EDIT	X
058	DELAY ALT 62	V93W5737C	8.4	DEC	SECS		62	0.00	99.99	FH	5.8, CRT	ALT PRIMARY DELAY TIME EDIT	X
059	ROT RATE VERN 63	V93R5711C	8.5	DEC	DPS		63	0.0020	1.0000	HKM	5.8, CRT	VERN DISCRETE RATE EDIT	X
060	ATT DB VERN 64	V93H5777C	8.4	DEC	DEG		64	0.010	40.000	HKM	5.8, CRT	VERN ATT DEADBAND EDIT	X

Table 4.2.22-1. DAP CONFIGURATION (PFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
061	RATE DB VERN 65	V93R5732C	8.6	DEC	DPS		65	.010	.500	HKM	5.8, CRT	VERN RATE LIMIT EDIT	X
062	ROT PLS VERN 66	V93R5704C	8.5	DEC	DPS		66	.001	.500	HKM	5.8, CRT	VERN ROT PULSE LEVEL EDIT	X
063	COMP VERN 67	V93H5747C	8.6	DEC	DPS		67	0.00	.999	HKM	5.8, CRT	VERN ROT CMPNT DBD EDIT	X
064	CNTL ACC 68	V93J5762C	2.0	DEC			68	0	9	BHKM	5.8, CRT	CNTL ACCEL EDIT	X
065	REBOOST 8 CFG	V94U0218C	2.0	DEC			8	1	4	Q,H	4.35, CRT, TLM	REBOOST CONFIGURATION	X
066	REBOOST 9 INTVL	V94W0219C	7.2	DEC	SECS		9	0.08	999.99	R,H	4.35, CRT, TLM	REBOOST FIRING INTERVAL	X

Table 4.2.22-2. DAP CONFIGURATION (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
001	(OPS)	V93X0040X	2	1		5.0															UI	OPS FUNCTION PAGE	X	
002	(SPEC)	V93X0042X	7	1		4.0																UI	SPEC FUNCTION PAGE	X
003	(DISP)	V93X0044X	10	1		4.0																UI	DISPLAY FUNCTION PAGE	X
004	(UL)	V92X5032X	34	1		2.0	UL							X								UI	UPLINK ACTIVITY IND	X
005	(GPC)	V93X0048X	36	1		2.0																UI	GPC DRIVER	X
006	(MT)	V91W1990C	39	1		12.0																FCOS	MISSION ELAPSED TIME	X
007	(CRT TIMER)	V91W1987C	39	2		12.0																FCOS	DISPLAY CRT TIMER.GNC	X
008	XXX (PRI)	V72X2855X	5	3		3.0	PRI	PRI					X								BG	4.35	NORM JETS	X
009	XXXXX (DAP A)	V72X2807X	12	3		5.0	DAP A	DAP A					X								BG	4.35	DAP SELECT A	X
010	XXXXX (DAP B)	V72X2808X	23	3		5.0	DAP B	DAP B					X								BG	4.35	DAP SELECT B	X
011	1 DAP A	V93J5779C	16	3		3.0							X								CEG	KYBD, 5.8	DAP LOAD SEL A	X
012	2 DAP B	V93J5780C	27	3		3.0							X								CEG	KYBD, 5.8	DAP LOAD SEL B	X
013	DAP EDIT 3 DAP A	V93J5781C	48	4		3.0							X								FGH	KYBD	DAP LOAD EDIT A	X
014	DAP EDIT 4 DAP B	V93J5782C	48	5		3.0							X								FGH	KYBD	DAP LOAD EDIT B	X
015	XXXX (LOAD) 5	V93X3657X	44	6		4.0	LOAD	LOAD					X	X							GHI	KYBD	DAP EDIT MOD	X
016	ROT RATE PRI 10	V93R5705C	12	4		7.4			DPS												G	KYBD, 5.8	NORM DISCRETE RATE A	X
017	ROT RATE PRI 30	V93R5706C	23	4		7.4			DPS												G	KYBD, 5.8	NORM DISCRETE RATE B	X
018	ROT RATE PRI 50	V93R5707C	34	4		7.4			DPS				X								GH	KYBD, 5.8	NORM DISCRETE RATE EDIT	X
019	ATT DB PRI 11	V93H5766C	13	5		6.2			DEG												G	KYBD, 5.8	NORM ATT DEADBAND A	X
020	ATT DB PRI 31	V93H5767C	24	5		6.2			DEG												G	KYBD, 5.8	NORM ATT DEADBAND B	X
021	ATT DB PRI 51	V93H5775C	35	5		6.2			DEG				X								GH	KYBD, 5.8	NORM ATT DEADBAND EDIT	X
022	RATE DB PRI 12	V93R5726C	14	6		5.2			DPS												G	KYBD, 5.8	NORM RATE LIMIT A	X
023	RATE DB PRI 32	V93R5727C	25	6		5.2			DPS												G	KYBD, 5.8	NORM RATE LIMIT B	X
024	RATE DB PRI 52	V93R5728C	36	6		5.2			DPS				X								GH	KYBD, 5.8	NORM RATE LIMIT EDIT	X
025	ROT PLS PRI 13	V93R5714C	13	7		6.3			DPS												G	KYBD, 5.8	NORM ROT PULSE LEVEL A	X
026	ROT PLS PRI 33	V93R5715C	24	7		6.3			DPS												G	KYBD, 5.8	NORM ROT PULSE LEVEL B	X
027	ROT PLS PRI 53	V93R5716C	35	7		6.3			DPS				X								GH	KYBD, 5.8	NORM ROT PULSE LEVEL EDIT	X
028	COMP PRI 14	V93H5741C	14	8		5.3			DPS												G	KYBD, 5.8	NORM ROT CMPNT DBD A	X
029	COMP PRI 34	V93H5742C	25	8		5.3			DPS												G	KYBD, 5.8	NORM ROT CMPNT DBD B	X
030	COMP PRI 54	V93H5743C	36	8		5.3			DPS				X								GH	KYBD, 5.8	NORM ROT CMPNT DBD EDIT	X
031	P OPTION PRI 15	V93J5750C	15	9		4.0			RTXT												D,G	KYBD, 5.8	P NOM/NOSE/TAIL JET A	X
032	P OPTION PRI 35	V93J5751C	26	9		4.0			RTXT												D,G	KYBD, 5.8	P NOM/NOSE/TAIL JET B	X
033	P OPTION PRI 55	V93J5752C	37	9		4.0			RTXT				X								DGH	KYBD, 5.8	P NOM/NOSE/TAIL JET EDIT	X
034	Y OPTION PRI 16	V93J5754C	15	10		4.0			RTXT												D,G	KYBD, 5.8	Y NOM/NOSE/TAIL JET A	X
035	Y OPTION PRI 36	V93J5755C	26	10		4.0			RTXT												D,G	KYBD, 5.8	Y NOM/NOSE/TAIL JET B	X
036	Y OPTION PRI 56	V93J5756C	37	10		4.0			RTXT				X								DGH	KYBD, 5.8	Y NOM/NOSE/TAIL JET EDIT	X
037	TRAN PLS PRI 17	V93R5700C	13	11		6.3			DEC	FPS											G	KYBD, 5.8	TRAN PULSE LEVEL A	X
038	TRAN PLS PRI 37	V93R5701C	24	11		6.3			DEC	FPS											G	KYBD, 5.8	TRAN PULSE LEVEL B	X
039	TRAN PLS PRI 57	V93R5702C	35	11		6.3			DEC	FPS			X								GH	KYBD, 5.8	TRAN PULSE LEVEL EDIT	X
040	XXX (ALT)	V72X2896X	5	12		3.0	ALT	ALT	BLVL				X								BG	4.35	ALT PRCS MODE	X
041	RATE DB ALT 18	V93R1951C	13	13		6.3			DEC	DPS											G	KYBD, 5.8	ALT PRIMARY RATE LIMIT A	X
042	RATE DB ALT 38	V93R1956C	24	13		6.3			DEC	DPS											G	KYBD, 5.8	ALT PRIMARY RATE LIMIT B	X
043	RATE DB ALT 58	V93R5698C	35	13		6.3			DEC	DPS											GH	KYBD, 5.8	ALT PRIMARY RATE LIMIT EDIT	X
044	JET OPT ALT 19	V93U1952C	15	14		4.0			RTXT												GJ	KYBD, 5.8	ALT PRIMARY JET OPTION A	X
045	JET OPT ALT 39	V93U1957C	26	14		4.0			RTXT												GJ	KYBD, 5.8	ALT PRIMARY JET OPTION B	X

TABLE 4.2.22-5. INPUT FUNCTIONAL PARAMETERS FOR ORBIT DIGITAL AUTOPILOT CONFIG DISP (REF SPEC 5.8) (G6.1)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
ARRAY_ALT_DELAY_TIME(1)	V93W1955C	ALT PRIMARY DELAY TIME A	ORB DAP CONFIG DISP	S	BSS		79862F	
ARRAY_ALT_DELAY_TIME(1)	V93W1955CA	ALT PRIMARY DELAY TIME A	ORB DAP CONFIG SPEC	S	BSS		79862F	
ARRAY_ALT_DELAY_TIME(2)	V93W1960C	ALT PRIMARY DELAY TIME B	ORB DAP CONFIG DISP	S	BSS		79862F	
ARRAY_ALT_DELAY_TIME(2)	V93W1960CA	ALT PRIMARY DELAY TIME B	ORB DAP CONFIG SPEC	S	BSS		79862F	
ARRAY_ALT_JET_OPTION(1)	V93U1952C	ALT PRIMARY JET OPTION A	ORB DAP CONFIG DISP		VAR		79862F	
ARRAY_ALT_JET_OPTION(1)	V93U1952CA	ALT PRIMARY JET OPTION A	ORB DAP CONFIG SPEC		VAR		79862F	
ARRAY_ALT_JET_OPTION(2)	V93U1957C	ALT PRIMARY JET OPTION B	ORB DAP CONFIG DISP		VAR		79862F	
ARRAY_ALT_JET_OPTION(2)	V93U1957CA	ALT PRIMARY JET OPTION B	ORB DAP CONFIG SPEC		VAR		79862F	
ARRAY_ALT_MAX_JETS(1)	V93U1953C	ALT PRIMARY MAX JETS A	ORB DAP CONFIG DISP		VAR		79862F	
ARRAY_ALT_MAX_JETS(1)	V93U1953CA	ALT PRIMARY MAX JETS A	ORB DAP CONFIG SPEC		VAR		79862F	
ARRAY_ALT_MAX_JETS(2)	V93U1958C	ALT PRIMARY MAX JETS B	ORB DAP CONFIG DISP		VAR		79862F	
ARRAY_ALT_MAX_JETS(2)	V93U1958CA	ALT PRIMARY MAX JETS B	ORB DAP CONFIG SPEC		VAR		79862F	
ARRAY_ALT_ON_TIME(1)	V93W1954C	ALT PRIMARY ON TIME A	ORB DAP CONFIG DISP	S	BSS		90708C	
ARRAY_ALT_ON_TIME(1)	V93W1954CA	ALT PRIMARY ON TIME A	ORB DAP CONFIG SPEC	S	BSS		79862F	
ARRAY_ALT_ON_TIME(2)	V93W1959C	ALT PRIMARY ON TIME B	ORB DAP CONFIG DISP	S	BSS		79862F	
ARRAY_ALT_ON_TIME(2)	V93W1959CA	ALT PRIMARY ON TIME B	ORB DAP CONFIG SPEC	S	BSS		79862F	
ARRAY_ALT_RATE_LIMIT(1)	V93R1951C	ALT PRIMARY RATE LIMIT A	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_ALT_RATE_LIMIT(1)	V93R1951CA	ALT PRIMARY RATE LIMIT A	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
ARRAY_ALT_RATE_LIMIT(2)	V93R1956C	ALT PRIMARY RATE LIMIT B	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_ALT_RATE_LIMIT(2)	V93R1956CA	ALT PRIMARY RATE LIMIT B	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
ARRAY_COMP_THRESHOLD(1,1)	V93H5741C	NORM ROT CMPNT DBD A	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_COMP_THRESHOLD(1,1)	V93H5741CA	NORM ROT CMPNT DBD A	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
ARRAY_COMP_THRESHOLD(1,2)	V93H5745C	VERN ROT CMPNT DBD A	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_COMP_THRESHOLD(1,2)	V93H5745CA	VERN ROT CMPNT DBD A	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
ARRAY_COMP_THRESHOLD(2,1)	V93H5742C	NORM ROT CMPNT DBD B	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_COMP_THRESHOLD(2,1)	V93H5742CA	NORM ROT CMPNT DBD B	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
ARRAY_COMP_THRESHOLD(2,2)	V93H5746C	VERN ROT CMPNT DBD B	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_COMP_THRESHOLD(2,2)	V93H5746CA	VERN ROT CMPNT DBD B	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
ARRAY_DB(1,1)	V93H5766C	NORM ATT DEADBAND A	ORB DAP CONFIG DISP	DEG	VAR		79862F	
ARRAY_DB(1,1)	V93H5766CA	NORM ATT DEADBAND A	ORB DAP CONFIG SPEC	DEG	VAR		79862F	
ARRAY_DB(1,2)	V93H5768C	VERN ATT DEADBAND A	ORB DAP CONFIG DISP	DEG	VAR		79862F	
ARRAY_DB(1,2)	V93H5768CA	VERN ATT DEADBAND A	ORB DAP CONFIG SPEC	DEG	VAR		79862F	
ARRAY_DB(2,1)	V93H5767C	NORM ATT DEADBAND B	ORB DAP CONFIG DISP	DEG	VAR		79862F	
ARRAY_DB(2,1)	V93H5767CA	NORM ATT DEADBAND B	ORB DAP CONFIG SPEC	DEG	VAR		79862F	
ARRAY_DB(2,2)	V93H5769C	VERN ATT DEADBAND B	ORB DAP CONFIG DISP	DEG	VAR		79862F	
ARRAY_DB(2,2)	V93H5769CA	VERN ATT DEADBAND B	ORB DAP CONFIG SPEC	DEG	VAR		79862F	

TABLE 4.2.22-5. INPUT FUNCTIONAL PARAMETERS FOR ORBIT DIGITAL AUTOPILOT CONFIG DISP (REF SPEC 5.8) (G6.1)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ARRAY_MNVR_RATE(1,1)	V93R5705C	NORM DISCRETE RATE A	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_MNVR_RATE(1,1)	V93R5705CA	NORM DISCRETE RATE A	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
ARRAY_MNVR_RATE(1,2)	V93R5709C	VERN DISCRETE RATE A	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_MNVR_RATE(1,2)	V93R5709CA	VERN DISCRETE RATE A	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
ARRAY_MNVR_RATE(2,1)	V93R5706C	NORM DISCRETE RATE B	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_MNVR_RATE(2,1)	V93R5706CA	NORM DISCRETE RATE B	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
ARRAY_MNVR_RATE(2,2)	V93R5710C	VERN DISCRETE RATE B	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_MNVR_RATE(2,2)	V93R5710CA	VERN DISCRETE RATE B	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
ARRAY_NOM_NOSE_TAIL_PITCH(1)	V93J5750C	P NOM/NOSE/TAIL JET A	ORB DAP CONFIG DISP		VAR		92789C	
ARRAY_NOM_NOSE_TAIL_PITCH(1)	V93J5750CA	P NOM/NOSE/TAIL JET A	ORB DAP CONFIG SPEC		VAR		92789C	
ARRAY_NOM_NOSE_TAIL_PITCH(2)	V93J5751C	P NOM/NOSE/TAIL JET B	ORB DAP CONFIG DISP		VAR		92789C	
ARRAY_NOM_NOSE_TAIL_PITCH(2)	V93J5751CA	P NOM/NOSE/TAIL JET B	ORB DAP CONFIG SPEC		VAR		92789C	
ARRAY_NOM_NOSE_TAIL_YAW(1)	V93J5754C	Y NOM/NOSE/TAIL JET A	ORB DAP CONFIG DISP		VAR		79862F	
ARRAY_NOM_NOSE_TAIL_YAW(1)	V93J5754CA	Y NOM/NOSE/TAIL JET A	ORB DAP CONFIG SPEC		VAR		79862F	
ARRAY_NOM_NOSE_TAIL_YAW(2)	V93J5755C	Y NOM/NOSE/TAIL JET B	ORB DAP CONFIG DISP		VAR		79862F	
ARRAY_NOM_NOSE_TAIL_YAW(2)	V93J5755CA	Y NOM/NOSE/TAIL JET B	ORB DAP CONFIG SPEC		VAR		79862F	
ARRAY_PAYLOAD_EXTENDED(1)	V93J5758C	CNTL ACCEL A	ORB DAP CONFIG DISP		HXS		93017G	*
ARRAY_PAYLOAD_EXTENDED(1)	V93J5758CA	CNTL ACCEL A	ORB DAP CONFIG SPEC		HXS		90708C	
ARRAY_PAYLOAD_EXTENDED(2)	V93J5759C	CNTL ACCEL B	ORB DAP CONFIG DISP		HXS		93017G	*
ARRAY_PAYLOAD_EXTENDED(2)	V93J5759CA	CNTL ACCEL B	ORB DAP CONFIG SPEC		HXS		90708C	
ARRAY_RATE_LIMIT(1,1)	V93R5726C	NORM RATE LIMIT A	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_RATE_LIMIT(1,1)	V93R5726CA	NORM RATE LIMIT A	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
ARRAY_RATE_LIMIT(1,2)	V93R5730C	VERN RATE LIMIT A	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_RATE_LIMIT(1,2)	V93R5730CA	VERN RATE LIMIT A	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
ARRAY_RATE_LIMIT(2,1)	V93R5727C	NORM RATE LIMIT B	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_RATE_LIMIT(2,1)	V93R5727CA	NORM RATE LIMIT B	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
ARRAY_RATE_LIMIT(2,2)	V93R5731C	VERN RATE LIMIT B	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_RATE_LIMIT(2,2)	V93R5731CA	VERN RATE LIMIT B	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
ARRAY_ROT_PULSE(1,1)	V93R5714C	NORM ROT PULSE LEVEL A	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_ROT_PULSE(1,1)	V93R5714CA	NORM ROT PULSE LEVEL A	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
ARRAY_ROT_PULSE(1,2)	V93R5718C	VERN ROT PULSE LEVEL A	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_ROT_PULSE(1,2)	V93R5718CA	VERN ROT PULSE LEVEL A	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
ARRAY_ROT_PULSE(2,1)	V93R5715C	NORM ROT PULSE LEVEL B	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_ROT_PULSE(2,1)	V93R5715CA	NORM ROT PULSE LEVEL B	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
ARRAY_ROT_PULSE(2,2)	V93R5719C	VERN ROT PULSE LEVEL B	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_ROT_PULSE(2,2)	V93R5719CA	VERN ROT PULSE LEVEL B	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
ARRAY_TRANS_PULSE(1)	V93R5700C	TRANS PULSE LEVEL A	ORB DAP CONFIG DISP	FT/S	BSS		79862F	
ARRAY_TRANS_PULSE(1)	V93R5700CA	TRANS PULSE LEVEL A	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
ARRAY_TRANS_PULSE(2)	V93R5701C	TRANS PULSE LEVEL B	ORB DAP CONFIG DISP	FT/S	BSS		79862F	
ARRAY_TRANS_PULSE(2)	V93R5701CA	TRANS PULSE LEVEL B	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
DAP_DATA_CHANGE	V93X5774X	DAP DATA CHANGE FLAG	ORB DAP CONFIG DISP					
DAP_EDIT_LOAD	V93X3658X	DAP EDIT LOAD	ORB DAP CONFIG DISP		BD		79862F	
DAP_EDIT_LOAD	V93X3658XA	DAP EDIT LOAD	ORB DAP CONFIG SPEC		BD		79862F	
DAP_EDIT_MOD	V93X3657X	DAP EDIT MOD	ORB DAP CONFIG DISP		BD		79862F	
DAP_EDIT_REQ_A	V93X5787XA	DAP EDIT REQ A	ORB DAP CONFIG SPEC		BD		79862F	
DAP_EDIT_REQ_B	V93X5788XA	DAP EDIT REQ B	ORB DAP CONFIG SPEC		BD		79862F	

TABLE 4.2.22-5. INPUT FUNCTIONAL PARAMETERS FOR ORBIT DIGITAL AUTOPILOT CONFIG DISP (REF SPEC 5.8) (G6.1)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
DAP_LOAD_EDIT_A	V93J5781C	DAP LOAD EDIT A	ORB DAP CONFIG DISP		HXS		79862F	
DAP_LOAD_EDIT_B	V93J5782C	DAP LOAD EDIT B	ORB DAP CONFIG DISP				79862F	
DAP_LOAD_MOD_A	V93X5783XA	DAP LOAD MOD A	ORB DAP CONFIG SPEC		BD		79862F	
DAP_LOAD_MOD_B	V93X5784XA	DAP LOAD MOD B	ORB DAP CONFIG SPEC		BD		79862F	
DAP_LOAD_SEL_A	V93J5779C	DAP LOAD SEL A	ORB DAP CONFIG DISP		HXS		93017G	*
DAP_LOAD_SEL_A	V93J5779CA	DAP LOAD SEL A	ORB DAP CONFIG SPEC		HXS		79862F	
DAP_LOAD_SEL_B	V93J5780C	DAP LOAD SEL B	ORB DAP CONFIG DISP		HXS		93017G	*
DAP_LOAD_SEL_B	V93J5780CA	DAP LOAD SEL B	ORB DAP CONFIG SPEC		HXS		79862F	
DAP_SEL_REQ_A	V93X5785XA	DAP SEL REQ A	ORB DAP CONFIG SPEC		BD		79862F	
DAP_SEL_REQ_B	V93X5786XA	DAP SEL REQ B	ORB DAP CONFIG SPEC		BD		79862F	
EDIT_ALT_DELAY_TIME	V93W5737C	ALT PRIMARY DELAY TIME EDIT	ORB DAP CONFIG DISP	S	SPL		79862F	
EDIT_ALT_DELAY_TIME	V93W5737CA	ALT PRIMARY DELAY TIME EDIT	ORB DAP CONFIG SPEC	S	SPL		79862F	
EDIT_ALT_JET_OPTION	V93U5699C	ALT PRIMARY JET OPTION EDIT	ORB DAP CONFIG DISP		HXS		79862F	
EDIT_ALT_JET_OPTION	V93U5699CA	ALT PRIMARY JET OPTION EDIT	ORB DAP CONFIG SPEC		HXS		79862F	
EDIT_ALT_MAX_JETS	V93U5734C	ALT PRIMARY MAX JETS EDIT	ORB DAP CONFIG DISP		HXS		79862F	
EDIT_ALT_MAX_JETS	V93U5734CA	ALT PRIMARY MAX JETS EDIT	ORB DAP CONFIG SPEC		HXS		79862F	
EDIT_ALT_ON_TIME	V93W5740C	ALT PRIMARY ON TIME EDIT	ORB DAP CONFIG DISP	S	SPL		79862F	
EDIT_ALT_ON_TIME	V93W5740CA	ALT PRIMARY ON TIME EDIT	ORB DAP CONFIG SPEC	S	SPL		79862F	
EDIT_ALT_RATE_LIMIT	V93R5698C	ALT PRIMARY RATE LIMIT EDIT	ORB DAP CONFIG DISP	DEG/S	SPL		79862F	
EDIT_ALT_RATE_LIMIT	V93R5698CA	ALT PRIMARY RATE LIMIT EDIT	ORB DAP CONFIG SPEC	DEG	SPL		79862F	
EDIT_COMP_THRESHOLD(1)	V93H5743C	NORM ROT CMPNT DBD EDIT	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
EDIT_COMP_THRESHOLD(1)	V93H5743CA	NORM ROT CMPNT DBD EDIT	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
EDIT_COMP_THRESHOLD(2)	V93H5747C	VERN ROT CMPNT DBD EDIT	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
EDIT_COMP_THRESHOLD(2)	V93H5747CA	VERN ROT CMPNT DBD EDIT	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
EDIT_DB(1)	V93H5775C	NORM ATT DEADBAND EDIT	ORB DAP CONFIG DISP	DEG	VAR		79862F	
EDIT_DB(1)	V93H5775CA	NORM ATT DEADBAND EDIT	ORB DAP CONFIG SPEC	DEG	VAR		79862F	
EDIT_DB(2)	V93H5777C	VERN ATT DEADBAND EDIT	ORB DAP CONFIG DISP	DEG	VAR		79862F	
EDIT_DB(2)	V93H5777CA	VERN ATT DEADBAND EDIT	ORB DAP CONFIG SPEC	DEG	VAR		79862F	
EDIT_MNVR_RATE(1)	V93R5707C	NORM DISCRETE RATE EDIT	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
EDIT_MNVR_RATE(1)	V93R5707CA	NORM DISCRETE RATE EDIT	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
EDIT_MNVR_RATE(2)	V93R5711C	VERN DISCRETE RATE EDIT	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
EDIT_MNVR_RATE(2)	V93R5711CA	VERN DISCRETE RATE EDIT	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
EDIT_NOM_NOSE_TAIL_PITCH	V93J5752C	P NOM/NOSE/TAIL JET EDIT	ORB DAP CONFIG DISP		VAR		79862F	
EDIT_NOM_NOSE_TAIL_PITCH	V93J5752CA	P NOM/NOSE/TAIL JET EDIT	ORB DAP CONFIG SPEC		VAR		79862F	
EDIT_NOM_NOSE_TAIL_YAW	V93J5756C	Y NOM/NOSE/TAIL JET EDIT	ORB DAP CONFIG DISP		VAR		79862F	
EDIT_NOM_NOSE_TAIL_YAW	V93J5756CA	Y NOM/NOSE/TAIL JET EDIT	ORB DAP CONFIG SPEC		VAR		79862F	
EDIT_PAYLOAD_EXTENDED	V93J5762C	CNTL ACCEL EDIT	ORB DAP CONFIG DISP		VAR		90708C	
EDIT_PAYLOAD_EXTENDED	V93J5762CA	CNTL ACCEL EDIT	ORB DAP CONFIG SPEC		VAR		90708C	
EDIT_RATE_LIMIT(1)	V93R5728C	NORM RATE LIMIT EDIT	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
EDIT_RATE_LIMIT(1)	V93R5728CA	NORM RATE LIMIT EDIT	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
EDIT_RATE_LIMIT(2)	V93R5732C	VERN RATE LIMIT EDIT	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
EDIT_RATE_LIMIT(2)	V93R5732CA	VERN RATE LIMIT EDIT	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
EDIT_ROT_PULSE(1)	V93R5716C	NORM ROT PULSE LEVEL EDIT	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
EDIT_ROT_PULSE(1)	V93R5716CA	NORM ROT PULSE LEVEL EDIT	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
EDIT_ROT_PULSE(2)	V93R5704C	VERN ROT PULSE LEVEL EDIT	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
EDIT_ROT_PULSE(2)	V93R5704CA	VERN ROT PULSE LEVEL EDIT	ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	

TABLE 4.2.22-5. INPUT FUNCTIONAL PARAMETERS FOR ORBIT DIGITAL AUTOPILOT CONFIG DISP (REF SPEC 5.8) (G6.1)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
EDIT_TRANS_PULSE	V93R5702C	TRANS PULSE LEVEL EDIT	ORB DAP CONFIG DISP	FT/S	BSS		79862F	
EDIT_TRANS_PULSE	V93R5702CA	TRANS PULSE LEVEL EDIT	ORB DAP CONFIG SPEC	FT/S	BSS		79862F	
ENABLE_NF	V93X5344XA	NOTCH FILTER ENA FLAG	ORB DAP CONFIG DISP				90314H	
ENABLE_NF	V93X5344XB	NOTCH FILTER ENA FLAG	ORB DAP	EVENT	BD		93017G	*
LAMP_ALT	V72X2896X	FWD ALT PRCS MODE (LIGHT)	ORB DAP	EVENT	BD		93017G	*
LAMP_DAPLOAD_A	V72X2807X	FWD DAP SELECT A (LIGHT)	ORB DAP		BD		93017G	*
LAMP_DAPLOAD_B	V72X2808X	FWD DAP SELECT B (LIGHT)	ORB DAP		BD		93017G	*
LAMP_PRIMARY	V72X2855X	FWD RCS JETS NORM (LIGHT)	ORB DAP		BD		93017G	*
LAMP_VERNIER	V72X2856X	FWD RCS JETS VERNIER (LIGHT)	ORB DAP		BD		93017G	*
RBST_CONF	V94U0218C	REBOOST CONFIGURATION	ORB DAP CONFIG DISP		HXS		93017G	*
RBST_ENA	V90X0442XA	REBOOST ENABLE	ORB DAP		BD		93017G	*
RBST_ENA	V90X0442XB	REBOOST ENABLE	UNIV POINT PROC		BD		93017G	*
RBST_INTERVAL_DISP	V94W0219C	REBOOST FIRING INTERVAL	ORB DAP CONFIG DISP	S	SPL		93017G	*
XJETS_ACTIVE	V93X0992X	XJETS ACTIVE FLAG	ORB DAP CONFIG DISP	EVENT	BD		93017G	*
XJETS_ACTIVE	V93X0992XA	XJETS ACTIVE FLAG	ORB DAP	EVENT	BD		93017G	*

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.22-6. OUTPUT FUNCTIONAL PARAMETERS FROM ORBIT DIGITAL AUTOPILOT CONFIG DISP (REF SPEC 5.8) (G6.1)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ARRAY_ALT_DELAY_TIME(1)	V93W1955C	ALT PRIMARY DELAY TIME A	ORB DAP	S	BSS		79862F	
ARRAY_ALT_DELAY_TIME(2)	V93W1960C	ALT PRIMARY DELAY TIME B	ORB DAP CONFIG DISP	S	BSS		79862F	
ARRAY_ALT_JET_OPTION(1)	V93U1952C	ALT PRIMARY JET OPTION A	ORB DAP CONFIG DISP		VAR		79862F	
ARRAY_ALT_JET_OPTION(2)	V93U1957C	ALT PRIMARY JET OPTION B	ORB DAP CONFIG DISP		VAR		79862F	
ARRAY_ALT_MAX_JETS(1)	V93U1953C	ALT PRIMARY MAX JETS A	ORB DAP CONFIG DISP		VAR		79862F	
ARRAY_ALT_MAX_JETS(2)	V93U1958C	ALT PRIMARY MAX JETS B	ORB DAP CONFIG DISP		VAR		79862F	
ARRAY_ALT_ON_TIME(1)	V93W1954C	ALT PRIMARY ON TIME A	ORB DAP	S	BSS		90708C	
ARRAY_ALT_ON_TIME(2)	V93W1959C	ALT PRIMARY ON TIME B	ORB DAP CONFIG DISP	S	BSS		79862F	
ARRAY_ALT_RATE_LIMIT(1)	V93R1951C	ALT PRIMARY RATE LIMIT A	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_ALT_RATE_LIMIT(2)	V93R1956C	ALT PRIMARY RATE LIMIT B	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_COMP_THRESHOLD(1,1)	V93H5741C	NORM ROT CMPNT DBD A	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_COMP_THRESHOLD(1,2)	V93H5745C	VERN ROT CMPNT DBD A	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_COMP_THRESHOLD(2,1)	V93H5742C	NORM ROT CMPNT DBD B	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_COMP_THRESHOLD(2,2)	V93H5746C	VERN ROT CMPNT DBD B	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_DB(1,1)	V93H5766C	NORM ATT DEADBAND A	ORB DAP CONFIG DISP	DEG	VAR		79862F	
ARRAY_DB(1,2)	V93H5768C	VERN ATT DEADBAND A	ORB DAP CONFIG DISP	DEG	VAR		79862F	
ARRAY_DB(2,1)	V93H5767C	NORM ATT DEADBAND B	ORB DAP CONFIG DISP	DEG	VAR		79862F	
ARRAY_DB(2,2)	V93H5769C	VERN ATT DEADBAND B	ORB DAP CONFIG DISP	DEG	VAR		79862F	
ARRAY_MNVR_RATE(1,1)	V93R5705C	NORM DISCRETE RATE A	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_MNVR_RATE(1,2)	V93R5709C	VERN DISCRETE RATE A	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_MNVR_RATE(2,1)	V93R5706C	NORM DISCRETE RATE B	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_MNVR_RATE(2,2)	V93R5710C	VERN DISCRETE RATE B	ORB DAP CONFIG DISP	DEG/S	BSS		79862F	
ARRAY_NOM_NOSE_TAIL_PITCH(1)	V93J5750C	P NOM/NOSE/TAIL JET A	ORB DAP CONFIG DISP		VAR		92789C	

TABLE 4.2.22-6. OUTPUT FUNCTIONAL PARAMETERS FROM ORBIT DIGITAL AUTOPILOT CONFIG DISP (REF SPEC 5.8) (G6.1)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ARRAY_NOM_NOSE_TAIL_PITCH(2)	V93J5751C	P NOM/NOSE/TAIL JET B	ORB DAP		VAR		92789C	
			ORB DAP CONFIG DISP					
ARRAY_NOM_NOSE_TAIL_YAW(1)	V93J5754C	Y NOM/NOSE/TAIL JET A	ORB DAP		VAR		79862F	
			ORB DAP CONFIG DISP					
ARRAY_NOM_NOSE_TAIL_YAW(2)	V93J5755C	Y NOM/NOSE/TAIL JET B	ORB DAP		VAR		79862F	
			ORB DAP CONFIG DISP					
ARRAY_PAYLOAD_EXTENDED(1)	V93J5758C	CNTL ACCEL A	DL FMT 22/1		HXS		93017G	*
			ORB DAP					
			ORB DAP CONFIG DISP					
ARRAY_PAYLOAD_EXTENDED(2)	V93J5759C	CNTL ACCEL B	DL FMT 22/1		HXS		93017G	*
			ORB DAP					
			ORB DAP CONFIG DISP					
ARRAY_RATE_LIMIT(1,1)	V93R5726C	NORM RATE LIMIT A	ORB DAP	DEG/S	BSS		79862F	
			ORB DAP CONFIG DISP					
ARRAY_RATE_LIMIT(1,2)	V93R5730C	VERN RATE LIMIT A	ORB DAP	DEG/S	BSS		79862F	
			ORB DAP CONFIG DISP					
ARRAY_RATE_LIMIT(2,1)	V93R5727C	NORM RATE LIMIT B	ORB DAP	DEG/S	BSS		79862F	
			ORB DAP CONFIG DISP					
ARRAY_RATE_LIMIT(2,2)	V93R5731C	VERN RATE LIMIT B	ORB DAP	DEG/S	BSS		79862F	
			ORB DAP CONFIG DISP					
ARRAY_ROT_PULSE(1,1)	V93R5714C	NORM ROT PULSE LEVEL A	ORB DAP	DEG/S	BSS		79862F	
			ORB DAP CONFIG DISP					
ARRAY_ROT_PULSE(1,2)	V93R5718C	VERN ROT PULSE LEVEL A	ORB DAP	DEG/S	BSS		79862F	
			ORB DAP CONFIG DISP					
ARRAY_ROT_PULSE(2,1)	V93R5715C	NORM ROT PULSE LEVEL B	ORB DAP	DEG/S	BSS		79862F	
			ORB DAP CONFIG DISP					
ARRAY_ROT_PULSE(2,2)	V93R5719C	VERN ROT PULSE LEVEL B	ORB DAP	DEG/S	BSS		79862F	
			ORB DAP CONFIG DISP					
ARRAY_TRANS_PULSE(1)	V93R5700C	TRANS PULSE LEVEL A	ORB DAP	FT/S	BSS		79862F	
			ORB DAP CONFIG DISP					
ARRAY_TRANS_PULSE(2)	V93R5701C	TRANS PULSE LEVEL B	ORB DAP	FT/S	BSS		79862F	
			ORB DAP CONFIG DISP					
DAP_DATA_CHANGE	V93X5774X	DAP DATA CHANGE FLAG	ORB DAP					
			ORB DAP CONFIG DISP					
DAP_EDIT_LOAD	V93X3658X	DAP EDIT LOAD	ORB DAP		BD		79862F	
			ORB DAP CONFIG SPEC					
DAP_EDIT_MOD	V93X3657X	DAP EDIT MOD	ORB DAP		BD		79862F	
			ORB DAP CONFIG DISP					
DAP_EDIT_REQ_A	V93X5787X	DAP EDIT REQ A	ORB DAP		BD		79862F	
			ORB DAP CONFIG SPEC					
DAP_EDIT_REQ_B	V93X5788X	DAP EDIT REQ B	ORB DAP		BD		79862F	
			ORB DAP CONFIG SPEC					
DAP_LOAD_EDIT_A	V93J5781C	DAP LOAD EDIT A	ORB DAP		HXS		79862F	
			ORB DAP CONFIG DISP					
			ORB DAP CONFIG SPEC					
DAP_LOAD_EDIT_B	V93J5782C	DAP LOAD EDIT B	ORB DAP				79862F	
			ORB DAP CONFIG DISP					
			ORB DAP CONFIG SPEC					
DAP_LOAD_MOD_A	V93X5783X	DAP LOAD MOD A	ORB DAP		BD		79862F	
			ORB DAP CONFIG SPEC					
DAP_LOAD_MOD_B	V93X5784X	DAP LOAD MOD B	ORB DAP		BD		79862F	
			ORB DAP CONFIG SPEC					

TABLE 4.2.22-6. OUTPUT FUNCTIONAL PARAMETERS FROM ORBIT DIGITAL AUTOPILOT CONFIG DISP (REF SPEC 5.8) (G6.1)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
DAP_LOAD_SEL_A	V93J5779C	DAP LOAD SEL A	DL FMT 22/1 ORB DAP CONFIG DISP ORB DAP CONFIG SPEC		HXS		93017G	*
DAP_LOAD_SEL_B	V93J5780C	DAP LOAD SEL B	DL FMT 22/1 ORB DAP CONFIG DISP ORB DAP CONFIG SPEC		HXS		93017G	*
DAP_SEL_REQ_A	V93X5785X	DAP SEL REQ A	ORB DAP CONFIG SPEC		BD		79862F	
DAP_SEL_REQ_B	V93X5786X	DAP SEL REQ B	ORB DAP CONFIG SPEC		BD		79862F	
EDIT_ALT_DELAY_TIME	V93W5737C	ALT PRIMARY DELAY TIME EDIT	ORB DAP CONFIG DISP ORB DAP CONFIG SPEC	S	SPL		79862F	
EDIT_ALT_JET_OPTION	V93U5699C	ALT PRIMARY JET OPTION EDIT	ORB DAP CONFIG DISP ORB DAP CONFIG SPEC		HXS		79862F	
EDIT_ALT_MAX_JETS	V93U5734C	ALT PRIMARY MAX JETS EDIT	ORB DAP CONFIG DISP ORB DAP CONFIG SPEC		HXS		79862F	
EDIT_ALT_ON_TIME	V93W5740C	ALT PRIMARY ON TIME EDIT	ORB DAP CONFIG DISP ORB DAP CONFIG SPEC	S	SPL		79862F	
EDIT_ALT_RATE_LIMIT	V93R5698C	ALT PRIMARY RATE LIMIT EDIT	ORB DAP CONFIG DISP ORB DAP CONFIG SPEC	DEG/S	SPL		79862F	
EDIT_COMP_THRESHOLD(1)	V93H5743C	NORM ROT CMPNT DBD EDIT	ORB DAP CONFIG DISP ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
EDIT_COMP_THRESHOLD(2)	V93H5747C	VERN ROT CMPNT DBD EDIT	ORB DAP CONFIG DISP ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
EDIT_DB(1)	V93H5775C	NORM ATT DEADBAND EDIT	ORB DAP CONFIG DISP ORB DAP CONFIG SPEC	DEG	VAR		79862F	
EDIT_DB(2)	V93H5777C	VERN ATT DEADBAND EDIT	ORB DAP CONFIG DISP ORB DAP CONFIG SPEC	DEG	VAR		79862F	
EDIT_MNVR_RATE(1)	V93R5707C	NORM DISCRETE RATE EDIT	ORB DAP CONFIG DISP ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
EDIT_MNVR_RATE(2)	V93R5711C	VERN DISCRETE RATE EDIT	ORB DAP CONFIG DISP ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
EDIT_NOM_NOSE_TAIL_PITCH	V93J5752C	P NOM/NOSE/TAIL JET EDIT	ORB DAP CONFIG DISP ORB DAP CONFIG SPEC		VAR		79862F	
EDIT_NOM_NOSE_TAIL_YAW	V93J5756C	Y NOM/NOSE/TAIL JET EDIT	ORB DAP CONFIG DISP ORB DAP CONFIG SPEC		VAR		79862F	
EDIT_PAYLOAD_EXTENDED	V93J5762C	CNTL ACCEL EDIT	ORB DAP CONFIG DISP ORB DAP CONFIG SPEC		VAR		90708C	
EDIT_RATE_LIMIT(1)	V93R5728C	NORM RATE LIMIT EDIT	ORB DAP CONFIG DISP ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
EDIT_RATE_LIMIT(2)	V93R5732C	VERN RATE LIMIT EDIT	ORB DAP CONFIG DISP ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
EDIT_ROT_PULSE(1)	V93R5716C	NORM ROT PULSE LEVEL EDIT	ORB DAP CONFIG DISP ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
EDIT_ROT_PULSE(2)	V93R5704C	VERN ROT PULSE LEVEL EDIT	ORB DAP CONFIG DISP ORB DAP CONFIG SPEC	DEG/S	BSS		79862F	
EDIT_TRANS_PULSE	V93R5702C	TRANS PULSE LEVEL EDIT	ORB DAP CONFIG DISP ORB DAP CONFIG SPEC	FT/S	BSS		79862F	

TABLE 4.2.22-6. OUTPUT FUNCTIONAL PARAMETERS FROM ORBIT DIGITAL AUTOPILOT CONFIG DISP (REF SPEC 5.8) (G6.1)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ENABLE_NF	V93X5344XA	NOTCH FILTER ENA FLAG	ORB DAP				90314H	
RBST_CONF	V94U0218C	REBOOST CONFIGURATION	ORB DAP CONFIG DISP DL FMT 22/1		HXS		93017G	*
RBST_INTERVAL_DISP	V94W0219C	REBOOST FIRING INTERVAL	ORB DAP ORB DAP CONFIG DISP DL FMT 22/1	S	SPL		93017G	*
XJETS_ACTIVE	V93X0992X	XJETS ACTIVE FLAG	ORB DAP DL FMT 22/1	EVENT	BD		93017G	*
	V90M3174P	FLIGHT CONTROL MFB DOWNLIST	ORB DAP ORB DAP CONFIG DISP DL FMT 22/1				93017G	*

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
(HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

TABLE 4.2.22-7. ORBIT DIGITAL AUTOPILOT CONFIG DISP (REF SPEC 5.8) (G6.1) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
MAG_CONTROL_FORCE (1)	V97U2957C	LB	F	S	D	P	G4.35 G6.1	00	ZFP	79862F	
MAG_CONTROL_FORCE (2)	V97U2958C	LB	F	S	D	P	G4.35 G6.1	00	ZFP	79862F	
MAG_CONTROL_FORCE (3)	V97U2959C	LB	F	S	D	P	G4.35 G6.1	00	ZFP	79862F	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.22-8. ORBIT DIGITAL AUTOPILOT CONFIG DISP (REF SPEC 5.8) (G6.1) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.22-9. ORBIT DIGITAL AUTOPILOT CONFIG DISP (REF SPEC 5.8) (G6.1) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.23 RELATIVE NAVIGATION (PFS)

TITLE: REL NAV

TYPE: SPEC/033

AVAILABILITY: PFS:GNC OPS 2

4.2.23.1 Purpose, Operation, and Organization

This display provides data and controls for on-orbit/rendezvous navigation operations with the star tracker (S TRK), rendezvous radar (RR), Crewman Optical Alignment Sight (COAS) and Global Positioning System (GPS). On-orbit/rendezvous NAV filter controls and state vector management controls are provided to allow manual control of navigation data from the S TRK, RR, COAS, or GPS depending on which instrument is being used. A KU Band Antenna enabling capability is also provided.

Rendezvous navigation functions are enabled by Item 1. Normally, RNDZ NAV will respond to Item 1 by initiating the calculation of relative state information. If, however, the target state vector is more than a predetermined age limit (the K-Load MAX_TIME_TOL), RNDZ NAV will reject the enable command, and an "ILLEGAL ENTRY" message will be generated.

Item 1 and a number of the remaining display items, (2 through 4) and (8 through 25), represent RNDZ NAV configuration controls and commands. Since the RNDZ NAV calculations related to the other display items are contingent on the previous execution of Item 1, most of these item entries will not be accepted, and will result in the generation of an "ILLEGAL ENTRY" message unless RNDZ NAV has first been enabled (via Item 1 or another means, e.g. via GMEM). Items 10 and 15 are exceptions.

Execution of Item 10 when RNDZ NAV is not enabled will be allowed, and will result in a transfer of the Orbiter state to the target state. The transfer will allow the crew to utilize RNDZ NAV, when the target state vector age exceeds the K-Load MAX_TIME_TOL.

Execution of Item 15 (pre-assignment of the filter to either the orbiter or target) must occur prior to rendezvous navigation becoming active via Item 1. This is described in greater detail in subtopic (11) below.

- (1) The relative motion information portion of this display is divided into two sections: current navigated relative state information, and relative motion parameters provided by the radar system. The following current navigated relative state information will be displayed if RNDZ NAV is enabled and updated every two seconds until the display is terminated via crew command. If RNDZ NAV is not enabled, these parameters will be blanked.
 - a. Line-of-sight range (kft) between vehicles.
 - b. Range rate (fps) – the sign convention is negative for a closing rate and positive for an opening rate.
 - c. The angle between the projection of the Orbiter tracking body vector (selected on UNIV PTG-Ref. Section 4.2.26) into the orbit plane and the local horizontal plane (0 to 360 degrees).
 - d. Out-of-plane position – the current perpendicular distance between the Orbiter and the orbital plane of the target vehicle (kft); positive along the negative angular momentum vector of the target.

- e. Out-of-plane velocity – the current rate at which the Orbiter is moving relative to the target orbital plane (fps); positive along the negative angular momentum vector of the target.
- f. Time of the next Orbiter/target orbital nodal crossing (MET–hr:min:sec).

Item 4 allows the crew to control the source of the navigated relative state data being displayed. The display is initialized with the data being derived from the “Propagated” State Vector, i.e., a navigated state vector that is not updated by the RNDZ NAV filter. This is indicated by the text PROP displayed next to item 4. Execution of item 4 changes the source of the navigated relative state data to the “Filtered” state vector, i.e., a navigated state vector that incorporates RNDZ NAV filter data. This is indicated by the text FLTR displayed next to item 4. Item 4 acts as a flip-flop alternately selecting the “Propagated” and “Filtered” state vectors as a data source. Taking GPS_TO_G&C will result in the displayed relative state being computed using GPS states for the orbiter rather than the FLTR or PROP states. Item 4 controls the source of navigation data to the Universal Pointing Specialist Function (4.213) and On-Orbit Guidance as well as the display. If rendezvous navigation is not enabled, execution of this item will be illegal.

- (2) The following current radar relative state information is initialized upon display callup and subsequently updated at once-per-second until the display is terminated via crew command. A status symbol is provided to the right of each parameter as follows: a down arrow (↓) – an indication for loss of good data; “M” – an indication that the radar system is in the COMM MODE or commfault; or (blank) – data good. The appropriate parameters are blanked if the radar system is not operative or if a specific parameter has a commfault associated with the data:

- a. Line-of-sight range (kft) between the vehicles.
- b. Range rate (fps) – sign convention is the same as for the current navigated state (1) b., above.
- c. Pitch position (elevation) of the radar antenna gimbal relative to its null position (90 deg); positive sense – antenna motion toward the +X Orbiter axis.
- d. Roll position (azimuth) of the radar antenna gimbal relative to its null position (180 deg); positive sense – antenna motion toward the –Y Orbiter axis.
- e. Pitch inertial angle rate (mr/sec); positive sense – antenna motion toward the +X Orbiter axis (mr = milliradian).
- f. Roll inertial angle rate (mr/sec); positive sense – antenna motion toward the –Y Orbiter axis (mr = milliradian).

The status of the Radar System is displayed next to “RR”. The status designation will be one of the following:

- a. STST – Self test in progress.
- b. COMM – Mode switch is in the COMM position indicating that the KU band antenna is being used for communications.

Any of the following status indicators will be overridden by self-test.

- c. GPC – The Antenna steering switch is in the GPC position. Antenna pointing and search are under GPC Control and the manual slew switches are inhibited.
 - d. GDSG – The Antenna steering switch is in the GPC DESIG position. Antenna pointing and inertial stabilization are under GPC Control. The manual slew switches, programmed search function and RF angle tracking are inhibited.
 - e. ATRK – The Antenna steering switch is in the AUTO position. Antenna pointing is done via the manual slew switches which are disabled when RF angle track is achieved.
 - f. MSLW – The Antenna steering switch is in the MAN SLEW position. Antenna pointing is done via the manual slew switches. RF Angle track and inertial stabilization are inhibited.
- (3) This display contains data and controls required to monitor and select the angle sensors for rendezvous navigation. The rendezvous angle sensor block contains controls to select either the S TRK, RR, or COAS as the source of angle information for state vector navigation. These controls are implemented as items 12, 13 and 14. The S TRK, RR, and COAS angle data are mutually exclusive; i.e., if the RR is selected, the appropriate item number will be tagged with an asterisk(*) and the previously selected S TRK or COAS will be deselected and the appropriate asterisk (*) blanked. Upon initial display callup, the S TRK shall be selected. The appearance or removal of an asterisk (*) will have a time delay depending on the RNDZ NAV processing rate. If rendezvous navigation is not enabled, execution of items 12, 13 and 14 will be illegal.
- (4) The rendezvous angle sensor block contains other information used to monitor S TRK and COAS operation. The “status” remote text readout indicates the currently selected S TRK status (–Y or –Z S TRK previously selected to the Target Track Mode on the S TRK/COAS CNTL display–Ref. Section 4.2.20) and will display the following: (blank), NO TARGET, FALSE TRK, OUT FOV, HI RATE. A separate status display field provides a “BITE” indication on the selected S TRK. Also displayed are two offset angles that represent the displacement of the target being tracked by the –Z S TRK in the –Z COAS FOV. This offset data is driven only when the –Z Star Tracker has been selected for either the star track mode (Item 4) or the target track mode (Item 6) on the Star Tracker/COAS control display. Otherwise, the display is blanked.
- (5) On–Orbit/RNDZ NAV filter data, status, and controls are also displayed. Since only a single instrument (RR, S TRK, or COAS) may be used at a time to supply navigation angle data, the angle data being displayed is only for the instrument selected. RR range and range rate data are always available to NAV as long as their respective “data goods” are present. RR range and range rate data and S TRK, RR, or COAS angle data are used to update the state if the respective data pass a residual edit test in NAV. Data from the RR and S TRK are automatically requested by NAV for processing. COAS marks are executed manually by the crew centering the target in the COAS FOV and pressing the “ADI REF” pushbutton. When the COAS is selected for input to NAV, the computation of a new ADI reference is inhibited.
- (6) The residuals formed in NAV by subtracting the NAV estimate of the measurement from the observed measurement are displayed for RR range and range rate and S TRK, RR, or are COAS angle parameters for the instrument selected.

- (7) The residual ratio is computed by the on-orbit rendezvous navigation software and is displayed and used for editing bad data. The edit test for the processing of measurement data is computed in two ways depending upon the status of the force control on the REL NAV display. The nominal residual edit test is applied when the force control is "OFF". The edit test criterion is relaxed when the force control is "ON". Data passing the residual edit test are used to update the state vector and covariance matrix. If the data fails the residual edit test, the residual and ratio data will be displayed but the data will not be used in the update process. Residual and ratio data are blanked anytime RNDZ NAV is inhibited.
- (8) Two parameters, SV Update POS and VEL, display the magnitude of the change to the filtered data Vector Position (POS) and Velocity (VEL) mode by the Rendezvous Nav filter in the last computation cycle.
- (9) ACPT/REJ mark history data are also displayed. These data reflect the number of NAV marks that have been accepted or rejected for a data type by the NAV filter.

A status indicator on the rejected data is driven as a down arrow(↓) when an "I-loaded number of sequential marks are rejected and removed when the mark is forced and accepted or an "I-loaded" number of sequential acceptable marks occur. The ACPT/REJ counters are reset to zero when a Target or Orbiter State Vector is changed by uplink or by the crew; a Target to Orbiter, Orbiter to Target or PROP TO FLTR state vector transfer is performed; rendezvous navigation is enabled; a covariance matrix reinitialization is performed; or after a delta velocity burn. The ACPT/REJ counters for angle data are also reset to zero whenever the input data source is changed (e.g., COAS marks are selected in place of S TRK marks). The ACPT/REJ counters are blanked when RNDZ navigation is inhibited.

- (10) There are three crew controls each for range, range rate, and angle data which provide auto (AUT), inhibit (INH), and force (FOR) capability. These controls are implemented as items 17 through 25. When a crew selection is made, an asterisk(*) is driven after the selected item number. The appearance or removal of an asterisk(*) will have a time delay depending on the NAV processing rate. The "AUT", "INH", and "FOR" functions are mutually exclusive for any one parameter set (i.e., angle, RNG, R DOT); consequently, an asterisk(*) may never be tagged to more than one of these three items simultaneously. When the display is initially called, the "INH" item numbers will be automatically selected. The "INH" function causes data to be presented to the filter for processing in order to generate residual and ratio data for display, but it shall not be used to update the state vector nor shall the reject counter be incremented. The "AUT" function allows for automatic processing of data in the NAV filter. The "FOR" function will relax the edit test criterion based upon the value of the residual ratio from the last data point. Data will be processed if the current residual passes the new edit test criteria. The "FOR" function, when executed, stays in effect only for the next data point. Then control reverts to the previously executed function (either "AUT" or "INH"). The asterisk(*) will be driven in the "FOR" column for only one NAV processing cycle. If rendezvous navigation is not enabled, execution of items 17 through 25 will be illegal.
- (11) The FLTR UPDATE Item Entry (Item 15) allows the crew to change which vehicle state is to be filtered. The FLTR UPDATE Item Entry is a toggle that switches from either the orbiter state to be filtered, or the target filter state to be filtered. The FLTR UPDATE Item Entry (Item 15) shall only be valid if rendezvous navigation (Item 1) is OFF; if an Item 15 is requested while rendezvous navigation (Item 1) is enabled, then an "ILLEGAL ENTRY" message shall be generated. The "XXX" field by Item 15 shall be either "ORB"

(SHUTTLE_FILTER_FLAG = ON) or “TGT” (SHUTTLE_FILTER_FLAG = OFF). FLTR UPDATE is initialized to the pre-mission defined I-Load value upon entry to OPS 2, and shall be restored to the pre-mission defined I-Load value whenever the GN&C OPS 2 overlay occurs.

- (12) Item 5 provides the capability to initiate and terminate powered flight navigation (AVG G) in MM 201. This item control is legal only in MM 201. An asterisk(*) will be driven after the item number when powered flight navigation is enabled. The display will be initialized with powered flight navigation ON (asterisk(*)) each time MM 201 is entered. In Major Mode 202, powered flight navigation will be enabled and an asterisk(*) will be displayed after item 5 whenever the display is called. The appearance or removal of the asterisk(*) will have a time delay depending on ORB/RND NAV processing rate.
- (13) The following controls are provided to manage the on-orbit/rendezvous navigation function which are as follows:
- Item 1 provides the control for enabling and disabling all the principal functions required to support rendezvous navigation. When rendezvous navigation is enabled, an asterisk(*) will be driven next to the item number. When the item number is re-executed the asterisk (*) will be removed, rendezvous navigation support software will be disabled, and orbit navigation will be enabled. When the display is first called, rendezvous navigation will be disabled. The appearance or removal of this asterisk(*) will have a time delay depending on the ORB/RND NAV SEQ processing rate.
- (14) Four item controls are provided for the transfer of State Vectors. Item 8 transfers and overwrites the filtered state vector into the Propagated State Vector Slots, and, item 9 transfers and overwrites the Propagated State Vector into the filtered State Vector Slots. The filtered State Vector is a State Vector that incorporates RNDZ NAV filter data derived from Rendezvous Radar, Star Tracker or COAS measurements. The Propagated State Vector is a separate State Vector which is not updated by RNDZ NAV filter inputs. The filtered and Propagated State Vectors will be either the Orbiter or Target State Vector depending on the value of a mission dependent I-Load.
- Item 10 transfers and overwrites the Orbiter State Vector into the Target State Vector Slots and item 11 transfers and overwrites the Target State Vector into the Orbiter State Vector Slots. For these two transfers, only the filtered State Vector will be involved. Whenever any of the four transfer items is executed, an asterisk (*) will be displayed next to the appropriate item number while the selected transfer is in progress. The appearance and removal of the asterisk (*) will have a time delay depending on the NAV processing rate; the asterisk (*) being displayed for only one NAV cycle. Items 8, 9, 10 and 11 are mutually exclusive, execution of any of these items while a transfer is in progress will be illegal. In addition, items 8, 9, and 11 are legal only while rendezvous navigation is enabled (asterisk (*) displayed by the item 1). Two parameters, FLTR MINUS PROP POS and VEL, indicate the difference between the propagated and filtered State Vectors. Once the NAV filter has converged, these parameters can be used to determine when to update the Propagated State with the filtered state.
- (15) Item 16 (COVAR REINIT) provides the control for reinitialization of the covariance matrix. An asterisk(*) will be driven next to this item number while the covariance matrix is being reinitialized. The appearance or removal of this asterisk will have a time delay depending on the NAV processing rate. The asterisk(*) will be displayed for one NAV cycle. This capability is required in addition to the reinitialization which occurs whenever rendezvous navigation is enabled. If rendezvous navigation is not enabled, execution of this item will be illegal.

- (16) Item 3 provides the control to enable/inhibit navigation from incorporating measurements while in MM202. Upon return to MM201, this item is set to inhibit. If the measurement enable item is executed in MM201, an operator error shall be generated. When the display is first called, this item will be initialized inhibited. An asterisk(*) shall be driven next to this item number whenever navigation measurement incorporation is enabled in MM202. The appearance or removal of this asterisk(*) will have a time delay depending on the NAV processing rate. If rendezvous navigation is not enabled in MM202, execution of this item will be illegal.
- (17) Item 2 provides the control to enable/inhibit GNC Angle Pointing data ICC between GNC and SM Major Functions. When the display is first called, upon all legal transitions to OPS 2, and upon OPS 2 Mode Recalls, the GNC Angle Pointing data ICC is inhibited. The ICC data will also be inhibited upon any transition to OPS 8. An asterisk(*) shall be displayed after the item number whenever GNC Angle Pointing data ICC is enabled. If rendezvous navigation is not enabled, execution of this item will be illegal.

All item entry controls not supported in any software release shall be illegal and if executed shall result in an "ILLEGAL ENTRY" CRT message.

- (18) The following Global Positioning System data is shown below the residual and ratio data for RR range, RR range rate, and S TRK, RR, or COAS angle parameters to provide an optimum crew interface with GPS relative to GPS performance during rendezvous:
- GPS position residual, the magnitude of the difference between the orbiter position vector (R_FILT) and the selected GPS position vector, in kilofeet.
 - GPS position ratio, the ratio of the position residual to a maximum allowable residual.
 - GPS velocity residual, the magnitude of the difference between the orbiter velocity vector (V_FILT) and the selected GPS velocity vector, in feet/second.
 - GPS velocity ratio, the ratio of the velocity residual to a maximum allowable residual.

The calculation of UVW position and velocity residuals shall be in an inertial coordinate system for GNC OPS 2.

The GPS state residual, ratio, alpha character indicator, and ratio status indicator fields are blank if no selected GPS state is available, indicated by GPS_SV_SEL_AVAIL = OFF. If the GPS receiver state processing principal function determines that no GPS state has passed the residual edit test (indicated by NUM_GPS_SEL = 0) on the latest navigation cycle, the residual and ratio data fields shall display the RATIO and RESID, for the selected GPS state from the previous state which has been propagated to the current time in the GPS receiver state processing principal function. The "P" and "V" alpha character to the left of the RESID data field for this case will be displayed double overbright.

For nominal operation, that is, good data from the installed receivers and no residual edit test override, the parameter status indicator field after the ratio data will be blank. A down arrow, "↓", will be displayed if the residual edit test has failed, that is, the displayed residual ratio is greater than 1. An up arrow, "↑", will be displayed to indicate the crew has overridden the software quality assessments and at least one receiver's state is a candidate for the GPS state vector selection filter.

(19) The following Global Positioning System data and control Item Entries are shown in the upper right hand of the REL NAV display to provide an optimum crew interface with GPS relative to GPS status during rendezvous:

– STAT

A GPS receiver status field is displayed in the upper right hand of the REL NAV display for each receiver. Possible status indications are described in the following table, and are shown in the order of precedence. In addition, if a receiver processor failure occurs, a CLASS 3 alarm will be annunciated by GAX. “RPF” and “M” will be displayed double overbright. All characters are displayed right justified.

Display	Message Description
NI	Receiver is not installed
M	Communication fault
BIT	Receiver Built-In-Test in progress
RPF	Receiver processor failure
BATT	GPS battery low
DGF	GPS data good failure
(blank)	Nominal operation - No GPS related anomaly

– Available/Selected GPS Receiver States

A parameter status field for each of the three receivers shall be displayed which will provide information on:

- Receiver state eligible for selection and actually selected (“*”). See the following paragraph for a summary of when a receiver state is eligible for selection.
- Receiver state eligible for selection, but not actually selected (“/”). This condition only exists when three receiver states are eligible for the selection filter.
- Receiver state not eligible for selection due to a QA 4 dilemma (“?”). This condition applies when the QA 4 dilemma is set and will override a down arrow due to all other conditions.
- Receiver state not eligible for selection, and no QA 4 dilemma (“↓”) exists.
- Data is missing for a GPS receiver (“M”), reflecting the commfault.

A receiver state is eligible for selection if all of the following are true:

- the receiver data is valid (data good is on),
- the receiver has not been deselected by the crew,
- the receiver has not failed the QA 4 dilemma,

- and, one or more of the following are true:
 - the receiver has passed quality assessment checks (QA 1, QA 3, and QA 4),
 - the quality assessment check is overridden (QA 1, QA 3, and QA 4 checks are overridden by Item Entries 29, 30 and 31 (for GPS receivers 1, 2 and 3 respectively) on the GPS STATUS Display (see Section 4.2.36 of STS 83-0020V1, note 12)),
 - or, the GPS to G&C command is in “FORCE” (Item Entry 34 on the GPS STATUS Display (see Section 4.2.36 of STS 83-0020V1, note 18).
- Figure of Merit Derived Position Error

The one sigma position error (in feet) based on the receiver Figure of Merit (FOM) and labeled as ‘P 1 σ ’ is presented for each installed GPS receiver. The applications software will provide an integer from 0 to 9 which shall be converted to display a one sigma standard position error in feet as indicated below:

FOM Integer	Position error (P), one sigma (1 σ) to be displayed (feet)
0	(blank)
1	75
2	175
3	250
4	325
5	650
6	1650
7	3275
8	16400
9	99999

The output position error derived from FOM is blanked if the FOM integer value is 0 (0 is an initialization value, not provided by hardware input).

These one sigma position errors were approximated by converting the maximum estimated error from meters to feet and then rounding to the closest multiple of 25 feet.

The one sigma position error will be blank when GPS data is determined by the GPS_RCVR State Proc to be invalid.

– Deselected Receiver

Item Entries 31, 32, and 33 provide the capability for each GPS receiver to be deselected or reselected (toggle) for use by the GPS selection filter. Deselection is indicated by an asterisk “*” adjacent to the DES item number. A blank next to a DES item number indicates that the associated receiver has not been deselected (either initial value or reselection). The asterisk settings for these items are driven by the GPS RCVR STATE PROC (4.21).

If a GPS receiver is not installed ($\text{GPS_INSTALLED(I)} = 0$ for the specific receiver), then execution of the associated Item Entry shall result in an “ILLEGAL ENTRY” message being generated.

GPS receivers can also be deselected or reselected from GPS STATUS DISP (6.51) in GN&C OPS 2, 3, and 8, and in Major Modes 602 and 603. GPS receivers can also be deselected or reselected from HORIZ SIT DISP (6.21) in GN&C OPS 3, and Major Modes 602 and 603. Deselection or reselection will carryover OPS transitions in the GNC Major Function base.

(20) GPS to Navigation Controls

Items 42, 43, and 44 set the GPS to Navigation Auto/Inhibit command and the GPS to Navigation Force command. Executing Item 42 (GPS to Navigation Auto/Inhibit command is set to “AUTO”) allows the navigation filter state to be automatically reset/updated with the selected GPS state (when available) every I-Load specified time interval while in GN&C Major Mode 201 (automatic “AUTO” reset/update of the navigation filter state is not permitted in Major Mode 202). Executing Item 43 (GPS to Navigation Auto/Inhibit command is set to “INHIBIT”) inhibits the resetting of the navigation filter state with the selected GPS state. Items 42 and 43 are mutually exclusive.

Executing Item 44 (GPS to Navigation Force command is set to “FORCE”) forces the navigation filter state to be automatically reset/updated with the selected GPS state (when available) on the navigation cycle, the “FORCE” command taking precedence over the setting of the GPS to Navigation Auto/Inhibit command on that cycle. Navigation Force command to “FORCE” is permitted in both Major Mode 201 and 202. While the FORCE command is being executed, the setting of the GPS to Navigation Auto/Inhibit command remains as set by the crew. The “FORCE” command is removed by navigation after the navigation reset is executed, so that the setting of the GPS to Navigation Auto/Inhibit command again controls the resetting of the navigation state with the selected GPS state on subsequent navigation cycles. Note that the “FORCE” is a one-time force.

In GNC Major Mode 202, if GPS_TO_NAV_AI is in “AUTO” and GPS_TO_NAV_FORCE is “OFF” then no GPS state will be incorporated into Navigation and the application software shall command a down arrow, “↓”, in the parameter status indicator field immediately to the right of Item Entry 42. At all times, the parameter status indicator shall be blank. The GPS state will be incorporated into Navigation in GNC Major Mode 202 if the GPS_TO_NAV_FORCE is commanded to “FORCE”.

If rendezvous navigation (Item1) is enabled, and the GPS to Navigation Auto/Inhibit command is set to “AUTO” or the GPS to Navigation Force command is set to “FORCE”, then a GPS Resynch will occur. The purpose of the GPS Resynch is to reset the orbiter navigation system inertial state estimate to the selected GPS orbiter state estimate, to maintain the orbiter to target M50 inertial relative state conditions and to adjust the relative navigation covariance matrix state error statistics. See Section 4.2.10.2 GPS Resynch of STS 83-0006 for additional information on GPS Resynch.

An asterisk, “*”, next to the item number represents the selected setting. Note that only one setting will be indicated on a given navigation cycle. The indication is FORCE if the GPS to Navigation Force Command was selected. If the GPS to Navigation Force Command was not

selected, the indication is either AUTO or INHIBIT, depending on the selection of the GPS to Navigation Auto/Inhibit Command.

The initial setting of the GPS to Navigation Auto/Inhibit command is “INHIBIT”. It will also be set to “INHIBIT” at OPS transitions. The initial setting of the GPS to Navigation Force command is “OFF” and it will be set to “OFF” at OPS transitions.

The GPS to navigation commands can also be set on SPEC 55 (Section 4.2.36), with the setting there also shown on the REL NAV display in GN&C OPS 2.

In addition, these Item Entries will be allowed or not allowed in a given Operational Sequence depending on the value of the GPS_LOCKOUT I-Load parameter. If the value of GPS_LOCKOUT is 0 or 1, execution of Items 42, 43, and 44 will not be permitted in GN&C OPS 2 and an “ILLEGAL ENTRY” message will be generated. If the value of GPS_LOCKOUT is 2 or 3, execution of Items 42, 43, and 44 will be permitted in GN&C OPS 2.

The following is a summary of Item Entries that shall result in an “ILLEGAL ENTRY” message being generated depending on how many GPS Receivers are installed:

Number of GPS Receivers Installed	GPS_INSTALLED	Item Entries Give “ILLEGAL ENTRY”
0	0, 0, 0	31, 32, 33
1	0, 1, 0	31, 33
3	1, 1, 1	None

- (21) Implied Item Numbers. Item numbers 6, 7, 26 through 30, and 34 through 41 are implied and are not legal for use on the PFS “REL NAV” display. If any of the item numbers are executed, an operator error shall result, the input rejected, and the “ILLEGAL ENTRY” CRT message shall be displayed

4.2.23.2 Relative Navigation (PFS) Keyboard Processing Addendum

- A. Average G On/Off Command Destinations for this signal are the ORB/REND NAV (4.126), REL NAV SPEC (5.24) and ORB UPP (4.22).
- B. KU ANT ENA/INH Command The KU Antenna Enable command is defined by one signal (V93X6859X) which has two states:

- 0 – KU ANT INH
- 1 – KU ANT ENA

Note: KU_SEL (V93X6859X) must be initialized to inhibit upon all legal transitions to OPS 2 and re-initialized to inhibit whenever an OPS 2 Mode Recall occurs. KU_SEL must also be set to inhibit whenever a transition to OPS 8 occurs.

This signal is sent to the following destinations: CRT, UNIV POINT PROC (4.213) and GNC/SM-PL IF (4.111).

- C. RNDZ NAV ENA COMMAND If Item 1 is executed to disable RENDEZVOUS NAV ENABLE CMD, the KU Antenna Enable Command (V93X6859X) is set to zero (inhibit).

Otherwise, if item 1 is executed to enable RENDEZVOUS NAV ENABLE CMD, a check is made to determine if the time tag of the UPP state (T_RESET) has reached the target age limit minus 15 seconds, (the K-Load MAX_TIME_TOL-15.0). If it is determined that this is the case, Item 1 is rejected and an "ILLEGAL ENTRY" warning message is generated.

If (ABS (T_RESET – T_TV) > (MAX_TIME_TOL – 15.0)) then

- (i) Reject the "Item 1" entry
- (ii) Generate an "ILLEGAL ENTRY" message

Destinations for this signal are ORB/RNDZ NAV SEQ (4.148), MSC and TLM.

- D. RESTRICTIONS IMPOSED BY RENDZ NAV ACTIVE FLAG RENDZ NAV ACTIVE FLAG (V90X4765X) places restrictions on the use of most other item entries on the display. If RENDZ NAV ACTIVE FLAG is OFF, the following item entries are rejected, accompanied by an "ILLEGAL ENTRY" warning message:

- Items 2, 3, and 4
- Items 8, 9, and 11
- Items 12 through 14
- Items 16 through 25

- E. DELETED
- F. RR RNG EDIT OVRD Selection The RR RANGE EDIT OVRD AUT/INH/FOR selection is defined by one signal (V93J6241C) with three states:

- 0 – EDIT OVRD RNG AUTO SELECTED
- 1 – EDIT OVRD RNG INH SELECTED
- 2 – EDIT OVRD RNG FOR SELECTED

- G. RR RNG RATE EDIT OVRD Selection The RR RANGE RATE EDIT OVRD AUTO/INH/FOR selection is defined by one signal (V93J6247C) with three states:
- 0 – EDIT OVRD R DOT AUTO SELECTED
 - 1 – EDIT OVRD R DOT INH SELECTED
 - 2 – EDIT OVRD R DOT FOR SELECTED
- H. V/EL/Y EDIT OVRD Selection The V/EL/Y EDIT OVRD AUT/INH/FOR selection is defined by one signal (V93J6237C) with three states:
- 0 – EDIT OVRD V/EL/Y AUTO SELECTED
 - 1 – EDIT OVRD V/EL/Y INH SELECTED
 - 2 – EDIT OVRD V/EL/Y FOR SELECTED
- I. ST TRK, RR, COAS Angle Selection The ANGLE SELECTION–ST TRK/RR/COAS Command (DO_ST_RR_COAS) is defined by one signal (V93J6236C) with three states:
- 1 – STAR TRACKER ANGLES SELECTED
 - 2 – RENDEZVOUS RADAR ANGLES SELECTED
 - 3 – COAS ANGLES SELECTED
- J. Filter Update. Item Entry 15 shall be legal only if RENDZ NAV ACTIVE FLAG (V90X4765X) is OFF. Execution of Item Entry 15 while RENDZ NAV ACTIVE FLAG is ON shall be illegal and will result in an “ILLEGAL ENTRY” message being generated and the input rejected. Destinations for this parameter are ONORB/REND NAV (4.126), ORB/RENDZ NAV SEQ (4.148), CRT (6.11) and TLM.
- K. GPS Installed. If GPS_INSTALLED(1) = OFF, then execution of Item Entry 31 shall be illegal and shall result in an “ILLEGAL ENTRY” message being generated. If GPS_INSTALLED(2) = OFF, then execution of Item Entry 32 shall be illegal and result in an “ILLEGAL ENTRY” message being generated. If GPS_INSTALLED(3) = OFF, then execution of Item Entry 33 shall be illegal and shall result in an “ILLEGAL ENTRY” message being generated.
- L. GPS to Navigation Auto/Inhibit/Force Commands. The GPS to Navigation Auto/Inhibit/Force commands consist of two signals: the GPS to Navigation Auto/Inhibit command, V93X1202X and the GPS to Navigation Force command, V93X1201X. Destination for these signals from the REL NAV display is ONORB/RNDZ NAV (4.126). Note that the GPS to Navigation Force command (V93X1201X) may be active (that is set to “FORCE”) independent of the state of the GPS to Navigation Auto/Inhibit command. The “FORCE” state of the GPS to Navigation Force command is reset to the inactive state after one NAV cycle.

The states for the GPS to Navigation Auto/Inhibit command (GPS_TO_NAV_AI) are as follows (the default setting shall be INHIBIT):

Signal/State	Function Desired
V93X1202X/OFF	AUT (Auto Selected)
V93X1202X/ON	INH (Inhibit Selected)

The states for the GPS to Navigation Force command (GPS_TO_NAV_FORCE) are as follows (the default setting shall be Force deselected):

Signal/State	Function Desired
V93X1201X/OFF	Force Deselected
V93X1201X/ON	FOR (Force Selected)

- M. GPS Installed. If no GPS receivers are installed on the vehicle, indicated by GPS_INSTALLED = (0, 0, 0), execution of Item Entries 42, 43 and 44 shall be illegal and will result in an “ILLEGAL ENTRY” message being generated.
- N. GPS Lockout. The following Tables describe the values and use of GPS_LOCKOUT and what Item Entries are permitted on the Relative Navigation Display for different I-Load values.

GPS_LOCKOUT DESCRIPTION AND USE:

GPS_LOCKOUT VALUE	DESCRIPTION
0	<ul style="list-style-type: none"> • NO GPS receivers installed
1	<ul style="list-style-type: none"> • GPS receivers installed • Capability to use selected GPS state in the onboard system locked out
2	<ul style="list-style-type: none"> • GPS receivers installed • Use of selected GPS state in the onboard system allowed in OPS 2 and OPS 8
≥ 3	<ul style="list-style-type: none"> • GPS receivers installed • Use of selected GPS state in the onboard system allowed in OPS 2, OPS 8, OPS 3, Major Mode 602, and Major Mode 603

LEGALITY OF REL NAV DISPLAY ITEM ENTRIES
WITH DEPENDENCY ON GPS_LOCKOUT

• GPS LOCKOUT VALUE	0	1	2	≥ 3
• GPS_TO_NAV_AI (Items 42, 43) and GPS_TO_NAV_FORCE (Item 44) Legality	I	I	2	2

- “I” indicates Item Entry results in an “ILLEGAL ENTRY” message being generated.
- A number indicates the OPS or Major Mode in which the Item Entry is available (NOT Illegal)

4.2.23.3 Relative Navigation (PFS) CRT Display Processing Addendum

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word “STAT” being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT display processing Table 4.2.23–2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the “M” PSI is displayed (for Commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)
Blank (default)	↓ M ∅
1	↓ ↑ M ∅
2	↑ M ∅
3	↓ ∅
4	↑ ∅
5	↓ ? ∅
6	↓ ↑ ∅
7	M ∅
8	↓ ? M ∅
9	? M ∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.2.23–2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. Nodal Crossing Time. Nodal crossing time in seconds is converted into hours, minutes, and seconds, and displayed as XX:XX:XX.

- B. Radar Mode Status. The radar mode status character string to be displayed is defined by one signal (V95J4303C) with seven states:

STATE	CHAR STRING DISPLAYED	(MODE INDICATED)
0	COMM	(Communications mode)
1	ATRK	(Automatic tracking radar mode)
2	GDSG	(General purpose computer designation radar mode)
3	GPC	(General purpose computer radar mode)
4	MSLW	(Manual slew radar mode)
5	STST	(Self-test in progress)
6	(blank)	(Initialization)

- C. RNDZ ANGLE SENSOR Data Source Selection Indicator. The rendezvous angle sensor data source selection indicator asterisk(*) is defined by one signal (V90J1416C) which has the following three states to determine which item number the indicator asterisk(*) is to be displayed after:

STATE	SOURCE SELECTED
0	S TRK IND (*)
1	COAS IND (*)
2	RR IND (*)

- D. S TRK in Target Track Mode STAT. The Star Tracker status indication character string to be displayed is defined by one signal (V95J4909C) with seven states to determine which Tracker, -Y or -Z, is in the Target Track mode:

STATE	CHARACTER STRING DISPLAYED
0	(blank)
3	FALSE TRK
4	OUT FOV
5	HI RATE
6	NO TARGET

- E. S TRK in Target Track Mode BITE Status. The character string “BITE” will be displayed flashing double overbright for whichever Star Tracker, -Y or -Z, is in the Target Track mode.

- F. FILTER Data Display. When the discrete DOING_REND_NAV (V90X4765X) is set (1 state), data from ORB/RENDZ NAV (4.126) are to be displayed in the FILTER section of this display; otherwise (0 state) blank these data fields.
- G. RR RNG EDIT OVRD Selection Indicator. The Rendezvous Radar range edit override auto/inhibit/force selection indicator asterisk(*) is defined by one signal (V90J1362C) which has the following three states to determine which item number the indicator asterisk(*) is to be displayed after:

STATE	EDIT OVRD SELECTED
0	RNG AUT IND (*)
1	RNG INH IND (*)
2	RNG FOR IND (*)

- H. RR RNG RATE EDIT OVRD Selection Indicator. The Rendezvous Radar range rate edit override auto/inhibit/force selection indicator asterisk (*) is defined by one signal (V90J1368C) which has the following three states to determine which item number the indicator asterisk (*) is to be displayed after:

STATE	EDIT OVRD SELECTED
0	RNG DOT AUT IND (*)
1	RNG DOT INH IND (*)
2	RNG DOT FOR IND (*)

- I. V/EL/Y EDIT OVRD Selection Indicator. The Rendezvous Angle sensor data (V/EL/Y) edit override auto/inhibit/force selection indicator asterisk (*) is defined by one signal (V90J1361C) which has the following three states to determine which item number the indicator asterisk(*) is to be displayed after:

STATE	EDIT OVRD SELECTED
0	V/EL/Y AUT IND (*)
1	V/EL/Y INH IND (*)
2	V/EL/Y FOR IND (*)

- J. RR RANGE. The Rendezvous Radar range data (V95H4287C) in feet shall be multiplied by a scale factor of “0.001” to convert and display the range in Kft.
- K. MEAS ENA. The sources for this signal (V90X1417X) are ORB/REND NAV (4.126) and ORB/RNDZ NAV SEQ(4.148).
- L. PTG VECTOR ELEV ANGLE CONVERSION. The ANGLE ‘θ’ DATA provided in radians from Rel Nav Spec (5.24), shall be converted by UI into degrees and displayed as XXX.XX.

- M. COAS OFFSETS (X & Y). The COAS offsets (X & Y) are blanked whenever the -Z ST Target track indicator (V95X4914X) is 0.
- N. GPS Receiver Status. The receiver status signal is set by the GPS SOP in response to GPS to GPC input data. The following table describes the receiver status conditions displayed for each GPS receiver. All character strings are displayed right justified.

GPS LRU 1 Receiver Status:

Signal/State	Display	Message Description
V94J0932C/0	NI	Receiver Not Installed
V94J0932C/1	M	LRU Communications Fault
V94J0932C/2	BIT	Receiver Built-In-Test in progress
V94J0932C/3	RPF	Receiver processor failure
V94J0932C/4	BATT	Low receiver Battery indication
V94J0932C/5	DGF	Data Good has Failed (Receiver DG is off)
V94J0932C/6	(blank)	No receiver anomaly

GPS LRU 2 Receiver Status:

Signal/State	Display	Message Description
V94J0933C/0	NI	Receiver Not Installed
V94J0933C/1	M	LRU Communications Fault
V94J0933C/2	BIT	Receiver Built-In-Test in progress
V94J0933C/3	RPF	Receiver processor failure
V94J0933C/4	BATT	Low receiver Battery indication
V94J0933C/5	DGF	Data Good has Failed (Receiver DG is off)
V94J0933C/6	(blank)	No receiver anomaly

GPS LRU 3 Receiver Status:

Signal/State	Display	Message Description
V94J0934C/0	NI	Receiver Not Installed
V94J0934C/1	M	LRU Communications Fault
V94J0934C/2	BIT	Receiver Built-In-Test in progress
V94J0934C/3	RPF	Receiver processor failure
V94J0934C/4	BATT	Low receiver Battery indication
V94J0934C/5	DGF	Data Good has Failed (Receiver DG is off)
V94J0934C/6	(blank)	No receiver anomaly

The “RPF” and “M” shall be displayed double overbright. The “RPF” condition will result in a CLASS 3 alarm annunciated by GAX.

- O. Figure of Merit Position Error. The applications software will provide an integer which shall be converted to display a one sigma standard error in feet as indicated below:

FOM Integer	Position error (P), one sigma (1σ) to be displayed (feet)
0	(blank)
1	75
2	175
3	250
4	325
5	650
6	1650
7	3275
8	16400
9	99999

The output position error derived from FOM shall be blanked if the FOM integer value is 0 (0 is an initialization value, not provided by hardware input).

- P. GPS Data Blanking. The selected GPS state residual, ratio, alpha character indicators, and ratio parameter status indicator fields shall be blanked if no selected GPS state is available as indicated by GPS_SV_SEL_AVAIL = OFF.

- Q. Summary of GPS Receiver Status. Information shall be displayed to the crew indicating which GPS receivers are selected, candidates for selection, determined to fail the QA 4 dilemma, or currently commfaulted. Information is provided by two inputs per GPS receiver, SEL_RCVR (MSID's V94X1037X, V94X1038X or V94X1039X) and GPS_DISP_FAIL_DIL (MSID's V94J6090C, V94J6091C or V94J6092C).

If SEL_RCVR is on for the I th GPS receiver, then an asterisk, "*" is displayed.

If SEL_RCVR is off for the I th GPS receiver, then the parameter status indicator GPS_DISP_FAIL_DIL shall be displayed showing either a blank, "↓", "?", or "M".

- R. GPS Position and Velocity Labels Intensity. If the residual ratio being displayed is that of the selected state from a previous navigation cycle propagated to current navigation time, because no GPS state was selected on the current navigation cycle, indicated by NUM_GPS_SEL = 0, then the alpha character will be displayed double overbright. The character displayed on line 23 is a "P" (character 50) and on line 24 (character 56) is a "V".
- S. GPS to Navigation A/I/F Display Flag. The GPS to Navigation A/I/F display flag is defined by one signal, the GPS TO NAVIGATION AUTO/INHIBIT/FORCE signal, V90J3463C, which has three states as shown below for determining where the indicators shall be driven. Source for this signal is ORB/RND NAV (4.126).

The states for the GPS Navigation Auto/Inhibit/Force signal are defined as follows:

Signal/State	Indicator to be Driven After
V90J3463C/0	AUT (Auto Selected)
V90J3463C/1	INH (Inhibited Selected)
V90J3463C/2	FOR (Force Selected)

- T. If GPS_INSTALLED(1) = OFF, this field shall be blanked.
- U. If GPS_INSTALLED(2) = OFF, this field shall be blanked.
- V. If GPS_INSTALLED(3) = OFF, this field shall be blanked.
- W. CREW DES RCVR RCVD In GNC Major Function Base. The copy of crew deselect receiver command from GPS RCVR STATE PROC (4.21) is carried across OPS transitions to insure display information is always correct
- X. This field shall be blanked if GPS_DG_SF(1) (V94X0986X) equals OFF.
- Y. This field shall be blanked if GPS_DG_SF(2) (V94X0987X) equals OFF.
- Z. This field shall be blanked if GPS_DG_SF(3) (V94X0988X) equals OFF.

4.2.23.4 Relative Navigation Figure/Table References

Figure 4.2.23-1	Relative Navigation Display (PFS)
Table 4.2.23-1	Keyboard Processing Table
Table 4.2.23-2	CRT Display Processing Table
Table 4.2.23-3	CRT Display Processing Background Requirements N/A
Table 4.2.23-4	Mission Design Background Constants N/A
Table 4.2.23-5	Input Functional Parameters
Table 4.2.23-6	Output Functional Parameters
Table 4.2.23-7	I-Loads
Table 4.2.23-8	K-Loads
Table 4.2.23-9	Constants

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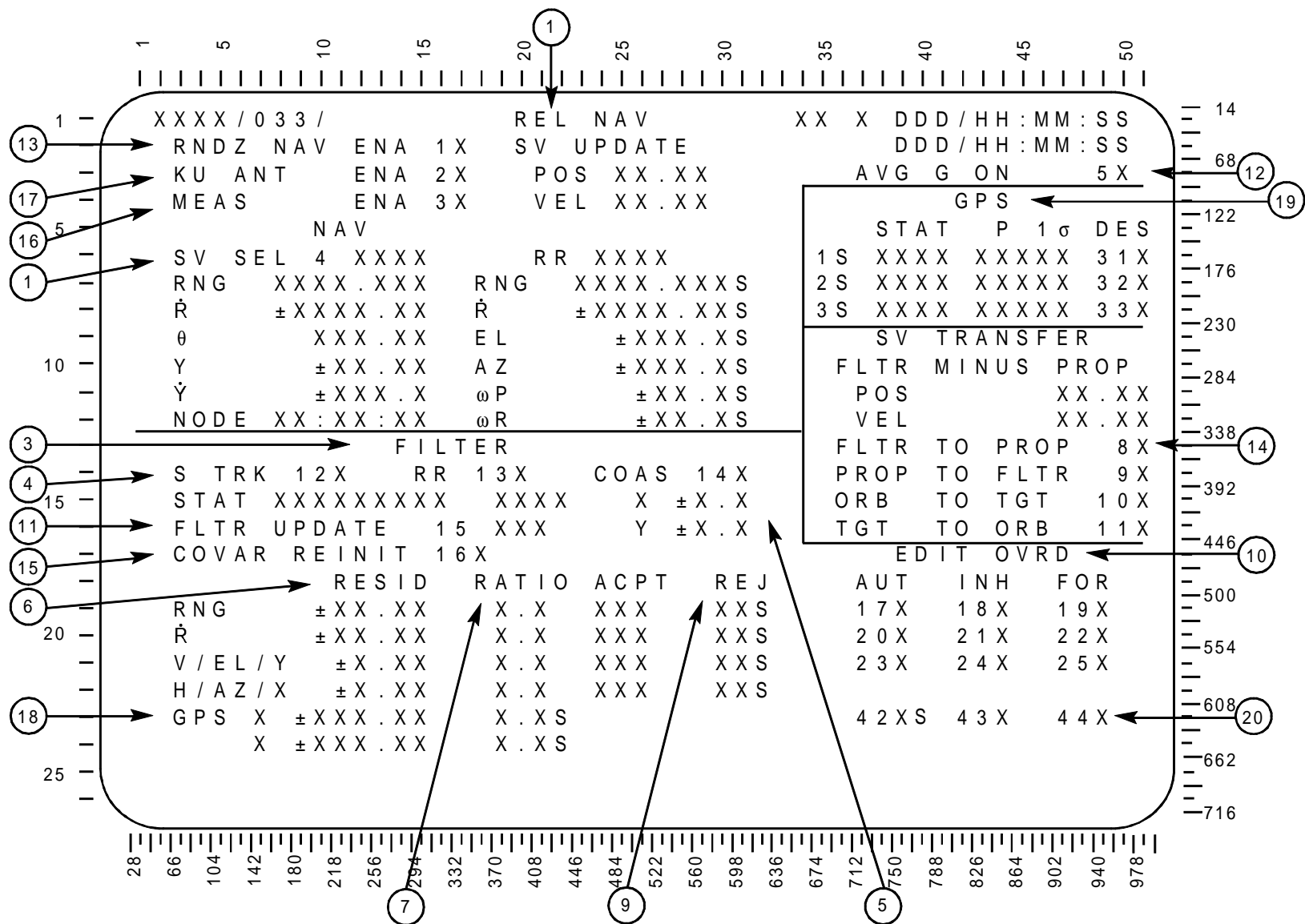


FIGURE 4.2.23-1. Relative Navigation Display (PFS)

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Table 4.2.23-1. RELATIVE NAVIGATION (PFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
001	RNDZ NAV ENA 1	V93X6220X	0.0	CTRL			1			C	ORB/REND NAV SEQ	RENDEZVOUS NAV ENABLE CMD	X
002	KU ANT ENA 2	V93X6859X	0.0	CTRL			2			B, D	G/SM IF, CRT	GNC ANGLE POINTING ENA/INH	X
003	MEAS ENA 3	V93X6232X	0.0	CTRL			3			D	ORB/REND NAV	NAV MEASUREMENT ENA CMD	X
004	SV SEL 4	V90X4989X	0.0	CTRL			4			D	ORB/REND NAV	USER STATE SEL FLAG	X
005	AVG G ON 5	V93X5408X	0.0	CTRL			5			A	ORB/REND NAV	PWR FLT NAV AVG G ON/OFF CMD	X
006	FLTR TO PROP 8	V90X4987X	0.0	CTRL			8			D	ORB/REND NAV	FLTRD TO PROP STATE X-FER FLAG	X
007	PROP TO FLTR 9	V90X4988X	0.0	CTRL			9			D	ORB/REND NAV	PROP TO FLTRD STATE X-FER FLAG	X
008	ORB TO TGT 10	V93X6215X	0.0	CTRL			10				ORB/REND NAV	STATE VCTR XFR ORB TO TGT	X
009	TGT TO ORB 11	V93X6216X	0.0	CTRL			11			D	ORB/REND NAV	STATE VCTR XFR TGT TO ORB	X
010	S TRK 12	V93J6236C	0.0	CTRL			12			I, D	ORB/REND NAV	ANGLE SELECTION-ST TRK/RR/COAS	
011	RR 13	V93J6236C	0.0	CTRL			13			I, D	ORB/REND NAV	ANGLE SELECTION-ST/TRK/RR/COAS	
012	COAS 14	V93J6236C	0.0	CTRL			14			I, D	ORB/REND NAV	ANGLE SELECTION-ST TRK/RR/COAS	
013	COVAR REINIT 16	V93X6233X	0.0	CTRL			16			D	ORB/REND NAV	COVARIANCE REINIT	X
014	RNG EDIT AUT 17	V93J6241C	0.0	CTRL			17			F, D	ORB/REND NAV	RANGE EDIT OVRD-A/I/F	X
015*	RND EDIT INH 18	V93J6241C	0.0	CTRL			18			F, D	ORB/REND NAV	RANGE EDIT OVRD-A/I/F	X
016*	RNG EDIT FOR 19	V93J6241C	0.0	CTRL			19			F, D	ORB/REND NAV	RANGE EDIT OVRD-A/I/F	X
017	RNG DOT EDIT AUT 20	V93J6247C	0.0	CTRL			20			G, D	ORB/REND NAV	RR RANGE RATE EDIT OVRD-A/I/F	X
018*	RNG DOT EDIT INH 21	V93J6247C	0.0	CTRL			21			G, D	ORB/REND NAV	RR RANGE RATE EDIT OVRD-A/I/F	X
019*	RNG DOT EDIT FOR 22	V93J6247C	0.0	CTRL			22			G, D	ORB/REND NAV	RR RANGE RATE EDIT OVRD-A/I/F	X
020	V/EL/Y EDIT AUT 23	V93J6237C	0.0	CTRL			23			H, D	ORB/REND NAV	V/EL/Y EDIT OVRD-A/I/F	X
021*	V/EL/Y EDIT INH 24	V93J6237C	0.0	CTRL			24			H, D	ORB/REND NAV	V/EL/Y EDIT OVRD-A/I/F	X
022*	V/EL/Y EDIT FOR 25	V93J6237C	0.0	CTRL			25			H, D	ORB/REND NAV	V/EL/Y EDIT OVRD-A/I/F	X
023	FLTR UPDATE 15	V90X4952X	0.0	CTRL			15			J	ORB/REND NAV, ORB/REND NAV SEQ, TLM, CRT	VEHICLE STATE TO BE FILTERED	
024	GPS 1 DES 31	V93X1205X	0.0	CTRL			31			K	4.17, 4.21, 4.110, 6.21, 6.51	DESELECT GPS 1 RCVR CMD	
025	GPS 2 DES 32	V93X1206X	0.0	CTRL			32			K	4.17, 4.21, 4.110, 6.21, 6.51	DESELECT GPS 2 RCVR CMD	
026	GPS 3 DES 33	V93X1207X	0.0	CTRL			33			K	4.17, 4.21, 4.110, 6.21, 6.51	DESELECT GPS 3 RCVR CMD	
027	GPS (TO NAV) AUT 42	V93X1202X	0.0	CTRL			42			L,M,N	ORB/REND NAV	GPS TO NAV AUTO/INHIBIT CMD	
028	GPS (TO NAV) INH 43	V93X1202X	0.0	CTRL			43			L,M,N	ORB/REND NAV	GPS TO NAV AUTO/INHIBIT CMD	
029	GPS (TO NAV) FOR 44	V93X1201X	0.0	CTRL			44			L,M,N	ORB/REND NAV	GPS TO NAV FORCE CMD	

Table 4.2.23-2. RELATIVE NAVIGATION (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B A N K	S I Z E S	I N T E N S I T Y	F L A T N E S S	R A T E	S E N S I T I V E N E S S	L E V E L	B E C A M E R A	D I S T A N C E	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
001	(OPS)	V93X0040X	2	1		5.0															UI	OPS FUNCTION PAGE	X	
002	(SPEC)	V93X0042X	7	1		4.0																UI	SPEC FUNCTION PAGE	X
003	(DISP)	V93X0044X	10	1		4.0																UI	DISPLAY FUNCTION PAGE	X
004	(UL)	V92X5032X	34	1		2.0	UL						X									UI	UPLINK ACTIVITY IND	X
005	(GPC)	V93X0048X	36	1		2.0																UI	GPC DRIVER	X
006	(MT)	V91W1990C	39	1		12.0			DHMS													FCOS	MISSION ELAPSED TIME	X
007	(CRT TIMER)	V91W1987C	39	2		12.0			DHMS													FCOS	DISPLAY CRT TIMER,GNC	X
008	RR XXXX(MODE STAT)	V95J4303C	24	6		4.0													B		RR SOP	R RADAR MODE STATUS WORD	X	
009	NAV RNG	V94H3322C	7	7		9.3			KFT													REL NAV	LOS RANGE CURRENT	X
010	NAV R-DOT	V94H3323C	8	8		8.2			FPS							X						REL NAV	RANGE RATE CURRENT	X
011	NAV THETA	V94U3338C	9	9		7.2			DEG											L		REL NAV	PTG VECTOR ELEV ANGLE	X
012	NAV Y	V94H3326C	10	10		6.2			KFT													REL NAV	OUT-OF-PLANE POS CURRENT	X
013	NAV Y-DOT	V94L3325C	10	11		6.1			FPS													REL NAV	OUT-OF-PLANE VEL CURRENT	X
014	NAV NODE	V94W3336C	8	12		8.0			HMS												A	REL NAV	ORBITER/TARGET NODE TIME(SEC)	X
015	RR RNG	V95H4287C	22	7		9.3			KFT												J	RR SOP	R RADAR RANGE	X
016	RR R-DOT	V95R4288C	23	8		8.2			FPS													RR SOP	R RADAR RANGE RATE	X
017	RR EL	V95H4281C	25	9		6.1			DEG													RR SOP	R RADAR PITCH ANGLE	X
018	RR AZ	V95H4284C	25	10		6.1			DEG													RR SOP	R RADAR ROLL ANGLE	X
019	RR OMEGA P	V95R4282C	26	11		5.1			MRS													RR SOP	R RADAR PITCH RATE	X
020	RR OMEGA R	V95R4285C	26	12		5.1			MRS													RR SOP	R RADAR ROLL RATE	X
021	RR RNG (S)	V95J4298C	31	7		1.0																RR SOP	R RADAR RANGE STATUS WORD	X
022	RR R-DOT (S)	V95J4299C	31	8		1.0																RR SOP	R RADAR RANGE RATE STATUS WORD	X
023*	RR EL (S)	V95J4300C	31	9		1.0																RR SOP	R RADAR ANGLE STATUS WORD	X
024	RR AZ (S)	V95J4300C	31	10		1.0																RR SOP	R RADAR ANGLE STATUS WORD	X
025	RR OMEGA P (S)	V95J4302C	31	11		1.0																RR SOP	R RADAR ANGLE RATE STATUS WORD	X
026*	RR OMEGA R (S)	V95J4302C	31	12		1.0																RR SOP	R RADAR ANGLE RATE STATUS WORD	X
027*	AVG G ON 5	V90X1289X	50	3		1.0	*															O/R NAV SEQ	PWR FLT NAV AVG G ON/OFF IND	X
028	KU ANT ENA 2	V93X6859X	17	3		1.0	*															KYBD	GNC ANGLE POINTING ENA/INH	X
029	ORB TO TGT 10	V90X1413X	51	15		1.0	*															ORB/REND NAV	ORBITER TO TARGET SV IND	X
030	TGT TO ORB 11	V90X1414X	51	16		1.0	*															ORB/REND NAV	TARGET TO ORBITER SV IND	X

Table 4.2.23-2. RELATIVE NAVIGATION (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A Z E S	I N T E N S I T Y	F L A T E N E S S	R A T E	S I G N A L	L E V E L	B A N D W I D T H	D E P T H	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																TYPE
							1	0															
031	COVAR REINIT 16	V90X1415X	18	17		1.0	*													ORB/REND NAV	COVAR MATRIX REINIT IN PROG FLAG	X	
032	RNDZ NAV ENA 1	V90X4765X	17	2		1.0	*													O/R NAV SEQ	RENDZ NAV ACTIVE FLAG	X	
033	MEAS ENA 3	V90X1417X	17	4		1.0	*												K	O/R NAV SEQ	NAV MEASUREMENT ENABLE IND	X	
034	S TRK 12	V90J1416C	11	14		1.0													C	ORB/REND NAV	ST/RR/COAS DATA SEL IND	X	
035*	RR 13	V90J1416C	20	14		1.0													C	ORB/REND NAV	ST/RR/COAS DATA SEL IND	X	
036*	COAS 14	V90J1416C	31	14		1.0													C	ORB/REND NAV	ST/RR/COAS DATA SEL IND	X	
037	STAT (STATUS)	V95J4909C	8	15		9.0													D	STR TRK SOP	ST IN TGT TRK STATUS IND	X	
038	STAT (BITE)	V95X4731X	19	15		4.0	BITE												E	STR TRK SOP	ST IN TGT TRK BITE IND	X	
039	COAS DELTA DEG X	V95H4940C	28	15		4.1			DEG		X								M	STR TRK SOP	VERTICAL OFFSET OF -Z COAS IND	X	
040	COAS DELTA DEG Y	V95H4941C	28	16		4.1			DEG		X								M	STR TRK SOP	HORIZ OFFSET OF -Z COAS IND	X	
041*	RNG RESID	V90H0221C	10	19		6.2			KFT						X				F	ORB/REND NAV	BARO ALT/RR RNG MEAS RESIDUAL	X	
042*	R-DOT RESID	V90A0711C	10	20		6.2			FPS						X				F	ORB/REND NAV	DRAG ALT/RR R DOT MEAS RESIDUAL	X	
043*	V/EL/Y RESID	V90H0214C	11	21		5.2			DEG						X				F	ORB/REND NAV	TAC R/OPTICS V/Y/EL MEAS RESIDUAL	X	
044*	H/AZ/X RESID	V90H0212C	11	22		5.2			DEG						X				F	ORB/REND NAV	TAC AZ/OPTICS H/X/AZ MEAS RESIDUAL	X	
045*	RNG RATIO	V90U0222C	18	19		4.1			DEC										F	ORB/REND NAV	BARO ALT/RR RNG RESID RATIO	X	
046*	R-DOT RATIO	V90U0713C	18	20		4.1			DEC										F	ORB/REND NAV	DRAG ALT/RR R DOT RESID RATIO	X	
047*	V/EL/Y RATIO	V90U0217C	18	21		4.1			DEC										F	ORB/REND NAV	TAC R/OPTICS V/Y/EL RESID RATIO	X	
048*	H/AZ/X RATIO	V90U0216C	18	22		4.1			DEC										F	ORB/REND NAV	TAC AZ/OPTICS H/X/AZ RESID RATIO	X	
049	RNG ACPT	V90J1400C	23	19		4.0			DEC										F	ORB/REND NAV	RR RNG MARKS ACCEPTED	X	
050	R-DOT ACPT	V90J1401C	23	20		4.0			DEC										F	ORB/REND NAV	RR R DOT MARKS ACCEPTED	X	

Table 4.2.23-2. RELATIVE NAVIGATION (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	STAS	BLANK	SIZES	INTELS	FLATS	RATES	SIGNALS	LBA	BANDS	DNL	Add Ref	Source	Nomenclature	CRT		
			X	Y		CHAR	BILEVEL																	TYPE	
							1	0																	
051	V/EL/Y ACPT	V90J1403C	23	21		4.0														F	ORB/REND NAV	V/Y/EL ANGULAR MARKS ACCEPTED	X		
052	H/AZ/X ACPT	V90J1402C	23	22		4.0															F	ORB/REND NAV	H/X/AZ ANGULAR MARKS ACCEPTED	X	
053	RNG REJ	V90J1405C	29	19		3.0															F	ORB/REND NAV	RR RNG MARKS REJECTED	X	
054	R-DOT REJ	V90J1406C	29	20		3.0															F	ORB/REND NAV	RR RDOT MARKS REJECTED	X	
055	V/EL/Y REJ	V90J1408C	29	21		3.0															F	ORB/REND NAV	V/Y/EL ANGULAR MARKS REJECTED	X	
056	H/AZ/X REJ	V90J1407C	29	22		3.0															F	ORB/REND NAV	H/X/AZ ANGULAR MARKS REJECTED	X	
057*	RNG REJ (S)	V90X0223X	32	19		1.0						X									F	3	ORB/REND NAV	BARO ALT/RR RNG EDIT HIST IND	X
058*	R-DOT REJ (S)	V90X0712X	32	20		1.0						X									F	3	ORB/REND NAV	DRAG ALT/RR R DOT EDIT HIST IND	X
059*	V/EL/Y REJ (S)	V90X0215X	32	21		1.0						X									F	3	ORB/REND NAV	TAC R/OPTICS V/Y/EL EDIT HIST IND	X
060*	H/AZ/X REJ (S)	V90X0213X	32	22		1.0						X									F	3	ORB/REND NAV	TAC AZ/OPTICS H/X/AZ EDIT HIST IND	X
061	RNG EDIT AUT 17	V90J1362C	39	19		1.0															G		ORB/REND NAV	RNDZ NAV RR RNGE AUTO/INH/FOR FLAG	X
062*	RNG EDIT INH 18	V90J1362C	44	19		1.0															G		ORB/REND NAV	RNDZ NAV RR RNGE AUTO/INH/FOR FLAG	X
063*	RNG EDIT FOR 19	V90J1362C	49	19		1.0															G		ORB/REND NAV	RNDZ NAV RR RNGE AUTO/INH/FOR FLAG	X
064	R-DOT EDIT AUT 20	V90J1368C	39	20		1.0															H		ORB/REND NAV	RNDZ NAV RANGE RATE A/I/F FLAG	X
065*	R-DOT EDIT INH 21	V90J1368C	44	20		1.0															H		ORB/REND NAV	RNDZ NAV RANGE RATE A/I/F FLAG	X

Table 4.2.23-2. RELATIVE NAVIGATION (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	STAS	BLANK	SIZES	INTELS	FLATS	RATES	SLANGS	BLANKS	D	Add Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL																TYPE
							1	0															
066*	R-DOT EDIT FOR 22	V90J1368C	49	20		1.0													H	ORB/REND NAV	RNDZ NAV RANGE RATE A/I/F FLAG	X	
067	V/EL/Y EDIT AUT 23	V90J1361C	39	21		1.0													I	ORB/REND NAV	RNDZ NAV ANGLE AUT/INH/FOR FLAG	X	
068*	V/EL/Y EDIT INH 24	V90J1361C	44	21		1.0													I	ORB/REND NAV	RNDZ NAV ANGLE AUT/INH/FOR FLAG	X	
069*	V/EL/Y EDIT FOR 25	V90J1361C	49	21		1.0													I	ORB/REND NAV	RNDZ NAV ANGLE AUT/INH/FOR FLAG	X	
070	SV SEL 4	V90X4986X	12	6		4.0	FLTR	PROP												ORB/REND NAV	POS FDBK UPP SOURCE FLAG	X	
071	FLTR TO PROP 8	V90X4984X	51	13		1.0	*													ORB/REND NAV	POS FDBK FLTRD TO PROP FLAG	X	
072	PROP TO FLTR 9	V90X4985X	51	14		1.0	*													ORB/REND NAV	POS FDBK PROP TO FLTRD FLAG	X	
073	SV UPDATE POS	V90H4999C	24	3		6.2			DEC	KFT	X									ORB/REND NAV	RSS FLTR CORRECTION POS	X	
074	SV UPDATE VEL	V90L5000C	24	4		6.2			DEC	FPS	X									ORB/REND NAV	RSS FLTR CORRECTION VEL	X	
075	FLTR MINUS PROP POS	V90H4997C	46	11		6.2			DEC	KFT	X									ORB/REND NAV	RSS FLTR MINUS PROP POS	X	
076	FLTR MINUS PROP VEL	V90L4998C	46	12		6.2			DEC	FPS	X									ORB/REND NAV	RSS FLTR MINUS PROP VEL	X	
077	GPS 1 (S)	V94X1037X	36	6		1.0	*		BLVL		X								Q,T	4.21	GPS 1 SEL		
078	GPS 1 DISPLAY STATUS	V94J6090C	36	6		1.0			STAT		X								Q,T	5.24	GPS 1 DISPLAY STATUS		
079	GPS 1 STAT XXXX	V94J0932C	38	6		4.0			CHAR				A						N	4.17	GPS 1 RCVR STATUS FOR DISPLAY		
080	P 1σ (GPS 1 QA1 FOM)	V94H1082C	42	6		6.0			DEC	FT	X								O,X	4.21	GPS 1 NAV FOM		
081	GPS 1 DES RCVR 31	V94X0964X	51	6		1.0	*		BLVL										W	4.21	DESELECT GPS RCVR 1 FDBK	X	
082	GPS 2 (S)	V94X1038X	36	7		1.0	*		BLVL		X								Q,U	4.21	GPS 2 SEL		
083	GPS 2 DISPLAY STATUS	V94J6091C	36	7		1.0			STAT		X								Q,U	5.24	GPS 2 DISPLAY STATUS		
084	GPS 2 STAT XXXX	V94J0933C	38	7		4.0			CHAR				A						N	4.17	GPS 2 RCVR STATUS FOR DISPLAY		
085	P 1σ (GPS 2 QA1 FOM)	V94H1083C	42	7		6.0			DEC	FT	X								O,Y	4.21	GPS 2 NAV FOM		

Table 4.2.23-2. RELATIVE NAVIGATION (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	S T A T U S	B L A N K	S I Z E	I N T E N S I T Y	F L A T N E S S	R A T E	S I G N A L	L E A N	B A N D	D I S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
086	GPS 2 DES RCVR 32	V94X0965X	51	7		1.0	*													W	4.21	DESELECT GPS RCVR 2 FDBK	X	
087	GPS 3 (S)	V94X1039X	36	8		1.0	*													Q,V	4.21	GPS 3 SEL		
088	GPS 3 DISPLAY STATUS	V94J6092C	36	8		1.0														Q,V	8 5.24	GPS 3 DISPLAY STATUS		
089	GPS 3 STAT XXXX	V94J0934C	38	8		4.0								A						N	4.17	GPS 3 RCVR STATUS FOR DISPLAY		
090	P 1σ (GPS 3 QA1 FOM)	V94H1084C	42	8		6.0														O,Z	4.21	GPS 3 NAV FOM		
091	GPS 3 DES RCVR 33	V94X0966X	51	8		1.0	*													W	4.21	DESELECT GPS RCVR 3 FDBK	X	
092	FLTR UPDATE 15	V90X4952X	19	16		3.0	ORB	TGT						B						KYBD		VEHICLE STATE TO BE FILTERED		
093	P (GPS POS CHAR)	ADDENDUM	7	23		1.0					X	X								P,R	4.21	SEL GPS POS CHARACTER		
094	GPS POS RESID	V94H6046C	9	23		7.2					X									P	4.21	SEL GPS POS RESIDUAL		
095	GPS POS RATIO	V94H6047C	18	23		4.1					X									P	4.21	SEL GPS POS RES RATIO		
096	GPS POS RATIO (S)	V94J6048C	22	23		1.0					X									P	6 4.21	SEL GPS POS RES RATIO STATUS		
097	GPS (TO NAV) AUT 42	V90J3463C	39	23		1.0					X									S	ORB/REND NAV	GPS TO NAV AUTO/INHIBIT/FORCE FDBK		
098	GPS TO NAV (S)	V94X6082X	40	23		1.0					X									S	3 ORB/REND NAV	GPS TO NAV EXEC STATUS		
099	GPS (TO NAV) INH 43	V90J3463C	44	23		1.0					X									S	ORB/REND NAV	GPS TO NAV AUTO/INHIBIT/FORCE FDBK		
100	GPS (TO NAV) FOR 44	V90J3463C	49	23		1.0					X									S	ORB/REND NAV	GPS TO NAV AUTO/INHIBIT/FORCE FDBK		
101	V (GPS VEL CHAR)	ADDENDUM	7	24		1.0					X	X								P,R	4.21	SEL GPS VEL CHARACTER	X	
102	GPS VEL RESID	V94L6049C	9	24		7.2					X									P	4.21	SEL GPS VEL RESIDUAL		
103	GPS VEL RATIO	V94L6050C	18	24		4.1					X									P	4.21	SEL GPS VEL RES RATIO		
104	GPS VEL RATIO (S)	V94J6051C	22	24		1.0					X									P	6 4.21	SEL GPS VEL RES RATIO STATUS		
105	(MSG LINE)	V93X0050X	1	25		44.0								G							UI			MESSAGE LINE
106	(BUFFER MSG)	V93X0054X	45	25		4.0								G							UI			BUFFER MESSAGE INDICATOR
107	(SPL)	V93X0056X	2	26		49.0								G							UI			SCRATCH PAD LINE

TABLE 4.2.23-5. INPUT FUNCTIONAL PARAMETERS FOR RELATIVE NAVIGATION DISP (REF 5.24 SPEC.) (G6.11)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
ANGLES_AIF_DISPLAY	V90J1361C	RNDZ NAV ANGLE AUT/INH/FOR FLAG	ORB/RND NAV		HXS		93017G	*
ANGLES_AIF_DISPLAY	V90J1361CA	RNDZ NAV ANGLE AUT/INH/FOR FLAG	ORB/RND NAV SEQ		HXS		92834C	
ANGLES_ENABLE_DISPLAY	V90J1416C	ST/RR/COAS DATA SEL IND	ORB/RND NAV		HXS		93017G	*
ANGRT_STATUS	V95J4302C	R RADAR ANGLE RATE STATUS WORD	RR SOP		VAR			
ANG_STATUS	V95J4300C	R RADAR ANGLE STATUS WORD	RR SOP		VAR			
BITE_II	V95X4731X	ST IN TGT TRK BITE IND	STAR TRCK SOP		BD			
CREW_DESELECT_RCVR(1)	V93X1205XA	DESELECT GPS 1 RCVR CMD	GPS STATUS DISP		BD		92817C	
CREW_DESELECT_RCVR(1)	V93X1205XB	DESELECT GPS 1 RCVR CMD	HORIZ SIT DISP		BD		92817C	
CREW_DESELECT_RCVR(2)	V93X1206XA	DESELECT GPS 2 RCVR CMD	GPS STATUS DISP		BD		92817C	
CREW_DESELECT_RCVR(2)	V93X1206XB	DESELECT GPS 2 RCVR CMD	HORIZ SIT DISP		BD		92817C	
CREW_DESELECT_RCVR(3)	V93X1207XA	DESELECT GPS 3 RCVR CMD	GPS STATUS DISP		BD		92817C	
CREW_DESELECT_RCVR(3)	V93X1207XB	DESELECT GPS 3 RCVR CMD	HORIZ SIT DISP		BD		92817C	
CREW_DES_RCVR_RCVD(1)	V94X0964X	DESELECT GPS RCVR 1 FDBK	GPS RCVR STATE PROC		BD		92067D	
CREW_DES_RCVR_RCVD(2)	V94X0965X	DESELECT GPS RCVR 2 FDBK	GPS RCVR STATE PROC		BD		92067D	
CREW_DES_RCVR_RCVD(3)	V94X0966X	DESELECT GPS RCVR 3 FDBK	GPS RCVR STATE PROC		BD		92067D	
DELR_GPS_SEL	V94H6046C	SEL GPS POS RESIDUAL KFT	GPS RCVR STATE PROC	KFT	SPL		92067D	
DELR_RATIO_GPS_SEL	V94H6047C	SEL GPS POS RES RATIO	GPS RCVR STATE PROC		SPL		92067D	
DELR_RATIO_GPS_SEL_ST	V94J6048C	SEL GPS POS RES RATIO STATUS	GPS RCVR STATE PROC		VAR		92067D	
DELV_GPS_SEL	V94L6049C	SEL GPS VEL RESIDUAL	GPS RCVR STATE PROC	FT/S	SPL		92067D	
DELV_RATIO_GPS_SEL	V94L6050C	SEL GPS VEL RES RATIO	GPS RCVR STATE PROC		SPL		92067D	
DELV_RATIO_GPS_SEL_ST	V94J6051C	SEL GPS VEL RES RATIO STATUS	GPS RCVR STATE PROC		VAR		92067D	
DID_COVAR_REINIT	V90X1415X	COVAR MATRIX REINIT IN PROG FLAG	ORB/RND NAV		BD		93017G	*
DID_FILT_TO_PROP	V90X4984X	POS FDBK FLTRD TO PROP FLAG	ORB/RND NAV		BD		93017G	*
DID_ORB_TO_TGT	V90X1413X	ORBITER TO TARGET SV IND	ORB/RND NAV		BD		93017G	*
DID_PROP_TO_FILTER	V90X4985X	POS FDBK PROP TO FLTRD FLAG	ORB/RND NAV		BD		93017G	*
DID_SV_SRC_FOR_UPP	V90X4986X	POS FDBK UPP SOURCE FLAG	ORB/RND NAV		BD		93017G	*
DID_TGT_TO_ORB	V90X1414X	TARGET TO ORBITER SV IND	ORB/RND NAV		BD		93017G	*
DISP_DELQ(1)	V90H0212CD	TAC AZ/OPTICS H/X/AZ MEAS RESIDUAL	ORB/RND NAV	DEG	SPL		93017G	*
DISP_DELQ(2)	V90H0214CD	TAC R/OPTICS V/Y/EL MEAS RESIDUAL	ORB/RND NAV	DEG	SPL		93017G	*
DISP_DELQ(3)	V90H0221CD	BARO ALT/RR RNG MEAS RESIDUAL	ORB/RND NAV	KFT	SPL		93017G	*
DISP_DELQ(4)	V90A0711CC	DRAG ALT/RR R DOT MEAS RESIDUAL	ORB/RND NAV	FT/S	SPL		93017G	*
DISP_EDIT(1)	V90X0213XD	TAC AZ/OPTICS H/X/AZ EDIT HIST IND	ORB/RND NAV		SPL		93017G	*
DISP_EDIT(2)	V90X0215XD	TAC R/OPTICS V/Y/EL EDIT HIST IND	ORB/RND NAV		SPL		93017G	*
DISP_EDIT(3)	V90X0223XD	BARO ALT/RR RNG EDIT HIST IND	ORB/RND NAV		SPL		93017G	*
DISP_EDIT(4)	V90X0712XD	DRAG ALT/RR R DOT EDIT HIST IND	ORB/RND NAV		SPL		93017G	*
DISP_SIG(1)	V90U0216CD	TAC AZ/OPTICS H/X/AZ RESID RATIO	ORB/RND NAV		SPL		93017G	*

TABLE 4.2.23-5. INPUT FUNCTIONAL PARAMETERS FOR RELATIVE NAVIGATION DISP (REF 5.24 SPEC.) (G6.11)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
DISP_SIG(2)	V90U0217CD	TAC R/OPTICS V/Y/EL RESID RATIO	ORB/RND NAV				93017G	*
DISP_SIG(3)	V90U0222CD	BARO ALT/RR RNG RESID RATIO	ORB/RND NAV				93017G	*
DISP_SIG(4)	V90U0713CC	DRAG ALT/RR R DOT RESID RATIO	ORB/RND NAV				93017G	*
DOING_MEAS_ENABLE	V90X1417XA	NAV MEASUREMENT ENABLE IND	ORB/RND NAV SEQ				93017G	*
DOING_MEAS_ENABLE	V90X1417XB	NAV MEASUREMENT ENABLE IND	ORB/RND NAV				93017G	*
DOING_PWRD_FLT_NAV	V90X1289X	PWR FLT NAV AVG G ON/OFF IND	ORB/RND NAV SEQ		BD		93017G	*
DOING_REND_NAV	V90X4765X	RENDZ NAV ACTIVE FLAG	ORB/RND NAV SEQ		BD		93017G	*
DO_FILTERED_TO_PROP	V90X4987X	FLTRD TO PROP STATE X-FER FLAG	ORB/RND NAV		BD		39766G	
DO_ORB_TO_TGT	V93X6215X	STATE VCTR X-FER ORB TO TGT FLAG	ORB/RND NAV		BD		39766G	
DO_PROP_TO_FILTERED	V90X4988X	PROP TO FLTRD STATE X-FER FLAG	ORB/RND NAV		BD		39766G	
DO_TGT_TO_ORB	V93X6216X	STATE VCTR X-FER TGT TO ORB FLAG	ORB/RND NAV		BD		39766G	
FOM_NAV(1)	V94H1082CA	GPS 1 NAV FOM	GPS RCVR STATE PROC		HXS		92067D	
FOM_NAV(2)	V94H1083CA	GPS 2 NAV FOM	GPS RCVR STATE PROC		HXS		92067D	
FOM_NAV(3)	V94H1084CA	GPS 3 NAV FOM	GPS RCVR STATE PROC		HXS		92067D	
GPS_DG_SF(1)	V94X0986X	GPS 1 DG NAV	GPS RCVR STATE PROC		BD		92369B	
GPS_DG_SF(2)	V94X0987X	GPS 2 DG NAV	GPS RCVR STATE PROC		BD		92369B	
GPS_DG_SF(3)	V94X0988X	GPS 3 DG NAV	GPS RCVR STATE PROC		BD		92369B	
GPS_DISP_FAIL_DIL(1)	V94J6090CB	GPS 1 DISPLAY STATUS	REL NAV SPEC		VAR		92067D	
GPS_DISP_FAIL_DIL(2)	V94J6091CB	GPS 2 DISPLAY STATUS	REL NAV SPEC		VAR		92067D	
GPS_DISP_FAIL_DIL(3)	V94J6092CB	GPS 3 DISPLAY STATUS	REL NAV SPEC		VAR		92067D	
GPS_NAV_AIF_EXEC	V94X6082X	GPS TO NAV EXEC STATUS	ORB/RND NAV		BD		92067D	
GPS_RCVR_STATUS(1)	V94J0932C	GPS 1 RCVR STATUS FOR DISPLAY	GPS SOP		VAR		92067D	
GPS_RCVR_STATUS(2)	V94J0933C	GPS 2 RCVR STATUS FOR DISPLAY	GPS SOP		VAR		92067D	
GPS_RCVR_STATUS(3)	V94J0934C	GPS 3 RCVR STATUS FOR DISPLAY	GPS SOP		VAR		92067D	
GPS_SV_SEL_AVAIL	V90X3081XC	GPS SEL STATE VCTR AVAIL FLAG	GPS RCVR STATE PROC		BD		92132C	
GPS_TO_NAV_AIF	V90J3463CC	GPS TO NAV AUTO/INHIBIT/FORCE	ORB/RND NAV		HXS		92132C	
H_COAS	V95H4941C	HORIZ OFFSET OF -Z COAS IND	STAR TRCK SOP	DEG	SPL		93017G	*
KU_SEL	V93X6859XA	KU ANTENNA ENA/INH CMD	REL NAV DISP					
NUM_GPS_SEL	V94U1013C	NUMBER OF GPS SEL CANDIDATES	GPS RCVR STATE PROC		HXS		92067D	
N_ACCEPT(1)	V90J1402CA	H/X/AZ ANGULAR MARKS ACCEPTED	ORB/RND NAV				93017G	*
N_ACCEPT(2)	V90J1403CA	V/Y/EL ANGULAR MARKS ACCEPTED	ORB/RND NAV				93017G	*
N_ACCEPT(3)	V90J1400CA	RR RNG MARKS ACCEPTED	ORB/RND NAV				93017G	*
N_ACCEPT(4)	V90J1401CA	RR R DOT MARKS ACCEPTED	ORB/RND NAV				93017G	*
N_REJECT(1)	V90J1407CA	H/X/AZ ANGULAR MARKS REJECTED	ORB/RND NAV				93017G	*
N_REJECT(2)	V90J1408CA	V/Y/EL ANGULAR MARKS REJECTED	ORB/RND NAV				93017G	*
N_REJECT(3)	V90J1405CA	RR RNG MARKS REJECTED	ORB/RND NAV				93017G	*
N_REJECT(4)	V90J1406CA	RR RDOT MARKS REJECTED	ORB/RND NAV				93017G	*
RANGE_AIF_DISPLAY	V90J1362C	RNDZ NAV RR RNGE AUTO/INH/FOR FLAG	ORB/RND NAV		HXS		93017G	*
RANGE_AIF_DISPLAY	V90J1362CA	RNDZ NAV RR RNG AUT/INH/FOR FLAG	ORB/RND NAV SEQ		HXS		92834C	
RDOT_AIF_DISPLAY	V90J1368C	RNDZ NAV RANGE RATE A/I/F FLAG	ORB/RND NAV		HXS		93017G	*
RDOT_AIF_DISPLAY	V90J1368CA	RNDZ NAV RR R DOT AUT/INH/FOR FLAG	ORB/RND NAV SEQ		HXS		92834C	
RD_CUR	V94H3323C	RANGE RATE CURRENT	REL NAV SPEC	FT/S	SPL		89662B	
RNGRT_STATUS	V95J4299C	R RADAR RANGE RATE STATUS WORD	RR SOP		VAR			
RNG_CUR_DISP	V94H3322C	LOS RANGE CURRENT	REL NAV SPEC	KFT	SPL		89662B	
RNG_STATUS	V95J4298C	R RADAR RANGE STATUS WORD	RR SOP		VAR			
RR_PITCHO	V95H4281C	R RADAR PITCH ANGLE	RR SOP	DEG	VAR		92297B	

TABLE 4.2.23-5. INPUT FUNCTIONAL PARAMETERS FOR RELATIVE NAVIGATION DISP (REF 5.24 SPEC.) (G6.11)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
RR_PRTEO	V95R4282C	R RADAR PITCH RATE	RR SOP	MRAD/S	VAR		92297B	
RR_RANGEO	V95H4287C	R RADAR RANGE	RR SOP	FT	VAR		92297B	
RR_RNGRO	V95R4288C	R RADAR RANGE RATE	RR SOP	FT/S	VAR		92297B	
RR_ROLLO	V95H4284C	R RADAR ROLL ANGLE	RR SOP	DEG	VAR		92297B	
RR_RRTEO	V95R4285C	R RADAR ROLL RATE	RR SOP	MRAD/S	VAR		92297B	
RR_STAT_DISP	V95J4303C	R RADAR MODE STATUS WORD	RR SOP		VAR			
R_FMP_DISP	V90H4997C	RSS FLTR MINUS PROP POS	ORB/RND NAV	KFT	SPL		93017G	*
R_MEAS_RSS	V90H4999C	RSS FLTR CORRECTION POS	ORB/RND NAV	KFT	SPL		93017G	*
SEL_RCVR(1)	V94X1037X	GPS 1 SEL	GPS RCVR STATE PROC		BD		92067D	
SEL_RCVR(2)	V94X1038X	GPS 2 SEL	GPS RCVR STATE PROC		BD		92067D	
SEL_RCVR(3)	V94X1039X	GPS 3 SEL	GPS RCVR STATE PROC		BD		92067D	
SHUTTLE_FILTER_FLAG	V90X4952X	VEHICLE STATE TO BE FILTERED	REL NAV DISP		BD		92067D	
STAT	V95J4909C	ST IN TGT TRK STATUS IND	STAR TRCK SOP		VAR			
STATUS(1)	V95J4929C	-Z ST STATUS INDICATION	STAR TRCK SOP		HXS		93017G	*
STATUS(2)	V95J4930C	-Y ST STATUS INDICATION	STAR TRCK SOP		HXS		93017G	*
THETA_CUR	V94U3338C	PTG VECTOR ELEV ANGLE	REL NAV SPEC	RAD	SPL		89662B	
T_NODE_SEC	V94W3336C	ORBITER/TARGET NODE TIME(SEC)	REL NAV SPEC	S	SPL		89662B	
T_RESET	V90W0534CG	TIME OF FILTER STATE VCTR	ORB/RND NAV	S			92834C	
T_RESET	V90W0534CH	TIME OF FILTER STATE VCTR	ORB/RND NAV SEQ	S			92834C	
T_TV	V90W0315CA	TIME TAG OF TARGET VEH STATE VCTR	ORB/RND NAV	S			93017G	*
T_TV	V90W0315CB	TIME TAG OF TARGET VEH STATE VCTR	ORB/RND NAV SEQ	S			93017G	*
V_COAS	V95H4940C	VERTICAL OFFSET OF -Z COAS IND	STAR TRCK SOP	DEG	SPL		93017G	*
V_FMP_DISP	V90L4998C	RSS FLTR MINUS PROP VEL	ORB/RND NAV	FT/S	SPL		93017G	*
V_MEAS_RSS	V90L5000C	RSS FLTR CORRECTION VEL	ORB/RND NAV	FT/S	SPL		93017G	*
YD_CUR	V94L3325C	OUT-OF-PLANE VEL CURRENT	REL NAV SPEC	FT/S	SPL		89662B	
Y_CUR_DISP	V94H3326C	OUT-OF-PLANE POS CURRENT	REL NAV SPEC	KFT	SPL		89662B	
	V94X4814X	ILLEGAL ENTRY MSG(REL NAV DISPLAY)	UI					

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.23-6. OUTPUT FUNCTIONAL PARAMETERS FROM RELATIVE NAVIGATION DISP (REF 5.24 SPEC.) (G6.11)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ANGLES_AIF	V93J6237C	V/EL/Y EDIT OVRD-A/I/F	ORB/RND NAV		VAR		92834C	
CREW_DESELECT_RCVR(1)	V93X1205XC	DESELECT GPS 1 RCVR CMD	GAX GPS RCVR STATE PROC GPS SOP GPS STATUS DISP HORIZ SIT DISP		BD		92817C	
CREW_DESELECT_RCVR(2)	V93X1206XC	DESELECT GPS 2 RCVR CMD	GAX GPS RCVR STATE PROC GPS SOP GPS STATUS DISP HORIZ SIT DISP		BD		92817C	
CREW_DESELECT_RCVR(3)	V93X1207XC	DESELECT GPS 3 RCVR CMD	GAX GPS RCVR STATE PROC GPS SOP GPS STATUS DISP HORIZ SIT DISP		BD		92817C	
DO_COVAR_REINIT	V93X6233X	COVARIANCE REINIT	ORB/RND NAV		BD			
DO_ORB_TO_TGT	V93X6215XA	STATE VCTR X-FER ORB TO TGT FLAG	ORB/RND NAV		BD		92834C	
DO_ST_RR_COAS	V93J6236C	ANGLE SELECTION-ST TRK/RR/COAS	ORB/RND NAV	SPECIAL	HXS		79801G	
GPS_TO_NAV_AI	V93X1202XC	GPS TO NAV AUTO/INHIBIT CMD	ORB/RND NAV		BD		92144C	
GPS_TO_NAV_FORCE	V93X1201XC	GPS TO NAV FORCE CMD	ORB/RND NAV		BD		92144C	
KU_SEL	V93X6859XA	KU ANTENNA ENA/INH CMD	GN&C/SM-PL IF REL NAV DISP UNIV POINT PROC					
MEAS_ENABLE	V93X6232XA	NAV MEASUREMENT ENA CMD	ORB/RND NAV					
PWRD_FLT_NAV	V93X5408XC	PWR FLT NAV AVG G ON/OFF CMD	ORB UPP ORB/RND NAV REL NAV SPEC					
RANGE_AIF	V93J6241C	RANGE EDIT OVRD-A/I/F	ORB/RND NAV		VAR			
RDOT_AIF	V93J6247C	RR RANGE RATE EDIT OVRD-A/I/F	ORB/RND NAV		VAR			
REND_NAV_FLAG	V93X6220XB	RENDEZVOUS NAV ENABLE CMD	DL FMT 22/1 DL FMT 32/1 MSC ORB/RND NAV SEQ		BD		93017G	*
SHUTTLE_FILTER_FLAG	V90X4952X	VEHICLE STATE TO BE FILTERED	ORB/RND NAV ORB/RND NAV SEQ REL NAV DISP TLM		BD		92067D	
SV_SOURCE_FOR_UPP	V90X4989XB	USER STATE SELECTION FLAG	ORB/RND NAV				92157	
	V93M0518P	CGZB_REL_NAV_FLG_WD1_LFE	DL FMT 22/1 DL FMT 32/1				93017G	*
	V93X5410X	THR MON DEL V RES COMP	REL NAV SPEC		BD			
	V93X5413X	THR MON DEL V RES TOT	REL NAV SPEC		BD			

TABLE 4.2.23-6. OUTPUT FUNCTIONAL PARAMETERS FROM RELATIVE NAVIGATION DISP (REF 5.24 SPEC.) (G6.11)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
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NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
 (HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

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TABLE 4.2.23-7. RELATIVE NAVIGATION DISP (REF 5.24 SPEC.) (G6.11) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
GPS_INSTALLED(1)	V97U2924C	ND	D		M	X	G4.17 G4.20 G4.21 G4.23 G4.24 G4.25 G6.11 G6.21 G6.31 G6.51 V5.1.4	00	GPI	92292B	
GPS_INSTALLED(2)	V97U2831C	ND	D		M	X	G4.17 G4.20 G4.21 G4.23 G4.24 G4.25 G6.11 G6.21 G6.31 G6.51 V5.1.4	00	GPI	92292B	
GPS_INSTALLED(3)	V97U2925C	ND	D		M	X	G4.17 G4.20 G4.21 G4.23 G4.24 G4.25 G6.11 G6.21 G6.31 G6.51 V5.1.4	00	GPI	92292B	
GPS_LOCKOUT	V97U3563C	ND	I	S	M	P	G4.123 G4.139 G4.148 G6.11 G6.21 G6.51	00	GPI	92292B	
SHUTTLE_FILTER_FLAG	V90X4952X	NONE	D		M	P	G6.11	00	ZPB	92067D	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.23-8. RELATIVE NAVIGATION DISP (REF 5.24 SPEC.) (G6.11) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
MAX_TIME_TOL MAX ALLOWABLE TOTAL PREDICTION INTERVAL	V96U8685C	00	+5.4	E+04	SEC	F	S	P G4.126 G4.127 G4.148 G4.15 G6.11	92834C	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.23-9. RELATIVE NAVIGATION DISP (REF 5.24 SPEC.) (G6.11) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.24 DELETED.

4.2.25 ORBIT TARGETING (PFS)

TITLE: ORBIT TGT

TYPE: SPEC/034

AVAILABILITY: PFS:GNC OPS 2

4.2.25.1 Purpose, Operation, and Organization

This display is used prior to and during rendezvous or during the execution of a standoff-type maneuver to predict and choose a two impulse maneuver sequence. When the maneuver parameters are computed, the data are transferred to the ORB MNVR DIP (4.158). On initial callup, the maneuver predictor match, and input parameter data fields (Items 1–20) shall display zeros and thereafter reflect crew inputs. Items 21–24 are initialized to I-Load values. The TIG in the past indicator is an asterisk(*).

If target set zero is displayed (ITEM 1 has not been accessed) or if DOING_REND_NAV (V90X4765X from ORB/RND NAV SEQ 4.148) is OFF, then ITEMS 28 and 29 will be illegal, causing an “ILLEGAL ENTRY” message to be displayed. If target set zero is displayed and new values have not been input for ITEMS 21, 22, 23 and 24, then ITEM 26 will be illegal. If target set zero is displayed, then ITEMS 2–20 will also be illegal.

This display is divided into two major parts. One area contains the maneuver information. The second area is further subdivided into two sections: INITIALIZATION data (INPUTS) and CONTROLS. The Orbiter State Vector is displayed in the third area of the format.

- A. The top half of the display page contains the following maneuver information:
 - 1. The number of the target upon which the maneuver is based.
 - 2. An indicator asterisk(*) of the impulsive ignition time (TIG) being in the past.
 - 3. TIG – The impulsive ignition time of the maneuver in MET (days, hours, minutes, seconds).
 - 4. Delta VX, delta VY, and delta VZ indicating LVLH external delta-V components of each maneuver in feet per second.
 - 5. Total delta-V of the maneuver in feet per second.
 - 6. Distance to which the on-orbit predictor was matched in the targeting in feet.
- B. Inputs This section contains the inputs to the two-impulse maneuver targeting. Inputs are available from an I-LOAD. The different sets of data available are selectable by an appropriate target number. The stored data may be retrieved and modified prior to execution of the targeting. All required targeting inputs may also be loaded manually. The targeting inputs shown in this section are:
 - 1. TGT NO – The target number for the desired set of pre-stored targeting inputs. Upon entry of a TGT NO, the targeting inputs specified by that TGT NO will be retrieved and displayed in the appropriate locations on the display.

2. T1 TIG – The impulsive ignition time (days, hours, minutes, seconds) of the first maneuver of the two–impulse set in MET. If T1 TIG is in the past a COMPUTE T1 will cause T1 TIG to be set to current time plus a pre–defined delta time and the targeting performed using the navigated state.
6. EL – The elevation angle measured from the Orbiter, positive up, to the target. If $EL \neq 0$ then an elevation angle search is performed and the TIG is determined. If $EL = 0$ then the input TIG is used.
7. T1 $\Delta X/DNRNG$, ΔY , $\Delta Z/\Delta H$, ΔX DOT, ΔY DOT, & ΔZ DOT – The Orbiter relative position (kft) and velocity (fps) (with respect to the target–centered relative rotating curvilinear reference frame) at the T1 TIG time to be used in the targeting calculations. If all these items are zero or if T1 TIG is past and a COMPUTE T1 is executed, the values are computed from onboard navigation information and are displayed at these locations along with targeting outputs. If any of the items are not zero and T1 TIG is in the future, the values displayed will be used as input to the targeting solution.
13. T2 TIG – The impulsive ignition time (days, hours, minutes, seconds) of the second maneuver of the two–impulse set in MET. If ΔT is not zero, a COMPUTE T1 will cause T2 TIG to be calculated and displayed in these locations along with the targeting outputs.
17. ΔT – The transfer time in minutes between the first maneuver time and the second maneuver time. If ΔT is zero and T2 TIG is not, a COMPUTE T1 will cause ΔT to be calculated and displayed in this location along with the targeting outputs. If ΔT is less than zero, ΔT will be recomputed and displayed.
18. T2 ΔX , ΔY , & ΔZ – The desired Orbiter relative position (kft) (with respect to the target–centered relative rotating curvilinear reference frame) at the T2 TIG to be used in the targeting calculations.
21. BASE TIME – The time (days, hours, minutes, seconds) in MET from which subsequent maneuvers are calculated. A value is incorporated through an I–load. Execution of a Lambert targeting solution using the elevation angle option (e.g., a Terminal Phase Initiation (TPI) MNVR) will automatically define BASE TIME as the computed MNVR TIG Time.

C. Controls This section lists the executable items available in this specialist function.

1. T2 to T1 – The item to transfer the T2 TIG of the previous maneuver sequence to the T1 TIG slot of the current maneuver sequence. (NOTE: This capability allows sequential execution of two–impulse targeting sets where only the first maneuver is executed and it is desired to target a new two–impulse set with the T1 maneuver being at the previously defined T2 TIG.)

While either the T1 or T2 computations are in progress, entry of any item on the display is illegal, and any attempt to execute an item will cause an “ILLEGAL ENTRY” message to be generated.

2. XXXX – This field displays the word “LOAD” (the item to load item entry data values into the data slots for use by the targeting routine). If any item entry, except TGT NO, in

the INPUTS section is made the word “LOAD” will flash until this item is executed. After execution of this item, the field will again continuously show “LOAD” until another input item is entered. Execution of this item also causes values shown in the INPUTS section to be stored in the area of memory containing the predefined target sets; thus updating the I-LOAD.

3. COMPUTE T1 – The item to calculate the first maneuver solution of a two-impulse set and display the results in the MNVR section of this display. An asterisk (*) is driven by the item number until the maneuver calculations are complete. Parameters used in the calculation are those specified in the INPUTS section of the display. Any INPUTS not specified on the display (e.g., T1 $\Delta X/DNRNG$, ΔY , $\Delta Z/\Delta H$, $\Delta X DOT$, $\Delta Y DOT$, $\Delta Z DOT$) will be displayed in the INPUTS section after being computed. The CRT timer clock will be started automatically to count down to the next unexecuted maneuver TIG as soon as the T1 computation is finished. The displayed maneuver solution results are transferred to the appropriate DISPLAY and GUIDANCE buffers.
 4. COMPUTE T2 – The item to initiate calculation of the second maneuver of a two-impulse set. The maneuver solution computed is that required to null the relative velocity at the T2 TIG. If T2 TIG is in the past, it is set to current time plus a pre-defined delta time and the maneuver is computed using the navigated state vector. The CRT timer clock will be started automatically to count down to the next unexecuted maneuver TIG as soon as the T2 computation is finished. An asterisk(*) is driven by the item number until the maneuver calculations are complete. The displayed maneuver solution results are transferred to the appropriate DISPLAY and GUIDANCE buffers.
- D. Orbiter State Vector The lower right area of the display format provides the current time-homogeneous M50 Orbiter State Vector. Immediately below the ‘ORBITER STATE’ heading is the GMT time tag in days/hours: minutes: seconds associated with the states’ position (displayed in kilofeet) and velocity (displayed in kilofeet per second) components displayed below the time tag.
- E. Item 27, on this display, is a nonfunctioning item. Any attempt to execute this item will result in an “ILLEGAL ENTRY” message as result of operator error.

4.2.25.2 Orbit Targeting (PFS) Keyboard Processing Addendum

- A. ILLEGAL ENTRY CONDITIONS. An operator error shall result and the “ILLEGAL ENTRY” CRT message output when the following conditions exist upon execution of the specified item numbers;
1. Item entries 28 (COMPUTE T1) and 29 (COMPUTE T2) when Item 1 (TGT ID) is zero (i.e., a target set ID has not been selected) or the discrete DOING_REND_NAV (V90X4765X) from ORB/RND NAV SEQ (4.148) is OFF (0 stat).
 2. Item 26 load command when Item 1 (TGT ID) is zero and new values have not been entered for BASE TIME Items 21 (days), 22 (hours), 23 (minutes) or 24 (seconds).
 3. Targeting INPUT data Items 2 through 20 when Item 1 (TGT ID) is zero.

4.2.25.3 Orbit Targeting(PFS) CRT Display Processing Addendum

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word “STAT” being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT display processing Table 4.2.25–2. The numeric code, corresponding to one of those listed in the Table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the “M” PSI is displayed (for Commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)			
Blank (default)	↓		M	∅
1	↓ ↑		M	∅
2	↑		M	∅
3	↓			∅
4	↑			∅
5	↓	?		∅
6	↓ ↑			∅
7			M	∅
8	↓	?	M	∅
9		?	M	∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.2.25–2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. Days:Hours:Minutes:Seconds Conversion Time data in seconds is converted to days:hours:minutes:seconds in UI for display as XXX/XX:XX:XX. Leading zeroes are suppressed only for the days part of this field.
- B. Load Flash Flag The load flash flag shall be set anytime data is changed for Items 2 thru 20 or 21 thru 24. The following discretes shall inform ORB TGT (5.10) that data has been changed in the above item entries:
 - V93X6557X ITEM ENTRY 2–20 DATA CHANGE
 - V93X6558X ITEM ENTRY 21–24 DATA CHANGE
- C. Total Input Update Anytime data is changed in Item 1 a discrete (V93X6556X) Item Entry 1 Data Change is set to inform ORB TGT (5.10) that a new target set is desired.

4.2.25.4 Orbit Targeting Figure/Table References

Figure 4.2.25-1	Orbit Targeting Display (PFS)
Table 4.2.25-1	Keyboard Processing Table
Table 4.2.25-2	CRT Display Processing Table
Table 4.2.25-3	CRT Display Processing Background Requirements N/A
Table 4.2.25-4	Mission Design Background Constants N/A
Table 4.2.25-5	Input Functional Parameters
Table 4.2.25-6	Output Functional Parameters
Table 4.2.25-7	I-Loads
Table 4.2.25-8	K-Loads
Table 4.2.25-9	Constants

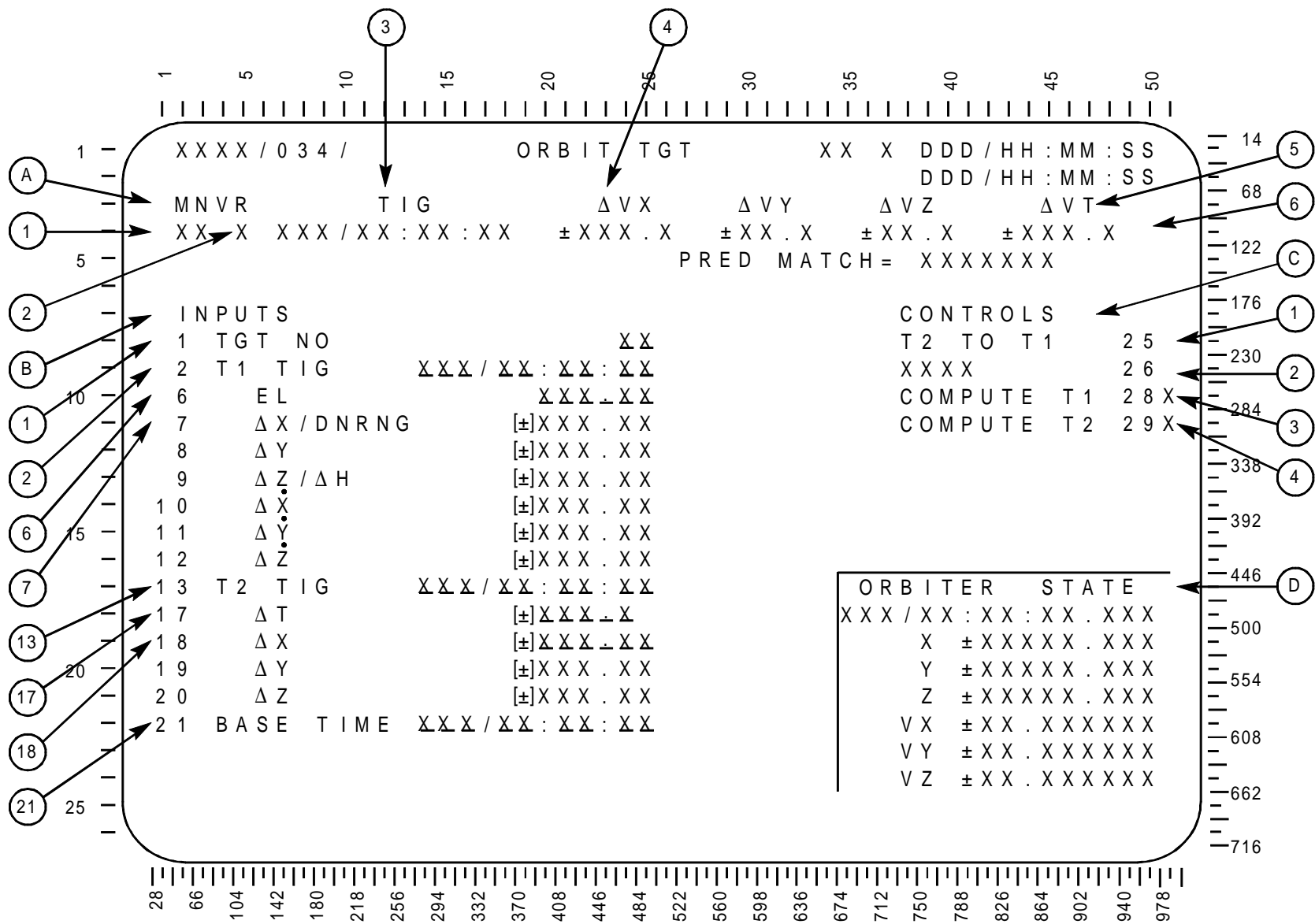


FIGURE 4.2.25-1.Orbit Targeting Display (PFS)

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Table 4.2.25-1. ORBIT TARGETING (PFS) KEYBOARD PROCESSING													
Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
001	2 TGT NO	V93J6540C	3.0	DEC			1	1	40		ORB TGT, CRT	TGT NO. SELECTED	X
002	2 T1 TIG (DAYS)	V93W6501C	4.0	DEC	DAYS		2	0	365	A	ORB TGT, CRT	T1 TIG (DAYS)	X
003	3 T1 TIG (HOURS)	V93W6502C	3.0	DEC	HRS		3	0	23	A	ORB TGT, CRT	T1 TIG (HRS)	X
004	4 T1 TIG (MINS)	V93W6503C	3.0	DEC	MINS		4	0	59	A	ORB TGT, CRT	T1 TIG (MIN)	X
005	5 T1 TIG (SECS)	V93W6504C	3.0	DEC	SECS		5	0	59	A	ORB TGT, CRT	T1 TIG (SEC)	X
006	6 T1 EL	V93H6530C	7.2	DEC	DEG		6	000.00	359.99	A	ORB TGT, CRT	T1 ELEVATION ANGLE	X
007	7 T1 DELTA X/DN RNG	V93L6543C	7.2	DEC	KFT		7	-999.99	+999.99	A	ORB TGT, CRT	T1 DELTA X/DN RNG	X
008	8 T1 DELTA Y	V93L6545C	7.2	DEC	KFT		8	-999.99	+999.99	A	ORB TGT, CRT	T1 DELTA Y	X
009	9 T1 DELTA Z/DELTA H	V93L6547C	7.2	DEC	KFT		9	-999.99	+999.99	A	ORB TGT, CRT	T1 DELTA Z/DELTA H	X
010	10 T1 DELTA X-DOT	V93U6550C	7.2	DEC	FPS		10	-999.99	+999.99	A	ORB TGT, CRT	T1 DELTA X DOT	X
011	11 T1 DELTA Y-DOT	V93U6531C	7.2	DEC	FPS		11	-999.99	+999.99	A	ORB TGT, CRT	T1 DELTA Y DOT	
012	12 T1 DELTA Z-DOT	V93U6559C	7.2	DEC	FPS		12	-999.99	+999.99	A	ORB TGT, CRT	T1 DELTA Z DOT	X
013	13 T2 TIG (DAYS)	V93W6516C	4.0	DEC	DAYS		13	0	365	A	ORB TGT, CRT	T2 TIG (DAYS)	X
014	14 T2 TIG (HOURS)	V93W6517C	3.0	DEC	HRS		14	0	23	A	ORB TGT, CRT	T2 TIG (HRS)	X
015	15 T2 TIG (MINS)	V93W6518C	3.0	DEC	MINS		15	0	59	A	ORB TGT, CRT	T2 TIG (MIN)	X
016	16 T2 TIG (SECS)	V93W6519C	3.0	DEC	SECS		16	0	59	A	ORB TGT, CRT	T2 TIG (SEC)	X
017	17 T2 DELTA T	V93W6510C	6.1	DEC	MINS		17	-300.0	+300.0	A	ORB TGT, CRT	T2 DELTA T	X
018	18 T2 DELTA X	V93H6511C	7.2	DEC	KFT		18	-999.99	+999.99	A	ORB TGT, CRT	T2 DELTA X	X
019	19 T2 DELTA Y	V93H6514C	7.2	DEC	KFT		19	-999.99	+999.99	A	ORB TGT, CRT	T2 DELTA Y	X
020	20 T2 DELTA Z	V93H6520C	7.2	DEC	KFT		20	-999.99	+999.99	A	ORB TGT, CRT	T2 DELTA Z	X
021	21 BASE TIME (DAYS)	V93W6524C	4.0	DEC	DAYS		21	0	365		ORB TGT, CRT	BASE TIME (DAYS)	X
022	22 BASE TIME (HOURS)	V93W6525C	3.0	DEC	HRS		22	0	23		ORB TGT, CRT	BASE TIME (HRS)	X
023	23 BASE TIME (MINS)	V93W6526C	3.0	DEC	MINS		23	0	59		ORB TGT, CRT	BASE TIME (MIN)	X
024	24 BASE TIME (SECS)	V93W6527C	3.0	DEC	SECS		24	0	59		ORB TGT, CRT	BASE TIME (SEC)	X
025	T2 TO T1 25	V93X6528X	0.0	CTRL			25				ORB TGT	T2 TO T1 XFER CMD	X
026	XXXX 26	V93X6535X	0.0	CTRL			26			A	ORB TGT	LOAD CMD	X
027*	COMPUTE T1 28	V93X6537X	0.0	CTRL			28			A	ORB TGT	COMPUTE T1 CMD	X
028*	COMPUTE T2 29	V93X6538X	0.0	CTRL			29			A	ORB TGT	COMPUTE T2 CMD	X

Table 4.2.25-2. ORBIT TARGETING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B A N K	S I Z E S	I N T E N S I T Y	F L A T N E S S	R A T E	S L E E P	L E A R N I N G	B A N K	D I S P L A Y	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
001	(OPS)	V93X0040X	2	1		5.0															UI	OPS FUNCTION PAGE	X	
002	(SPEC)	V93X0042X	7	1		4.0																UI	SPEC FUNCTION PAGE	X
003	(DISP)	V93X0044X	10	1		4.0																UI	DISPLAY FUNCTION PAGE	X
004	(UL)	V92X5032X	34	1		2.0	UL						X									UI	UPLINK ACTIVITY IND	X
005	(GPC)	V93X0048X	36	1		2.0																UI	GPC DRIVER	X
006	(MT)	V91W1990C	39	1		12.0			DHMS													FCOS	MISSION ELAPSED TIME	X
007	(CRT TIMER)	V91W1987C	39	2		12.0			DHMS													FCOS	DISPLAY CRT TIMER,GNC	X
008	MNVR XX	V95J7466C	1	4		3.0																ORB TGT	MNVR TGT NO COMPUTED	X
009	MNVR X	V95X7457X	5	4		1.0	*															ORB TGT	MNVR PAST FLAG	X
010	MNVR TIG	V95W7410C	6	4		13.0			DHMS											A		ORB TGT	IMPULSIVE IGNITION TIME(SEC)	X
011	MNVR DELTA VX	V95L7407C	21	4		6.1			FPS													ORB TGT	LVLH X-COMP OF TGT DELTA V	X
012	MNVR DELTA VY	V95L7408C	29	4		5.1			FPS													ORB TGT	LVLH Y-COMP OF TGT DELTA V	X
013	MNVR DELTA VZ	V95L7409C	36	4		5.1			FPS													ORB TGT	LVLH Z-COMP OF TGT DELTA V	X
014	MNVR DELTA VT	V95L7405C	43	4		6.1			FPS													ORB TGT	TGT DELTA V TOTAL	X
015	1 TGT NO	V93J6540C	23	8		3.0														C		KYBD	TGT NO. SELECTED	X
016	2 T1 TIG (DAYS)	V93W6501C	13	9		4.0			DAYS													ORB TGT, KYBD	T1 TIG (DAYS)	X
017	3 T1 TIG (HOURS)	V93W6502C	17	9		3.0			HRS													ORB TGT, KYBD	T1 TIG (HRS)	X
018	4 T1 TIG (MINS)	V93W6503C	20	9		3.0			MINS													ORB TGT, KYBD	T1 TIG (MIN)	X
019	5 T1 TIG (SECS)	V93W6504C	23	9		3.0			SECS													ORB TGT, KYBD	T1 TIG (SEC)	X
020	6 T1 EL	V93H6530C	19	10		7.2			DEG													ORB TGT, KYBD	T1 ELEVATION ANGLE	X
021	7 T1 DELTA X/DN RNG	V93L6543C	19	11		7.2			KFT													ORB TGT, KYBD	T1 DELTA X/DN RNG	X
022	8 T1 DELTA Y	V93L6545C	19	12		7.2			KFT													ORB TGT, KYBD	T1 DELTA Y	X
023	9 T1 DELTA Z/DELTA H	V93L6547C	19	13		7.2			KFT													ORB TGT, KYBD	T1 DELTA Z/DELTA H	X
024	10 T1 DELTA X-DOT	V93U6550C	19	14		7.2			FPS													ORB TGT, KYBD	T1 DELTA X DOT	X
025	11 T1 DELTA Y-DOT	V93U6531C	19	15		7.2			FPS													ORB TGT, KYBD	T1 DELTA Y DOT	X

Table 4.2.25-2. ORBIT TARGETING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E S	I N T E N S I T Y	F L A S H	R A T E	S I G N E R	L E V E L	B R A N C H	D I S T R I B U T I O N	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
026	12 T1 DELTA Z-DOT	V93U6559C	19	16		7.2			DEC	FPS						E	X				ORB TGT, KYBD	T1 DELTA Z DOT	X	
027	13 T2 TIG (DAYS)	V93W6516C	13	17		4.0			DEC	DAYS						E					ORB TGT, KYBD	T2 TIG (DAYS)	X	
028	14 T2 TIG (HOURS)	V93W6517C	17	17		3.0			DEC	HRS						E	X				ORB TGT, KYBD	T2 TIG (HRS)	X	
029	15 T2 TIG (MINS)	V93W6518C	20	17		3.0			DEC	MINS						E	X				ORB TGT, KYBD	T2 TIG (MIN)	X	
030	16 T2 TIG (SECS)	V93W6519C	23	17		3.0			DEC	SECS						E	X				ORB TGT, KYBD	T2 TIG (SEC)	X	
031	17 T2 DELTA T	V93W6510C	19	18		6.1			DEC	MINS						E	X				ORB TGT, KYBD	T2 DELTA T	X	
032	18 T2 DELTA X	V93H6511C	19	19		7.2			DEC	KFT						E	X				ORB TGT, KYBD	T2 DELTA X	X	
033	19 T2 DELTA Y	V93H6514C	19	20		7.2			DEC	KFT						E	X				ORB TGT, KYBD	T2 DELTA Y	X	
034	20 T2 DELTA Z	V93H6520C	19	21		7.2			DEC	KFT						E	X				ORB TGT, KYBD	T2 DELTA Z	X	
035	21 BASE TIME (DAYS)	V93W6524C	13	22		4.0			DEC	DAYS						E					ORB TGT, KYBD	BASE TIME (DAYS)	X	
036	22 BASE TIME (HOURS)	V93W6525C	17	22		3.0			DEC	HRS						E	X				ORB TGT, KYBD	BASE TIME (HRS)	X	
037	23 BASE TIME (MINS)	V93W6526C	20	22		3.0			DEC	MINS						E	X				ORB TGT, KYBD	BASE TIME (MIN)	X	
038	24 BASE TIME (SECS)	V93W6527C	23	22		3.0			DEC	SECS						E	X				ORB TGT, KYBD	BASE TIME (SEC)	X	
039	XXXX 26	V95X7411X	38	9		4.0	LOAD	LOAD	BLVL					X	E				B		ORB TGT	LOAD FLASH FLAG	X	
040	PRED MATCH (FEET)	V95H7431C	38	5		8.0			DEC							F					5.10	TARGET MISS DISTANCE	X	
041*	COMPUTE T1 28	V95X7386X	51	10		1.0	*		BLVL							E					ORB TGT	T1 COMPUTATION IN PROGRESS	X	
042*	COMPUTE T2 29	V95X7392X	51	11		1.0	*		BLVL							E					ORB TGT	T2 COMPUTATION IN PROGRESS	X	
043	ORB STATE (GMT-DAYS)	V90W5043C	34	18		4.0			DEC	DAYS						B					ORB/RND NAV	GMT DAYS OF FLTR STATE VCTR-DISP		
044	ORB STATE (GMT-HRS)	V90W5044C	38	18		3.0			DEC	HRS						B					ORB/RND NAV	GMT HRS OF FLTR STATE VCTR-DISP		
045	ORB STATE (GMT-MINS)	V90W5045C	41	18		3.0			DEC	MINS						B					ORB/RND NAV	GMT MIN OF FLTR STATE VCTR-DISP		

Table 4.2.25-2. ORBIT TARGETING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B A N K	S I Z E S	I N T E N S I T Y	F L T R S	R A T E	S I G N A L	L E V E L	B A N D W I D T H	D E L T A	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
046	ORB STATE (GMT-SECS)	V90W5046C	44	18		7.3			DEC	SECS														
047	ORBITER STATE X	V90H5040C	41	19		10.3			DEC	KFT						B	X				ORB/RND NAV	GMT SECS OF FLTR STATE VCTR-DISP		
048	ORBITER STATE Y	V90H5041C	41	20		10.3			DEC	KFT						B	X				ORB/RND NAV	X-COMP OF FLTRS CURR POS VCTR-DISP		
049	ORBITER STATE Z	V90H5042C	41	21		10.3			DEC	KFT						B	X				ORB/RND NAV	Y-COMP OF FLTRS CURR POS VCTR-DISP		
050	ORBITER STATE VX	V90L5047C	41	22		10.6			DEC	KFT/S						B	X				ORB/RND NAV	Z-COMP OF FLTRS CURR POS VCTR-DISP		
051	ORBITER STATE VY	V90L5048C	41	23		10.6			DEC	KFT/S						B	X				ORB/RND NAV	X-COMP OF FLTRS CURR VEL VCTR-DISP		
052	ORBITER STATE VZ	V90L5049C	41	24		10.6			DEC	KFT/S						B	X				ORB/RND NAV	Y-COMP OF FLTRS CURR VEL VCTR-DISP		
053	(MSG LINE)	V93X0050X	1	25		44.0			CHAR							G					UI	MESSAGE LINE	X	
054	(BUFFER MSG)	V93X0054X	45	25		4.0			CHAR							G					UI	BUFFER MESSAGE INDICATOR	X	
055	(SPL)	V93X0056X	2	26		49.0			CHAR							G					UI	SCRATCH PAD LINE	X	

TABLE 4.2.25-5. INPUT FUNCTIONAL PARAMETERS FOR ORBIT TARGETING DISPLAY (REF 5.10 SPEC.) (G6.14)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
DISP_DV(1)	V95L7407C	LVLH X-COMP OF TGT DELTA V	ORB TGT SPEC	FT/S	VAR			
DISP_DV(2)	V95L7408C	LVLH Y-COMP OF TGT DELTA V	ORB TGT SPEC	FT/S	VAR			
DISP_DV(3)	V95L7409C	LVLH Z-COMP OF TGT DELTA V	ORB TGT SPEC	FT/S	VAR			
DISP_DV_MAG	V95L7405C	TGT DELTA V TOTAL	ORB TGT SPEC	FT/S	VAR			
DISP_EL_ANG	V93H6530CA	T1 ELEVATION ANGLE	ORB TGTING DISP		DEG			
DISP_EL_ANG	V93H6530CB	T1 ELEVATION ANGLE	ORB TGT SPEC		DEG			
DISP_PROX_DT	V93W6510CA	T2 DELTA T	ORB TGTING DISP		MIN			
DISP_PROX_DT	V93W6510CB	T2 DELTA T	ORB TGT SPEC		MIN			
DISP_T1_DAY	V93W6501CA	T1 TIG (DAYS)	ORB TGTING DISP		DAY			
DISP_T1_DAY	V93W6501CB	T1 TIG (DAYS)	ORB TGT SPEC		DAY			
DISP_T1_HR	V93W6502CA	T1 TIG (HRS)	ORB TGTING DISP		HR			
DISP_T1_HR	V93W6502CB	T1 TIG (HRS)	ORB TGT SPEC		HR			
DISP_T1_MIN	V93W6503CA	T1 TIG (MIN)	ORB TGTING DISP		MIN			
DISP_T1_MIN	V93W6503CB	T1 TIG (MIN)	ORB TGT SPEC		MIN			
DISP_T1_SEC	V93W6504CA	T1 TIG (SEC)	ORB TGTING DISP		S			
DISP_T1_SEC	V93W6504CB	T1 TIG (SEC)	ORB TGT SPEC		S			
DISP_T1_X(1)	V93L6543CA	T1 DELTA X/DN RNG	ORB TGTING DISP		FT			
DISP_T1_X(1)	V93L6543CB	T1 DELTA X/DN RNG	ORB TGT SPEC		FT			
DISP_T1_X(2)	V93L6545CA	T1 DELTA Y	ORB TGTING DISP		FT			
DISP_T1_X(2)	V93L6545CB	T1 DELTA Y	ORB TGT SPEC		FT			
DISP_T1_X(3)	V93L6547CA	T1 DELTA Z/DELTA H	ORB TGTING DISP		FT			
DISP_T1_X(3)	V93L6547CB	T1 DELTA Z/DELTA H	ORB TGT SPEC		FT			
DISP_T1_XD(1)	V93U6550CA	T1 DELTA X DOT	ORB TGTING DISP		FT/S			
DISP_T1_XD(1)	V93U6550CB	T1 DELTA X DOT	ORB TGT SPEC		FT/S			
DISP_T1_XD(2)	V93U6531CA	T1 DELTA Y DOT	ORB TGTING DISP		FT/S			
DISP_T1_XD(2)	V93U6531CB	T1 DELTA Y DOT	ORB TGT SPEC		FT/S			
DISP_T1_XD(3)	V93U6559CA	T1 DELTA Z DOT	ORB TGTING DISP		FT/S			
DISP_T1_XD(3)	V93U6559CB	T1 DELTA Z DOT	ORB TGT SPEC		FT/S			
DISP_T2_DAY	V93W6516CA	T2 TIG (DAYS)	ORB TGTING DISP		DAY			
DISP_T2_DAY	V93W6516CB	T2 TIG (DAYS)	ORB TGT SPEC		DAY			
DISP_T2_HR	V93W6517CA	T2 TIG (HRS)	ORB TGTING DISP		HR			
DISP_T2_HR	V93W6517CB	T2 TIG (HRS)	ORB TGT SPEC		HR			
DISP_T2_MIN	V93W6518CA	T2 TIG (MIN)	ORB TGTING DISP		MIN			
DISP_T2_MIN	V93W6518CB	T2 TIG (MIN)	ORB TGT SPEC		MIN			
DISP_T2_SEC	V93W6519CA	T2 TIG (SEC)	ORB TGTING DISP		S			
DISP_T2_SEC	V93W6519CB	T2 TIG (SEC)	ORB TGT SPEC		S			

TABLE 4.2.25-5. INPUT FUNCTIONAL PARAMETERS FOR ORBIT TARGETING DISPLAY (REF 5.10 SPEC.) (G6.14)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
DISP_T2_XOFF	V93H6511CA	T2 DELTA X	ORB TGTING DISP	FT				
DISP_T2_XOFF	V93H6511CB	T2 DELTA X	ORB TGT SPEC	FT				
DISP_T2_YOFF	V93H6514CA	T2 DELTA Y	ORB TGTING DISP	FT				
DISP_T2_YOFF	V93H6514CB	T2 DELTA Y	ORB TGT SPEC	FT				
DISP_T2_ZOFF	V93H6520CA	T2 DELTA Z	ORB TGTING DISP	FT				
DISP_T2_ZOFF	V93H6520CB	T2 DELTA Z	ORB TGT SPEC	FT				
DISP_TMAN_TIME	V95W7410C	IMPULSIVE IGNITION TIME(SEC)	ORB TGT SPEC	S	VAR			
DOING_REND_NAV	V90X4765X	RENDZ NAV ACTIVE FLAG	ORB/RND NAV SEQ		BD		93017G	*
DSP_MISS	V95H7431C	TARGET MISS DISTANCE	ORB TGT SPEC	FT	VAR			
MAN_TGT	V95J7466C	MNVR TGT NO COMPUTED	ORB TGT SPEC	ND	HXS		93017G	*
PROX_BASE_DAY	V93W6524CA	BASE TIME (DAYS)	ORB TGTING DISP	DAY				
PROX_BASE_DAY	V93W6524CB	BASE TIME (DAYS)	ORB TGT SPEC	DAY				
PROX_BASE_HR	V93W6525CA	BASE TIME (HRS)	ORB TGTING DISP	HR				
PROX_BASE_HR	V93W6525CB	BASE TIME (HRS)	ORB TGT SPEC	HR				
PROX_BASE_MIN	V93W6526CA	BASE TIME (MIN)	ORB TGTING DISP	MIN				
PROX_BASE_MIN	V93W6526CB	BASE TIME (MIN)	ORB TGT SPEC	MIN				
PROX_BASE_SEC	V93W6527CA	BASE TIME (SEC)	ORB TGTING DISP	S				
PROX_BASE_SEC	V93W6527CB	BASE TIME (SEC)	ORB TGT SPEC	S				
PROX_LOAD_FLASH	V95X7411X	LOAD FLASH FLAG	ORB TGT SPEC		BD			
PROX_PAST_STATUS	V95X7457X	MNVR PAST FLAG	ORB TGT SPEC		BD			
PROX_T1_STAR_STATUS	V95X7386X	T1 COMPUTATION IN PROGRESS	ORB TGT SPEC		BD			
PROX_T2_STAR_STATUS	V95X7392X	T2 COMPUTATION IN PROGRESS	ORB TGT SPEC		BD			
PROX_TGT_SET_NO	V93J6540C	TGT NO. SELECTED	ORB TGTING DISP		VAR			
R_FILT_DISP(1)	V90H5040C	X-COMP OF FLTRS CURR POS VCTR-DISP	ORB/RND NAV	KFT			89387D	
R_FILT_DISP(2)	V90H5041C	Y-COMP OF FLTRS CURR POS VCTR-DISP	ORB/RND NAV	KFT			89387D	
R_FILT_DISP(3)	V90H5042C	Z-COMP OF FLTRS CURR POS VCTR-DISP	ORB/RND NAV	KFT			89387D	
T_FILT_DAYS	V90W5043C	GMT DAYS OF FLTR STATE VCTR-DISP	ORB/RND NAV	DAYS			89387D	
T_FILT_HRS	V90W5044C	GMT HRS OF FLTR STATE VCTR-DISP	ORB/RND NAV	HRS			89387D	
T_FILT_MIN	V90W5045C	GMT MIN OF FLTR STATE VCTR-DISP	ORB/RND NAV	MIN			89387D	
T_FILT_SECS	V90W5046C	GMT SECS OF FLTR STATE VCTR-DISP	ORB/RND NAV	S			89387D	
V_FILT_DISP(1)	V90L5047C	X-COMP OF FLTRS CORR VEL VCTR-DISP	ORB/RND NAV	KFT/S			89387D	
V_FILT_DISP(2)	V90L5048C	Y-COMP OF FLTRS CORR VEL VCTR-DISP	ORB/RND NAV	KFT/S			89387D	
V_FILT_DISP(3)	V90L5049C	Z-COMP OF FLTRS CORR VEL VCTR-DISP	ORB/RND NAV	KFT/S			89387D	
	V94X4816X	ILLEGAL ENTRY MSG(ORBIT TGT)	UI					

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.25-6. OUTPUT FUNCTIONAL PARAMETERS FROM ORBIT TARGETING DISPLAY (REF 5.10 SPEC.) (G6.14)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
DISP_EL_ANG	V93H6530CA	T1 ELEVATION ANGLE	ORB TGT SPEC	DEG				
			ORB TGTING DISP					
DISP_PROX_DT	V93W6510CA	T2 DELTA T	ORB TGT SPEC	MIN				
			ORB TGTING DISP					
DISP_T1_DAY	V93W6501CA	T1 TIG (DAYS)	ORB TGT SPEC	DAY				
			ORB TGTING DISP					
DISP_T1_HR	V93W6502CA	T1 TIG (HRS)	ORB TGT SPEC	HR				
			ORB TGTING DISP					
DISP_T1_MIN	V93W6503CA	T1 TIG (MIN)	ORB TGT SPEC	MIN				
			ORB TGTING DISP					
DISP_T1_SEC	V93W6504CA	T1 TIG (SEC)	ORB TGT SPEC	S				
			ORB TGTING DISP					
DISP_T1_X(1)	V93L6543CA	T1 DELTA X/DN RNG	ORB TGT SPEC	FT				
			ORB TGTING DISP					
DISP_T1_X(2)	V93L6545CA	T1 DELTA Y	ORB TGT SPEC	FT				
			ORB TGTING DISP					
DISP_T1_X(3)	V93L6547CA	T1 DELTA Z/DELTA H	ORB TGT SPEC	FT				
			ORB TGTING DISP					
DISP_T1_XD(1)	V93U6550CA	T1 DELTA X DOT	ORB TGT SPEC	FT/S				
			ORB TGTING DISP					
DISP_T1_XD(2)	V93U6531CA	T1 DELTA Y DOT	ORB TGT SPEC	FT/S				
			ORB TGTING DISP					
DISP_T1_XD(3)	V93U6559CA	T1 DELTA Z DOT	ORB TGT SPEC	FT/S				
			ORB TGTING DISP					
DISP_T2_DAY	V93W6516CA	T2 TIG (DAYS)	ORB TGT SPEC	DAY				
			ORB TGTING DISP					
DISP_T2_HR	V93W6517CA	T2 TIG (HRS)	ORB TGT SPEC	HR				
			ORB TGTING DISP					
DISP_T2_MIN	V93W6518CA	T2 TIG (MIN)	ORB TGT SPEC	MIN				
			ORB TGTING DISP					
DISP_T2_SEC	V93W6519CA	T2 TIG (SEC)	ORB TGT SPEC	S				
			ORB TGTING DISP					
DISP_T2_XOFF	V93H6511CA	T2 DELTA X	ORB TGT SPEC	FT				
			ORB TGTING DISP					
DISP_T2_YOFF	V93H6514CA	T2 DELTA Y	ORB TGT SPEC	FT				
			ORB TGTING DISP					
DISP_T2_ZOFF	V93H6520CA	T2 DELTA Z	ORB TGT SPEC	FT				
			ORB TGTING DISP					
PROX_BASE_DAY	V93W6524CA	BASE TIME (DAYS)	ORB TGT SPEC	DAY				
			ORB TGTING DISP					
PROX_BASE_HR	V93W6525CA	BASE TIME (HRS)	ORB TGT SPEC	HR				
			ORB TGTING DISP					
PROX_BASE_MIN	V93W6526CA	BASE TIME (MIN)	ORB TGT SPEC	MIN				
			ORB TGTING DISP					
PROX_BASE_SEC	V93W6527CA	BASE TIME (SEC)	ORB TGT SPEC	S				
			ORB TGTING DISP					

TABLE 4.2.25-6. OUTPUT FUNCTIONAL PARAMETERS FROM ORBIT TARGETING DISPLAY (REF 5.10 SPEC.) (G6.14)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
PROX_ITEM_1_STATUS	V93X6556X	ITEM ENTRY 1 DATA CHANGED	ORB TGT SPEC					
PROX_ITEM_21_TO_24_STATUS	V93X6558X	ITEM ENTRY 21-24 DATA CHANGED	ORB TGT SPEC					
PROX_ITEM_25_STATUS	V93X6528X	T2 TO T1 XFER CMD	ORB TGT SPEC		BD			
PROX_ITEM_26_STATUS	V93X6535X	LOAD CMD	ORB TGT SPEC		BD			
PROX_ITEM_28_STATUS	V93X6537X	COMPUTE T1 CMD	ORB TGT SPEC		BD		89692B	
PROX_ITEM_29_STATUS	V93X6538X	COMPUTE T2 CMD	ORB TGT SPEC		BD		89692B	
PROX_ITEM_2_TO_20_STATUS	V93X6557X	ITEM ENTRY 2 THRU 20 DATA CHANGED	ORB TGT SPEC					
PROX_TGT_SET_NO	V93J6540C	TGT NO. SELECTED	ORB TGT SPEC		VAR			
			ORB TGTING DISP					

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
(HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

TABLE 4.2.25-7. ORBIT TARGETING DISPLAY (REF 5.10 SPEC.) (G6.14) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.25-8. ORBIT TARGETING DISPLAY (REF 5.10 SPEC.) (G6.14) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.25-9. ORBIT TARGETING DISPLAY (REF 5.10 SPEC.) (G6.14) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.26 UNIVERSAL POINTING (PFS)

TITLE: UNIV PTG

TYPE: OPS/2011

AVAILABILITY: PFS:GNC OPS 2

4.2.26.1 Purpose, Operation, and Organization

This display, presented in Figure 4.2.26, is the Major Mode 201 display and provides the crew with four mutually exclusive options for auto attitude control with respect to the ADI inertial reference frame. Three options are “universal” in that they are defined by data inputs by the crew. The other option is a “cancel” option that only holds the attitude that is current at the time the option is selected.

The first option is the maneuver option. It allows the crew to maneuver the Orbiter to a specified attitude at a specified start time.

The second option is the tracking option. It allows the crew to orient the Orbiter to point a specified body vector at another orbiting vehicle, an earth target, center of the earth (for LVLH hold), center of sun, or a celestial target at a specified start time.

The third option is the rotation option. It allows the crew to rotate the Orbiter about a specified body vector at the DAP selected rate beginning at a specified start time.

The fourth option is the cancel option. It allows the crew to deselect any other option and hold attitude automatically about the existing attitude at the time the cancel option is selected.

A capability to set the duration of, and execute or terminate a reboost is provided. The start of the reboost can be enabled to execute immediately or at a time in the future.

Also provided is the capability to monitor vehicle attitude parameters in roll, pitch, and yaw body coordinates.

- (1) The current maneuver completion time (CUR MNVR COMPL) is displayed in hours, minutes and seconds, and updated every two seconds in mission elapsed time (MET) during rotation maneuver and tracking control options whenever a maneuver is in progress until the attitude is within a given tolerance of the DAP attitude deadband about the desired attitude at which time it will be frozen. Also, whenever the DAP LVLH mode is selected, the maneuver completion time will be frozen if a maneuver was in progress. If a maneuver is not in progress when the cancel option, or the DAP “MAN” or LVLH mode is selected, the maneuver completion time is not changed and reflects the completion time of the last selected rotation maneuver, or tracking option. If the cancel option is selected, the MNVR COMPL time is reset to zero.

Items 1 through 4 provide the start time (START TIME) in days, hours, minutes, and seconds (in MET) for the selected control option. A control option will be initiated at the displayed time or at any time following that time providing the On-Orbit DAP is in the automatic attitude control mode and the appropriate control option is selected on this display. If the displayed time is in the past and a control option is selected, it will be initiated immediately. The start time (Items 1–4) will be initialized as zero the first time the display is called and thereafter will reflect crew inputs.

- (2) Items 5, 6, and 7 are used to select the roll, pitch, and yaw (R,P,Y) components respectively of the desired final inertial attitude of the vehicle for the maneuver option (MNVR OPTION) in degrees with respect to the Attitude Director Indicator (ADI) inertial coordinate system. These items will be initialized as zero the first time the display is called and thereafter will reflect crew inputs.
- (3) Item 8 selects the target identification (TGT ID) for the tracking option. The target identification consists of one to three decimal digits which identify the target line-of-sight as follows:

<u>TGT ID</u>	<u>LINE-OF-SIGHT TO</u>
1	Orbiting Vehicle
2	Center of Earth
3	Earth Surface
4	Center of Sun
5	Celestial Targets
6 Thru 10	Unassigned
11 Thru 110	Navigation Stars

This parameter is initialized to a value of 2 (two). The Line-Of-Sight (LOS) vector in each case is determined as described below:

- A. Center of Earth. The LOS to the center of the Earth is defined for local vertical attitude holds by the Orbiter vehicle state vector in Earth centered coordinates.
- B. Orbiting Vehicle. The LOS to another orbiting vehicle for rendezvous tracking is determined from the state vectors of the Orbiter and the other vehicle.
- C. Earth Relative Target. The Earth surface target LOS for surveillance attitude control is obtained from crew specified values of latitude, longitude, and altitude, or depth (negative altitude) from the Fisher Ellipsoid.
- D. Center of Sun. The LOS to the sun is defined by a polar ephemeris maintained by NAV in earth centered coordinates.
- E. Celestial Target. The celestial target LOS for inertial attitude holds is obtained from crew specified values of right ascension and declination.
- F. Navigation Stars. The LOS vectors to each of 100 navigation stars are obtained from the navigation star table.
- (4) Items 9 and 10 select right ascension (RA) and declination (DEC) respectively in degrees with respect to the mean-of-50 reference frame. These items are used for crew specification of celestial targets for inertial attitude control. Selected celestial targets (TGT ID equal to 4 or 5) as well as the navigation stars (TGT ID equal to 11 through 110) have their associated right ascension and declination displayed.

When a TGT ID equal to 5 is selected, the right ascension and declination data will flash. This flashing indicates to the crew that they have the option to change the data via the keyboard. Flashing will continue until the data is entered, a control option selection is made, or if the TGT ID is changed. Any attempt to enter data into any of these items when the TGT is not equal to 5 shall result in an “ILLEGAL ENTRY” message being generated.

When any of the TGT ID’s for navigation stars are selected, the RA and DEC will be displayed from the navigation star table. Any attempt to write over this display will result in an “ILLEGAL ENTRY” message. These Items (9 and 10) will be initially displayed as zero for the celestial targets.

- (5) Items 11, 12, and 13 select latitude (LAT), longitude (LON), and altitude (ALT) respectively with respect to the Fischer ellipsoid. When the TGT ID for Earth relative targets (ID equal to 3) is selected, these Earth site parameters will flash. This flashing indicates to the crew that they have the option to change the data using appropriate item inputs. The flashing will continue until the data is entered, a control option is selected, or the target ID is changed. Any attempt to enter data into any of these items when the TGT ID is not equal to 3 shall result in an “ILLEGAL ENTRY” message being generated. These items will be initially displayed as zero.
- (6) Item 14 selects the body vector (BODY VECT) which is pointed along the LOS for the tracking option and along the axis of rotation for the rotation option. The BODY VECT identifiers are as follows:

<u>BODY VECT IDENTIFIER</u>	<u>AXIS</u>
1	+X
2	-X
3	-Z
4	-Y ST
5	Selectable

Any attempt to load other identifiers will result in an “ILLEGAL ENTRY” message. The identifier will be initially loaded with a value of 1 (one).

- (7) Items 15 and 16 select the pitch (P) and yaw (Y) components (displayed in degrees) respectively for the Orbiter vehicle body vector. Selection of a BODY VECT identifier initiates the display of the corresponding body vector components. Selection of the Selectable BODY VECT identifier (BODY VECT identifier equal to 5) causes the pitch and yaw component data to commence flashing. This flashing indicates to the crew that these components may be written over with new values. The flashing will continue until data is entered, a control option selection is made, or the body vector selection is changed. Attempting to load data outside of the allowable range (0 to 359.99 DEGS for P) and (270 to 359.99 or 0 to 90 DEGS for Y) will result in generation of an “ILLEGAL ENTRY” message. Attempting to load any data for identifiers other than 5 will also trigger an “ILLEGAL ENTRY” message. These items will be initialized as zero the first time the display is called and thereafter will reflect crew inputs.

- (8) Item 17 selects the Omicron (OM) angle for the tracking (TRK) control option. Omicron specifies the Orbiter vehicle attitude orientation about the pointing Line-Of-Sight. It is the angle between a plane formed by the negative orbital angular momentum vector and the target vector and the plane formed by the +Y axis and body pointing vector. Where the +Y axis is the body vector, the second plane shall be formed by the +Y axis and the -Z axis.

Selection of a TGT ID of any defined value causes the value of OM to blank on the display. If the TRK control option is subsequently selected OM remains blank. This indicates that two axis tracking is selected. On the other hand, if Omicron is executed, and the TRK control option is subsequently selected while a finite value exists on the OM display, then three axis tracking is selected. Attempting to load data outside of the allowable range (0 to 359.99 DEGS) will result in generation of an "ILLEGAL ENTRY" message. Entering a body vector identifier while three axis tracking is selected, initiates the flashing of the value of Omicron. Flashing continues until data is loaded or a control option selection is made. Omicron is initially zero when the display is first called.

- (9) Items 18, 19, and 20 select the maneuver (MNVR), tracking (TRK), or rotation (ROT) control option respectively. Initiation of any of these control options occurs as a result of executing the appropriate item number and is dependent upon the selection of the automatic attitude control mode in the On-Orbit DAP. The time at which a control option is initiated is dependent upon the START TIME. If the start time is current or in the past, the control function will be initiated when selected and an asterisk(*) will appear momentarily in the (FUT) column next to the selected option, move to the current (CUR) next to the selected option and any other option in progress will be deselected (i.e., asterisk(*) removed). If the start time is in the future, the control option will be initiated when the specified start time occurs and in the meantime an asterisk(*) will appear in the future (FUT) column adjacent to the selected option. Whenever a future option's start time is within 30 seconds of current time and "AUTO" is not selected on the orbital DAP panel a Class 3 alert and CRT message "SEL AUTO" will be generated. While one option is being executed, the crew may enter data for a single future option without interrupting execution of the current option. When an option is selected to be executed in the future, the asterisk(*) indicating the selected option will appear in the Future (FUT) column opposite the applicable option. The asterisk(*) indicating the active option will remain next to the current option in the current (CUR) column. When the current time is equal to the Future option's start time, the asterisk(*) in the future (FUT) column will be blanked and an asterisk(*) displayed in the options current (CUR) column. When a Future option becomes current any other option active at that time will be deselected. If a future tracking, rotation or maneuver option has been selected and any data required for the selected option is changed prior to the future start time, the appropriate discrete shall be output to deselect the future option. The crew must then reselect the desired future option to be executed.
- (10) Item 21 selects the maneuver cancel (CNCL) control option. Executing the CNCL option deselects both current and future control options and initiates an inertial attitude hold at the current attitude. No asterisk(*) is displayed after Item 21 when it is selected or reselected. The CNCL option will be deselected upon any other subsequent OPTION selection. The display will be initialized the first time with Item 21 selected.

- (11) Item 22 selects the coordinate reference or attitude monitor axis (ATT MON AXIS) for the display of attitude angles, errors, and rates. The parameter has two values. Executing a value of "1" for the monitor axis will initiate the display of "1 +X" adjacent to MON AXIS. In that case, the attitude monitor quantities will be displayed relative to the standard Orbiter body axis coordinate system. However, executing a value of "2" for the monitor axis will initiate the display of "2 -X" adjacent to MON AXIS. In that case, the attitude monitor quantities will be displayed relative to a coordinate system that is rotated 180 degrees about the Z axis with respect to the standard body coordinate system. The display will be initialized the first time it is called with the standard Orbiter body axis coordinates (22 MON AXIS equal to "1 +X") displayed.
- (12) Items 23 and 24 select total attitude error (ERR TOT) and DAP attitude error (ERR DAP) respectively. These items are mutually exclusive and control the type of attitude errors to be displayed by the ADI error needles and on this display. Total attitude errors are obtained from the difference between the current and required attitudes measured with respect to the eigen axis. DAP attitude errors are obtained from the difference between the DAP derived desired attitude and the DAP state estimator determination of the current attitude. The display and the ADI are initialized with total attitude errors selected.
- (13) Total attitude, error, and rate are displayed as part of the attitude monitor function on this display. Both current (CUR) and required (REQD) attitudes are displayed in Euler angles relative to the ADI inertial coordinate system. Attitude errors (ERR) are those described in paragraph 12 above. Attitude rate (RATE) is obtained from the DAP state estimator. The final desired attitude and attitude errors will be displayed while the orbital DAP mode switch is in "auto" or "manual" if (1) any current option is selected or (2) a future (MNVR) or (TRK) option is selected and there is not a current option selected. Whenever the LVLH DAP mode or the CNCL option is selected, or no current option is active and a future (MNVR) or (TRK) option is deselected due to data change, the required attitude is set equal to the current attitude and the attitude errors are zeroed. For the LVLH DAP mode, the attitude errors are set to zero each completed cycle. When the display is first called with the CNCL option selected, the required attitude is equal to the current attitude and the attitude errors are zero initially and will then vary depending upon the DAP deadband.
- (14) Items 25, 26 and 27-29 provide control of a reboost burn. Item 25 initiates a request for a reboost if the reboost duration is not zero. The reboost duration time in hours, minutes, and seconds may be entered via items 27-29. If a request is executed, a reboost will be enabled at the start time shown by items 1-4, or immediately if the start time is in the past. An asterisk (*) will reflect either the current (CUR) or future (FUT) status of the reboost request. When a reboost is in progress, the status will display an asterisk under current and the duration timer will decrement to reflect the time remaining. Upon completion or interruption of the reboost, the current indicator will clear and the duration will be zeroed. Item 26 provides cancellation of the reboost, causes the current and future asterisk indicators to blank, and resets the duration time to zero. Both status indicators shall be initialized blank on first entry into OPS 2 and reset by Universal Pointing Proc on subsequent OPS 2 entries. The reboost duration shall be initialized to zero on the first pass entering OPS 2.

NOTES:

- (1) All entered data will remain on the display until a particular item is entered again or will blank as specified in paragraph (8).

- (2) The cyclic processing to orient the Orbiter as specified by one of the three universal pointing options will be terminated or inhibited by:
- a. Executing the maneuver item on the MNVR EXEC display, which will relinquish orientation control to the MNVR EXEC display.
 - b. Selecting the LVLH mode.
 - c. Execution of the terminate (CNCL) control item number terminates the cyclic processing for Orbiter attitude control and deselects all previous options. If "AUTO" control on the orbital DAP mode switch is selected when this control is executed, the Orbiter will go to attitude hold and attitude errors will be displayed with respect to the current attitude when the cancel option was selected. If subsequent to selecting the CNCL option in Auto, a Manual Maneuver is performed, attitude errors with respect to the CNCL ATT hold attitude will be displayed. If after the Manual Maneuver the DAP control is returned to Auto, the S/C will remain in inertial Attitude hold with attitude errors displayed with respect to the previous CNCL ATT HOLD ATTITUDE. These errors can be zeroed by reselecting the cancel option which will then display errors with respect to the current attitude regardless of whether you are in AUTO or MAN DAP control.
 - d. Reinitiation criteria – If the terminate (CNCL) control has not been executed, the cyclic processing to orient the Orbiter will be reestablished by:

Exiting the MNVR EXEC Major Mode.

Selecting LVLH on the orbital DAP control panel reinitiates the LVLH processing done by UNIV POINT PROC (4.213) but does not reinitiate any other Auto Maneuver Mode.

Selecting "AUTO" control on the orbital DAP control panel.

Either of the above will allow the Orbiter to be oriented as specified by the currently–selected option.

If the terminate (CNCL) control has been executed, the cyclic processing will not be initiated until another option is selected on this display.

4.2.26.2 Universal Pointing (PFS) Keyboard Processing Addendum

- A. If subsequent to selection of the future maneuver data, a required future option is changed by data entry in Items 5 through 7 prior to the future start time, the discrete signal (V93X6884X) is set and sent to UNIV POINT PROC (4.213) to deselect the future option.
- B. If subsequent to selection of the future tracking option data, a required future option is changed by data entry in Items 8 thru 17 prior to the future start time, the discrete signal (V93X6882X) is set and sent to the UNIV POINT PROC (4.213) to deselect the future option.
- C. If subsequent to selection of the future rotation data, a required future option is changed by data entry in Items 14 thru 16 prior to the future start time, the signal (V93X6883X) is set and sent to the UNIV POINT PROC (4.213) to deselect the future option.

- D. The attitude pointing option selected is defined by one signal (V93J6829C) with the following four states:
 - 0 – No option selected
 - 1 – MNVR option selected
 - 2 – Tracking option selected
 - 3 – Rotation Option selected

- E. The monitor axis selected is defined by one signal (V93U6868C) with the following two states:
 - 1 – +X CONTROL AXIS selected
 - 2 – -X CONTROL AXIS selected

- F. The attitude error selected is defined by one signal (V93X6845X) with the following two states:
 - 0 – DAP errors selected
 - 1 – Total errors selected

The signal is sent to ORB ADI PROC (4.169), UNIV POINT PROC (4.213) and CRT (6.27).

- G. When data is entered into TGT ID, Item 8, a signal (V93X6881X) is reset, the UNIV POINT PROC (4.213) enables the two-axis maneuver and Omicron, Item 17 is blanked. When data is entered into Item 17, a discrete signal (V93X6881X) is set and the UNIV POINT PROC (4.213) enables the three-axis maneuver.

- H. When data is entered into Items 1 through 4, a discrete signal (V93X6885X) is set and sent to the UNIV POINT PROC (4.213) to deselect any future option.

- I. The Body Vector is defined by one signal (V93U6805C) with the following five states:

<u>State</u>	<u>Body Vector</u>
1	+X axis
2	-X axis
3	-Z axis
4	-Y ST
5	Universal Option

- J. The target vector ID is defined by the signal (V93U6810C) with the following states:

<u>State</u>	<u>Target Type</u>
1	Orbital Object (Rendezvous Target)
2	Center of Earth
3	Earth Relative Target (requires manual entry definition)
4	Center of Sun
5	Celestial (requires manual entry definition)
6 thru 10	Unassigned
11–110	Navigation Stars

Specification of states other than defined above (I and J) shall result in an “ILLEGAL ENTRY” message.

- K. The maneuver termination signal (V93X6871X) is mutually exclusive with the current option signal (V93J6829C). Execution of Item 18, 19, or 20 shall reset the maneuver termination signal.
- L. If a reboost request Item 25 is executed and the reboost duration time is not zero, the reboost request (V94X0214X) will be set. Execution of item 25 while the duration is equal to zero shall result in an “ILLEGAL ENTRY” message and no further action.
- M. A reboost cancel Item 26 initiates a reboost cancellation command to the Orbit DAP (4.35) and the UNIV POINT PROC (4.213). The Orbit DAP will reset the reboost enable after transitioning to rotation control. The UNIV POINT PROC will zero the reboost duration time and when the reboost enable is reset will blank the FUT and CUR statuses and reset the cancel command RBST_CNCL (V94X0217X).
- N. The reboost duration Items 27, 28 and 29 provide input of the desired reboost duration time in hours, minutes, and seconds. Entry of a new duration while a reboost is in progress, RBST_CUR (V94X0216X) is set, shall result in an “ILLEGAL ENTRY” message and the input will be rejected. Entry of a new duration while a future reboost is pending shall result in a reset of the pending reboost, RBST_FUT (V94X0215X) reset, thus requiring another reboost request to re-initiate a reboost at the new duration. Entry of the duration hours, minutes, or seconds will initiate a re-calculation of the reboost duration (V94W0213C) in total seconds for output to the ORB DAP (4.35) and TLM.
- O. If subsequent to selection of a future reboost and prior to start of the future reboost a new start time is entered in items 1-4, the pending reboost shall be reset, RBST_FUT(V94X0215X) reset, thus requiring another reboost request to re-initiate a reboost at the new start time.
- P. This Item Entry will accept inputs in degrees, outputs to other functions will be converted to radians.

4.2.26.3 Universal Pointing (PFS) CRT Display Processing Addendum

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word “STAT” being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT display processing Table 4.2.26–2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the “M” PSI is displayed (for Commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)			
Blank (default)	↓		M	∅
1	↓	↑	M	∅
2		↑	M	∅
3	↓			∅
4		↑		∅
5	↓		?	∅
6	↓	↑		∅
7			M	∅
8	↓		?	M ∅
9			?	M ∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.2.26–2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. Current maneuver completion time is displayed in hours:minutes:seconds. Input is converted from seconds in User Interface.
- B. These signals shall display (non-flashing) the preloaded body vectors when input values of 1 thru 4 are loaded into Item 14 (BODY VECT). Attempt to overwrite these values will result in an “ILLEGAL ENTRY” message. These signals shall flash the previous loaded values when 5 (Universal Option) is loaded into Item 14. Flashing will cease upon entry of Item numbers 18, 19, 20, or 21. Data entry via Item 15 and 16 shall terminate flashing of the P and Y data fields respectively. Selection of a BODY VECT (Item 14) other than Universal shall terminate flashing of both P and Y data fields. The source for this signal is UNIV POINT PROC (4.213) or KYBD (6.27).
- C. Omicron shall be blanked when the target ID is entered. If a body vector ID is entered via Item 14, the value of OMICRON displayed shall flash. Flashing shall continue until either new data is loaded via Item 17 or a control option selection is made via Items 18,19, or 20. If OMICRON is blank, maneuvers will be 2-axis maneuvers.

- D. Current option indicator asterisk(*) is defined by one signal (V95J7482C) which has four states:
- 0 – No current option selected
 - 1 – MNVR current option selected
 - 2 – Tracking current option selected
 - 3 – Rotation current option selected
- E. Future option indicator asterisk(*) is defined by one signal (V95J7483C) which has four states:
- 0 – No future option selected
 - 1 – MNVR future option selected
 - 2 – Tracking future option selected
 - 3 – Rotation future option selected
- F. The monitor axis signal (V93U6868C) has the following states which are crew input. The following defines the text which is to be displayed for each state.

<u>Signal Values</u>	<u>Text</u>
1	+x
2	-x

- G. When the value 5 (Celestial Target) is entered as the target ID (Item 8) the RA and DEC data fields shall flash. Data entry via Items 9 and 10 shall terminate the flashing of RA and DEC, respectively. Selection of a different target ID (different from 5) shall stop the flashing of both RA and DEC data fields. Attempts to enter data into RA or DEC (Items 9 or 10) when target ID is not equal to 5 shall result in an “ILLEGAL ENTRY” message. The source for this signal is UNIV POINT PROC (4.213) or KYBD (6.27).
- H. When the value 3 (Earth Relative Target) is entered as the target ID (Item 8) the LAT, LON, and ALT data fields shall flash. Data entry via Items 11, 12, and 13 shall terminate the flashing of LAT, LON, and ALT respectively. Selection of a different target ID (different from 3) shall stop the flashing of LAT, LON, and ALT data fields. Attempts to enter data into LAT, LON, or ALT when target ID is not equal to 3 shall result in an “ILLEGAL ENTRY” message.
- I. The reboost request indicators reflect the status of the reboost burn. If the burn of a non-zero duration has been requested for a start time in the future, an asterisk (*) will be shown under the reboost FUT column. If a reboost is requested for a start time in the past or if the current time reaches the start time for a pending reboost, the asterisk in the FUT column is blanked and an asterisk will be displayed in the reboost CUR column. If the reboost is interrupted or completes naturally, the reboost CUR and FUT asterisks will be blanked. The reboost CUR and FUT statuses are driven by outputs from the UNIV POINT PROC (4.213), RBST_CUR (V94X0216X) and RBST_FUT (V94X0215X) respectively.
- J. The reboost duration hours, minutes, and seconds reflect either the required duration of the desired reboost burn or the time remaining of a burn in progress. Prior to a reboost burn, the duration time will display the keyboard entry of the desired reboost duration. As the burn is in progress, the duration time will be updated by the UNIV POINT PROC (4.213) to reflect the time remaining in the reboost burn. The duration time will be set to zero by the UNIV POINT PROC (4.213) on the immediate pass following a completion, interruption, or cancellation of a reboost burn.

K. This parameter is converted from a unit of radians to degrees for display.

4.2.26.4 Universal Pointing Figure/Table References

Figure 4.2.26-1	Universal Pointing Display (PFS)
Table 4.2.26-1	Keyboard Processing Table
Table 4.2.26-2	CRT Display Processing Table
Table 4.2.26-3	CRT Display Processing Background Requirements N/A
Table 4.2.26-4	Mission Design Background Constants N/A
Table 4.2.26-5	Input Functional Parameters
Table 4.2.26-6	Output Functional Parameters
Table 4.2.26-7	I-Loads
Table 4.2.26-8	K-Loads
Table 4.2.26-9	Constants

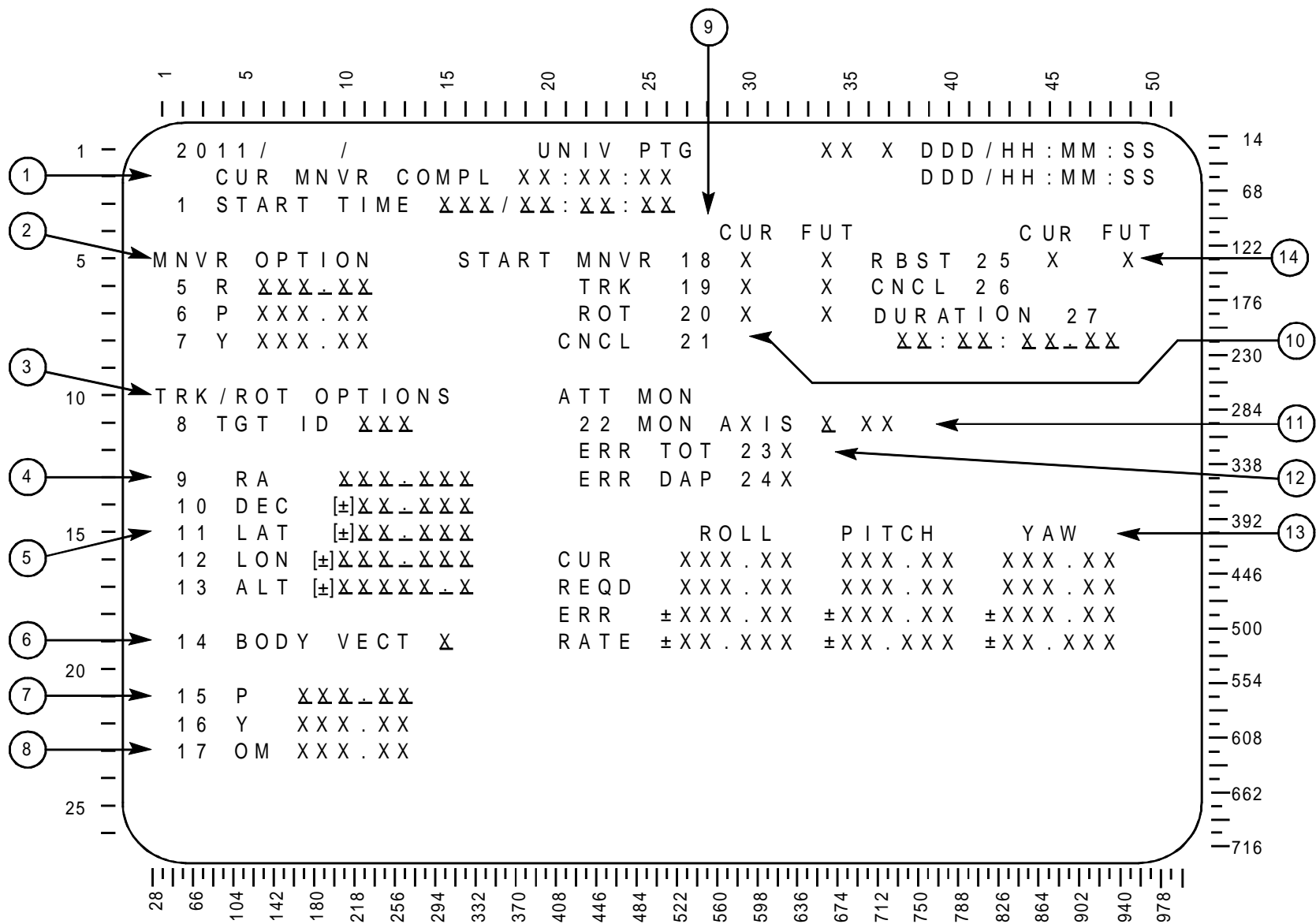


FIGURE 4.2.26-1. Universal Pointing Display (PFS)

Table 4.2.26-1. UNIVERSAL POINTING (PFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
001	1 START TIME (DAYS)	V93W6801C	4.0	DEC	DAYS		1	000	365	H	UNIV PTG,CRT	MNVR START TIME(DAYS)	X
002	2 START TIME (HOURS)	V93W6802C	3.0	DEC	HRS		2	00	23	H	UNIV PTG,CRT	MNVR START TIME (HR)	X
003	3 START TIME (MINS)	V93W6803C	3.0	DEC	MINS		3	00	59	H	UNIV PTG,CRT	MNVR START TIME (MIN)	X
004	4 START TIME (SEC)	V93W6804C	3.0	DEC	SECS		4	00	59	H	UNIV PTG,CRT	MNVR START TIME (SEC)	X
005	5 R	V93H6837C	7.2	DEC	DEG		5	000.00	359.99	AP	UNIV PTG,CRT	INPUT INERTIAL ROLL ANGLE	X
006	6 P	V93H6838C	7.2	DEC	DEG		6	000.00	359.99	AP	UNIV PTG,CRT	INPUT INERTIAL PITCH ANGLE	X
007	7 Y	V93H6839C	7.2	DEC	DEG		7	000.00	090.00	AP	UNIV PTG,CRT	INPUT INERTIAL YAW ANGLE	X
008								270.00	359.99				
009	8 TGT ID	V93U6810C	4.0	DEC			8	01	05	BGJ	UNIV PTG,CRT	TGT VECTOR ID	X
010								11	110				
011	9 RA	V93H6813C	8.3	DEC	DEG		9	000.000	359.999	BP	UNIV PTG,CRT	TARGET VECTOR RIGHT ASCENSION	X
012	10 DEC	V93H6815C	7.3	DEC	DEG		10	-90.000	+90.000	BP	UNIV PTG,CRT	DEC OF CELEST TGT	X
013	11 LAT	V93H6820C	7.3	DEC	DEG		11	-90.000	+90.000	BP	UNIV PTG,CRT	LAT OF EARTH-FIXED TGT	X
014	12 LON	V93H6821C	8.3	DEC	DEG		12	-180.000	+180.000	BP	UNIV PTG,CRT	LONG OF EARTH-FIXED TGT	X
015	13 ALT	V93H6822C	8.1	DEC	NM		13	-3444.0	+20000.0	B	UNIV PTG,CRT	ALT OF EARTH-FIXED TGT	X
016	14 BODY VECT	V93U6805C	2.0	DEC			14	1	5	BCI	UNIV PTG,CRT	BODY VECTOR ID	X
017	15 P	V93U6806C	7.2	DEC	DEG		15	000.00	359.99	BCP	UNIV PTG,CRT	BODY VECTOR PITCH COORDINATE	X
018	16 Y	V93U6807C	7.2	DEC	DEG		16	000.00	090.00	BCP	UNIV PTG,CRT	BODY VECTOR YAW COORDINATE	X
019								270.00	359.99				
020	17 OM	V93H6825C	7.2	DEC	DEG		17	000.00	359.99	BGP	UNIV PTG,CRT	OMICRON	X
021	START MNVR 18	V93J6829C	0.0	CTRL			18			D	UNIV PTG	SELECTED ATTITUDE OPTION	X
022*	START TRK 19	V93J6829C	0.0	CTRL			19			D	UNIV PTG	SELECTED ATTITUDE OPTION	X
023*	START ROT 20	V93J6829C	0.0	CTRL			20			D	UNIV PTG	SELECTED ATTITUDE OPTION	X
024*	CNCL 21	V93X6871X	0.0	CTRL			21			K	UNIV PTG	MANEUVER TERMINATION	X
025	22 MON AXIS	V93U6868C	2.0	DEC			22	1	2	E	UNIV PTG,CRT	MONITOR AXIS INDICATOR	X
026	ERR TOT 23	V93X6845X	0.0	CTRL			23			F	UNIV PTG	TOTAL/DAP ERROR SELECT FLAG	X
027*	ERR DAP 24	V93X6845X	0.0	CTRL			24			F	UNIV PTG	TOTAL/DAP ERROR SELECT FLAG	X
028	RBST RQST 25	V94X0214X	0.0	CTRL			25			L, O	UNIV PTG	REBOOST REQUEST	X
029	RBST CNCL 26	V94X0217X	0.0	CTRL			26			M	UNIV PTG, 4.35	REBOOST CANCEL	X
030	27 RBST DURATION (HRS)	V94W0210C	3.0	DEC	HRS		27	00	23	N	CRT	RBST DURATION HOURS	X

Table 4.2.26-1. UNIVERSAL POINTING (PFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
031	28 RBST DURATION (MINS)	V94W0211C	3.0	DEC	MINS		28	00	59	N	CRT	RBST DURATION MINS	X
032	29 RBST DURATION (SECS)	V94W0212C	6.2	DEC	SECS		29	00.00	59.99	N	CRT	RBST DURATION SECS	X

Table 4.2.26-2. UNIVERSAL POINTING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T		
			X	Y		CHAR	BILEVEL																	TYPE	
							1	0																	
001	(OPS)	V93X0040X	2	1		5.0															UI	OPS FUNCTION PAGE	X		
002	(SPEC)	V93X0042X	7	1		4.0																UI	SPEC FUNCTION PAGE	X	
003	(DISP)	V93X0044X	10	1		4.0																UI	DISPLAY FUNCTION PAGE	X	
004	(UL)	V92X5032X	34	1		2.0	UL							X								UI	UPLINK ACTIVITY IND	X	
005	(GPC)	V93X0048X	36	1		2.0																UI	GPC DRIVER	X	
006	(MT)	V91W1990C	39	1		12.0																FCOS	MISSION ELAPSED TIME	X	
007	(CRT TIMER)	V91W1987C	39	2		12.0																FCOS	DISPLAY CRT TIMER.GNC	X	
008	CUR MNVR COMPL	V95W7472C	19	2		8.0														A	UNIV PTG	CURRENT MNVR COMPL MET	X		
009	1 START TIME (DAYS)	V93W6801C	14	3		4.0																KYBD	MNVR START TIME(DAYS)	X	
010	2 START TIME (HOURS)	V93W6802C	18	3		3.0																KYBD	MNVR START TIME (HR)	X	
011	3 START TIME (MINS)	V93W6803C	21	3		3.0																KYBD	MNVR START TIME (MIN)	X	
012	4 START TIME (SEC)	V93W6804C	24	3		3.0																KYBD	MNVR START TIME (SEC)	X	
013	5 R	V93H6837C	5	6		7.2															K	KYBD	INPUT INERTIAL ROLL ANGLE	X	
014	6 P	V93H6838C	5	7		7.2															K	KYBD	INPUT INERTIAL PITCH ANGLE	X	
015	7 Y	V93H6839C	5	8		7.2															K	KYBD	INPUT INERTIAL YAW ANGLE	X	
016	8 TGT ID	V93U6810C	10	11		4.0															CGH	KYBD	TGT VECTOR ID	X	
017	9 RA	V93H6813C	9	13		8.3								X							GK	UNIV PG,KYBD	TARGET VECTOR RIGHT ASCENSION	X	
018	10 DEC	V93H6815C	10	14		7.3								X		X					GK	UNIV PG,KYBD	DEC OF CELEST TGT	X	
019	11 LAT	V93H6820C	10	15		7.3								X	E	X					HK	KYBD	LAT OF EARTH-FIXED TGT	X	
020	12 LON	V93H6821C	9	16		8.3								X	E	X					HK	KYBD	LONG OF EARTH-FIXED TGT	X	
021	13 ALT	V93H6822C	9	17		8.1								X	E	X					H	KYBD	ALT OF EARTH-FIXED TGT	X	
022	14 BODY VECT	V93U6805C	14	19		2.0																BC	KYBD	BODY VECTOR ID	X
023	15 P	V93U6806C	7	21		7.2								X								BK	UNIV PG,KYBD	BODY VECTOR PITCH COORDINATE	X
024	16 Y	V93U6807C	7	22		7.2								X								BK	UNIV PG,KYBD	BODY VECTOR YAW COORDINATE	X
025	17 OM	V93H6825C	7	23		7.2				X				X	E							CK	KYBD	OMICRON	X
026	START MNVR 18 CUR	V95J7482C	30	5		1.0																D	UNIV PTG	CURRENT OPTION INDICATOR	X
027*	START TRK 19 CUR	V95J7482C	30	6		1.0																D	UNIV PTG	CURRENT OPTION INDICATOR	X
028*	START ROT 20 CUR	V95J7482C	30	7		1.0																D	UNIV PTG	CURRENT OPTION INDICATOR	X
029	START MNVR 18 FUT	V95J7483C	34	5		1.0																E	UNIV PTG	FUTURE OPTION IND	X
030*	START TRK 19 FUT	V95J7483C	34	6		1.0																E	UNIV PTG	FUTURE OPTION IND	X
031*	START ROT 20 FUT	V95J7483C	34	7		1.0																E	UNIV PTG	FUTURE OPTION IND	X
032	22 MON AXIS	V93U6868C	33	11		2.0																F	KYBD	MONITOR AXIS INDICATOR	X
033*	MON AXIS XX	V93U6868C	36	11		2.0																F	KYBD	MONITOR AXIS INDICATOR	X
034	ERR TOT 23	V93X6845X	32	12		1.0	*																KYBD	TOTAL/DAP ERROR SELECT FLAG	X
035*	ERR DAP 24	V93X6845X	32	13		1.0		*															KYBD	TOTAL/DAP ERROR SELECT FLAG	X

Table 4.2.26-2. UNIVERSAL POINTING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
036	ATT CUR ROLL	V95H7473C	26	16		7.2			DEC	DEG										K	UNIV PTG	CURRENT INERTIAL ROLL ANGLE	X	
037	ATT CUR PITCH	V95H7474C	34	16		7.2			DEC	DEG										K	UNIV PTG	CURRENT INERTIAL PITCH ANGLE	X	
038	ATT CUR YAW	V95H7475C	42	16		7.2			DEC	DEG										K	UNIV PTG	CURRENT INERTIAL YAW ANGLE	X	
039	ATT REQD ROLL	V95H7467C	26	17		7.2			DEC	DEG										K	UNIV PTG	REQD INERTIAL ROLL ANGLE	X	
040	ATT REQD PITCH	V95H7468C	34	17		7.2			DEC	DEG										K	UNIV PTG	REQD INERTIAL PITCH ANGLE	X	
041	ATT REQD YAW	V95H7484C	42	17		7.2			DEC	DEG										K	UNIV PTG	REQD INERTIAL YAW ANGLE	X	
042	ATT ERR ROLL	V95H7490C	26	18		7.2			DEC	DEG						X					UNIV PTG	ROLL ATTITUDE ERROR	X	
043	ATT ERR PITCH	V95H7491C	34	18		7.2			DEC	DEG						X					UNIV PTG	PITCH ATTITUDE ERROR	X	
044	ATT ERR YAW	V95H7492C	42	18		7.2			DEC	DEG						X					UNIV PTG	YAW ATTITUDE ERROR	X	
045	ATT RATE ROLL	V95R7476C	26	19		7.3			DEC	DPS						X					UNIV PTG	IMU BODY RATE AROUND X-AXIS	X	
046	ATT RATE PITCH	V95R7477C	34	19		7.3			DEC	DPS						X					UNIV PTG	IMU BODY RATE AROUND Y-AXIS	X	
047	ATT RATE YAW	V95R7487C	42	19		7.3			DEC	DPS						X					UNIV PTG	IMU BODY RATE AROUND Z-AXIS	X	
048	RBST_FUT 25	V94X0215X	49	5		1.0	*		BLVL											I	UNIV PTG	REBOOST FUTURE STATUS	X	
049	RBST_CUR 25	V94X0216X	45	5		1.0	*		BLVL											I	UNIV PTG	REBOOST CURRENT STATUS	X	
050	27 RBST DURATION (HRS)	V94W0210C	37	8		3.0			DEC	HRS										J	KYBD, UNIV PTG	RBST DURATION HOURS	X	
051	28 RBST DURATION (MINS)	V94W0211C	40	8		3.0			DEC	MINS										J	KYBD, UNIV PTG	RBST DURATION MINS	X	
052	29 RBST DURATION (SECS)	V94W0212C	43	8		6.2			DEC	SECS										J	KYBD, UNIV PTG	RBST DURATION SECS	X	
053	(MSG LINE)	V93X0050X	1	25		44.0			CHAR												UI	MESSAGE LINE	X	
054	(BUFFER MSG)	V93X0054X	45	25		4.0			CHAR												UI	BUFFER MESSAGE INDICATOR	X	
055	(SPL)	V93X0056X	2	26		49.0			CHAR												UI	SCRATCH PAD LINE	X	

TABLE 4.2.26-5. INPUT FUNCTIONAL PARAMETERS FOR UNIVERSAL POINTING DISPLAY (G6.27)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
ATT_ERR(1)	V95H7490C	ROLL ATTITUDE ERROR	UNIV POINT PROC	DEG	SPL		93017G	*
ATT_ERR(2)	V95H7491C	PITCH ATTITUDE ERROR	UNIV POINT PROC	DEG	SPL		93017G	*
ATT_ERR(3)	V95H7492C	YAW ATTITUDE ERROR	UNIV POINT PROC	DEG	SPL		93017G	*
ATT_RATE(1)	V95R7476C	IMU BODY RATE AROUND X-AXIS	UNIV POINT PROC	DEG/S	SPL		93017G	*
ATT_RATE(2)	V95R7477C	IMU BODY RATE AROUND Y-AXIS	UNIV POINT PROC	DEG/S	SPL		93017G	*
ATT_RATE(3)	V95R7487C	IMU BODY RATE AROUND Z-AXIS	UNIV POINT PROC	DEG/S	SPL		93017G	*
BODV_ID	V93U6805C	BODY VECTOR ID	UNIV PTG DISP		HXS		93017G	*
BODV_PITCH	V93U6806CA	BODY VECTOR PITCH COORDINATE	UNIV POINT PROC		RAD		92749B	
BODV_PITCH	V93U6806CB	BODY VECTOR PITCH COORDINATE	UNIV PTG DISP		RAD		93017G	*
BODV_YAW	V93U6807CA	BODY VECTOR YAW COORDINATE	UNIV POINT PROC		RAD		92749B	
BODV_YAW	V93U6807CB	BODY VECTOR YAW COORDINATE	UNIV PTG DISP		RAD		93017G	*
ERR_SEL	V93X6845X	TOTAL/DAP ERROR SELECT FLAG	UNIV PTG DISP		BD		93017G	*
IDAY	V93W6801C	MNVR START TIME(DAYS)	UNIV PTG DISP	D/H/M/S	HXS		93017G	*
Ihour	V93W6802C	MNVR START TIME (HR)	UNIV PTG DISP	HR	HXS		93017G	*
IMIN	V93W6803C	MNVR START TIME (MIN)	UNIV PTG DISP	MIN	HXS		93017G	*
ISEC	V93W6804C	MNVR START TIME (SEC)	UNIV PTG DISP	S	HXS		93017G	*
MNVR_CMPL_TIME	V95W7472C	CURRENT MNVR COMPL MET	UNIV POINT PROC		S		89662B	
MON_AXIS	V93U6868C	MONITOR AXIS INDICATOR	UNIV PTG DISP		VAR			
OMICRON	V93H6825C	OMICRON	UNIV PTG DISP	RAD	SPL		93017G	*
OPT_CUR	V95J7482C	CURRENT OPTION INDICATOR	UNIV POINT PROC		HXS		93017G	*
OPT_FUT	V95J7483C	FUTURE OPTION IND	UNIV POINT PROC		HXS		93017G	*
PITCHC	V95H7474C	CURRENT INERTIAL PITCH ANGLE	UNIV POINT PROC	RAD	SPL		93017G	*
PITCHI	V93H6838C	INPUT INERTIAL PITCH ANGLE	UNIV PTG DISP	RAD	SPL		93017G	*
PITCHR	V95H7468C	REQD INERTIAL PITCH ANGLE	UNIV POINT PROC	RAD	SPL		93017G	*
RBST_CUR	V94X0216X	REBOOST CURRENT STATUS	UNIV POINT PROC		BD		93017G	*
RBST_DURATION	V94W0213CB	REBOOST DURATION	UNIV POINT PROC	S	SPL		93017G	*
RBST_FUT	V94X0215XB	REBOOST FUTURE STATUS	UNIV POINT PROC		BD		93017G	*
RBST_HOUR	V94W0210CA	RBST DURATION HOURS	UNIV PTG DISP	HR	HXS		92187F	
RBST_HOUR	V94W0210CB	RBST DURATION HOURS	UNIV POINT PROC	HR	HXS		92187F	
RBST_MIN	V94W0211CA	RBST DURATION MINS	UNIV PTG DISP	MIN	HXS		92187F	
RBST_MIN	V94W0211CB	RBST DURATION MINS	UNIV POINT PROC	MIN	HXS		92187F	
RBST_SEC	V94W0212CA	RBST DURATION SECS	UNIV PTG DISP	S	SPL		92187F	
RBST_SEC	V94W0212CB	RBST DURATION SECS	UNIV POINT PROC	S	SPL		92187F	
ROLLC	V95H7473C	CURRENT INERTIAL ROLL ANGLE	UNIV POINT PROC	RAD	SPL		93017G	*
ROLLI	V93H6837C	INPUT INERTIAL ROLL ANGLE	UNIV PTG DISP	RAD	SPL		93017G	*
ROLLR	V95H7467C	REQD INERTIAL ROLL ANGLE	UNIV POINT PROC	RAD	SPL		93017G	*

TABLE 4.2.26-5. INPUT FUNCTIONAL PARAMETERS FOR UNIVERSAL POINTING DISPLAY (G6.27)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
TGT_ALT	V93H6822C	ALT OF EARTH-FIXED TGT	UNIV PTG DISP	NM	SPL		93017G	*
TGT_DEC	V93H6815CA	TARGET VECTOR DECLINATION	UNIV POINT PROC	RAD			92749B	
TGT_DEC	V93H6815CB	DEC OF CELEST TGT	UNIV PTG DISP	RAD			93017G	*
TGT_ID	V93U6810C	TGT VECTOR ID	UNIV PTG DISP		HXS		93017G	*
TGT_LAT	V93H6820C	LAT OF EARTH-FIXED TGT	UNIV PTG DISP	RAD	SPL		93017G	*
TGT_LON	V93H6821C	LONG OF EARTH-FIXED TGT	UNIV PTG DISP	RAD	SPL		93017G	*
TGT_RA	V93H6813CA	TARGET VECTOR RIGHT ASCENSION	UNIV POINT PROC	RAD			92749B	
TGT_RA	V93H6813CB	TARGET VECTOR RIGHT ASCENSION	UNIV PTG DISP	RAD			93017G	*
YAWC	V95H7475C	CURRENT INERTIAL YAW ANGLE	UNIV POINT PROC	RAD	SPL		93017G	*
YAWI	V93H6839C	INPUT INERTIAL YAW ANGLE	UNIV PTG DISP	RAD	SPL		93017G	*
YAWR	V95H7484C	REQD INERTIAL YAW ANGLE	UNIV POINT PROC	RAD	SPL		93017G	*

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.26-6. OUTPUT FUNCTIONAL PARAMETERS FROM UNIVERSAL POINTING DISPLAY (G6.27)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
BODV_ID	V93U6805C	BODY VECTOR ID	DL FMT 22/1 UNIV POINT PROC		HXS		93017G	*
BODV_PITCH	V93U6806CB	BODY VECTOR PITCH COORDINATE	UNIV PTG DISP DL FMT 22/1 UNIV POINT PROC	RAD			93017G	*
BODV_YAW	V93U6807CB	BODY VECTOR YAW COORDINATE	UNIV PTG DISP DL FMT 22/1 UNIV POINT PROC	RAD			93017G	*
ERR_SEL	V93X6845X	TOTAL/DAP ERROR SELECT FLAG	UNIV PTG DISP DL FMT 22/1 ORB ADI PROC		BD		93017G	*
FUT_DCD IDAY	V93X6885X V93W6801C	FUTURE OPTION DATA CHANGE MNVR START TIME(DAYS)	UNIV POINT PROC DL FMT 22/1 UNIV POINT PROC	D/H/M/S	BD HXS		93078B 93017G	*
IHOUR	V93W6802C	MNVR START TIME (HR)	UNIV PTG DISP DL FMT 22/1 UNIV POINT PROC	HR	HXS		93017G	*
IMIN	V93W6803C	MNVR START TIME (MIN)	UNIV PTG DISP DL FMT 22/1 UNIV POINT PROC	MIN	HXS		93017G	*
ISEC	V93W6804C	MNVR START TIME (SEC)	UNIV PTG DISP DL FMT 22/1 UNIV POINT PROC	S	HXS		93017G	*
MNV_DCD MON_AXIS	V93X6884X V93U6868C	FUTURE MANEUVER OPTION DATA CHANGE MONITOR AXIS INDICATOR	UNIV POINT PROC UNIV POINT PROC		VAR			
OMICRON	V93H6825C	OMICRON	UNIV PTG DISP DL FMT 22/1 UNIV POINT PROC	RAD	SPL		93017G	*
OPT_CNCL OPT_SEL PITCHI	V93X6871X V93J6829C V93H6838C	MANEUVER TERMINATION SELECTED ATTITUDE OPTION INPUT INERTIAL PITCH ANGLE	UNIV POINT PROC UNIV POINT PROC DL FMT 22/1 UNIV POINT PROC		BD VAR SPL		93017G	*
RBST_CNCL	V94X0217XA	REBOOST CANCEL	UNIV PTG DISP ORB DAP UNIV POINT PROC		BD		92187F	
RBST_DURATION	V94W0213CA	REBOOST DURATION	DL FMT 22/1 ORB DAP UNIV POINT PROC	S	SPL		93017G	*
RBST_FUT RBST_HOUR RBST_MIN RBST_RQST RBST_SEC	V94X0215XA V94W0210CA V94W0211CA V94X0214X V94W0212CA	REBOOST FUTURE STATUS RBST DURATION HOURS RBST DURATION MINS REBOOST REQUEST RBST DURATION SECS	UNIV POINT PROC UNIV PTG DISP UNIV PTG DISP UNIV POINT PROC UNIV PTG DISP	HR MIN S	BD HXS HXS BD SPL		92187F 92187F 92187F 92187F 92187F	

TABLE 4.2.26-6. OUTPUT FUNCTIONAL PARAMETERS FROM UNIVERSAL POINTING DISPLAY (G6.27)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ROLLI	V93H6837C	INPUT INERTIAL ROLL ANGLE	DL FMT 22/1 UNIV POINT PROC UNIV PTG DISP	RAD	SPL		93017G	*
ROT_DCD TGT_ALT	V93X6883X V93H6822C	FUTURE ROTATION OPTION DATA CHANGE ALT OF EARTH-FIXED TGT	UNIV POINT PROC DL FMT 22/1 UNIV POINT PROC UNIV PTG DISP	NM	SPL		93017G	*
TGT_DEC	V93H6815CB	DEC OF CELEST TGT	DL FMT 22/1 UNIV POINT PROC UNIV PTG DISP	RAD			93017G	*
TGT_ID	V93U6810C	TGT VECTOR ID	DL FMT 22/1 UNIV POINT PROC UNIV PTG DISP		HXS		93017G	*
TGT_LAT	V93H6820C	LAT OF EARTH-FIXED TGT	DL FMT 22/1 UNIV POINT PROC UNIV PTG DISP	RAD	SPL		93017G	*
TGT_LON	V93H6821C	LONG OF EARTH-FIXED TGT	DL FMT 22/1 UNIV POINT PROC UNIV PTG DISP	RAD	SPL		93017G	*
TGT_RA	V93H6813CB	TARGET VECTOR RIGHT ASCENSION	DL FMT 22/1 UNIV POINT PROC UNIV PTG DISP	RAD			93017G	*
THREE_AXIS TRK_DCD YAWI	V93X6881X V93X6882X V93H6839C	THREE/TWO AXIS TRACKING FLAG FUTURE TRACKING OPTION DATA CHANGE INPUT INERTIAL YAW ANGLE	UNIV POINT PROC UNIV POINT PROC DL FMT 22/1 UNIV POINT PROC UNIV PTG DISP	RAD	SPL		93017G	*
	V93M0509PA	CGZB_28_FLAG_WD1	DL FMT 22/1				93017G	*

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
(HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

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TABLE 4.2.26-7. UNIVERSAL POINTING DISPLAY (G6.27) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.26-8. UNIVERSAL POINTING DISPLAY (G6.27) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
BODV_ID	V93U6805C	00	+1	ND	I	S	P	G4.213 G6.27	92749B	
BODV_PITCH	V93U6806C	00	+0.0	E+00	F	S	P	G4.213 G6.27	92749B	
BODV_YAW	V93U6807C	00	+0.0	E+00	F	S	P	G4.213 G6.27	92749B	
OMICRON	V93H6825C	00	+0.0	E+00	F	S	P	G4.213 G6.27	92749B	
PITCHI	V93H6838C	00	+0.0	E+00	F	S	P	G4.213 G6.27	92749B	
ROLLI	V93H6837C	00	+0.0	E+00	F	S	P	G4.213 G6.27	92749B	
TGT_DEC	V93H6815C	00	+0.0	E+00	F	S	P	G4.213 G6.27	92749B	
TGT_LAT	V93H6820C	00	+0.0	E+00	F	S	P	G4.213 G6.27	92749B	
TGT_LON	V93H6821C	00	+0.0	E+00	F	S	P	G4.213 G6.27	92749B	
TGT_RA	V93H6813C	00	+0.0	E+00	F	S	P	G4.213 G6.27	92749B	
YAWI	V93H6839C	00	+0.0	E+00	F	S	P	G4.213 G6.27	92749B	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.26-9. UNIVERSAL POINTING DISPLAY (G6.27) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

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4.2.27 DELETED.

4.2.28 DELETED.

4.2.29 DELETED

4.2.30 DELETED.

4.2.31 OVERRIDE (PFS)

TITLE: OVERRIDE

TYPE: SPEC/051

AVAILABILITY: OPS 1, 3, and 6

4.2.31.1 Purpose, Operation, and Organization

This display, Figure 4.2.31–1, is used during OPS 1, 3, and 6 to allow the crew the capability to deselect or reselect an ADTA or IMU LRU or Hydraulic System to solve an RM dilemma or to force RM to consider a previously deselected LRU. The display also provides the crew the capability to open or close the vent doors during OPS 3 and 6; to select the desired SW Mode for the following dedicated switch failures: ABORT SW, ET SEP SW, ET UMB DR SW, and ENTRY Roll Mode SW; to override any RCS MANF LVL MICRO SW DILEMMA which causes RM to set the MANF VLV STATUS to CLOSED; to enable/inhibit the OMS/RCS interconnect function, the AFT RCS dump, the forward RCS dump, the OMS assist burn, and the OMS dump; to select the elevon schedule and body bending filter in OPS–3 and to select the entry atmosphere model. The display also provides the crew with the capability to control the SSME drag chute repositioning sequence and to select the wraparound flight control system mode.

1. Items 1 and 2 allow the crew to select a TAL abort in MM103 and MM104, or an ATO abort in MM102, MM103, and MM104. These items are mutually exclusive and the selected abort will be indicated by an asterisk(*). Item 3 allows the crew to initiate the abort selected. An asterisk(*) will be displayed whenever an abort has been initiated via this item. The display will be initialized the first time with these items deselected i.e., no asterisks. If any of these three items are executed in any Major Mode other than described above, an “ILLEGAL ENTRY” CRT message will be displayed. Also, execution of Item 3 without having first selected the type of abort (TAL or ATO) shall result in an “ILLEGAL ENTRY” message.

Item 4 (THROT MAX), Item 50 (THROT ABT), and Item 51 (THROT NOM), provide the crew with the capability to change the SSME upper throttle level limit to one of three pre-mission I-Loaded throttle limit values and to re-scale the SBTC to the new throttle level. Items 4, 50 and 51 are mutually exclusive and the selected throttle limit shall be indicated by driving an asterisk (*) after the applicable item number. If one of these three items is already selected, re-execution of that item number shall result in that item remaining selected as indicated by the asterisk continuing to be driven after the item number and there will be no change in the throttle limit. Upon initial call up (first time ever) of this display, items 4, 50, and 51 shall be initialized deselected (i.e., no asterisk after any of the item numbers) and thereafter shall reflect valid crew input. A valid item entry shall be carried across GNC OPS transitions such that the displayed asterisk shall reflect the last valid selection whenever the display is visible; if no valid item entry has been executed/selected, then no asterisk shall be displayed for these items at any time.

In MM102, MM103, and MM601, manual throttling may be enabled to one of the three (I-Loaded) upper throttle limit levels. Execution of Item 4, Item 50 or Item 51 in any major mode other than MM102, MM103, or MM601 shall result in an operator error with the display and annunciation of a Class 5 “ILLEGAL ENTRY” CRT message.

Execution of Item 4, Item 50 or Item 51 shall result in the following:

- a. In MM102, auto throttling to a new selected upper throttle level will be enabled but will remain under the control of guidance until an engine fails at which time the new selected upper throttle limit will be commanded.
 - b. In MM103, the selected throttle limit level will be commanded upon execution of Item 4, Item 50 or Item 51.
 - c. In MM601, prior to Powered Pitch Around (PPA), the selected throttle limit level will be commanded upon execution of Item 4, Item 50 or Item 51; after PPA, the new throttle limit level will be enabled but throttling will remain under control of guidance.
2. The controls and displays in the PRPLT DUMP section of the display give the crew control of OMS and RCS dumps in OPS 1, 3, and 6.
- 2A. Items 5, 6, 7, 8, and 9 provide the capability for the crew to enable, inhibit, and control manual or automatic abort dumps. Item 5 OMS/RCS Interconnect (ICNCT) provides the capability to enable or inhibit the OMS/RCS Interconnect function. Item 6 (ARM), and 7 (START) allow the crew to manually initiate a dump. Item 8 (STOP) allows inhibiting or terminating an automatic dump or terminating a manual dump. Item 9 (QUAN/SIDE) provides the capability to enter an amount of propellant to be dumped, measured in percent of full tanks. OMS DUMP TTG provides output of the time to go for a dump in seconds, whether the dump is in progress or not.

Item 5 (ICNCT) shall be initialized to "ENA" in OPS 1 and "INH" in OPS 3. Items 6 (ARM), 7 (START), and 8 (STOP) shall be initialized reset, in OPS 1 and 3, with a blank (no asterisk) displayed. Item 9 (QUAN/SIDE) shall be initialized in OPS 1 as a function of the manual OMS dump time I-load or OPS 9 uplinked value. After transitioning to OPS 3, Item 9 (QUAN/SIDE) shall be recomputed as a function of the manual OMS dump time prior to display. The 'CPLT' (complete) character string shall be initialized blank and thereafter reflect the status of the OMS/RCS Interconnect Complete Flag from OMS/RCS Interconnect sequence.

Execution of Item 5 (ICNCT) shall alternately inhibit and enable the OMS/RCS Interconnect function, displaying "INH" or "ENA" as appropriate. If a manual dump is initiated, the status of the OMS/RCS Interconnect shall be determined by Item 5 state. If an intact abort is selected, then Item 5 shall be set to an I-loaded value, by the Abort Control Sequence, based on the abort selected. Whenever the Abort Control Sequence or OMS/RCS INCT SEQ terminates the OMS/RCS Interconnect, Item 5 (ICNCT) shall be reset (INH). In MM304 and MM602, if the OME_ONLY_FLAG (V90X8051X) is set, execution of Item 5 (ICNCT) shall be rejected and an "ILLEGAL ENTRY" message shall be displayed. Item 5 (ICNCT) shall not operate when SERC flag is set in OPS 1 or MM601. In this case, the OMS/RCS Interconnect is automatically enabled by the Abort Control Sequence. Execution of Item 5 (ICNCT) during this time shall no longer control the OMS/RCS Interconnect function and shall result in an "ILLEGAL ENTRY" message.

To the right of the 'XXX ICNCT 5', a character string "CPLT" shall be displayed when the OMS to RCS Interconnect complete flag is true (blank when false). 'CPLT' shall remain displayed until the return to normal is completed, at that time it shall be blanked.

Execution of Item 6 (ARM) will display an * beside Item 6 and blank the STOP *.

Execution of Item 7 (START) when Item 6 is set (ARM * displayed) shall start the dump, and display an * next to Item 7. Execution of Item 7 when Item 6 is reset (no ARM *) shall cause an "ILLEGAL ENTRY" message to be displayed and the input rejected.

When the crew manually initiates a contingency abort from the XXXXXX TRAJ 1 DISP (6.52), XXXXXX TRAJ 2 DISP (6.53), or RTLS TRAJ 2 DISP (6.54), the PRPLT DUMP ARM and START discrettes are set ON, the STOP discrete is set OFF, an asterisk shall be displayed next to Item 6 and Item 7, and Item 8 shall be blanked.

Execution of Item 8 (STOP) when Item 6 (ARM) is set shall blank the ARM * and display the STOP *. Execution of Item 8 when Items 6 and 7 are both set (dump in progress) shall stop the dump, blank the ARM and START *'s and display the STOP *. An automatic dump associated with an abort selection other than 2EO or 3EO contingency shall be inhibited (not performed) if an * is present next to Item 8. An automatic dump associated with a 2EO or 3EO contingency abort shall not be inhibited if an * is present next to Item 8; the dump will occur and the * next to Item 8 shall be blanked. Execution of Item 8 when an automatic dump has been initiated by the abort selected (ARM and START reset) shall display the STOP * and cause the ABT CNTL SEQ to stop the dump in progress.

Item 9 (QUAN/SIDE) provides the capability for the crew to control the amount of OMS propellant, in percent quantity per side, to be dumped. Item 9 (QUAN/SIDE) shall be initialized in OPS 1 as a function of the manual OMS dump time I-load or OPS 9 uplinked value. After transitioning to OPS 3, Item 9 (QUAN/SIDE) shall be recomputed as a function of the manual OMS dump time prior to display. Thereafter, any changes to the manual dump quantity shall be supplied by crew input. If an intact abort or OMS assist burn is selected, the OMS dump time shall be set to an I-loaded value, by the Abort Control Sequence, based on the abort selected or the assist load, and the dump quantity (Item 9) shall then be computed and displayed as a function of the OMS dump time I-load. If a manual dump is initiated, the amount of OMS propellant to be dumped shall be determined by the OMS dump quantity.

If a new value is entered into Item 9 while any OMS dump is in progress, the dump shall be based on the new value. If the quantity entered via Item 9 exceeds MAX QUAN ENTRY an "ILLEGAL ENTRY" message shall be displayed and the quantity entered rejected.

Items 5 through 9 shall be illegal entries in Major Modes MM104 through MM106. If attempted during these major modes, an "ILLEGAL ENTRY" message shall be displayed and the input rejected.

OMS DUMP TTG (time-to-go) displays the amount of time remaining, in seconds, to dump OMS propellant. The OMS dump time shall be initialized in OPS 1 to the manual OMS dump time I-load or OPS 9 uplinked value and to the manual OMS dump time upon transition to OPS 3; thereafter, any changes to the manual OMS dump time shall be the value computed as a function of the quantity crew input via Item 9. If an intact abort is selected, then the OMS dump time shall be set to an I-loaded value based on the abort selected. If the OMS assist burn is initiated, the OMS dump then shall be set to the I-Loaded assist burn time.

The OMS DUMP TTG value shall reflect dump time using a scale factor based on a two OMS engine flow rate. When an OMS/RCS interconnect is completed, and RCS JETS are being

commanded ON, the OMS DUMP TTG computation shall be adjusted by a scale factor to reflect the additional RCS flow rates.

The OMS DUMP TTG shall decrement as dumping occurs. When it reaches zero, the dump shall be terminated by the Abort Control Sequencer.

- 2B. Items 13 (AFT RCS) and 14 (TIME) provide the capability to control the aft RCS propellant dump in OPS 3 and 6. In OPS 6, this item is initialized to the last value from OPS 1. Item 13 is initialized to ENA in OPS 1 allowing a dump to start automatically when other criteria are met. Subsequent execution of Item 13 inhibits the dump if it is not in progress and stops the dump if it is in progress. The state of Item 13 is indicated by “ENA” or “INH” displayed next to Item 13. Execution of Item 13 will change ENA to INH or vice versa. In OPS 3 with the TAL flag not set, Item 13 is initialized to INH, inhibiting the aft RCS dump. In OPS 3 with the TAL flag set, item 13 is initialized to the last value from OPS 1. Execution of Item 13 is required to ENABLE the dump.

Item 14 (TIME) is initialized with an I-Loaded or uplinked dump time value in seconds in OPS 1, and OPS 3 if the TAL flag is set. In OPS 6, this item is initialized to the last value from OPS 1. The crew can input a different value of dump time using Item 14 during OPS 1/6 & 3. The dump time displayed next to Item 14 will decrement at the appropriate rate, depending upon the number of jets involved, whenever the dump is in progress. In OPS 3, with the TAL flag not set, Item 14 is initialized with a dump time of 0 seconds; however a MM304 aft RCS dump may be enabled by inputting a non-zero dump time via Item 14 and enabling the dump via Item 13.

Item 15 (FWD RCS) and 16 (TIME) control the forward RCS dump in the same manner that Items 13 and 14 control the aft RCS dump. The initialization criteria and operation are the same.

The display fields associated with Items 15 and 16 will be blanked while a Contingency Dump is in progress (OPS 1 & 6). Execution of any of these items at this time will cause an “ILLEGAL ENTRY” message.

3. Items 17 and 18 allow the crew to command the Aerojet DAP to use the AUTO or FIXED elevon schedules. The selected schedule is indicated by an asterisk displayed next to the appropriate item during operation in OPS 3.

The display is initialized with the AUTO schedule selected. Once initialized, the display will reflect the last crew input by displaying an asterisk next to the appropriate item in OPS 3 only. In OPS 1 or OPS 6, the asterisk is blanked as the elevon schedule is I-Loaded independent of crew input.

Items 17 and 18 are mutually exclusive; execution of one automatically deselects the other and displays the asterisk appropriately. These items are legal in OPS 3 only; execution in any other OPS will result in an “ILLEGAL ENTRY” message.

4. Items 20 and 21 allow the crew to command the Aerojet DAP to use the nominal (NOM) or alternate (ALT) body bending filters. The selected body bending filter is indicated by an asterisk displayed next to the appropriate item during operation in OPS 3.

The display is initialized with the NOM body bending filter selected. If OPS 3 is entered from OPS 1, then it is initialized with the ALT body bending filter selected. Once initialized, the display will reflect the last crew input by displaying an asterisk next to the item in OPS 3 only. In OPS 1 or OPS 6, the asterisk is blanked as the body bending filter is I-Loaded independent of crew input.

Items 20 and 21 are mutually exclusive; execution of one automatically deselects the other and displays the asterisk appropriately. These items are legal in OPS 3 only; execution in any other OPS will result in an "ILLEGAL ENTRY" message.

5. Items 22, 23 and 24 allow the crew to select one of three atmospheric models for use by Entry Navigation. The display is initialized with the nominal (NOM) atmospheric model selected. Item 23 selects a North polar model while Item 24 selects a South polar model. Items 22, 23, and 24 are mutually exclusive: execution of one of these items deselects the currently active model and selects the one corresponding to the executed item. The selected item is indicated by an asterisk displayed next to the appropriate item. Items 22, 23, and 24 are active in OPS 3 only, execution in any other OPS will result in a "ILLEGAL ENTRY" message.
6. For each of the IMU LRU's the following data is displayed cyclically to the crew to aid in solving RM dilemmas. A parameter status column is provided after each LRU ID number that shall be blank for normal operation, display a down arrow (↓) for an RM declared failure or an IMU deselection, display a question mark (?) for an RM dilemma, or an "M" for missing data. The STAT column allows display of the output of Built-in-Test Equipment (BITE) Status (hardware and software). The STAT column will either be blank for normal operation or display "BITE" to indicate a problem detected in the LRU. The ATT column has two parameters displayed, which IMU is selected for use and whether the IMU data is good or not. "RGA" is displayed when IMU data is not good. There are three item numbers (25, 26, 27) which allow the crew to reselect an LRU that has been declared failed or deselected by RM or to deselect an LRU for use by the IMU selection filter.
7. For each of the three hydraulic systems, two item numbers are provided to allow the crew to manually override automatic system management and to reselect the automatic system management after selecting the manual mode of operation. An asterisk (*) is displayed after the item numbers indicating the selected mode. The items are mutually exclusive and initialized in the auto mode. A status column is provided for each hydraulic system to display a blank for normal operation or upmoded manual system operation, a question mark (?) for an RM dilemma, and a down arrow (↓) for a failure or downmoded system.
8. For each of the four ADTA LRU's the following data is displayed to the crew cyclically to allow them to determine whether an LRU failed by RM is in agreement with the other LRU's and should be reselected or to aid in solving RM dilemmas; ADTA derived altitude in feet, ADTA derived angle of attack in degrees, and ADTA derived mach number. A parameter status column after the LRU ID number shall be blank for normal operation, display a down arrow (↓) for an RM declared failure or crew deselection, display a question mark (?) for an RM dilemma, or an "M" for missing data. There are four item numbers (34, 35, 36, 37) which allow the crew to reselect an LRU for use by the ADTA selection filter. These items are legal in MM304, MM305, MM602, and MM603. Execution of these items in OPS 1, MM301, MM302, MM303, or MM601 will result in an "ILLEGAL ENTRY" message.

9. When an LRU has been declared failed by RM a down arrow (↓) will be displayed in the PSI column and an asterisk (*) will be driven after the deselect/select item number to indicate that the LRU is failed and deselected. If the deselect/select item number is then executed, the LRU will reselect and the down arrow (↓) and asterisk (*) removed and the fail bit in RM is reset such that this LRU is used by the selection filter until such time that RM declares it failed again. If an LRU is deselected that is in a normal state or in a dilemma, a down arrow (↓) will be displayed in the PSI column and an asterisk (*) driven after the deselect/select item number.
10. The display will be initialized each time it is called with the current state of the LRU's that are deselected or selected. If no previous failure had occurred prior to calling this display in OPS 1 or 6, the display would show all LRU's selected. If an LRU was deselected during OPS 2 or 8, when this display is called in OPS 3, this LRU would still be deselected. During OPS 1, the ADTA data will be blanked.
11. Two items (38, 39) allow the crew to select the ET SEP AUTO Mode or initiate ET SEPARATION. An asterisk (*) will be displayed when these items are selected. When the display is first called, it will be initialized with these items deselected i.e., no asterisks. These items are provided as a backup means of initiating separation based on failures of the dedicated switches. These items are legal only in MM102, MM103, MM104, MM105, MM106, and MM601.
12. One item (40) is provided which allows the crew to backup the dedicated switch for closing the ET Umbilical Doors. When the display is first called, this item will be deselected i.e., no asterisk. This item is legal only in MM104, MM105, and MM106.
13. One item (41) is provided which allows the crew to OVERRIDE an RCS MANF VLV Micro SW dilemma which has forced RCS RM to set the valve status to closed. Execution of this item causes RCS RM to set the VLV status to OPEN on any valve in dilemma and puts the RCS JETS (ones without previous OFF or LK failures that have not been failure overridden) back in the jet availability table.
14. A status of where GNC SW RM feels the position of the Entry Roll Mode SW is provided to the crew. In addition, an item (42) is provided that allows the crew to select the "AUTO" position in case this switch fails. When this item is executed, an asterisk (*) will be displayed and the status from GNC SW RM will also read "AUTO". The display will be initialized the first time with this item deselected (i.e., no asterisk) and thereafter will reflect crew inputs. Item 42 is legal only in MM304, MM305, MM602, and MM603. Execution in any other Major Mode will result in an "ILLEGAL ENTRY" CRT message being displayed.
15. Items 43 (OPEN) and 44 (CLOSE) provide the manual capability to command open or close the appropriate vent doors. An asterisk (*) shall be displayed next to the item after it is commanded by keyboard entry or by the Vent Control Sequencer indicating the sequence is in progress. At the completion of the open or close sequence, the "OP" or "CL" string shall be displayed following item 43 or 44, respectively. These items are mutually exclusive. Execution of one item shall cause the other item's asterisk to be blanked, as well as the "OP" and "CL" character string fields. When an operation is in progress the character strings shall be blank and an attempt to execute either command will result in an "ILLEGAL ENTRY" message being displayed and the input rejected.

The display is initially blank until the Vent Control Sequencer configures the vent doors for launch. An asterisk (*) is then displayed next to item 43, and after the completion of the open sequence "OP" shall be displayed following item 43. Thereafter, items 43 and 44 shall display an asterisk corresponding to the last executed command and "OP" or "CL" upon completion of the last commanded open or close operation.

Item 43 (OPEN) shall be legal only in OPS 3, MMs 602 and 603. Item 44 (CLOSE) shall be legal in MMs 301 through 304, 602, and in MMs 305 and 603 only after the ROLLOUT_IND (V96X0052X) is set. Execution of these items in any other Major Mode will result in an "ILLEGAL ENTRY" message being displayed and the input rejected.

16. Item 19 (SSME REPOS) shall provide status of the SSME drag chute repositioning sequence by displaying the character string "ENA" or "INH" to the right of the item number. This item control shall provide the crew the capability to enable or inhibit the automatic repositioning of the SSMEs which takes place in MM304 when the velocity criteria has been satisfied. The character string status field shall be initialized to blank and shall remain blank until set to "ENA" upon transition to OPS 3. Thereafter the status field shall reflect crew inputs based on SSME_REPOS changes.

Each execution of item 19 shall cause the discrete SSME_REPOS to toggle ON or OFF and be sent to LDG GEAR VLV CNTL (4.215) and CRT (6.47) to enable/inhibit performance of the SSME drag chute repositioning sequence. Item 19 shall be legal in MM301, MM302, MM303, and MM304 and execution in any other major mode shall result in an "ILLEGAL ENTRY" message and the input rejected as an operator error.

17. Item 45 (WRAP MODE) shall provide the status of the wraparound flight control system mode by displaying the character string "ENA", "ACT" or "INH" to the right of the item number. This item control shall provide the crew the capability to enable or inhibit this mode. The character string status field shall be initialized to blank and shall remain blank until transition to OPS 3 at which point the field shall be initialized based on the WRAP_MODE_INIT I-load, except when a TAL abort is declared. When a TAL abort is declared, the status field shall be initialized to "INH". "ENA" or "INH" reflects the selected mode. When Aerojet DAP wrap mode is active, "ACT" will be displayed.

Each execution of Item 45 shall cause the discrete WRAP_MODE to toggle ON or OFF and be sent to AEROJET DAP (4.36), and CRT (6.47) to enable/inhibit the wraparound flight control system mode. Item 45 shall be legal in OPS 3. Execution in any other OPS mode will result in an "ILLEGAL ENTRY" CRT message being displayed and the input rejected.

18. Pass keyboard inputs for the items with an "X" in the DK column of the Keyboard Processing Table shall provide response in the BFS via a selective DK listen mode.
19. IMPLIED ITEM NUMBERS. Items 10, 11, 12, 46, 47, 48, and 49 are implied on the display format but are not legal for use on the PFS "OVERRIDE" display. If any of these item numbers are executed, an operator error shall result, the input rejected and the Class 5 "ILLEGAL ENTRY" CRT message shall be output and displayed.

4.2.31.2 Override Keyboard Processing Addendum

- A. • The ORBITER DUMP ENABLE (V93X6980X) and the ORBITER DUMP INHIBIT (V93X6981X) discretes are initialized reset in OPS 1 and OPS 3.
- When ARM (V93X5350X) and START (V93X5351X) discretes are both set, the DUMP ENABLE discrete is set and the DUMP INHIBIT and STOP (V93X5352X) discretes are reset.
 - When the STOP (V93X5352X) discrete is set while the DUMP ENABLE discrete is set, the DUMP INHIBIT discrete is set and the DUMP ENABLE discrete is reset.
 - When the STOP discrete is set while the ARM, the DUMP ENABLE and the DUMP INHIBIT discretes are reset, the DUMP INHIBIT discrete is set.
 - Destinations for the ARM, START and STOP discretes are OVERRIDE SPEC (5.21) and CRT (6.47).
 - Destinations for the ORBITER DUMP ENABLE and INHIBIT discretes are: ABT CNTL SEQ (4.192) and MSC.
- B. • Upon transition to OPS 3, SSME_REPOS (V93X5480X) shall be initialized to “ON” and thereafter shall reflect crew input.
- Execution of item 19 (SSME REPOS) shall be legal in MM301, MM302, MM303, and MM304 only. Execution in any other major mode shall be treated as an operator error with the input rejected and the “ILLEGAL ENTRY” CRT message being output.
 - Destinations for SSME_REPOS (V93X5480X) are LDG GEAR VLV CNTL (4.215) and CRT (6.47).
- C. When item 17 is executed, the ALTERNATE ELEVON SCHEDULE CMD (V93X4493X) is set to 0. When item 18 is executed, V93X4493X is set to 1.
- D. When item 20 is executed, the BODY BENDING FILTER CMD (V93X4494X) is reset to 0. When item 21 is executed, V93X4494X is set to 1.
- E. Destinations for this signal are: GN&C SW RM (4.180) and CRT (6.47).
- F. • Items 43 and 44 are mutually exclusive.
- Execution of either item number shall be illegal, the input rejected and the “ILLEGAL ENTRY” CRT message displayed when an open or close vent door operation is in progress, i.e., when VENT CONFIGURATION (V93J1601C) is equal to zero.
 - Execution of item 43 (OPEN) shall be legal only in OPS 3, MM 602 and MM 603. Execution of item 44 (CLOSE) shall be legal only in MMs 301 through 304, 602 and in MMs 305 and 603 only after the ROLLOUT_IND (V96X0052X) is set “ON”. Execution of these items in any other Major Mode shall result in rejection of the input and display of the “ILLEGAL ENTRY” CRT message.

- Destinations for this signal are: VENT CNTL SEQ (4.161), and CRT (6.47). When item 43 is executed the VENT DOOR SEQUENCE INITIATE (V95X0235X) is sent to MSC and the ALL VENT CLOSE CMD (V93X7201X) is reset to 0. When item 44 is executed, V95X0235X is again sent to MSC and V93X7201X is set to 1.

- G. Initialization, Mutual Exclusivity, OPS Carryover, and Signal Destinations. Items 4, 50 and 51 are mutually exclusive and upon initial call up (first time ever) of this display shall be initialized deselected and thereafter shall reflect valid crew input. Once a valid item entry has been selected, re-execution of that item number shall result in that item remaining selected and there will be no change in the throttle limit level. A valid item entry shall be carried across GNC OPS transitions. Execution of Item 4, Item 50 or Item 51 in any major mode other than MM102, MM103, or MM601 shall result in an operator error with the display and annunciation of a Class 5 “ILLEGAL ENTRY” CRT message. Destinations for this signal are : ASC 1STG GUID (4.1), ASC 2STG GUID (4.2), PW RTLS GUID (4.4), PW CONT GUID (4.5) and CRT (6.47).
- H. The SELECTED ATMOSPHERE MODEL INDEX (V93J5353C) is set according to the states of Items 22, 23 and 24 as specified in the table below.

ATMOSPHERE SELECT COMMAND	SELECTED ATMOSPHERE MODEL INDEX (V93J5353C)
Item 22 (V93X5354X) NOM	0
Item 23 (V93X5355X) N POLAR	1
Item 24 (V93X5356X) S POLAR	2

The ATMOSPHERE MODEL INDEX (V93J5353C) is output to ENT NAV (4.127) and TLM.

- I. Destinations of this signal are: ABT CNTL SEQ (4.192) and OVERRIDE SPEC FUNCTION (5.21).
- J. Destinations of this signal are: E/L RCS CMD SOP (4.58), ASC RCS CMD SOP (4.190) and OVERRIDE SPEC FUNCTION (5.21).
- K. Destinations of this signal are: GAX (4.110), IMU RM (4.72), and CRT (6.47).
- L. Destinations of this signal are: GAX (4.110), ADTA RM (4.73), and CRT (6.47).
- M. Destinations of this signal are: ET SEP SEQ (4.116) and CRT (6.47).
- N. Destinations of this signal are: GN&C SW RM (4.180) and CRT (6.47).
- O. Destinations of this signal are: CRT (6.47) and OVERRIDE SPEC FUNCTION (5.21).

- P. OMS DUMP QUAN/SIDE Item Entry Limit Check. In OPS 1/6 initialize MAX QUAN ENTRY equal to MANUAL_OMS_DT (V99U9717C) times 0.14971 PCT/SEC. If the OMS DUMP QUANTITY PERCENT PER POD (V93Q6280C) item entry is greater than MAX QUAN ENTRY an “ILLEGAL ENTRY” message shall be displayed and the input rejected. In OPS 3, initialize MAX QUAN ENTRY equal to ENTRY_OMS_FUEL_BURN_TIME (V99U9571C) times 0.14971 PCT/SEC. If the OMS DUMP QUANTITY PERCENT PER POD (V93Q6280C) item entry is greater than MAX QUAN ENTRY an “ILLEGAL ENTRY” message shall be displayed and the input rejected.
- Q. • Execution of Item 45 (WRAP MODE) shall be legal in OPS 3 only. Execution in any other OPS mode shall be treated as an operator error with the input rejected and the “ILLEGAL ENTRY” CRT message being output
- Destinations for WRAP_MODE (V93X0891X) are AEROJET DAP (4.36) and CRT (6.47).

4.2.31.3 Override CRT Display Processing Addendum

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word “STAT” being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT Display Processing Table 4.2.31-2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the “M” PSI is displayed (for Commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)
Blank (default)	↓ M ∅
1	↓ ↑ M ∅
2	↑ M ∅
3	↓ ∅
4	↑ ∅
5	↓ ? ∅
6	↓ ↑ ∅
7	M ∅
8	↓ ? M ∅
9	? M ∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.2.31–2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. This signal will be set to its “0” state by either the crew executing the item number to deselect an LRU or when RM declares the LRU failed. For the IMU LRU, this signal will also be set to its “0” state when RM automatically deselects a commfaulted (bypassed) IMU in OPS 3.

This signal can only be set to the “1” state by the crew executing the item number to RESELECT an LRU.

- B. The following remote text will be displayed depending on the state of the SELECTED IMU ID (V90J2560C):

STATE	TEXT
1	1
2	2
3	3

- C. The character display for the PRL SYS 1, 2 and 3 status indicators will be a down arrow (↓), question mark (?), or blank depending on the disagree signal from HYD SYS FDIR (4.249) and fail signal from HYD SYS SOP (4.52) as follows:

Disagree State	Fail State	Char Displayed
0	0	(blank)
0	1	↓
1	0	?
1	1	↓

- D. The AUT signal is initialized true (1), signifying that the hydraulic system management is handled automatically. The AUT signal is reset to the zero state by crew input of a deselect command (DES signal 1 + 0). The crew input of the AUT item number toggles the AUT signal state. The value of the AUT signal is retained across OPS transitions.
- E. The DES signal is initialized true (1), signifying selection of the unit as a candidate for automatic system management. Crew input of the DES item number toggles the DES state, deselecting the unit (DES 1 + 0) or selecting the unit (DES 0 + 1). This signal is changed only by crew input and is retained across OPS transitions. Manually upmoding a unit which has been automatically downmoded requires first a deselection, resetting the AUT, then a select cmd (i.e. two DES item entries).
- F. Sources for this signal are VENT CNTL SEQ (4.161) or OVERRIDE (6.47).

- G. The character string to be displayed depends on the bilevel state of the following signals from GN&C SW RM (4.180).

V	V	
9	9	
0	0	
X	X	
3	3	
3	3	
2	2	
1	2	DISPLAY
X	X	CHAR STRING
0	0	AUTO
1	0	LGAIN
0	1	NO YJET
1	1	(NOT VALID)

NOTE: If Item 42 is set, the above signals will be reset by GN&C SW RM (4.180) to their (0) state.

- H. Deleted.
- I. Deleted.
- J. Deleted.
- K. Deleted.
- L. The sources for V93X5348X are OVERRIDE DISPLAY KEYBOARD (6.47), OMS/RCS Interconnect Sequence (4.184), CONT 3EO GUID (4.6), and ABT CNTL SEQ (4.192).
- M. The AFT RCS Time display parameter is computed as follows: In OPS 1, V93W6958C is initialized to the uplinkable I-Load V97U9785C. In OPS 3 for the TAL FLAG = true, V93W6958C is initialized to the uplinkable I-load V99U9574C.

The AFT_RCS_TTG_SF (V94J3757C) will be initialized to 1.0. Thereafter any changes to the initial value will be supplied by the E/L RCS CMD SOP (4.58).

If AFT_RCS_TTG_SF (V94J3757C) is equal to zero, it will be set to 1.

AFT_RCS_TIME (V90W8281C) =

(AFT_RCS_DURATION (V93W6958C) – AFT_RCS_COUNTER (V90W8229C))

AFT_RCS_TTG_SF (V94J3757C)

- N. The FWD RCS Time display parameter is computed as follows: In OPS 1, V93W6957C is initialized to the uplinkable I-Load V97U3751C. In OPS 3, with the TAL FLAG = true, it is set to the uplinkable I-Load V97U3752C.

The FWD_RCS_TTG_SF (V94J3756C) will be initialized to 1.0. Thereafter, any changes to the initial value will be supplied by the E/L RCS CMD SOP (4.58) or the ASC RCS CMD SOP (4.190).

If FWD_RCS_TTG_SF is equal to zero, it will be set to 1.

FWD_RCS_TIME (V90W8284C) =

$$\frac{(\text{FWD_RCS_DURATION (V93W6957C)} - \text{FWD_RCS_COUNTER (V90W8228C)})}{\text{FWD_RCS_TTG_SF (V94J3756C)}}$$

- O. Deleted.
- P. Deleted.
- Q. These parameters are blanked whenever the ORBITER DUMP ENABLE discrete (V93X6980X) is set in OPS 1 or OPS 6.
- R. AFT RCS DUMP INH/ENA SEL Signal Source. Sources for V93X6949X are ABT CNTL SEQ (4.192) and OVERRIDE DISPLAY KEYBOARD (6.47).
- S. FWD RCS DUMP INH/ENA SEL Signal Source. Sources for V93X6948X are E/L RCS CMD SOP (4.58), ASC RCS CMD SOP (4.190), CONT 3EO GUID (4.6), and OVERRIDE DISPLAY KEYBOARD (6.47).
- T. ENTRY FCS ELEVON and FILTER CMD Asterisk Blanking. The feedback execution indicator asterisks for Items 17, 18, 20 and 21 shall be blanked if in OPS 1 or 6. The asterisks shall be initialized and displayed in OPS 3 only.
- U. CPLT (INTERCONNECT COMPLETE) Signal Source. Source for V90X8282X is ABORT OMS/RCS INTERCONNECT SEQUENCE (4.184).
- V. Sources for PRPLT_DUMP_ARM (V93X5350X), PRPLT_DUMP_START (V93X5351X), and PRPLT_DUMP_STOP (V93X5352X) are OVERRIDE SPEC FUNCTION (5.21), OVERRIDE DISPLAY (6.47), and XXXXXX TRAJ 1 DISP (6.52), XXXXXX TRAJ 2 DISP (6.53), and RTLS TRAJ 2 DISP (6.54).

- W. Crew SSME Repositioning Item Blanking and Initialization. Item 19 (SSME REPOS) status field character string shall remain blank until transition to OPS 3:

IF FIRST TRANSITION TO OPS 3

(MM_CODE_301/MM301 (V90X8183X) = ON)

THEN SET SSME_REPOS (V93X5480X) = ON

AND Display the status character string “ENA”

AFTER FIRST TRANSITION TO OPS 3, Display the status character string based upon the last crew input. This value shall be maintained across OPS transitions.

Source for MM_CODE_301/MM_301 (V90X8183X) is MSC.

Source for SSME_REPOS (V93X5480X) is the KEYBOARD (6.47).

- X. The source of these signals is the VENT CNTL SEQ (4.161). The character string to be displayed for VENT DOOR OPEN XX and VENT DOOR CLOSE XX is dependent on the value of V93J1601C as shown below:

V93J1601C (Vent Configuration)	VENT DOOR OPEN Character String	VENT DOOR CLOSE Character String
0	(BLANK)	(BLANK)
1	“OP”	(BLANK)
2	(BLANK)	“CL”

Upon completion of the open or close operation, the character string shall be displayed to the right of the entry currently displaying the asterisk (*).

- Y. Crew Wraparound Mode Item Blanking and Initialization.

- Item 45 (WRAP MODE) status field character string shall remain blank until transition to OPS 3.
- Upon transition to OPS 3, the WRAP_MODE (V93X0891X) shall be initialized to the value of the WRAP_MODE_INIT I-load (V97U7459C).

UPON TRANSITION TO OPS 3

(MM_CODE_301/MM301 (V90X8183X) = ON) THEN

IF WRAP_MODE_INIT (V97U7459C) = ON AND

TAL_ABORT_DECLARED

(V90X8658X) = OFF THEN

SET WRAP_MODE (V93X0891X) = ON

AND Display the status character string “ENA”

ELSE

SET WRAP_MODE (V93X0891X) = OFF

AND Display the status character string “INH”

- AFTER TRANSITION TO OPS 3, Display the status character string based upon the last crew input (WRAP_MODE) and AEROJET DAP mode (WRAP) as below.

```

IF WRAP (V94X0008X) = ON THEN
  Display the character string "ACT"
ELSE
  IF WRAP_MODE (V93X0891X) = ON THEN
    Display the character string "ENA"
  ELSE
    Display the character string "INH"

```

V	V	
9	9	
4	3	
X	X	
0	0	
0	8	
0	9	
8	1	
X	X	
0	0	INH
0	1	ENA
1	0	ACT
1	1	ACT

- Source for MM_CODE_301/MM301 (V90X8183X) is MSC.
Source for WRAP_MODE (V93X0891X) is the KEYBOARD (6.47)
Source for TAL_ABORT_DECLARED (V90X8658X) is MSC.
Source for WRAP (V94X0008X) is Aerojet DAP
- Z. Initialization and Blanking. Items 4, 50 and 51 shall be initialized blank, i.e., no asterisk displayed after the item number, upon initial call up (first time ever) of this display. They shall remain blank until a valid item entry of one of these mutually exclusive items has been executed.

4.2.31.4 Override Figure/Table References

Figure 4.2.31-1	Override Display (PFS)
Table 4.2.31-1	Keyboard Processing Table
Table 4.2.31-2	CRT Display Processing Table
Table 4.2.31-3	CRT Display Processing Background Requirements N/A
Table 4.2.31-4	Mission Design Background Constants N/A
Table 4.2.31-5	Input Functional Parameters
Table 4.2.31-6	Output Functional Parameters
Table 4.2.31-7	I-Loads
Table 4.2.31-8	K-Loads
Table 4.2.31-9	Constants

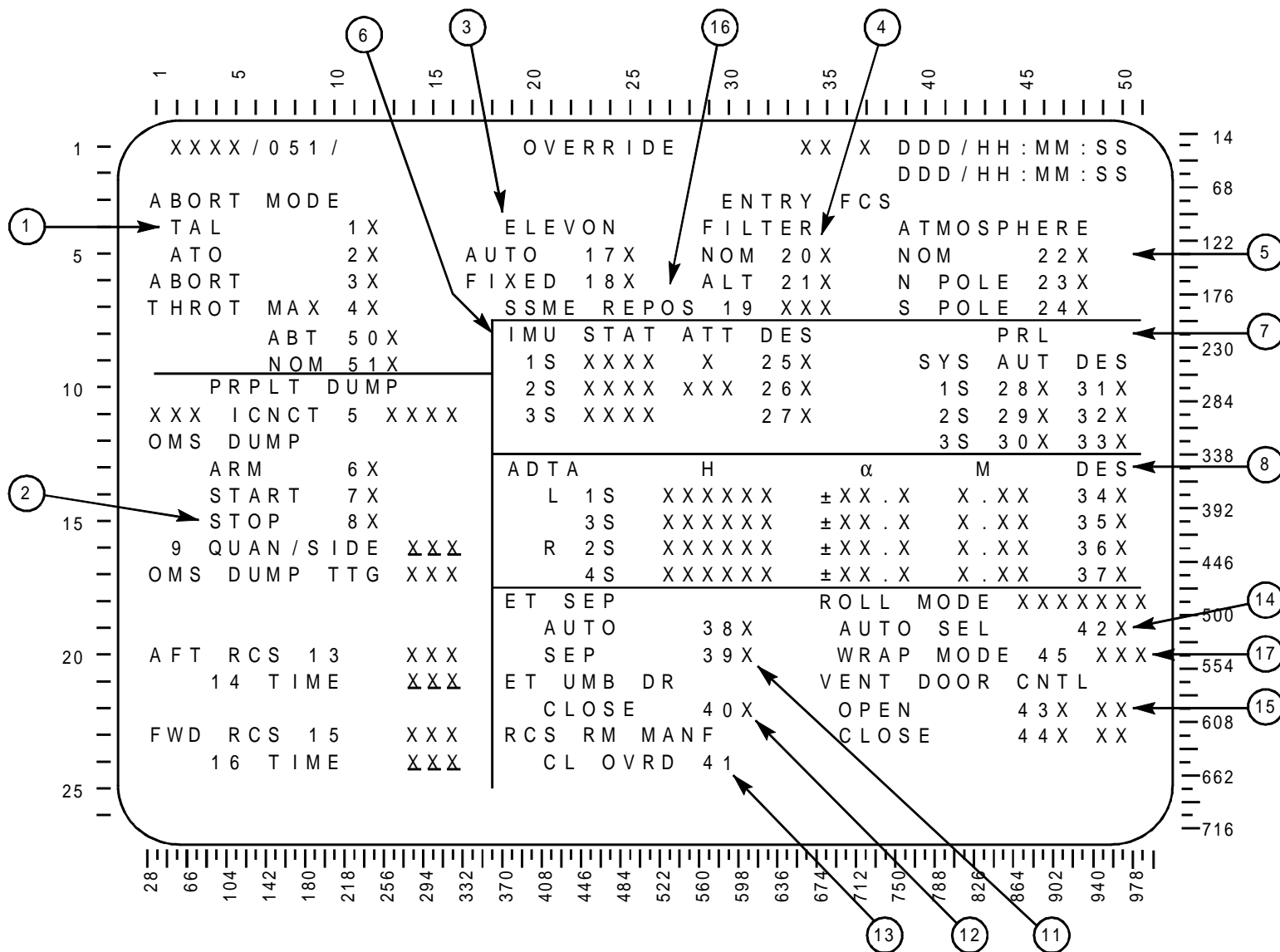


FIGURE 4.2.31-1. Override Display (PFS)

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Table 4.2.31-1. OVERRIDE (PFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D I K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
001*	ABORT MODE TAL 1	V93X5334X	0.0	CTRL		X	1				5.21, CRT	BACKUP TAL ABORT SEL	X
002	ABORT MODE ATO 2	V93X5335X	0.0	CTRL		X	2				5.21, CRT	BACKUP ATO ABORT SEL	X
003	ABORT 3	V93X5336X	0.0	CTRL		X	3				5.21, CRT	BACKUP ABORT CMD	X
004*	THROT MAX 4	V93X5349X	0.0	CTRL		X	4			G	ADDENDUM	MAX THROTTLE LEVEL COMMAND	X
005	XXX ICNCT 5	V93X5348X	0.0	CTRL		X	5				ABT CNTL, CRT	OMS/RCS INTERCONNECT INH/ENA CMD	
006	PROPLT DUMP ARM 6	V93X5350X	0.0	CTRL		X	6			A	CRT, 5.21	ORB PROP DUMP ARM CMD	
007	PROPLT DUMP START 7	V93X5351X	0.0	CTRL		X	7			A	CRT, 5.21	ORB PROP DUMP START CMD	
008	PROPLT DUMP STOP 8	V93X5352X	0.0	CTRL		X	8			A	CRT, 5.21	ORB PROP DUMP STOP CMD	
009	OMS DUMP 9 QUAN/SIDE	V93Q6280C	4.0	DEC	PCT	X	9	0	ADDEN DUM	O, P	ADDENDUM	OMS DUMP QUANTITY PERCENT PER POD	
010	AFT RCS 13	V93X6949X	0.0	CTRL		X	13				4.192	AFT RCS DUMP INH/ENA SEL	
011	14 AFT RCS DURATION	V93W6958C	4.0	DEC	SEC	X	14			I	ADDENDUM	AFT RCS DUMP DURATION	
012	FWD RCS 15	V93X6948X	0.0	CTRL		X	15				4.58, 4.192	FWD RCS DUMP INH/ENA SEL	
013	16 FWD RCS DURATION	V93W6957C	4.0	DEC	SEC	X	16			J	ADDENDUM	FWD RCS DUMP DURATION	
014*	ELEVON AUTO 17	V93X4493X	0.0	CTRL		X	17			C	CRT, 4.36	ALTERNATE ELEVON SCHEDULE CMD	X
015*	ELEVON FIXED 18	V93X4493X	0.0	CTRL		X	18			C	CRT, 4.36	ALTERNATE ELEVON SCHEDULE CMD	X
016	SSME REPOS 19	V93X5480X	0.0	CTRL		X	19			B	ADDENDUM	CREW SSME REPOSITION	
017	FILTER NOM 20	V93X4494X	0.0	CTRL		X	20			D	CRT, 4.36	NOM BODY BENDING FILTER CMD	
018	FILTER ALT 21	V93X4494X	0.0	CTRL		X	21			D	CRT, 4.36	ALT BODY BENDING FILTER CMD	
019	ATMOSPHERE NOM 22	V93X5354X	0.0	CTRL		X	22			H	CRT, 5.21	NOMINAL ATMOSPHERE SELECT CMD	
020	ATMOSPHERE N POLE 23	V93X5355X	0.0	CTRL		X	23			H	CRT, 5.21	NORTH POLAR ATMOSPHERE SELECT CMD	
021	ATMOSPHERE S POLE 24	V93X5356X	0.0	CTRL		X	24			H	CRT, 5.21	SOUTH POLAR ATMOSPHERE SELECT CMD	
022*	IMU 1 DES 25	V93X6711X	0.0	CTRL			25			K	ADDENDUM	IMU 1 SEL/DES CMD	X
023*	IMU 2 DES 26	V93X6712X	0.0	CTRL			26			K	ADDENDUM	IMU 2 SEL/DES CMD	X
024*	IMU 3 DES 27	V93X6713X	0.0	CTRL			27			K	ADDENDUM	IMU 3 SEL/DES CMD	X
025*	PRL SYS 1 AUT 28	V93X5320X	0.0	CTRL			28				HYD SOP, CRT	PRL 1 AUTO/MAN SELECT	X
026*	PRL SYS 2 AUT 29	V93X5321X	0.0	CTRL			29				HYD SOP, CRT	PRL 2 AUTO/MAN SELECT	X
027*	PRL SYS 3 AUT 30	V93X5322X	0.0	CTRL			30				HYD SOP, CRT	PRL 3 AUTO/MAN SELECT	X
028*	PRL SYS 1 DES 31	V93X5330X	0.0	CTRL			31				HYD SOP, CRT	PRL 1 SEL/DES CMD	X
029*	PRL SYS 2 DES 32	V93X5331X	0.0	CTRL			32				HYD SOP, CRT	PRL 2 SEL/DES CMD	X
030*	PRL SYS 3 DES 33	V93X5332X	0.0	CTRL			33				HYD SOP, CRT	PRL 3 SEL/DES CMD	X

Table 4.2.31-1. OVERRIDE (PFS) KEYBOARD PROCESSING													
Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
031*	ADTA 1 DES 34	V93X4571X	0.0	CTRL			34			L	ADDENDUM	ADTA 1 DES CMD	X
032*	ADTA 3 DES 35	V93X4575X	0.0	CTRL			35			L	ADDENDUM	ADTA 3 DES CMD	X
033*	ADTA 2 DES 36	V93X4573X	0.0	CTRL			36			L	ADDENDUM	ADTA 2 DES CMD	X
034*	ADTA 4 DES 37	V93X4577X	0.0	CTRL			37			L	ADDENDUM	ADTA 4 DES CMD	X
035*	ET SEP AUTO 38	V93X5340X	0.0	CTRL			38			E	ADDENDUM	BACKUP ET SEP AUTO SEL	X
036*	ET SEP SEP 39	V93X5341X	0.0	CTRL			39			M	ADDENDUM	BACKUP ET MAN SEP CMD	X
037*	ET UMB DR CLOSE 40	V93X5342X	0.0	CTRL			40			M	ADDENDUM	BACKUP ET UMB DR CLOSE CMD	X
038*	MANF CL OVRD 41	V93X5347X	0.0	CTRL			41				RCS RM, CRT	RCS MANF OP/CL STATUS OVRD	X
039*	ENTRY ROLL AUTO 42	V93X5345X	0.0	CTRL			42			N	ADDENDUM	ENTRY SW OVERRIDE	X
040*	VENT DOOR OPEN 43	V93X7201X	0.0	CTRL		X	43			F	ADDENDUM	ALL VENT CLOSE CMD	X
041*	VENT DOOR CLOSE 44	V93X7201X	0.0	CTRL		X	44			F	ADDENDUM	ALL VENT CLOSE CMD	X
042	WRAP MODE 45	V93X0891X	0.0	CTRL		X	45			Q	ADDENDUM	WRAPAROUND FCS MODE	X
043	THROT ABT 50	V93X0994X	0.0	CTRL		X	50			G	ADDENDUM	ABORT THROTTLE LEVEL COMMAND	
044	THROT NOM 51	V93X0995X	0.0	CTRL		X	51			G	ADDENDUM	NOMINAL THROTTLE LEVEL COMMAND	

Table 4.2.31-2. OVERRIDE (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B A N K	S I Z E S	I N T E R N S	F A T E S H	R A T E	S I G N E R	L E V E L	B A N D W I D T H	D E P T H	Add Ref	Source	Nomenclature	C R T		
			X	Y		CHAR	BILEVEL																	TYPE	
							1	0																	
001	(OPS)	V93X0040X	2	1		5.0															UI	OPS FUNCTION PAGE	X		
002	(SPEC)	V93X0042X	7	1		4.0																UI	SPEC FUNCTION PAGE	X	
003	(DISP)	V93X0044X	10	1		4.0																UI	DISPLAY FUNCTION PAGE	X	
004	(UL)	V92X5032X	34	1		2.0	UL							X								UI	UPLINK ACTIVITY IND	X	
005	(GPC)	V93X0048X	36	1		2.0																UI	GPC DRIVER	X	
006	(MT)	V91W1990C	39	1		12.0			DHMS													FCOS	MISSION ELAPSED TIME	X	
007	(CRT TIMER)	V91W1987C	39	2		12.0			DHMS													FCOS	DISPLAY CRT TIMER, GNC	X	
008*	ABORT MODE TAL 1	V93X5334X	12	4		1.0	*															KYBD	BACKUP TAL ABORT SEL	X	
009	ABORT MODE ATO 2	V93X5335X	12	5		1.0	*															KYBD	BACKUP ATO ABORT SEL	X	
010	ABORT 3	V93X5336X	12	6		1.0	*															KYBD	BACKUP ABORT CMD	X	
011*	IMU 1 (S)	V94J4160C	21	9		1.0														8	GAX	IMU 1 I/O, FAIL STATUS	X		
012*	IMU 2 (S)	V94J4161C	21	10		1.0														8	GAX	IMU 2 I/O, FAIL STATUS	X		
013*	IMU 3 (S)	V94J4162C	21	11		1.0														8	GAX	IMU 3 I/O, FAIL STATUS	X		
014	IMU 1 STAT	V95X0023X	23	9		4.0	BITE															IMU INT P	IMU 1 FAILURE INDICATOR	X	
015	IMU 2 STAT	V95X1023X	23	10		4.0	BITE															IMU INT P	IMU 2 FAILURE INDICATOR	X	
016	IMU 3 STAT	V95X2023X	23	11		4.0	BITE															IMU INT P	IMU 3 FAILURE INDICATOR	X	
017	IMU ATT X	V90J2560C	29	9		1.0															B	IMU RM	SELECTED IMU ID	X	
018	IMU ATT XXX	V90X2555X	28	10		3.0		RGA														IMU RM	ATTITUDE DATA GOOD FLAG	X	
019*	THROT MAX 4	V93X5349X	12	7		1.0	*			X												Z	KYBD	MAX THROTTLE LEVEL COMMAND	X
020	PROPLT DUMP ARM 6	V93X5350X	12	13		1.0	*															V	ADDENDUM	ORBITER PROP DUMP ARM CMD	
021	PROPLT DUMP START 7	V93X5351X	12	14		1.0	*															V	ADDENDUM	ORBITER PROP DUMP START CMD	
022	PROPLT DUMP STOP 8	V93X5352X	12	15		1.0	*															V	ADDENDUM	ORBITER PROP DUMP STOP CMD	
023	OMS DUMP 9 QUAN/SIDE	V93Q6280C	13	16		4.0			PCT													B	KYBD, 5.21	OMS DUMP QUANTITY PERCENT PER POD	
024	AFT RCS 13	V93X6949X	14	20		3.0	ENA	INH														R	ADDENDUM	AFT RCS DUMP INH/ENA SEL	
025	14 AFT RCS TIME	V90W8281C	13	21		4.0			SEC													M	5.21	AFT RCS DUMP TIME	
026	FWD RCS 15	V93X6948X	14	23		3.0	ENA	INH			X											Q, S	ADDENDUM	FWD RCS DUMP INH/ENA SEL	
027	16 FWD RCS TIME	V90W8284C	13	24		4.0			SEC		X											N, Q	5.21	FWD RCS DUMP TIME	
028	ELEVON AUTO 17	V93X4493X	25	5		1.0		*			X											T	KYBD	ALTERNATE ELEVON SCHEDULE CMD	
029	ELEVON FIXED 18	V93X4493X	25	6		1.0	*				X											T	KYBD	ALTERNATE ELEVON SCHEDULE CMD	
030	SSME REPOS 19 XXX	V93X5480X	33	7		3.0	ENA	INH			X											W	KYBD	CREW SSME REPOSITION	

Table 4.2.31-2. OVERRIDE (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A Z E S	I N T E R N A T I O N A L	F A I L S E	R E S P O N S E	S E L E C T	B E N E F I T	D I S P L A Y	Add Ref	Source	Nomenclature	C R T		
			X	Y		CHAR	BILEVEL															TYPE	
							1	0															
031	FILTER NOM 20	V93X4494X	35	5		1.0		*	BLVL														
032	FILTER ALT 21	V93X4494X	35	6		1.0		*	BLVL														
033	XXX ICNCT 5	V93X5348X	1	11		3.0	ENA	INH	BLVL														
034	CPLT (ICNCT COMPLETE)	V90X8282X	13	11		4.0	CPLT		BLVL														
035	OMS DUMP TTG	V93W8202C	13	17		4.0			DEC	SEC													
036	ATMOSPHERE NOM 22	V93X5354X	48	05		1.0		*	BLVL														
037	ATMOSPHERE N POLE 23	V93X5355X	48	06		1.0		*	BLVL														
038	ATMOSPHERE S POLE 24	V93X5356X	48	07		1.0		*	BLVL														
039*	IMU 1 DES 25	V93X6711X	34	9		1.0			BLVL					B				A	KYBD, IMU RM	IMU 1 SEL/DES CMD		X	
040*	IMU 2 DES 26	V93X6712X	34	10		1.0			BLVL					B				A	KYBD, IMU RM	IMU 2 SEL/DES CMD		X	
041*	IMU 3 DES 27	V93X6713X	34	11		1.0			BLVL					B				A	KYBD, IMU RM	IMU 3 SEL/DES CMD		X	
042*	ADTA 1 (S)	V94J4200C	24	14		1.0			STAT					B				8	GAX	ADTA 1 I/O, FAIL STATUS		X	
043*	ADTA 3 (S)	V94J4202C	24	15		1.0			STAT					B				8	GAX	ADTA 3 I/O, FAIL STATUS		X	
044*	ADTA 2 (S)	V94J4201C	24	16		1.0			STAT					B				8	GAX	ADTA 2 I/O, FAIL STATUS		X	
045*	ADTA 4 (S)	V94J4203C	24	17		1.0			STAT					B				8	GAX	ADTA 4 I/O, FAIL STATUS		X	
046	ADTA 1 H	V95H3193C	26	14		7.0			DEC	FT				B					ADTA SOP	ADTA 1 ALT INDICATION		X	
047	ADTA 3 H	V95H3195C	26	15		7.0			DEC	FT				B					ADTA SOP	ADTA 3 ALT INDICATION		X	
048	ADTA 2 H	V95H3194C	26	16		7.0			DEC	FT				B					ADTA SOP	ADTA 2 ALT INDICATION		X	
049	ADTA 4 H	V95H3196C	26	17		7.0			DEC	FT				B					ADTA SOP	ADTA 4 ALT INDICATION		X	
050	ADTA 1 ALPHA	V95H3186C	35	14		5.1			DEC	DEG				B	X				ADTA SOP	ADTA 1 ALPHA INDICATION		X	
051	ADTA 3 ALPHA	V95H3188C	35	15		5.1			DEC	DEG				B	X				ADTA SOP	ADTA 3 ALPHA INDICATION		X	
052	ADTA 2 ALPHA	V95H3187C	35	16		5.1			DEC	DEG				B	X				ADTA SOP	ADTA 2 ALPHA INDICATION		X	
053	ADTA 4 ALPHA	V95H3189C	35	17		5.1			DEC	DEG				B	X				ADTA SOP	ADTA 4 ALPHA INDICATION		X	
054	ADTA 1 M	V95L3180C	41	14		5.2			DEC					B					ADTA SOP	ADTA 1 MACH INDICATION		X	
055	ADTA 3 M	V95L3182C	41	15		5.2			DEC					B					ADTA SOP	ADTA 3 MACH INDICATION		X	
056	ADTA 2 M	V95L3181C	41	16		5.2			DEC					B					ADTA SOP	ADTA 2 MACH INDICATION		X	
057	ADTA 4 M	V95L3183C	41	17		5.2			DEC					B					ADTA SOP	ADTA 4 MACH INDICATION		X	
058	PRL SYS 1 (S)	ADDENDUM	42	10		1.0			STAT					B				C	5	HYD SOP	PRL SYS 1 STATUS		
059	PRL SYS 2 (S)	ADDENDUM	42	11		1.0			STAT					B				C	5	HYD SOP	PRL SYS 2 STATUS		
060	PRL SYS 3 (S)	ADDENDUM	42	12		1.0			STAT					B				C	5	HYD SOP	PRL SYS 3 STATUS		

Table 4.2.31-2. OVERRIDE (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E S	I N T E R N A L	F L A S H	R A T E	S I G N A L	L E V E L	B A N D W I D T H	D E L T A	Add Ref	Source	Nomenclature	C R T					
			X	Y		CHAR	BILEVEL																	TYPE				
							1	0																				
061*	PRL SYS 1 AUT 28	V93X5320X	46	10		1.0	*														D	KYBD	PRL 1 AUTO/MAN SELECT	X				
062*	PRL SYS 2 AUT 29	V93X5321X	46	11		1.0	*															D	KYBD	PRL 2 AUTO/MAN SELECT	X			
063*	PRL SYS 3 AUT 30	V93X5322X	46	12		1.0	*															D	KYBD	PRL 3 AUTO/MAN SELECT	X			
064*	PRL SYS 1 DES 31	V93X5330X	50	10		1.0		*														E	KYBD	PRL 1 SEL/DES CMD	X			
065*	PRL SYS 2 DES 32	V93X5331X	50	11		1.0		*														E	KYBD	PRL 2 SEL/DES CMD	X			
066*	PRL SYS 3 DES 33	V93X5332X	50	12		1.0		*														E	KYBD	PRL 3 SEL/DES CMD	X			
067*	ADTA 1 DES 34	V93X4571X	50	14		1.0		*														A	KYBD	ADTA 1 DES CMD	X			
068*	ADTA 3 DES 35	V93X4575X	50	15		1.0		*														A	KYBD	ADTA 3 DES CMD	X			
069*	ADTA 2 DES 36	V93X4573X	50	16		1.0		*														A	KYBD	ADTA 2 DES CMD	X			
070*	ADTA 4 DES 37	V93X4577X	50	17		1.0		*														A	KYBD	ADTA 4 DES CMD	X			
071*	ET SEP AUTO 38	V93X5340X	31	19		1.0	*																	KYBD	BACKUP ET SEP AUTO SEL	X		
072*	ET SEP SEP 39	V93X5341X	31	20		1.0	*																	KYBD	BACKUP ET MAN SEP CMD	X		
073*	ET UMB DR CLOSE 40	V93X5342X	31	22		1.0	*																	KYBD	BACKUP ET UMB DR CLOSE CMD	X		
074	ENTRY ROLL XXXXXXXX	ADDENDUM	45	18		7.0																	G	GNC SW RM	ENTRY ROLL MODE STATUS			
075*	ENTRY ROLL AUTO 42	V93X5345X	50	19		1.0	*																G	KYBD	ENTRY SW OVERRIDE	X		
076*	VENT DOOR OPEN 43	V93X7201X	47	22		1.0		*																F	KYBD	ALL VENT CLOSE CMD	X	
077*	VENT DOOR CLOSE 44	V93X7201X	47	23		1.0	*																	F	KYBD	ALL VENT CLOSE CMD	X	
078	WRAP MODE 45 XXX	ADDENDUM	49	20		3.0					X													Y	ADDENDUM	WRAPAROUND FCS MODE	X	
079	VENT DOOR OPEN XX	V93J1601C	49	22		2.0					X													X	VENT CNTL SEQ	VENT CONFIGURATION	X	
080	VENT DOOR CLOSE XX	V93J1601C	49	23		2.0					X													X	VENT CNTL SEQ	VENT CONFIGURATION	X	
081	THROT ABT 50	V93X0994X	13	8		1.0	*				X													Z	KYBD	ABORT THROTTLE LEVEL COMMAND		
082	THROT NOM 51	V93X0995X	13	9		1.0	*				X													Z	KYBD	NOMINAL THROTTLE LEVEL COMMAND		
083	(MSG LINE)	V93X0050X	1	25		44.0																				UI	MESSAGE LINE	X
084	(BUFFER MSG)	V93X0054X	45	25		4.0																				UI	BUFFER MESSAGE INDICATOR	X
085	(SPL)	V93X0056X	2	26		49.0																				UI	SCRATCH PAD LINE	X

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TABLE 4.2.31-5. INPUT FUNCTIONAL PARAMETERS FOR OVERRIDE DISPLAY (REF 5.21 SPEC.) (G6.47)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
ABT_THROT_CMD	V93X0994X	ABORT THROTTLE LEVEL COMMAND	OVERRIDE DISP		BD		92232B	
AFT_RCS_DUMP_ENABLE	V93X6949XA	AFT RCS DUMP ENABLE	OVERRIDE DISP		BD		90114B	
AFT_RCS_DUMP_ENABLE	V93X6949XB	AFT RCS DUMP ENABLE	ABT CNTL SEQ		BD		89149B	
AFT_RCS_DUMP_TIMER	V99U9574C	AFT RCS DUMP TIMER	UL	S			92392C	
ALPHA_RM(1)	V95H3186C	ADTA 1 ALPHA INDICATION	ADTA SOP	DEG	SPL		93017G	*
ALPHA_RM(2)	V95H3187C	ADTA 2 ALPHA INDICATION	ADTA SOP	DEG	SPL		93017G	*
ALPHA_RM(3)	V95H3188C	ADTA 3 ALPHA INDICATION	ADTA SOP	DEG	SPL		93017G	*
ALPHA_RM(4)	V95H3189C	ADTA 4 ALPHA INDICATION	ADTA SOP	DEG	SPL		93017G	*
ALT_ELV	V93X4493X	ALTERNATE ELEVON SCHEDULE CMD	OVERRIDE DISP		BD			
ATT_DG	V90X2555X	ATTITUDE DATA GOOD FLAG	IMU RM				93017G	*
ENTRY_OMS_FUEL_BURN_TIME	V99U9571C	TAL MM 304 OMS DUMP TIMER	UL	S	SPL	S	92175D	
FILT	V93X4494X	BODY BENDING FILTER SCHED CMD	OVERRIDE DISP					
FRCS_DUMP_TIMER_OPS1	V97U3751C	FORWARD RCS DUMP TIMER OPS 1	UL	S			92463C	
FRCS_DUMP_TIMER_OPS3	V97U3752C	FORWARD RCS DUMP TIMER OPS 3	UL	S			92463C	
FWD_RCS_DUMP_ENABLE	V93X6948XA	FWD RCS DUMP ENABLE	OVERRIDE DISP		BD		89149B	
FWD_RCS_DUMP_ENABLE	V93X6948XB	FWD RCS DUMP ENABLE	ASC RCS CMD SOP		BD		89149B	
FWD_RCS_DUMP_ENABLE	V93X6948XC	FWD RCS DUMP ENABLE	E/L RCS CMD SOP		BD		89149B	
FWD_RCS_DUMP_ENABLE	V93X6948XD	FWD RCS DUMP ENABLE	CONT 3E/O GUID		BD		90964	
HPU_RM(1)	V95H3193C	ADTA 1 ALT INDICATION	ADTA SOP	KFT	SPL		93017G	*
HPU_RM(2)	V95H3194C	ADTA 2 ALT INDICATION	ADTA SOP	KFT	SPL		93017G	*
HPU_RM(3)	V95H3195C	ADTA 3 ALT INDICATION	ADTA SOP	KFT	SPL		93017G	*
HPU_RM(4)	V95H3196C	ADTA 4 ALT INDICATION	ADTA SOP	KFT	SPL		93017G	*
HYDRFAIL(1)	V96X3005X	HYDR SYS 1 FAIL STATUS	HYD SYS SOP		BD		93017G	*
HYDRFAIL(2)	V96X3006X	HYDR SYS 2 FAIL STATUS	HYD SYS SOP		BD		93017G	*
HYDRFAIL(3)	V96X3007X	HYDR SYS 3 FAIL STATUS	HYD SYS SOP		BD		93017G	*
IMU_1_DES/C_SEL_1	V93X6711XA	IMU 1 SEL/DES CMD	IMU ALIGN DISP		BD		93017G	*
IMU_1_DES/C_SEL_1	V93X6711XB	IMU 1 SEL/DES CMD	OVERRIDE DISP		BD		93017G	*
IMU_1_DES/C_SEL_1	V93X6711XC	IMU 1 SEL/DES CMD	IMU RM		BD		93017G	*
IMU_2_DES/C_SEL_2	V93X6712XA	IMU 2 SEL/DES CMD	IMU ALIGN DISP		BD		93017G	*
IMU_2_DES/C_SEL_2	V93X6712XB	IMU 2 SEL/DES CMD	OVERRIDE DISP		BD		93017G	*
IMU_2_DES/C_SEL_2	V93X6712XC	IMU 2 SEL/DES CMD	IMU RM		BD		93017G	*
IMU_3_DES/C_SEL_3	V93X6713XA	IMU 3 SEL/DES CMD	IMU ALIGN DISP		BD		93017G	*
IMU_3_DES/C_SEL_3	V93X6713XB	IMU 3 SEL/DES CMD	OVERRIDE DISP		BD		93017G	*
IMU_3_DES/C_SEL_3	V93X6713XC	IMU 3 SEL/DES CMD	IMU RM		BD		93017G	*
IMU_FAIL_IND(1)	V95X0023XA	IMU 1 FAILURE INDICATOR	IMU INT PROC				93017G	*
IMU_FAIL_IND(2)	V95X1023XA	IMU 2 FAILURE INDICATOR	IMU INT PROC				93017G	*

TABLE 4.2.31-5. INPUT FUNCTIONAL PARAMETERS FOR OVERRIDE DISPLAY (REF 5.21 SPEC.) (G6.47)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
IMU_FAIL_IND(3)	V95X2023XA	IMU 3 FAILURE INDICATOR	IMU INT PROC				93017G	*
L_GAIN	V90X3321X	SEL ENTRY ROLL MODE L GAIN	GN&C SW RM		BD		92157	
MANUAL_OMS_DT	V99U9717C	MANUAL OMS DUMP TIMER	UL	S	SPL	S	92175D	
MAX_THROT_CMD	V93X5349X	MAXIMUM THROTTLE LEVEL COMMAND	OVERRIDE DISP		BD		89990E	
MM_CODE_102/MM_102	V90X8158X	MAJOR MODE 102 FLAG	MSC				93012D	
MM_CODE_103/MM_103	V90X8156X	MAJOR MODE 103 FLAG	MSC				93012D	
MM_CODE_104/MM_104	V90X8152X	MAJOR MODE 104 FLAG	MSC				92355B	
MM_CODE_105/MM_105	V90X8623X	MAJOR MODE 105 FLAG	MSC				92355B	
MM_CODE_106/MM_106	V90X8153X	MAJOR MODE 106 FLAG	MSC				92355B	
MM_CODE_301/MM_301	V90X8183X	MAJOR MODE 301 FLAG	MSC				93064D	
MM_CODE_302/MM_302	V90X8624X	MAJOR MODE 302 FLAG	MSC				92355B	
MM_CODE_303/MM_303	V90X8182X	MAJOR MODE 303 FLAG	MSC				92355B	
MM_CODE_304/MM_304	V90X8161X	MAJOR MODE 304 FLAG	MSC				92355B	
MM_CODE_305/MM_305	V90X8162X	MAJOR MODE 305 FLAG	MSC				92355B	
MM_CODE_601/MM_601	V90X8194X	MAJOR MODE 601 FLAG	MSC		BD		93012D	
MM_CODE_602/MM_602	V90X8174X	MAJOR MODE 602 FLAG	MSC				92355B	
MM_CODE_603/MM_603	V90X8122X	MAJOR MODE 603 FLAG	MSC				92355B	
M_RM(1)	V95L3180C	ADTA 1 MACH INDICATION	ADTA SOP		SPL		93017G	*
M_RM(2)	V95L3181C	ADTA 2 MACH INDICATION	ADTA SOP		SPL		93017G	*
M_RM(3)	V95L3182C	ADTA 3 MACH INDICATION	ADTA SOP		SPL		93017G	*
M_RM(4)	V95L3183C	ADTA 4 MACH INDICATION	ADTA SOP		SPL		93017G	*
NOM_THROT_CMD	V93X0995X	NOMINAL THROTTLE LEVEL COMMAND	OVERRIDE DISP		BD		92232B	
NO_Y_JET	V90X3322X	SEL ENTRY ROLL MODE NO Y JET	GN&C SW RM		BD		92157	
OME_ONLY_FLAG	V90X8051X	OME ONLY FLAG	ABT CNTL SEQ				90114B	
OMS_DUMP_QTY	V93Q6280CA	OMS DUMP QUANTITY PERCENT PER POD	OVERRIDE DISP	PCT			90114B	
OMS_DUMP_QTY	V93Q6280CB	OMS DUMP QUANTITY PERCENT PER POD	OVERRIDE SPEC	PCT			90114B	
OMS_TTG	V93W8202C	OMS TIME TO GO	OVERRIDE SPEC	S			92392C	
OPS3_INDICATOR	V90X8649X	OPS 3 IND	MSC		BD		93023D	
PRPLT_DUMP_ARM	V93X5350XA	ORB PRPLNT DUMP ARM CMD	OVERRIDE DISP				89990E	
PRPLT_DUMP_ARM	V93X5350XB	ORB PRPLNT DUMP ARM CMD	OVERRIDE SPEC				89990E	
PRPLT_DUMP_ARM	V93X5350XC	ORB PRPLNT DUMP ARM CMD	XXXXXX TRAJ 1 DISP				93012D	
PRPLT_DUMP_ARM	V93X5350XD	ORB PRPLNT DUMP ARM CMD	XXXXXX TRAJ 2 DISP				93012D	
PRPLT_DUMP_ARM	V93X5350XE	ORB PRPLNT DUMP ARM CMD	RTLS TRAJ 2 DISP				93012D	
PRPLT_DUMP_START	V93X5351XA	ORB PRPLNT DUMP START CMD	OVERRIDE DISP				89990E	
PRPLT_DUMP_START	V93X5351XB	ORB PRPLNT DUMP START CMD	OVERRIDE SPEC				89990E	
PRPLT_DUMP_START	V93X5351XC	ORB PRPLNT DUMP START CMD	XXXXXX TRAJ 1 DISP				93012D	
PRPLT_DUMP_START	V93X5351XD	ORB PRPLNT DUMP START CMD	XXXXXX TRAJ 2 DISP				93012D	
PRPLT_DUMP_START	V93X5351XE	ORB PRPLNT DUMP START CMD	RTLS TRAJ 2 DISP				93012D	
PRPLT_DUMP_STOP	V93X5352XA	ORB PRPLNT DUMP STOP CMD	OVERRIDE DISP				89990E	
PRPLT_DUMP_STOP	V93X5352XB	ORB PRPLNT DUMP STOP CMD	OVERRIDE SPEC				89990E	
PRPLT_DUMP_STOP	V93X5352XC	ORB PRPLNT DUMP STOP CMD	XXXXXX TRAJ 1 DISP				93012D	
PRPLT_DUMP_STOP	V93X5352XD	ORB PRPLNT DUMP STOP CMD	XXXXXX TRAJ 2 DISP				93012D	
PRPLT_DUMP_STOP	V93X5352XE	ORB PRPLNT DUMP STOP CMD	RTLS TRAJ 2 DISP				93012D	
ROLLOUT_IND	V96X0052X	ROLLOUT FLAG	LANDING SOP				90102D	
RTLS_POST_MECO_RCS_PROP_RCS_X_DT	V97U9785C	RTLS AFT RCS DUMP TIMER	UL	S			92392C	
SEL_IMU_ID	V90J2560C	SELECTED IMU ID	IMU RM		HXS		93017G	*

TABLE 4.2.31-5. INPUT FUNCTIONAL PARAMETERS FOR OVERRIDE DISPLAY (REF 5.21 SPEC.) (G6.47)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
SSME_REPOS	V93X5480X	CREW SSME REPOSITION	OVERRIDE DISP		BD		89991E	
TAL_ABORT_DECLARED	V90X8658X	TAL ABORT DECLARED	MSC				93090E	
WRAP	V94X0008X	WRAPAROUND MODE DISCRETE	AEROJET DAP		BD		93017G	*
WRAP_MODE	V93X0891X	WRAPAROUND FCS MODE	OVERRIDE DISP		BD		90476F	
	V90X6350X	HYD SYS 1 DISAGREE	HYD SYS FDIR				92354	
	V90X6351X	HYD SYS 2 DISAGREE	HYD SYS FDIR				92354	
	V90X6352X	HYD SYS 3 DISAGREE	HYD SYS FDIR				92354	
	V90X8282X	OMS TO RCS INTERCONNECT COMP FLAG	ABT OMS/RCS CONN		BD		93017G	*
	V90X8913X	SERC FLAG	ABT CNTL SEQ				89990E	
	V93J1601C	VENT CONFIGURATION	VENT CNTL SEQ		BSU		89944H	
	V93X4571XA	ADTA 1 DES CMD	SENSOR SELF TEST DISP				93017G	*
	V93X4571XB	ADTA 1 DES CMD	OVERRIDE DISP				93017G	*
	V93X4571XC	ADTA 1 DES CMD	ADTA RM					
	V93X4573XA	ADTA 2 DES CMD	SENSOR SELF TEST DISP				93017G	*
	V93X4573XB	ADTA 2 DES CMD	OVERRIDE DISP				93017G	*
	V93X4573XC	ADTA 2 DES CMD	ADTA RM					
	V93X4575XA	ADTA 3 DES CMD	SENSOR SELF TEST DISP				93017G	*
	V93X4575XB	ADTA 3 DES CMD	OVERRIDE DISP				93017G	*
	V93X4575XC	ADTA 3 DES CMD	ADTA RM					
	V93X4577XA	ADTA 4 DES CMD	SENSOR SELF TEST DISP				93017G	*
	V93X4577XB	ADTA 4 DES CMD	OVERRIDE DISP				93017G	*
	V93X4577XC	ADTA 4 DES CMD	ADTA RM					
	V93X5320X	PRL 1 AUTO/MAN SELECT	OVERRIDE DISP		BD			
	V93X5321X	PRL 2 AUTO/MAN SELECT	OVERRIDE DISP		BD			
	V93X5322X	PRL 3 AUTO/MAN SELECT	OVERRIDE DISP		BD			
	V93X5330X	PRL 1 SEL/DES CMD	OVERRIDE DISP		BD			
	V93X5331X	PRL 2 SEL/DES CMD	OVERRIDE DISP		BD			
	V93X5332X	PRL 3 SEL/DES CMD	OVERRIDE DISP		BD			
	V93X5334X	BACKUP TAL ABORT SEL	OVERRIDE DISP		BD		89245D	
	V93X5335X	BACKUP ATO ABORT SEL	OVERRIDE DISP		BD			
	V93X5336X	BACKUP ABORT CMD	OVERRIDE DISP		BD			
	V93X5340X	BACKUP ET SEP AUTO SEL	OVERRIDE DISP		BD		93064D	
	V93X5341X	BACKUP ET MAN SEP CMD	OVERRIDE DISP		BD		93064D	
	V93X5342X	BACKUP ET UMB DR CLOSE CMD	OVERRIDE DISP		BD		93064D	
	V93X5345X	ENTRY SW OVERRIDE	OVERRIDE DISP		BD			
	V93X5347X	RCS MANF OP/CL STATUS OVRD	OVERRIDE DISP		BD			
	V93X5348XA	OMS/RCS INTERCONNECT INH/ENA CMD	OVERRIDE DISP		BD		93017G	*
	V93X5348XB	OMS/RCS INTERCONNECT INH/ENA CMD	ABT CNTL SEQ		BD		93017G	*
	V93X5348XC	OMS/RCS INTERCONNECT INH/ENA CMD	ABT OMS/RCS CONN		BD		90964	
	V93X5348XD	OMS/RCS INTERCONNECT INH/ENA CMD	CONT 3E/O GUID		BD		90964	
	V93X5354X	NOMINAL ATMOSPHERE SELECT CMD	OVERRIDE DISP		BD			
	V93X5355X	NORTH POLAR ATMOSPHERE SELECT CMD	OVERRIDE DISP		BD			
	V93X5356X	SOUTH POLAR ATMOSPHERE SELECT CMD	OVERRIDE DISP		BD			
	V93X7201XA	ALL VENT CLOSE CMD	VENT CNTL SEQ					
	V93X7201XB	ALL VENT CLOSE CMD	OVERRIDE DISP					
	V94J4160C	IMU 1 I/O, FAIL STATUS	GAX		VAR			

TABLE 4.2.31-5. INPUT FUNCTIONAL PARAMETERS FOR OVERRIDE DISPLAY (REF 5.21 SPEC.) (G6.47)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V94J4161C	IMU 2 I/O, FAIL STATUS	GAX		VAR			
	V94J4162C	IMU 3 I/O, FAIL STATUS	GAX		VAR			
	V94J4200C	ADTA 1 I/O, FAIL STATUS	GAX		VAR			
	V94J4201C	ADTA 2 I/O, FAIL STATUS	GAX		VAR			
	V94J4202C	ADTA 3 I/O, FAIL STATUS	GAX		VAR			
	V94J4203C	ADTA 4 I/O, FAIL STATUS	GAX		VAR			
	V94X4811X	ILLEGAL ENTRY MSG(OVERRIDE)	UI					

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.31-6. OUTPUT FUNCTIONAL PARAMETERS FROM OVERRIDE DISPLAY (REF 5.21 SPEC.) (G6.47)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ABT_THROT_CMD	V93X0994X	ABORT THROTTLE LEVEL COMMAND	ASC 1STG GUID ASC 2STG GUID OVERRIDE DISP PW CONT GUID PW RTLS GUID		BD		92232B	
AFT_RCS_DUMP_ENABLE	V93X6949XA	AFT RCS DUMP ENABLE	ABT CNTL SEQ OVERRIDE DISP		BD		90114B	
ALT_ELV	V93X4493X	ALTERNATE ELEVON SCHEDULE CMD	AEROJET DAP OVERRIDE DISP		BD			
FILFT	V93X4494X	BODY BENDING FILTER SCHED CMD	AEROJET DAP OVERRIDE DISP		BD			
FWD_RCS_DUMP_ENABLE	V93X6948XA	FWD RCS DUMP ENABLE	ASC RCS CMD SOP E/L RCS CMD SOP OVERRIDE DISP		BD		89149B	
IMU_1_DES/C_SEL_1	V93X6711XB	IMU 1 SEL/DES CMD	DL FMT 21/A DL FMT 23/A GAX IMU RM OVERRIDE DISP		BD		93017G	*
IMU_2_DES/C_SEL_2	V93X6712XB	IMU 2 SEL/DES CMD	DL FMT 21/A DL FMT 23/A GAX IMU RM OVERRIDE DISP		BD		93017G	*
IMU_3_DES/C_SEL_3	V93X6713XB	IMU 3 SEL/DES CMD	DL FMT 21/A DL FMT 23/A GAX IMU RM OVERRIDE DISP		BD		93017G	*
MAX_THROT_CMD	V93X5349X	MAXIMUM THROTTLE LEVEL COMMAND	ASC 1STG GUID ASC 2STG GUID OVERRIDE DISP PW CONT GUID PW RTLS GUID		BD		89990E	
NOM_THROT_CMD	V93X0995X	NOMINAL THROTTLE LEVEL COMMAND	ASC 1STG GUID ASC 2STG GUID OVERRIDE DISP PW CONT GUID PW RTLS GUID		BD		92232B	
OMS_DUMP_QTY	V93Q6280CA	OMS DUMP QUANTITY PERCENT PER POD	OVERRIDE DISP	PCT			90114B	
PRPLT_DUMP_ARM	V93X5350XA	ORB PRPLNT DUMP ARM CMD	OVERRIDE SPEC				89990E	
PRPLT_DUMP_START	V93X5351XA	ORB PRPLNT DUMP START CMD	OVERRIDE DISP OVERRIDE SPEC				89990E	

TABLE 4.2.31-6. OUTPUT FUNCTIONAL PARAMETERS FROM OVERRIDE DISPLAY (REF 5.21 SPEC.) (G6.47)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
PRPLT_DUMP_STOP	V93X5352XA	ORB PRPLNT DUMP STOP CMD	OVERRIDE DISP				89990E	
SSME_REPOS	V93X5480X	CREW SSME REPOSITION	OVERRIDE SPEC LDG GEAR VLV CNTL		BD		89991E	
WRAP_MODE	V93X0891X	WRAPAROUND FCS MODE	OVERRIDE DISP AEROJET DAP		BD		90476F	
	V93M0500PB	CGUB_IMU_SEL_MFE	OVERRIDE DISP DL FMT 21/A				93017G	*
	V93M0508PA	CGSB_FLAG_WORD2	DL FMT 23/A DL FMT 21/A				93017G	*
	V93M0510PB	CGRB_ADTA_SEL\$(1:)	DL FMT 23/A DL FMT 21/A				93017G	*
	V93M0511PB	CGRB_ADTA_SEL\$(2:)	DL FMT 23/A DL FMT 21/A				93017G	*
	V93M0512PB	CGRB_ADTA_SEL\$(3:)	DL FMT 23/A DL FMT 21/A				93017G	*
	V93M0513PB	CGRB_ADTA_SEL\$(4:)	DL FMT 23/A DL FMT 21/A				93017G	*
	V93W6957C	FWD RCS DUMP DURATION	ASC RCS CMD SOP E/L RCS CMD SOP	S			92392C	
	V93W6958C	AFT RCS DUMP DURATION	OVERRIDE SPEC ABT CNTL SEQ	S			92392C	
	V93X4571XB	ADTA 1 DES CMD	OVERRIDE SPEC ADTA RM				93017G	*
	V93X4573XB	ADTA 2 DES CMD	DL FMT 21/A DL FMT 23/A GAX				93017G	*
	V93X4575XB	ADTA 3 DES CMD	OVERRIDE DISP ADTA RM				93017G	*
	V93X4577XB	ADTA 4 DES CMD	DL FMT 21/A DL FMT 23/A GAX				93017G	*
	V93X5320X	PRL 1 AUTO/MAN SELECT	OVERRIDE DISP HYD SYS SOP		BD			
			OVERRIDE DISP					

TABLE 4.2.31-6. OUTPUT FUNCTIONAL PARAMETERS FROM OVERRIDE DISPLAY (REF 5.21 SPEC.) (G6.47)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V93X5321X	PRL 2 AUTO/MAN SELECT	HYD SYS SOP OVERRIDE DISP		BD			
	V93X5322X	PRL 3 AUTO/MAN SELECT	HYD SYS SOP OVERRIDE DISP		BD			
	V93X5330X	PRL 1 SEL/DES CMD	HYD SYS SOP OVERRIDE DISP		BD			
	V93X5331X	PRL 2 SEL/DES CMD	HYD SYS SOP OVERRIDE DISP		BD			
	V93X5332X	PRL 3 SEL/DES CMD	HYD SYS SOP OVERRIDE DISP		BD			
	V93X5334X	BACKUP TAL ABORT SEL	OVERRIDE DISP OVERRIDE SPEC		BD		89245D	
	V93X5335X	BACKUP ATO ABORT SEL	OVERRIDE DISP OVERRIDE SPEC		BD			
	V93X5336X	BACKUP ABORT CMD	OVERRIDE DISP OVERRIDE SPEC		BD			
	V93X5340X	BACKUP ET SEP AUTO SEL	GN&C SW RM OVERRIDE DISP		BD		93064D	
	V93X5341X	BACKUP ET MAN SEP CMD	ET SEP SEQ OVERRIDE DISP		BD		93064D	
	V93X5342X	BACKUP ET UMB DR CLOSE CMD	ET SEP SEQ OVERRIDE DISP		BD		93064D	
	V93X5345X	ENTRY SW OVERRIDE	GN&C SW RM OVERRIDE DISP		BD			
	V93X5347X	RCS MANF OP/CL STATUS OVRD	OVERRIDE DISP RCS RM		BD			
	V93X5348XA	OMS/RCS INTERCONNECT INH/ENA CMD	ABT CNTL SEQ DL FMT 21/A DL FMT 23/A DL FMT 32/A OVERRIDE DISP		BD		93017G	*
	V93X5354X	NOMINAL ATMOSPHERE SELECT CMD	OVERRIDE DISP OVERRIDE SPEC		BD			
	V93X5355X	NORTH POLAR ATMOSPHERE SELECT CMD	OVERRIDE DISP OVERRIDE SPEC		BD			
	V93X5356X	SOUTH POLAR ATMOSPHERE SELECT CMD	OVERRIDE DISP OVERRIDE SPEC		BD			
	V93X7201XB	ALL VENT CLOSE CMD	OVERRIDE DISP VENT CNTL SEQ					
	V95X0235XB	VENT DOOR SEQ INIT	MSC		BD		89599C	

TABLE 4.2.31-6. OUTPUT FUNCTIONAL PARAMETERS FROM OVERRIDE DISPLAY (REF 5.21 SPEC.) (G6.47)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
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NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
(HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

TABLE 4.2.31-7. OVERRIDE DISPLAY (REF 5.21 SPEC.) (G6.47) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
AFT_RCS_DUMP_TIMER	V99U9574C	SEC	F	S	M	C	G6.47	00	QTR	92463C	
ENTRY_OMS_FUEL_BURN_TIME	V99U9571C	SEC	F	S	M	C	G4.192 G6.47	00	QTO	90655	
FRCS_DUMP_TIMER_OPS1	V97U3751C	SEC	F	S	M	C	G6.47	00	QFR	92463C	
FRCS_DUMP_TIMER_OPS3	V97U3752C	SEC	F	S	M	C	G6.47	00	QFR	92463C	
MANUAL_OMS_DT	V99U9717C	SEC	F	S	M	C	G4.192 G4.6 G5.21 G6.47	00	QRP	90705H	
RTLS_POST_MECO_RCS_PROP_RCS_X_DT	V97U9785C	SEC	F	S	M	C	G6.47	00	QRM	92364D	
WRAP_MODE_INIT	V97U7459C	ND	D		D	C	G6.47	00	ZF9	90476F	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.31-8. OVERRIDE DISPLAY (REF 5.21 SPEC.) (G6.47) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.31-9. OVERRIDE DISPLAY (REF 5.21 SPEC.) (G6.47) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.32 DELETED.

4.2.33 DELETED.

4.2.34 RTLS TRAJECTORY 2 (BFS)

TITLE: RTLS TRAJ 2

TYPE: OPS/6011

AVAILABILITY: BFS, MF: OPS 6

4.2.34.1 Purpose, Operation, and Organization

- (1) The RTLS TRAJ 2 display is up during MM601. It provides trajectory, loads, attitude, and guidance information to the crew. The crew uses this display to monitor automatic guidance or to fly the abort using manual guidance.
- (2) The mission-dependent central plot is an altitude vs horizontal component of relative velocity profile for a last time abort. No scale is to appear on the display. Current vehicle state is indicated by a moving up pointing triangle, with the predicted state for 30 seconds and 60 seconds in the future indicated by circles. Update rate is 1920 ms. A vertical line intersects the curved line where horizontal relative velocity is zero, and the sign attached to velocity must change at this point to prevent doubling back.

The right most vertical line represents the nominal ascent profile. An abort after staging would originate on this line. The line to the left of the nominal lines is from an engine out at liftoff case.

Associated with the central plot (same scale) are the $\bar{q} = 2$ line and the $\bar{q} = 10$ line. The $\bar{q} = 2$ line is the altitude vs. velocity line which, if the vehicle is on or below this line, \bar{q} is greater than 2. The $\bar{q} = 10$ line is the altitude vs velocity line which, if the vehicle state is below this line, \bar{q} will be greater than 10 PSF. These lines are ET separation constraints and are not mission dependent.

- (3) The scale on the left is pitch angle of attack (α) and ΔH DOT. Moving overbright, oversize triangles indicate present α (left pointing) and ΔH DOT (right pointing). The α indicator should not flash if offscale. Its update rate is 320 ms. The ΔH DOT is actual radius rate from navigation minus the nominal radius rate for the present ΔR . Update rate of the present ΔH DOT is 960 ms and the triangle flashes if off scale. The displayed ΔH DOT is inverted (multiplied by -1) so that the display is “fly-to”.
- (4) The scale across the top is delta range (ΔR). ΔR is defined as glide range potential based on mission-dependent energy state minus present range to the landing site, in nautical miles. Present ΔR is indicated by a moving, oversize, overbright down pointing triangle which should not flash if offscale. Update rate is 320 ms. A tic mark is placed on the scale where powered pitch down (PD) nominally occurs at MECO – 20 seconds. Another tic mark is placed where three engine pitch down (PD3) occurs.

(5) The g's scale is total load factor in g's. A moving, overbright, oversize left pointing triangle indicates current total load factor. Update rate is once every 960 ms. The indicator will flash if load factor exceeds a mission dependent I-load value.

(6) The following digital readouts are to be provided as shown. Update rate of once every 960ms.

β – Yaw angle of attack (deg)

α – Pitch angle of attack (deg)

H DOT – Altitude (radius) rate (FPS)

(7) TMECO is the predicted time of MECO, from guidance. It reads in minutes and seconds from liftoff. Update rate is once every 1920 ms. Immediately below TMECO value is PRPLT – percent propellant remaining in the ET. The value is updated once every 960ms. “SEP INH” shall be displayed double overbright and flashing at the XXX XXX position below “PRPLT” if the ET SEP inhibit discrete is set by the ET SEP sequencer.

(8) A digital readout throttle command (in percent) shall be displayed with an update rate of once every 960 ms.

(9) Prior to BFS ENGAGE the ADI errors in roll, pitch and yaw computed by BFS software shall be displayed for comparison with the PASS driven ADI error needles. These parameters and their text labels shall be dynamically driven. Signs of the error values shall be driven U, D, L, R to indicate fly-to errors, e.g., the action required to null these errors is:

R roll error, roll right
U pitch error, pitch up
R yaw error, yaw right

If the computed value of R roll error is 100 degrees or greater in either direction, then the roll error display shall show an overflow indicator of “R>>” for a right fly-to roll error or “L>>” for a left fly-to roll error. When the value of R roll error returns to the normal display range of 99 degrees or less, the overflow indicator shall be replaced by the sign and value of roll error as defined above.

Update rate is once every 960 ms.

These parameters shall not be displayed during post BFS ENGAGE.

(10) Selection of Item 1 (PPA) issues a command (S_RTLS_FB_CMD) to powered flight guidance to force BFS into the Powered Pitch Around phase during an RTLS abort. The asterisk (*) is displayed when the S_RTLS_FB (V95X0149X) flag is set by BFS POWERED FLIGHT GUIDANCE.

(11) The guidance status parameter (GUID) provides an indication of the status of the guidance solution prior to powered pitcharound. The value of GUID is a mnemonic or a 3 digit integer.

a. At RTLS selection, GUID INIT will be displayed until initialization is complete.

- b. When guidance has converged and the vehicle is progressing to the powered pitcharound point, GUID displays the percent deviation of the predicted final mass from the RTLS mass target. As the pitcharound point is approached, the numeric value will decrement to zero.
- c. If guidance is unconverged or if powered pitcharound has been delayed because of an attitude violation, GUID INHB will be displayed to indicate that powered pitcharound is inhibited.
- d. At the beginning of powered pitcharound, GUID PPA will be displayed and the field will be frozen.

4.2.34.2 RTLS Trajectory 2 Keyboard Processing Addendum.

Not applicable.

4.2.34.3 RTLS Trajectory 2 CRT Display Processing Addendum.

All necessary processings for dynamic symbols on this display are defined in the section B.4.218 (RTLS Traj 2 DIP) of this FSSR. The overbright symbols (referenced by following addenda A, B, C, D, G, & H) are displayed at the intensity level of 43 overwritten twice (equivalent intensity of 86) with the exception of the circle which is at 21.

- A. ΔR Scale. Display the “down pointing triangle” (symbol, 06) on the CRT field specified by a variable X position data and a constant Y position data (see Table 4.2.34–3).
- B. Vehicle Current Position on Central Curve. Display the “up pointing triangle” (symbol, 7F) at the location specified by dynamic data.
- C. Flash Flag for G Symbol. If this discrete (V94X1329X) is set display the “left pointing triangle” (symbol, 0C) flashing on the CRT field. If the discrete is reset, display the symbol without flashing.
- D. Alpha Symbol Display. Display the “left pointing triangle” (symbol, 0C) on the alpha scale defined by Y position data and a constant X position data (see Table 4.2.34–3).
- E. Time of MECO. Time of MECO in seconds, input from the GNC module, Powered Flight Guidance is converted and displayed in minutes and seconds from liftoff.
- F. Dynamic Symbol. All dynamic symbols are displayed large size and overbright.
- G. Vehicle Predicted Positions on Central Curve. Display circles with a radius of 5 AU’s at the location specified by dynamic data.
- H. Flash Flag for Delta H DOT Symbol Flashing on the CRT Field. If the discrete is reset, display the symbol without flashing. Y position of the symbol is dynamic for a constant X position data (see Table 4.2.34–3).

NOTES: Maximum number of mission-dependent constants are as follows:

- (a) 15 solid lines
- (b) 0 dashed lines
- (c) 6 character strings

4.2.34.4 RTLS Trajectory 2 Figure/Table References

Figure 4.2.34-1	RTLS Trajectory 2 Display (BFS) Generic
Table 4.2.34-1	Keyboard Processing Table
Table 4.2.34-2	CRT Display Processing Table
Table 4.2.34-3	CRT Display Processing Background Requirements
Table 4.2.34-4	Mission Design Background Constants N/A
Table 4.2.34-5	Input Functional Parameters N/A
Table 4.2.34-6	Output Functional Parameters N/A
Table 4.2.34-7	I-Loads
Table 4.2.34-8	K-Loads
Table 4.2.34-9	Constants N/A

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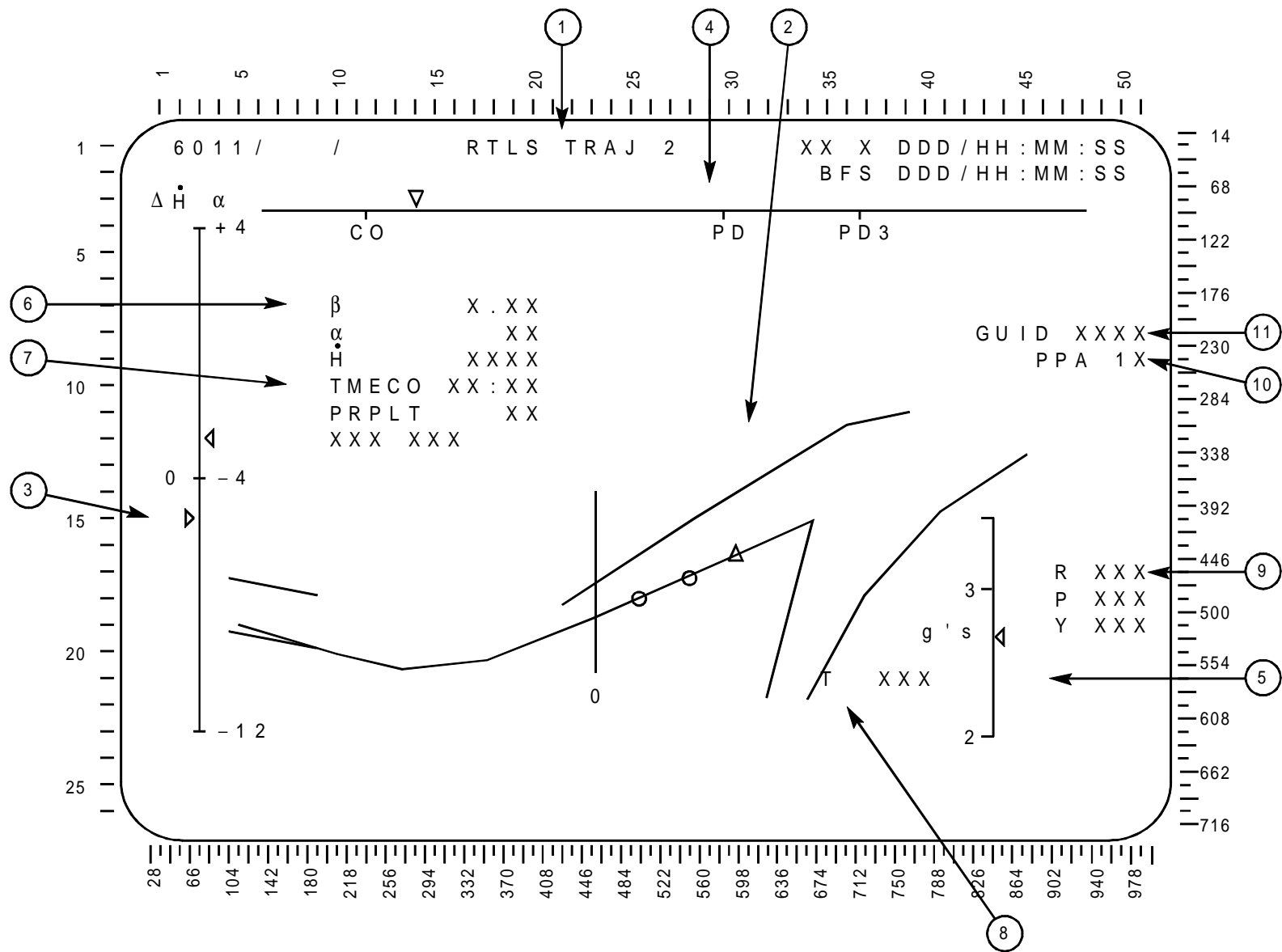


FIGURE 4.2.34-1. RTLS Trajectory 2 Display (BFS)

Table 4.2.34-1. RTLS TRAJECTORY 2 (BFS) KEYBOARD PROCESSING														
Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination		Nomenclature	C R T
								MIN	MAX		PFS	BFS		
001	PPA (1)	V93U5204C	0.0	CTRL			1					PFGD	START POWERED PITCH AROUND	

Table 4.2.34-2. RTLS TRAJECTORY 2 (BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T					
			X	Y		CHAR	BILEVEL																	TYPE				
							1	0																				
001	(OPS)	V93X0040X	2	1		5.0		CHAR																				
002	(SPEC)	V93X0042X	7	1		4.0		CHAR																				
003	(DISP)	V93X0044X	10	1		4.0		DEC																				
004	(UL)	V92X5032X	34	1		2.0	UL	BLVL					X	G														
005	(GPC)	V93X0048X	36	1		2.0		DEC						B														
006	(MT)	V91W1990C	39	1		12.0		CHAR	DHMS					A														
007	(CRT TIMER)	V91W1987C	39	2		12.0		CHAR	DHMS					A														
008	BETA	V90H2249C	16	7		5.2		DEC	DEG					A														
009	ALPHA	V90H2246C	18	8		3.0		DEC	DEG					A														
010	H-DOT	V95L0511C	16	9		5.0		DEC	FPS					A														
011	TMECO	V90W1970C	16	10		5.0		CHAR	MS												E							
012	XXX	V90X8259X	10	12		3.0	SEP	BLVL				X	X															
013	XXX	V90X8259X	14	12		3.0	INH	BLVL				X	X															
014	T	V90U1948C	37	21		4.0		DEC	PCT					A														
015	PRPLT	V94U1325C	18	11		3.0		DEC	PCT					A														
016	(CUR VEH X POS)	V94U1322C			*			DEC																				
017	(CUR VEH Y POS)	V94U1323C			*			DEC			X										B F							
018	(PRED VEH X1 POS)	V94U1321C			*			DEC				X																
019	(PRED VEH Y1 POS)	V94H1326C			*			DEC				X									F G							
020	(PRED 2 X POS)	V94U1330C			*			DEC				X																

Table 4.2.34-2. RTLS TRAJECTORY 2 (BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
021	(PRED 2 Y POS)	V94U1331C										X								G F	DOP 6	ALT/VEL 2ND PRED Y POS	X	
022	(DEL H DOT Y POS)	V94U3894C			*							X	X	A						H	DOP 6	ASC TRAJ 2 Y COORD OF DELTA H-DOT		
023	(Y POS OF ALPHA)	V94H1327C			*							X		F						D F	DOP 6	RTLS TRAJ 2 Y COORD OF ALPHA	X	
024	(Y POS OF G)	V94U1328C			*							X	X	A						C F	DOP 6	RTLS TRAJ 2 Y COORD OF G- LOAD	X	
025	(X POS OF DELTA R)	V94U1324C			*							X		F						A F	DOP 6	X COORD OF DELTA RANGE	X	
026	(R)	V98U0017C	47	17		1.0						X									MI	ADI ROLL ERROR LABEL BFS	X	
027	(P)	V98U0018C	47	18		1.0															MI	ADI PITCH ERROR LABEL BFS	X	
028	(Y)	V98U0019C	47	19		1.0															MI	ADI YAW ERROR LABEL BFS	X	
029	P	V90H2233C	49	17		3.0			DEG					A	R						DAP	BODY PITCH ATTITUDE ERROR	X	
030	R	V90H2234C	49	18		3.0			DEG					A	U						DAP	BODY ROLL ATTITUDE ERROR	X	
031	Y	V90H2235C	49	19		3.0			DEG					A	R						DAP	BODY YAW ATTITUDE ERROR	X	
032	PPA 1	V95X0149X	51	9		1.0	*														PF GD	RTLS FLYBACK HAS BEGUN		
033	GUIDXXXX (CHAR STRG)	V94J1366C	48	8		4.0								B							DOP 6	RTLS GUID STATUS-CHAR STRING		
034	GUIDXXXX (DEC VAL)	V94G1367C	48	8		4.0								B							DOP 6	RTLS GUID STATUS-DECIMAL VAL		
035	(MSG LINE)	V93X0050X	2	25		46.0								G							MI	MESSAGE LINE	X	
036	(BUFFER MSG)	V93X0054X	48	25		4.0								G							MI	BUFFER MESSAGE INDICATOR	X	
037	(SPL)	V93X0056X	2	26		49.0								G							MI	SCRATCH PAD LINE	X	
038	(BFS)	V98X0015X	35	2		3.0						X									MI	BFS IDENTIFIER BFS	X	

Table 4.2.34-3. RTLS TRAJECTORY 2 CRT DISPLAY PROCESSING BACKGROUND REQUIREMENTS; DESIGN DEPENDENT				
VECTORS				
VECTOR ID	ORIGIN		TERMINAL	
	X(AU)	Y(AU)	X(AU)	Y(AU)
ΔR scale	136	95	936	95
α / delta H dot scale	75	110	75	622
g's scale	845	628	845	403
$\bar{q} = 2$	103	468	188	484
$\bar{q} = 10$	103	522	188	541
CHARACTER STRINGS				
CHARACTER STRING ID	ORIGIN			
	X(AU)	Y(AU)	X(AU)	Y(AU)
ΔR scale symbols	CO		227	118
	CO tick mark (symbol 18)		236	104
ΔH DOT and α scale symbols	α		94	82
	+4		103	110
	-4		103	366
	-12		103	622
	ΔH		37	82
	•		56	68
	0		46	366
g scale symbols	g's		778	514
	3		819	478
	2		819	628
Background symbols	T		683	568
	β		208	190
	α		208	217
	•		208	230
	H		208	244
	TMECO		208	271
	PRPLT		208	298

<p>Table 4.2.34-3. RTLS TRAJECTORY 2 CRT DISPLAY PROCESSING BACKGROUND REQUIREMENTS; DESIGN DEPENDENT</p>
<p>Location of minus symbol (2D) for:</p> <p style="padding-left: 40px;">Δ H DOT & α scale @ X = 75 Y = 110, 366 & 622</p> <p style="padding-left: 40px;">g's scale @ X = 838, Y = 628, 478 & 402</p> <p>Location of vertical symbol (18) for:</p> <p style="padding-left: 40px;">Δ R scale @ Y = 104, X = 236</p> <p>Dynamic symbol design dependent locations:</p> <p>α scale, Left-pointing triangle (symbol,0C) centered at X = 110</p> <p>g's scale, centered @ X = 851</p> <p>ΔR scale, Down-pointing triangle (symbol,06) centered @ Y = 86</p> <p>ΔH DOT, Right-pointing triangle (symbol,0B) centered @ X = 69</p>
<p>NOTE: X, Y position of design dependent data is with respect to the origin being at upper left corner of CRT.</p>

TABLE 4.2.34-7. BFS RTLS TRAJECTORY 2 (POST STS-1) (4.2.34) I-LOADS

BFS NAME	MSID	ENG UNITS	DT	PR	D	S	PARA	MC	CAT	LAST CR	R E V
RB_CHAR_STRING(06,1)	V96U7793C	ND	CH		M	B	4.2.34	00	DFR	93012D	
RB_CHAR_STRING(06,2)	V96U7794C	AU	I	S	M	B	4.2.34	00	DFR	93012D	
RB_CHAR_STRING(06,3)	V96U7795C	AU	I	S	M	B	4.2.34	00	DFR	93012D	
RB_CHAR_STRING(01,1)	V97U8924C	ND	CH		M	B	4.2.34	00	DFR	93012D	
RB_CHAR_STRING(01,2)	V97U8925C	AU	I	S	M	B	4.2.34	00	DAE	DC0830	
RB_CHAR_STRING(01,3)	V97U8926C	AU	I	S	M	B	4.2.34	00	DFR	93012D	
RB_CHAR_STRING(02,1)	V97U8927C	ND	SY		M	B	4.2.34	00	DFR	93012D	
RB_CHAR_STRING(02,2)	V97U8928C	AU	I	S	M	B	4.2.34	00	DAE	DC0830	
RB_CHAR_STRING(02,3)	V97U8929C	AU	I	S	M	B	4.2.34	00	DFR	93012D	
RB_CHAR_STRING(03,1)	V97U8930C	ND	CH		M	B	4.2.34	00	DFR	93012D	
RB_CHAR_STRING(03,2)	V97U8931C	AU	I	S	M	B	4.2.34	00	DAE	DC0830	
RB_CHAR_STRING(03,3)	V97U8932C	AU	I	S	M	B	4.2.34	00	DFR	93012D	
RB_CHAR_STRING(04,1)	V97U8933C	ND	SY		M	B	4.2.34	00	DFR	93012D	
RB_CHAR_STRING(04,2)	V97U8934C	AU	I	S	M	B	4.2.34	00	DAE	DC0830	
RB_CHAR_STRING(04,3)	V97U8935C	AU	I	S	M	B	4.2.34	00	DFR	93012D	
RB_CHAR_STRING(05,1)	V97U8936C	ND	CH		M	C	4.2.34	00	DFR	93012D	
RB_CHAR_STRING(05,2)	V97U8937C	AU	I	S	M	C	4.2.34	00	DAL	93012D	
RB_CHAR_STRING(05,3)	V97U8938C	AU	I	S	M	C	4.2.34	00	DFR	93012D	
RB_SOLID_LINE(01,1)	V97U8939C	AU	I	S	M	B	4.2.34	00	DAP	DC0689	
RB_SOLID_LINE(01,2)	V97U8940C	AU	I	S	M	B	4.2.34	00	DAP	DC0689	
RB_SOLID_LINE(01,3)	V97U8941C	AU	I	S	M	B	4.2.34	00	DAP	DC0689	
RB_SOLID_LINE(01,4)	V97U8942C	AU	I	S	M	B	4.2.34	00	DAP	DC0689	
RB_SOLID_LINE(02,1)	V97U8943C	AU	I	S	M	B	4.2.34	00	DAP	DC0689	
RB_SOLID_LINE(02,2)	V97U8944C	AU	I	S	M	B	4.2.34	00	DAP	DC0689	
RB_SOLID_LINE(02,3)	V97U8945C	AU	I	S	M	B	4.2.34	00	DAP	DC0689	
RB_SOLID_LINE(02,4)	V97U8946C	AU	I	S	M	B	4.2.34	00	DAP	DC0689	
RB_SOLID_LINE(03,1)	V97U8947C	AU	I	S	M	B	4.2.34	00	DAP	DC0689	
RB_SOLID_LINE(03,2)	V97U8948C	AU	I	S	M	B	4.2.34	00	DAP	DC0689	
RB_SOLID_LINE(03,3)	V97U8949C	AU	I	S	M	B	4.2.34	00	DAP	DC0689	
RB_SOLID_LINE(03,4)	V97U8950C	AU	I	S	M	B	4.2.34	00	DAP	DC0689	
RB_SOLID_LINE(04,1)	V97U8951C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(04,2)	V97U8952C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(04,3)	V97U8953C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(04,4)	V97U8954C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(05,1)	V97U8955C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(05,2)	V97U8956C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(05,3)	V97U8957C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(05,4)	V97U8958C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(06,1)	V97U8959C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(06,2)	V97U8960C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(06,3)	V97U8961C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(06,4)	V97U8962C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(07,1)	V97U8963C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(07,2)	V97U8964C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(07,3)	V97U8965C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(07,4)	V97U8966C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(08,1)	V97U8967C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	

TABLE 4.2.34-7. BFS RTLS TRAJECTORY 2 (POST STS-1) (4.2.34) I-LOADS

BFS NAME	MSID	ENG UNITS	DT	PR	D	S	PARA	MC	CAT	LAST CR	R E V
RB_SOLID_LINE(08,2)	V97U8968C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(08,3)	V97U8969C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(08,4)	V97U8970C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(09,1)	V97U8971C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(09,2)	V97U8972C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(09,3)	V97U8973C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(09,4)	V97U8974C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(10,1)	V97U8975C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(10,2)	V97U8976C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(10,3)	V97U8977C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(10,4)	V97U8978C	AU	I	S	M	B	4.2.34	00	DAK	DC2105	
RB_SOLID_LINE(11,1)	V97U8979C	AU	I	S	M	B	4.2.34	00	DAL	DC2105	
RB_SOLID_LINE(11,2)	V97U8980C	AU	I	S	M	B	4.2.34	00	DAL	DC2105	
RB_SOLID_LINE(11,3)	V97U8981C	AU	I	S	M	B	4.2.34	00	DAL	DC2105	
RB_SOLID_LINE(11,4)	V97U8982C	AU	I	S	M	B	4.2.34	00	DAL	DC2105	
RB_SOLID_LINE(12,1)	V97U8983C	AU	I	S	M	B	4.2.34	00	DAL	DC2105	
RB_SOLID_LINE(12,2)	V97U8984C	AU	I	S	M	B	4.2.34	00	DAL	DC2105	
RB_SOLID_LINE(12,3)	V97U8985C	AU	I	S	M	B	4.2.34	00	DAL	DC2105	
RB_SOLID_LINE(12,4)	V97U8986C	AU	I	S	M	B	4.2.34	00	DAL	DC2105	
RB_SOLID_LINE(13,1)	V97U8987C	AU	I	S	M	B	4.2.34	00	DAL	DC2105	
RB_SOLID_LINE(13,2)	V97U8988C	AU	I	S	M	B	4.2.34	00	DAL	DC2105	
RB_SOLID_LINE(13,3)	V97U8989C	AU	I	S	M	B	4.2.34	00	DAL	DC2105	
RB_SOLID_LINE(13,4)	V97U8990C	AU	I	S	M	B	4.2.34	00	DAL	DC2105	
RB_SOLID_LINE(14,1)	V97U8991C	AU	I	S	M	C	4.2.34	00	DAL	93012D	
RB_SOLID_LINE(14,2)	V97U8992C	AU	I	S	M	C	4.2.34	00	DAL	93012D	
RB_SOLID_LINE(14,3)	V97U8993C	AU	I	S	M	C	4.2.34	00	DAL	93012D	
RB_SOLID_LINE(14,4)	V97U8994C	AU	I	S	M	C	4.2.34	00	DAL	93012D	
RB_SOLID_LINE(15,1)	V97U8995C	AU	I	S	M	B	4.2.34	00	DFR	93012D	
RB_SOLID_LINE(15,2)	V97U8996C	AU	I	S	M	B	4.2.34	00	DFR	93012D	
RB_SOLID_LINE(15,3)	V97U8997C	AU	I	S	M	B	4.2.34	00	DFR	93012D	
RB_SOLID_LINE(15,4)	V97U8998C	AU	I	S	M	B	4.2.34	00	DFR	93012D	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.34-8. BFS RTLS TRAJECTORY 2 (POST STS-1) (4.2.34) K-LOADS

BFS NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PARA	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.35 OVERRIDE (BFS)

TITLE: OVERRIDE

TYPE: SPEC/051

AVAILABILITY: OPS 1,3,6 in BFS only

4.2.35.1 Purpose, Operation, and Organization

The OVERRIDE BFS Display (Figure 4.2.35–1) provides the capability for the crew to control the selection or deselection of an IMU for use in the selection processing of the IMU HIP and to control the selection or deselection of the Accelerometer Assembly (AA), Orbiter Rate Gyro Assembly (RGA) and Aerosurface for use in the selection processing of the INPUT HIP. The capability to manually command vent doors opened or closed, to enable/inhibit the OMS/RCS interconnect function and to select the desired switch mode in the event of the failure of the ET SEP, ET UMB DR, and ABORT switches and to command the DAP to select Ascent or Entry FCS parameters is also provided on this display. The crew has the ability to select the elevon schedule and the body bending filter in OPS 3 and to select the entry atmosphere model. In addition, control of Orbiter OMS/RCS propellant dumps and S-Band PM communications configuration is provided. The display also provides the crew with the capability to control the SSME drag chute repositioning sequence and to select the wraparound flight control system mode.

1. Two items (1,2) allow the crew to select a TAL abort in MM103 and MM104, or an ATO abort in MM102, MM103, and MM104. These items are mutually exclusive and the selected abort will be indicated by an asterisk (*). Another item (3) allows the crew to initiate the abort selected. An asterisk (*) will be displayed whenever an abort has been initiated via this item. The display will be initialized the first time with these items deselected i.e., no asterisks. If any of these three items are executed in any other Major Mode other than described above, an operator error shall result and the “ILLEGAL ENTRY” CRT message will be displayed. Also, execution of the backup abort command item without having first selected the type of abort (TAL or ATO) shall result in an operator error and CRT message.
2. Item 4 (THROT MAX), Item 50 (THROT ABT), and Item 51 (THROT NOM) allow the crew to change the SSME upper throttle level limit to one of three I-Loaded values by passing the item selection to Ascent Guidance (see BFS Guidance and Navigation PRD MG038104 for GN&C functional requirements related to these I-Loads). These three item entries are mutually exclusive and the selected item shall be indicated by an asterisk (*). These items do not toggle - i.e., making a valid item entry for an item that is already selected shall result in that item remaining selected with the asterisk continuing to be displayed next to it. On initial display call up, all three of these items shall be initialized deselected, i.e., with the asterisks blanked, and thereafter shall reflect crew inputs.

These item entries shall be valid in MM102, MM103 and MM601 only. Execution of these item entries in any other Major Mode shall result in an operator error and the “ILLEGAL ENTRY” CRT message shall be displayed.

A valid item entry shall be carried across OPS transitions, such that the displayed asterisk shall show the last valid selection at all times the display is visible. If no valid selection has been made, then no asterisk shall be displayed for these items at any time.

3. Items 5, 6, 7, 8, and 9 provide the capability for the crew to enable, inhibit, and control manual or automatic abort dumps. Item 5 OMS/RCS Interconnect (ICNCT) provides the capability to enable or inhibit the OMS/RCS Interconnect function. Item 6 (ARM), and 7 (START) allow the crew to manually initiate a dump. Item 8 (STOP) allows inhibiting or terminating an automatic dump, or terminating a manual dump. Item 9 (QUAN/SIDE) provides the capability to enter an amount of propellant to be dumped, measured in percent of full tanks. OMS DUMP TTG provides output of the time to go for a dump in seconds, whether the dump is in progress or not.

Item 5 (ICNCT) shall be initialized by SEQ to “ENA” in OPS 1 and “INH” in OPS 3. Items 6 (ARM), 7 (START), and 8 (STOP) shall be initialized reset, in OPS 1 and 3, with a blank (no asterisk) displayed. Item 9 (QUAN/SIDE) shall be initialized in OPS 1 to a software–calculated quantity based on a manual dump I–Load or a value uplinked to PASS and received via One Shot Transfer. In OPS 3, Item 9 (QUAN/SIDE) shall be initialized to the last value from OPS 1 or to an automatic dump value based on an abort selection. The ‘CPLT’ (complete) character string shall be initialized blank and thereafter reflect the status of the OMS_RCS_XFD_DONE flag from the OMS/RCS Interconnect sequence.

Execution of Item 5 (ICNCT) shall alternately inhibit and enable the OMS/RCS Interconnect function, displaying “INH” or “ENA” as appropriate. The state of Item 5 may be changed by item entry or by the Abort Control Sequence.

To the right of the ‘XXX ICNCT 5’, a character string “CPLT” shall be displayed when the OMS_RCS_XFD_DONE flag is true (blank when false).

Execution of Item 6 (ARM) will display an * beside Item 6 and blank the STOP *.

Execution of Item 7 (START) when Item 6 is set (ARM * displayed) shall start the dump, and display an * next to Item 7. Execution of Item 7 when Item 6 is reset (no ARM *) shall cause an “ILLEGAL ENTRY” message to be displayed and the input rejected.

Execution of Item 8 (STOP) when Item 6 (ARM) is set shall blank the ARM * and display the STOP *. Execution of Item 8 when Items 6 and 7 are both set (dump in progress) shall stop the dump, blank the ARM and START *’s and display the STOP *. An automatic dump associated with an abort selection shall be inhibited (not performed) if an * is present next to Item 8. Execution of Item 8 when an automatic dump has been initiated by the abort selected (ARM and START reset) shall display the STOP * and cause the ABT CNTL SEQ to stop the dump in progress.

Item 9 (QUAN/SIDE) provides the capability for the crew to control the amount of OMS propellant, in percent quantity per side, to be dumped. The OMS quantity shall be initialized as a function of the manual OMS dump time I–load, or a value uplinked to PASS and received via One Shot Transfer, in first pass to OPS 1, thereafter, any changes to the OMS quantity shall be supplied by crew input. When a legal OMS quantity is accepted, OMS_TIME and MANUAL_OMS_TIME shall be computed based on the new quantity. If no new quantity has been entered, MANUAL_OMS_TIME shall remain equal to the manual OMS dump time I–load or a value uplinked to PASS and received via One Shot Transfer.

For information only, if OMS_TIME is changed by Abort Sequencing, the OMS quantity shall be updated as a function of the OMS_TIME in subsequent update cycle. OMS_TIME can be a

value computed based on the quantity most recently entered via Item 9, an I-loaded intact abort automatic dump time, a nominal OMS Assist dump time, the MANUAL_OMS_DT I-load, or a value uplinked to PASS and received via One Shot Transfer.

If a new value is entered into Item 9 while any OMS dump is in progress, the dump shall be based on the new value. If the quantity entered via Item 9 exceeds MAX QUAN ENTRY an "ILLEGAL ENTRY" message shall be displayed and the quantity entered rejected.

If Abort Control is running, and an Item 9 entry is made which is less than or equal to the total quantity that was previously dumped, then OMS_TTG shall be displayed as 0 and Item 9 shall be displayed as the quantity entered.

Items 6 and 7 are legal entries in Major Modes MM103, MM304, and MM601 only. Items 5, 8, and 9 are legal entries in all Major Modes in OPS 1, 3, and 6 except in MM 104 through MM106. In MM 304, if the OME_ONLY_FLAG is set, execution of Item 5 (ICNCT) shall be rejected and an "ILLEGAL ENTRY" message shall be displayed. The Backup Flight System has DK listen capability for Items 5 through 9 in all OPS and Major Modes. A keyboard entry to the BFS Override Display shall be honored pre- or post-engaged in those Major Modes for which the entry is legal; if an item entry is made on a BFS commanded keyboard in any Major Modes in which it is not legal for BFS, then an "ILLEGAL ENTRY" message shall be displayed.

FOR INFORMATION ONLY

If a manual dump is initiated, the status of the OMS/RCS Interconnect shall be determined by Item 5 state. If an intact abort is selected when this item in ENA, the Item 5 shall be set to an I-loaded value based on the abort selected. If the abort is selected when this item is INH, then Item 5 shall remain inhibited. Whenever the Abort Control Sequence terminates the OMS/RCS Interconnect, Item 5 (ICNCT) shall be reset (INH).

The OMS_TTG value reflects dump time using a scale factor based on a two OMS engine flow rate. When an OMS/RCS interconnect is completed, and RCS JETS are being commanded ON, the OMS_TTG computation is adjusted by a scale factor to reflect the additional RCS flow rates.

The OMS TIME TO GO is computed by Abort Control Sequence as follows:

$$V93W8202C (OMS_TTG) = \frac{V98W4982C (OMS_TIME) - TB (V98W4981C)}{V94J3755C (OMS\ TIME\ SCALE\ FACTOR)}$$

The OMS_TTG decrements as dumping occurs. When it reaches zero, the dump shall be terminated by the Abort Control.

The AFT RCS DUMP TIME display parameter is computed by Abort Control Sequence as:
 AFT_RCS_TIME =
 AFT_RCS_DURATION (V93W6958C) – AFT_RCS_COUNTER (V98W4984C)

OMS DUMP COMPUTATION AND INITIALIZATIONS:

Upon OPS 1 initialization set:

$$\begin{aligned}\text{MANUAL_OMS_TIME (V98W4858C)} &= \text{MANUAL_OMS_DT} \\ \text{OMS_TIME (V98W4982C)} &= \text{MANUAL_OMS_DT} \\ \text{OMS_TTG (V93W8202C)} &= \text{OMS_TIME} \\ \text{OMS_DUMP_QTY (V93Q6280C)} &= \text{OMS_TIME} * 0.14971\end{aligned}$$

Where MANUAL_OMS_DT is the manual I-load value or a value uplinked to PASS and received via One Shot Transfer, and MANUAL_OMS_TIME equals the manual I-load value, a value uplinked to PASS and received via One Shot Transfer, or a computed time based on the last quantity entered via Item 9.

Whenever a new quantity is entered via Item 9 set:

$$\begin{aligned}\text{OMS_TIME} &= \text{OMS_DUMP_QTY} * 6.6794 \\ \text{MANUAL_OMS_TIME} &= \text{OMS_TIME} \\ \text{OMS_TTG} &= \text{OMS_TIME}\end{aligned}$$

OMS quantity shall be computed when OMS_TIME is changed by Abort Control Sequencing in MM 103, 104, 304, 601 and 602, or when OMS_TIME is reinitialized in OPS 0 by BOS after an IPL is performed, in this case OMS quantity shall be updated upon transition to MM301. In all cases, OMS quantity shall be computed as follows:

$$\text{OMS_DUMP_QTY} = \text{OMS_TIME} * 0.14971$$

- Items 13 (AFT RCS) and 14 (TIME) provide the capability to control the AFT RCS propellant dumps. Item 13 is initialized to ENA in OPS 1 allowing automatic dumps in MM 304, 602 and 603 to occur when other criteria are met. Execution of Item 13 shall toggle its ENA/INH states: INH to inhibit or stop the dump, ENA to allow the dump to occur when other criteria are met. The state shall be indicated by displaying "ENA" or "INH" next to Item 13. The ENA/INH condition is carried over to OPS 6 and is carried over to OPS 3 if the TAL flag is set. In OPS 3 and if the TAL flag is not set, Item 13 is initialized to INH. Item 13 is legal in OPS 1, 3 and 6.

Item 14 (TIME) is initialized to RTLS_POSTMECO_RCS_PLUSX_TIME time in seconds in OPS 1. In OPS 3 with the TAL flag set, time is initialized to the AFT_RCS_DUMP_TIMER. Both the RTLS_POSTMECO_RCS_PLUSX_TIME and AFT_RCS_DUMP_TIMER values are set by I-Loads V97U9785C and V99U9574C respectively, and may be updated with the one-shot transferred value. In OPS 3, with the TAL flag not set Item 14 is initialized with a dump time of 0 seconds. In OPS 6, this item is initialized to the last value from OPS 1. The crew can input a different value of dump time using Item 14 in OPS 1, 3 and 6. The dump time displayed next to Item 14 shall decrement at the appropriate rate whenever the dump is in progress. An aft RCS dump may be initiated in MM 304, 602 and 603 when other criteria are met by inputting a non-zero dump time via Item 14 and enabling the dump via Item 13.

Item 15 (FWD RCS) and 16 (TIME) control the forward RCS dump in the same manner that Items 13 and 14 control the aft RCS dump. The initialization criteria and operation are the same.

5. Items 17 and 18 allow the crew to command the Descent DAP to use the AUTO or FIXED elevon schedules. The selected schedule is indicated by an asterisk displayed next to the appropriate item during operation in OPS 3.

The display is initialized with the AUTO schedule selected. Once initialized, the display will reflect the last crew input by displaying an asterisk next to the appropriate item in OPS 3 only. In OPS 1 or OPS 6, the asterisk is blanked as the elevon schedule is I-loaded independent of crew input.

Items 17 and 18 are mutually exclusive; execution of one automatically deselects the other and displays the asterisk appropriately. These items are legal in OPS 3 only; execution in any other OPS will result in an "ILLEGAL ENTRY" message.

6. Items 20 and 21 allow the crew to command the Descent DAP to use the nominal (NOM) or alternate (ALT) body bending filters. The selected body bending filter is indicated by an asterisk displayed next to the appropriate item during operation in OPS 3.

The display is initialized with the NOM body bending filter selected. If OPS 3 is entered from OPS 1, then it is initialized with the ALT body bending filter selected. If OPS 3 is entered from OPS 0, the interface boolean is set off and the NOM filter is selected. Once initialized, the display will reflect the last crew input by displaying an asterisk next to the item in OPS 3 only. In OPS 1 or OPS 6, the asterisk is blanked as the body bending filter is I-Loaded independent of crew input.

Items 20 and 21 are mutually exclusive; execution of one automatically deselects the other and displays the asterisk appropriately. These items are legal in OPS 3 only; execution in any other OPS will result in an "ILLEGAL ENTRY" message.

7. Items 22, 23, and 24 allow the crew to select one of three atmospheric models for use by Entry Navigation. The display is initialized with the nominal (NOM) atmospheric model selected. Item 23 selects a North polar model while Item 24 selects a South polar model. Items 22, 23, and 24 are mutually exclusive: execution of one of these items deselects the currently active model and selects the one corresponding to the executed item. The selected item is indicated by an asterisk displayed next to the appropriate item. Items 22, 23, and 24 are active in OPS 3 only, execution in OPS 1 or 6 will result in an "ILLEGAL ENTRY" message.

8. Items 25, 26, and 27 provide the crew with the capability to select or deselect an IMU LRU for use by the selection processing of the IMU HIP. Execution of any of these items will cause the associated IMU to be deselected. An asterisk (*) is displayed beside the item number indicating deselection. The capability exists to reselect an IMU for use in selection processing but not as mid-value selection once it has been deselected. Reselection is accomplished by re-executing the associated DES item. This action will also cause the asterisk (*) to be blanked. Items 25, 26, and 27 are active in OPS 1, 3, and 6. They are initialized blank and will thereafter reflect the current select/deselect state as modified by crew entry. The IMU attitude (ATT) shall display which IMU (1, 2 or 3) is selected for use as an attitude source. It shall be blank prior to AS11A event (i. e. Attitude Processor is inactive).

9. Two items (28, 29) allow the crew to select the ET SEP AUTO Mode or to initiate ET SEPARATION. An asterisk (*) will be displayed when these items are selected. When the display is first called, it will be initialized with these items deselected, i.e., no asterisks. These items are provided as a backup means of initiating separation based on failures of the dedicated

switches. These items are legal only in MM102, MM103, MM104, MM105, MM106 and MM601; execution in any other Major Mode or Pre-BFS-ENGAGE will result in an operator error.

10. One item (30) is provided which allows the crew to backup the dedicated switch for closing the ET Umbilical Doors. When the display is first called, this item will be deselected i.e., no asterisk. This item is legal only in MM104, MM105, and MM106; execution in any other Major Mode or Pre-BFS-ENGAGE will result in an operator error.
11. Items 31-34 Accelerometer Assembly Deselect (AA DES), 35-38 Orbiter Rate Gyro Assembly Deselect (RGA DES), and 39-42 AeroSurface Feedback Deselect (SURF DES) allow the crew to manually deselect/reselect specific LRU's to be used by the HARDWARE INTERFACE PROGRAM (HIP). These items shall be initialized to all LRUs selected (set equal to zeroes and display blanks) upon entry into OPS 1 and upon transition from OPS 0 to OPS 3.

Execution of these items on any selected LRU (displaying blank) shall deselect the corresponding LRU, set the corresponding deselect command to 1 and display an asterisk next to the item.

Execution of these items on any deselected LRU (displaying asterisk) shall reselect it and blank the asterisk.

The status of these items shall be carried across the transition from OPS 1 to OPS 6 or OPS 1 to OPS 3.

At least one LRU has to be selected for each area (AA, RGA and SURF). An attempt to deselect the only selected LRU will result in rejection of the input and cause an "ILLEGAL ENTRY" message to be displayed.

12. Items 43 (OPEN) and 44 (CLOSE) provide the manual capability to command open or close the appropriate vent doors. An asterisk (*) shall be displayed next to the item after it is commanded by keyboard entry or by the Vent Control Sequencer indicating the sequence is in progress. At the completion of the open or close sequence, the "OP" or "CL" string shall be displayed following item 43 or 44, respectively. These items are mutually exclusive. Execution of one item shall cause the other item's asterisk to be blanked, as well as the "OP" and "CL" character string fields. When an operation is in progress the character strings shall be blank and an attempt to execute either command will result in an "ILLEGAL ENTRY" message being displayed and the input rejected.

The vent doors are initially configured to OPEN in OPS 0 by the Vent Control Sequencer. When the BFS override display becomes available (MM 101, pre-launch), it shall display the item 43 asterisk and "OP" with item 44 blanked and shall remain in this initial state during any pre-launch vent doors operations. After launch, items 43 and 44 shall display an asterisk corresponding to the last executed command and "OP" or "CL" upon completion of the last commanded open or close operation.

Item 43 (OPEN) shall be legal only in OPS 3, MMs 602 and 603. Item 44 (CLOSE) shall be legal only in MMs 301 through 304, 602 and in MMs 305 and 603 only after the ROLLOUT_IND is true. Execution of these items pre-BFS engage shall result in the "BFS ILLEGAL PRE-ENG" message being displayed, and the input rejected. Execution of these

items in any other major modes shall result in an “ILLEGAL ENTRY” message being displayed, and the input rejected.

13. Item 19 (SSME REPOS) shall provide status of the SSME drag chute repositioning sequence by displaying the character string “ENA” or “INH” to the right of the item number. This item control shall provide the crew the capability to enable or inhibit the automatic repositioning of the SSMEs which takes place in MM304 when the velocity criteria has been satisfied. The character string status field shall be initialized to blank and shall remain blank until set to “ENA” upon transition to OPS 3. Thereafter the status field shall reflect crew inputs based on SSME_REPOS changes.

Each execution of item 19 shall cause the discrete SSME_REPOS to toggle ON or OFF and be sent to LGIV_CNTL and CRT to enable/inhibit performance of the SSME drag chute repositioning sequence. Item 19 shall be legal in MM301, MM302, MM303, and MM304 and execution in any other major mode shall result in an “ILLEGAL ENTRY” message and the input rejected as an operator error.

14. Item 45 (WRAP MODE) shall provide the crew the capability to enable or inhibit the flight control system wraparound mode. A character string shall be displayed next to the item representing the state of the wraparound mode. “INH” shall be displayed when the wraparound mode is inhibited, “ENA” shall be displayed when the wraparound mode is enabled, and “ACT” shall be displayed when the wraparound mode is active. The character string to be displayed shall be determined by the value of WRAP_MODE (V93X0891X) and the flight control flag WRAP (V98X0447X).

Execution of Item 45 shall toggle the value of WRAP_MODE (V93X0891X) ON (set) and OFF (reset). This item shall be legal in OPS 3 only. Execution of this item in any other OPS sequence shall result in an “ILLEGAL ENTRY” message being displayed and the input rejected.

Note that even though WRAP_MODE may be set ON, the D_DAP will not internally invoke the wraparound mode until the dynamic pressure exceeds an I-Loaded value.

15. The item entries and controls as identified with an “X” in the “DK” column of the Keyboard Processing Table, 4.2.35-1, shall respond to PASS inputs via a selective DK listen mode as well as to inputs made on a keyboard dedicated to the BFS (Reference BFS PRD MG038101, Sect. 3.3.7.1).
16. Items 46 through 49 provide the capability to select one of four S-Band PM modes of operation. An overview of the S-Band PM Uplink/Display Interface protocol is found in section 3.6.4, S-Band System Uplink/Display Interface (Backup System Services, PRD MG038101). The S-Band mode items shall be available in OPS 1, 3, and 6. An asterisk (*) shall be displayed next to the indicated Item Entry when the telemetry conditions based upon data read from the PCMMU are as follows:

Communications Reconfiguration PCMMU Feedback	
Asterisk (*) Displayed next to ITEM	Condition
Item 46 - TDRS	V74X4786E (GCIL-S-BAND XPNDR-TDRS MODE) equals 1 AND V74X4788E (GCIL-S-BAND PM HI XPNDR STDN) equals 0 AND V74X4787E (GCIL-S-BAND PM LOW XPNDR STDN) equals 0 AND V74X4789E (GCIL-S-BAND PM XPNDR-SGLS MODE) equals 0 AND V74X4796E (GCIL-NSP CODING RECEIVE-ON) equals 1 AND V74X4797E (GCIL-NSP CODING TRANSMIT-ON) equals 1 AND V74X4752E (GCIL-NSP CODING RCV OFF) equals 0 AND V74X4751E (GCIL-NSP CODING XMIT-OFF) equals 0
Item 47 - STDN-HI	V74X4788E (GCIL-S-BAND PM HI XPNDR STDN) equals 1 AND V74X4786E (GCIL-S-BAND XPNDR-TDRS MODE) equals 0 AND V74X4787E (GCIL-S-BAND PM LOW XPNDR STDN) equals 0 AND V74X4789E (GCIL-S-BAND PM XPNDR-SGLS MODE) equals 0 AND V74X4751E (GCIL-NSP CODING XMIT-OFF) equals 1 AND V74X4797E (GCIL-NSP CODING TRANSMIT-ON) equals 0
Item 48 - STDN-LO	V74X4787E (GCIL-S-BAND PM LOW XPNDR STDN) equals 1 AND V74X4786E (GCIL-S-BAND XPNDR-TDRS MODE) equals 0 AND V74X4788E (GCIL-S-BAND PM HI XPNDR STDN) equals 0 AND V74X4789E (GCIL-S-BAND PM XPNDR-SGLS MODE) equals 0 AND V74X4751E (GCIL-NSP CODING XMIT-OFF) equals 1 AND V74X4797E (GCIL-NSP CODING TRANSMIT-ON) equals 0
Item 49 - SGLS	V74X4789E (GCIL-S-BAND PM XPNDR-SGLS MODE) equals 1 AND V74X4786E (GCIL-S-BAND XPNDR-TDRS MODE) equals 0 AND V74X4788E (GCIL-S-BAND PM HI XPNDR STDN) equals 0 AND V74X4787E (GCIL-S-BAND PM LOW XPNDR STDN) equals 0 AND V74X4752E (GCIL-NSP CODING RCV OFF) equals 1 AND V74X4751E (GCIL-NSP CODING XMIT-OFF) equals 1 AND V74X4796E (GCIL-NSP CODING RECEIVE-ON) equals 0 AND V74X4797E (GCIL-NSP CODING TRANSMIT-ON) equals 0

The asterisks (*) next to these items are mutually exclusive and no more than one asterisk shall be displayed at any time. If (data is available from the PCMMU and none of the above conditions are met) or data is not available from the PCMMU, then all asterisks shall be blanked.

There shall be a 4 character RTXT indication of the Network Signal Processor (NSP) uplink frame sync status displayed for crew use. The RTXT shall show a LOCK indication if either or both NSPs have the frame sync lock bit ON. The following logic shall be used:

IF	V74X5176E = 1 or V74X5177E = 1
THEN	set the character string to "LOCK"
ELSE	set the character string to "NOLK".

The asterisks and the character string fields described above shall both be updated at the default rate (once every 1920 ms). For information only - any of these items may change without item entry (e.g., by uplink), so they must be continuously updated to show the latest condition of the S-Band system.

17. Items 10, 11, and 12 are not legal item entries on the display. If any of these item numbers are executed an operator error shall result, the input rejected, and an "ILLEGAL ENTRY" message shall be displayed.

4.2.35.2 Override (BFS) Keyboard Processing Addendum

- A. Destinations for this signal are IMU HIP and CRT.
- B. Items 43 and 44 are mutually exclusive. Execution of either item number shall be illegal, the input rejected and the "ILLEGAL ENTRY" CRT message displayed when an open or close operation is in progress, i.e., when VENT CONFIGURATION (V93J1601C) is equal to zero. Execution of item 43 (OPEN) shall be legal only in OPS 3, MM 602 and MM 603. Execution of item 44 (CLOSE) shall be legal only in MMs 301 through 304, 602 and in MMs 305 and 603 only after the ROLLOUT_IND is set "ON". Execution of these items in any other Major Mode shall result in rejection of the input and display of the "ILLEGAL ENTRY" CRT message.

Destinations for this signal are the Vent Control Sequencer and the CRT. Whenever Item 43 (OPEN) is executed, the VENT DOOR SEQUENCE INITIATE (V95X0235X) shall be set to 1 and the ALL VENT CLOSE COMMAND discrete (V93X7201X) shall be reset to 0 which commands vent doors to the OPEN position, and places an asterisk (*) next to Item 43 on the display. Whenever Item 44 (CLOSE) is executed, the VENT DOOR SEQUENCE INITIATE (V95X0235X) shall be set to 1 and the ALL VENT CLOSE COMMAND discrete (V93X7201X) shall be set to 1 which commands all vent doors to the CLOSED position and places an asterisk (*) next to Item 44 on the display.

- C. Destinations for this signal are ET SEP and CRT.
- D. Destinations for this signal are the ABT CNTL SEQ and the CRT.
- E. These items are legal Post-BFS-ENGAGE only. Execution of any of these items in a legal major mode Pre-BFS-ENGAGE shall result in an operator error and a "BFS ILLEGAL PRE-ENG" CRT message. However, an attempt to execute any of these items in an illegal major mode either pre- or post-engaged shall result in an "ILLEGAL ENTRY" CRT message.
- F. Destinations for this signal are ET SEP, SSME OPS and CRT.

G. Initialization, Mutual Exclusivity, OPS Carryover, and Destination

On initial display call up, all three of these items shall be initialized deselected, i.e., with no asterisk (*) displayed.

These three items are mutually exclusive.

The last valid item entry shall be carried across OPS transitions, such that the displayed asterisk shall show the last valid selection at all times the display is visible. If no valid selection has been made, then no asterisk shall be displayed for these items at any time.

Destinations for each of these item entries are ASC GUID and CRT.

H. When item 20 is executed the BODY BENDING FILTER CMD (V93X4494X) is set to 0. When item 21 is executed V93X4494X is set to 1.

I. ILLEGAL ENTRIES. A minimum of one LRU shall be selected for each functional area. i.e., AA, RGA, SURF. Execution of the item number to deselect the only remaining selected LRU shall result in rejection of the input as an operator error and output display of an "ILLEGAL ENTRY" CRT message.

J. The ORBITER DUMP ENABLE (V93X6980X) and the ORBITER DUMP INHIBIT (V93X6981X) discretes are initialized reset in OPS 1 and OPS 3 by the Abort Control Sequence.

When the ARM (V93X5350X) and START (V93X5351X) discretes are both set, the DUMP ENABLE discrete is set and the DUMP INHIBIT discrete is reset.

When the STOP (V93X5352X) discrete is set while the DUMP ENABLE discrete is set, the DUMP INHIBIT discrete is set and the DUMP ENABLE discrete is reset.

Destination of the ORBITER DUMP ENABLE and INHIBIT discretes is the ABT CNTL SEQ.

K. When item 17 is executed the ALTERNATE ELEVON SCHEDULE CMD (V93X4493X) is set to 0. When item 18 is executed, V93X4493X is set to 1.

L. Destination for this signal is: ABT CNTL SEQ.

M. Destination for this signal is: RCS CMD HIP.

N. The SELECTED ATMOSPHERE MODEL INDEX (V93J5353C) is set according to the states of items 22, 23 and 24 as specified in the table below.

ATMOSPHERE SELECT COMMAND	SELECTED ATMOSPHERE MODEL INDEX (V93J5353C)
Item 22 (V93X5354X) NOM	0
Item 23 (V93X5355X) N POLAR	1
Item 24 (V93X5356X) S POLAR	2

The destination of the ATMOSPHERE MODEL INDEX is NAV and CRT.

- O. This DK Listen item shall not be allowed when entered on a BFS commanded DEU prior to BFS engagement in a major mode in which it is a legal entry post-engaged only. When attempted, the Class 5 message “BFS ILLEGAL PRE-ENG” shall be annunciated. However, an attempt to execute any of these items in an illegal major mode either pre- or post-engaged shall result in an “ILLEGAL ENTRY” CRT message.
- P. Destinations for this signal are: CRT and Abort Control.
- Q. OMS DUMP QUAN/SIDE Item Entry Limit Check. In OPS 1 initialize MAX QUAN ENTRY equal to MANUAL_OMS_DT (V99U9717C) times 0.14971 PCT/SEC. If the OMS DUMP QUANTITY PERCENT PER POD (V93Q6280C) item entry is greater than MAX QUAN ENTRY an “ILLEGAL ENTRY” message shall be displayed and the input rejected. In OPS 3, initialize MAX QUAN ENTRY equal to ENTRY_OMS_BURN_TIME (V99U9571C) times 0.14971 PCT/SEC. If the OMS DUMP QUANTITY PERCENT PER POD (V93Q6280C) item entry is greater than MAX QUAN ENTRY an “ILLEGAL ENTRY” message shall be displayed and the input rejected.
- R. Upon transition to OPS 3, SSME_REPOS (V93X5480X) shall be initialized to “ON” and thereafter shall reflect crew input.

Execution of Item 19 (SSME_REPOS) shall be legal in MM301, MM302, MM303, and MM304 only. Execution in any other major mode shall be treated as an operator error with the input rejected and the “ILLEGAL ENTRY” CRT message being output.

Destinations for SSME_REPOS (V93X5480X) are LGIV CNTL and CRT.
- S. Execution of Item 45 (WRAP MODE) shall be legal in OPS 3 only. Execution of this item in any other OPS sequence shall result in the “ILLEGAL ENTRY” CRT message being displayed and the input rejected.
- T. Destination for this signal is S-Band.

4.2.35.3 Override CRT Display Processing Addendum

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word “STAT” being inserted in the FORMAT TYPE column and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT Display Processing Table 4.2.35-2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the “M” PSI is displayed (for Commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)			
Blank (default)	↓		M	∅
1	↓	↑	M	∅
2		↑	M	∅
3	↓			∅
4		↑		∅
5	↓		?	∅
6	↓	↑		∅
7			M	∅
8	↓		?	M ∅
9			?	M ∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.2.35–2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. The source for this signal is the IMU HIP or Keyboard.
- B. The source for this signal is the SEQUENCING CONTROLLER (SEQ CN) or Keyboard.
- C. Crew SSME Repositioning Item Blanking and Initialization. Item 19 (SSME REPOS) status field character string shall remain blank until transition to OPS 3:

IF FIRST TRANSITION TO OPS 3

THEN SET SSME_REPOS (V93X5480X) = ON

AND Display the status character string “ENA”

OTHERWISE Display the status character string based upon the last crew input.

Source for SSME_REPOS (V93X5480X) is the KEYBOARD.

- D. Deleted.
- E. The AFT RCS DUMP TIME display parameter is initialized as:
In OPS 1, V93W6958C is initialized to RTLS_POSTMECO_RCS_PLUSX_TIME.
In OPS 3 for the TAL flag = true, V93W6958C is initialized to the AFT_RCS_DUMP_TIMER.
In OPS 3 with the TAL flag = false, V93W6958C is initialized to zero.
- F. The FWD RCS DUMP TIME display parameter is computed as:
The initial value of V93W6957C = FRCS_DUMP_TIMER_R in OPS 1 and FRCS_DUMP_TIMER in OPS 3.

FWD_RCS_TIME (V90W8284C) =

(FWD_RCS_DURATION (V93W6957C) – FWD_RCS_COUNTER (V98W4985C))

FWD_RCS_TTG_SF (V94J3756C)

- G. Whenever the AFT RCS DUMP is stopped automatically by the Abort Control Sequence when the (ENA) is set (DUMP IN PROGRESS), Display Processing shall reset the ENA Discrete, blank the ENA and set INH on the display. This capability shall be available in MM304, MM602 and MM603.
- H. Whenever the FWD RCS DUMP is stopped automatically by the RCS Command HIP when the (ENA) is set (DUMP IN PROGRESS), Display Processing shall reset the ENA Discrete, blank the ENA and set INH on the display. This capability shall be available in MM304, MM602 and MM603.
- I. ENTRY FCS ELEVON and FILTER CMD Asterisk Blanking.
The feedback execution indicator asterisks for Items 17, 18, 20 and 21 shall be blanked if in OPS 1 or 6. The asterisks shall be initialized and displayed in OPS 3 only.
- J. The source for this signal is the OMS/RCS CONN SEQ.
- K. The sources for this signal are the ABORT CONTROL and KYBD.
- L. The source of these signals is the VENT CNTL SEQ. The character string to be displayed for VENT DOOR OPEN XX and VENT DOOR CLOSE XX is dependent on the value of V93J1601C as shown below:

V93J1601C (Vent Configuration)	VENT DOOR OPEN Character String	VENT DOOR CLOSE Character String
0	(BLANK)	(BLANK)
1	“OP”	(BLANK)
2	(BLANK)	“CL”

Upon completion of the open or close operation, the character string shall be displayed to the right of the entry currently displaying the asterisk (*).

- M. IMU attitude source (IMU ATT) shall be displayed as follows:

V98J1040C	ATT
0	blank (prior to AS11A event)
1	“1”
2	“2”
3	“3”

N. Flight Control System Wraparound Mode Item Blanking and Initialization.

Item 45 (WRAP_MODE) status field shall be blank until transition to MM 301. Upon transition to MM 301, WRAP_MODE (V93X0891X) will be initialized by the SYS_INIT task (refer to PRD MG038106 Table 3.3.3-19 for SYS_INIT requirements).

An OPS 3 to OPS 0 transition shall cause the item 45 status field to be blanked. WRAP_MODE will be re-initialized by the SYS_INIT task upon a subsequent OPS 0 to OPS 3 transition.

The character strings "INH", "ENA" and "ACT" shall be displayed according to the following logic:

```
IF WRAP (V98X0447X) = ON THEN
    Display the character string "ACT"
ELSE
    IF WRAP_MODE (V93X0891X) = ON THEN
        Display the character string "ENA"
    ELSE
        Display the character string "INH"
```

Note that if the ENTRY MODE switch on panel L2 is in the "NO Y JET" position, the flight control flag WRAP (V98X0447X) will be reset to OFF.

- O. The source for WRAP_MODE (V93X0891X) is the KYBD.
The source for WRAP (V98X0447X) is the GNCPOOL.
The source for MM_CODE (V98U2408C) is the BEC.
The source for S_TAL is the BEC.

- P. This character string is dependent upon NSP FRAME SYNC LOCK 1 (V74X5176E) and NSP FRAME SYNC LOCK 2 (V74X5177E). The values for these parameters are acquired from the PCMMU and the displayed RTXT is based on the following logic:

```
IF          V74X5176E = 1 or V74X5177E = 1
THEN       set the character string to "LOCK"
ELSE       set the character string to "NOLK"
```

- Q. An asterisk (*) shall be displayed next to Items 46 through 49 according to the following logic:

Next to Item 46 if $V74X4786E = 1$ AND $V74X4788E = 0$ AND $V74X4787E = 0$ AND $V74X4789E = 0$ AND $V74X4796E = 1$ AND $V74X4797E = 1$ AND $V74X4752E = 0$ AND $V74X4751E = 0$

Next to Item 47 if $V74X4788E = 1$ AND $V74X4786E = 0$ AND $V74X4787E = 0$ AND $V74X4789E = 0$ AND $V74X4751E = 1$ AND $V74X4797E = 0$

Next to Item 48 if $V74X4787E = 1$ AND $V74X4786E = 0$ AND $V74X4788E = 0$ AND $V74X4789E = 0$ AND $V74X4751E = 1$ AND $V74X4797E = 0$

Next to Item 49 if $V74X4789E = 1$ AND $V74X4786E = 0$ AND $V74X4788E = 0$ AND $V74X4787E = 0$ AND $V74X4796E = 0$ AND $V74X4797E = 0$ AND $V74X4752E = 1$ AND $V74X4751E = 1$

The asterisks (*) next to these items are mutually exclusive and no more than one asterisk shall be displayed at any time. If (data is available from the PCMMU and none of the above conditions are met) or data is not available from the PCMMU, then all asterisks shall be blanked.

- R. On initial display call up, these items shall be initialized blank, i.e., with no asterisk displayed, and shall remain blanked until the corresponding valid keyboard item entry is made.

4.2.35.4 Override Figure/Table References

Figure 4.2.35-1	Override Display (BFS)
Table 4.2.35-1	Keyboard Processing Table
Table 4.2.35-2	CRT Display Processing Table
Table 4.2.35-3	CRT Display Processing Background Requirements N/A
Table 4.2.35-4	Mission Design Background Constants N/A
Table 4.2.35-5	Input Functional Parameters N/A
Table 4.2.35-6	Output Functional Parameters N/A
Table 4.2.35-7	I-Loads
Table 4.2.35-8	K-Loads
Table 4.2.35-9	Constants N/A

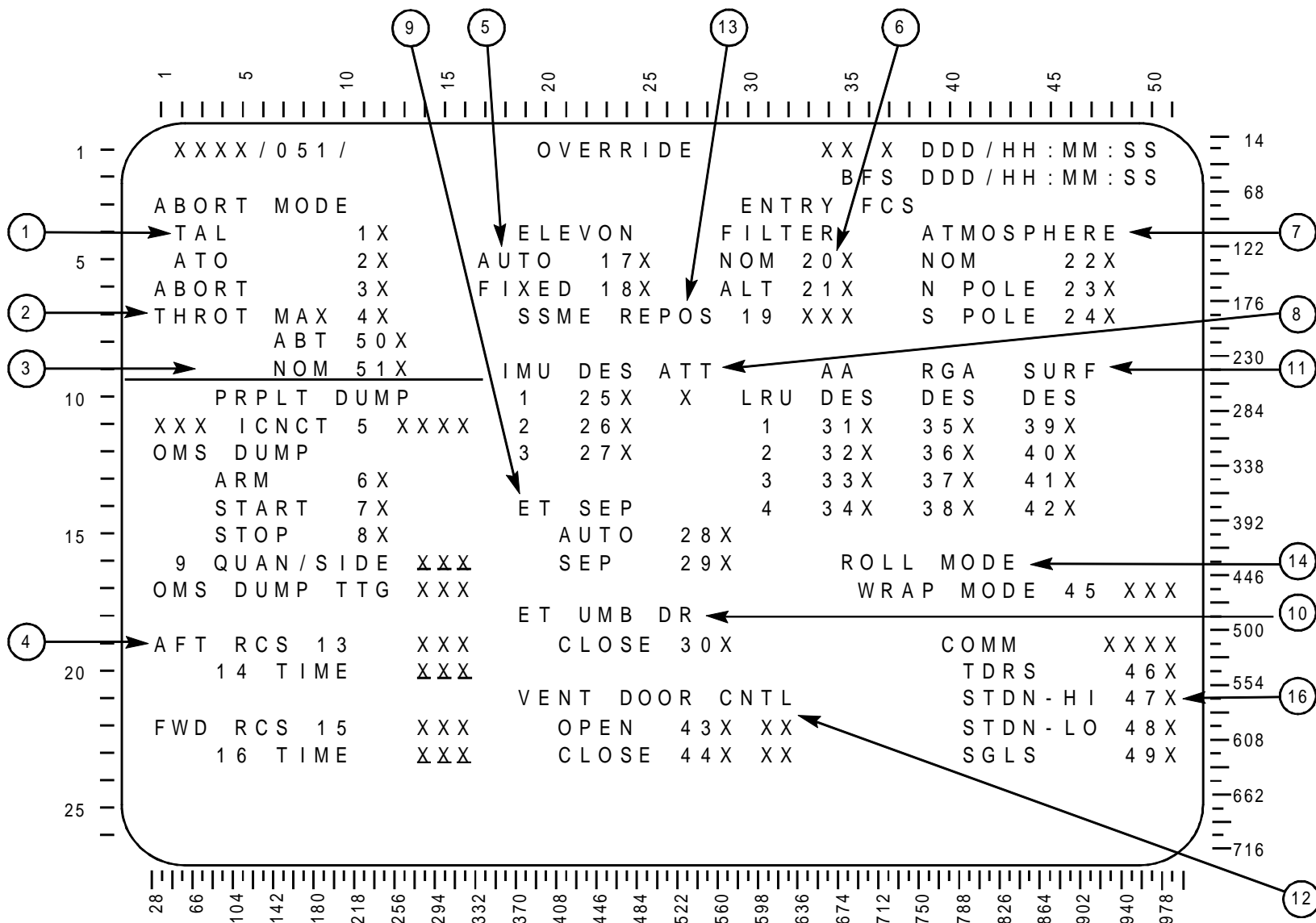


FIGURE 4.2.35-1. Override Display (BFS)

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Table 4.2.35-1. OVERRIDE (BFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination		Nomenclature	C R T
								MIN	MAX		PFS	BFS		
001*	ABORT MODE TAL 1	V93X5334X	0.0	CTRL		X	1			D	N/S	ABORT	BACKUP TAL ABORT SEL	X
002*	ABORT MODE ATO 2	V93X5335X	0.0	CTRL		X	2			D	N/S	ABORT	BACKUP ATO ABORT SEL	X
003*	ABORT 3	V93X5336X	0.0	CTRL		X	3			D	N/S	ABORT	BACKUP ABORT CMD	X
004*	THROT MAX 4	V93X5349X	0.0	CTRL		X	4			G	N/S	ADDEND	MAX THROTTLE LEVEL COMMAND	X
005	XXX ICNCT 5	V93X5348X	0.0	CTRL		X	5				N/S	ABTCRT	OMS/RCS INTERCONNECT INH/ENA CMD	
006	OMS DUMP ARM 6	V93X5350X	0.0	CTRL		X	6			J, O	N/S	OV, CRT	OMS DUMP ARM CMD	
007	OMS DUMP START 7	V93X5351X	0.0	CTRL		X	7			J, O	N/S	OV, CRT	OMS DUMP START CMD	
008	OMS DUMP STOP 8	V93X5352X	0.0	CTRL		X	8			J, O	N/S	OV, CRT	OMS DUMP STOP CMD	
009	OMS DUMP 9 QUAN/SIDE	V93Q6280C	4.0	DEC	PCT	X	9	0	ADDEN DUM	P, O, Q	N/S	ADDEND	OMS DUMP QUANTITY PERCENT PER POD	
010	AFT RCS 13	V93X6949X	0.0	CTRL		X	13			L	N/S	ABORT	AFT RCS DUMP INH/ENA SEL	
011	14 AFT RCS TIME	V93W6958C	4.0	DEC	SEC	X	14			L	N/S	ABORT	AFT RCS DUMP DURATION	
012	FWD RCS 15	V93X6948X	0.0	CTRL		X	15			M	N/S	RCSHIP	FWD RCS DUMP INH/ENA SEL	
013	16 FWD RCS TIME	V93W6957C	4.0	DEC	SEC	X	16			M	N/S	RCSHIP	FWD RCS DUMP DURATION	
014*	ELEVON AUTO 17	V93X4493X	0.0	CTRL		X	17			K	N/S	DAPCRT	ALTERNATE ELEVON SCHEDULE CMD	X
015	ELEVON FIXED 18	V93X4493X	0.0	CTRL		X	18			K	N/S	DAPCRT	ALTERNATE ELEVON SCHEDULE CMD	
016	SSME REPOS 19 XXX	V93X5480X	0.0	CTRL		X	19			R	N/S	ADDEND	CREW SSME REPOSITION	
017	NOM FILTER 20	V93X4494X	0.0	CTRL		X	20			H	N/S	DAPCRT	BODY BENDING FILTER CMD	
018	ALT FILTER 21	V93X4494X	0.0	CTRL		X	21			H	N/S	DAPCRT	BODY BENDING FILTER CMD	
019	ATMOSPHERE NOM 22	V93X5354X	0.0	CTRL		X	22			N	N/S	CRT	NOMINAL ATMOSPHERE SELECT CMD	
020	ATMOSPHERE N POLE 23	V93X5355X	0.0	CTRL		X	23			N	N/S	CRT	NORTH POLAR ATMOSPHERE SELECT CMD	
021	ATMOSPHERE S POLE 24	V93X5356X	0.0	CTRL		X	24			N	N/S	CRT	SOUTH POLAR ATMOSPHERE SELECT CMD	
022*	IMU 1 DES 25	V93X6711X	0.0	CTRL			25			A	N/S	IMUHP	IMU 1 SEL/DES CMD	X
023*	IMU 2 DES 26	V93X6712X	0.0	CTRL			26			A	N/S	IMUHP	IMU 2 SEL/DES CMD	X
024*	IMU 3 DES 27	V93X6713X	0.0	CTRL			27			A	N/S	IMUHP	IMU 3 SEL/DES CMD	X
025*	ET SEP AUTO 28	V93X5340X	0.0	CTRL			28			C, E	N/S	ETSEP	BACKUP ET SEP AUTO SEL	X
026*	ET SEP SEP 29	V93X5341X	0.0	CTRL			29			E, F	N/S	ETSEP	BACKUP ET MAN SEP CMD	X
027*	ET UMB DR CLOSE 30	V93X5342X	0.0	CTRL			30			C, E	N/S	ETSEP	BACKUP ET UMB DR CLOSE CMD	X
028	AA 1 DES 31	V93X4435X	0.0	CTRL			31			I	N/S	HIP_IN	AA 1 DES CMD/FAIL	
029	AA 2 DES 32	V93X4436X	0.0	CTRL			32			I	N/S	HIP_IN	AA 2 DES CMD/FAIL	
030	AA 3 DES 33	V93X4437X	0.0	CTRL			33			I	N/S	HIP_IN	AA 3 DES CMD/FAIL	
031	AA 4 DES 34	V93X4438X	0.0	CTRL			34			I	N/S	HIP_IN	AA 4 DES CMD/FAIL	
032	RGA 1 DES 35	V93X4516X	0.0	CTRL			35			I	N/S	HIP_IN	RGA 1 DES CMD/FAIL	
033	RGA 2 DES 36	V93X4518X	0.0	CTRL			36			I	N/S	HIP_IN	RGA 2 DES CMD/FAIL	
034	RGA 3 DES 37	V93X4520X	0.0	CTRL			37			I	N/S	HIP_IN	RGA 3 DES CMD/FAIL	
035	RGA 4 DES 38	V93X4522X	0.0	CTRL			38			I	N/S	HIP_IN	RGA 4 DES CMD/FAIL	
036	SURF 1 DES 39	V93X4761X	0.0	CTRL			39			I	N/S	HIP_IN	FCS FDBK XDUCER 1 DES CMD	
037	SURF 2 DES 40	V93X4763X	0.0	CTRL			40			I	N/S	HIP_IN	FCS FDBK XDUCER 2 DES CMD	
038	SURF 3 DES 41	V93X4765X	0.0	CTRL			41			I	N/S	HIP_IN	FCS FDBK XDUCER 3 DES CMD	
039	SURF 4 DES 42	V93X4767X	0.0	CTRL			42			I	N/S	HIP_IN	FCS FDBK XDUCER 4 DES CMD	
040*	VENT DOOR OPEN 43	V93X7201X	0.0	CTRL		X	43			B, O	N/S	ADDEND	ALL VENT CLOSE CMD	X

Table 4.2.35-1. OVERRIDE (BFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination		Nomenclature	C R T
								MIN	MAX		PFS	BFS		
041*	VENT DOOR CLOSE 44	V93X7201X	0.0	CTRL		X	44			B, O	N/S	ADDEND	ALL VENT CLOSE CMD	X
042*	WRAP MODE 45	V93X0891X	0.0	CTRL		X	45			S	N/S	D_DAP	WRAPAROUND FCS MODE INDICATOR BFS	X
043	COMM TDRS 46	V93X1005X	0.0	CTRL			46			T	N/S	S-BAND	TDRS MODE CMD	
044	COMM STDN-HI 47	V93X1007X	0.0	CTRL			47			T	N/S	S-BAND	STDN-HI MODE CMD	
045	COMM STDN-LO 48	V93X1006X	0.0	CTRL			48			T	N/S	S-BAND	STDN-LO MODE CMD	
046	COMM SGLS 49	V93X1008X	0.0	CTRL			49			T	N/S	S-BAND	SGLS MODE CMD	
047	THROT ABT 50	V93X0994X	0.0	CTRL		X	50			G	N/S	ADDEND	ABORT THROTTLE LEVEL COMMAND	
048	THROT NOM 51	V93X0995X	0.0	CTRL		X	51			G	N/S	ADDEND	NOMINAL THROTTLE LEVEL COMMAND	

Table 4.2.35-2. OVERRIDE (BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B A N K	S I Z E S	I N T E R S H	F L A T T E N E R S	R A T E S	L I G H T S	B E C H T	D A N C E S	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																TYPE
							1	0															
001	(OPS)	V93X0040X	2	1		5.0														MI	OPS FUNCTION PAGE	X	
002	(SPEC)	V93X0042X	7	1		4.0														MI	SPEC FUNCTION PAGE	X	
003	(DISP)	V93X0044X	10	1		4.0														MI	DISPLAY FUNCTION PAGE	X	
004	(UL)	V92X5032X	34	1		2.0	UL						X							MI	UPLINK ACTIVITY IND	X	
005	(GPC)	V93X0048X	36	1		2.0														MI	GPC DRIVER	X	
006	(MT)	V91W1990C	39	1		12.0														BOS	MISSION ELAPSED TIME	X	
007	(CRT TIMER)	V91W1987C	39	2		12.0														BOS	DISPLAY CRT TIMER,GNC	X	
008*	ABORT MODE TAL 1	V93X5334X	12	4		1.0	*													KYBD	BACKUP TAL ABORT SEL	X	
009*	ABORT MODE ATO 2	V93X5335X	12	5		1.0	*													KYBD	BACKUP ATO ABORT SEL	X	
010*	ABORT 3	V93X5336X	12	6		1.0	*													KYBD	BACKUP ABORT CMD	X	
011*	THROT MAX 4	V93X5349X	12	7		1.0	*																
012	OMS DUMP TTG	V93W8202C	13	17		4.0														SEC	MAX THROTTLE LEVEL COMMAND	X	
013	CPLT (ICNCT COMPLETE)	V98X4861X	13	11		4.0	CPLT																
014	XXX ICNCT 5	V93X5348X	1	11		3.0	ENA	INH															
015	OMS DUMP ARM 6	V93X5350X	12	13		1.0	*																
016	OMS DUMP START 7	V93X5351X	12	14		1.0	*																
017	OMS DUMP STOP 8	V93X5352X	12	15		1.0	*																
018	OMS DUMP 9 QUAN/SIDE	V93Q6280C	13	16		4.0																	
019	AFT RCS 13	V93X6949X	14	19		3.0	ENA	INH															
020	14 AFT RCS TIME	V90W8281C	13	20		4.0																	
021	FWD RCS 15	V93X6948X	14	22		3.0	ENA	INH															
022	16 FWD RCS TIME	V90W8284C	13	23		4.0																	
023*	ELEVON AUTO 17	V93X4493X	25	5		1.0		*															
024*	ELEVON FIXED 18	V93X4493X	25	6		1.0	*																
025	SSME REPOS 19 XXX	V93X5480X	33	7		3.0	ENA	INH															
026	NOM FILTER 20	V93X4494X	35	5		1.0		*															
027	ALT FILTER 21	V93X4494X	35	6		1.0	*																
028	ATMOSPHERE NOM 22	V93X5354X	48	5		1.0	*																
029	ATMOSPHERE N POLE 23	V93X5355X	48	6		1.0	*																
030	ATMOSPHERE S POLE 24	V93X5356X	48	7		1.0	*																
031	IMU ATT	V98J1040C	27	10		1.0																	
032*	IMU 1 DES 25	V93X6711X	24	10		1.0		*															
033*	IMU 2 DES 26	V93X6712X	24	11		1.0		*															
034*	IMU 3 DES 27	V93X6713X	24	12		1.0		*															
035*	ET SEP AUTO 28	V93X5340X	29	15		1.0	*																
036*	ET SEP SEP 29	V93X5341X	29	16		1.0	*																
037*	ET UMB DR CLOSE 30	V93X5342X	29	19		1.0	*																
038	AA 1 DES 31	V93X4435X	36	11		1.0	*																
039	AA 2 DES 32	V93X4436X	36	12		1.0	*																
040	AA 3 DES 33	V93X4437X	36	13		1.0	*																

Table 4.2.35-2. OVERRIDE (BFS) CRT DISPLAY PROCESSING																										
Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A K	S I Z E S	I N T E R N A T I O N A L	F L A T T E N E D	R A T E S	S L E E P I N G	L E A R N I N G	B A N D S	D I S P L A Y	Add Ref	Source	Nomenclature	C R T			
			X	Y		CHAR	BILEVEL																	TYPE		
							1	0																		
041	AA 4 DES 34	V93X4438X	36	14		1.0	*																			
042	RGA 1 DES 35	V93X4516X	41	11		1.0	*																			
043	RGA 2 DES 36	V93X4518X	41	12		1.0	*																			
044	RGA 3 DES 37	V93X4520X	41	13		1.0	*																			
045	RGA 4 DES 38	V93X4522X	41	14		1.0	*																			
046	SURF 1 DES 39	V93X4761X	46	11		1.0	*																			
047	SURF 2 DES 40	V93X4763X	46	12		1.0	*																			
048	SURF 3 DES 41	V93X4765X	46	13		1.0	*																			
049	SURF 4 DES 42	V93X4767X	46	14		1.0	*																			
050*	VENT DOOR OPEN 43	V93X7201X	29	22		1.0		*							A					B						X
051*	VENT DOOR CLOSE 44	V93X7201X	29	23		1.0	*								A					B						X
052	VENT DOOR OPEN XX	V93J1601C	31	22		2.0				X					A					L						X
053	VENT DOOR CLOSE XX	V93J1601C	31	23		2.0				X					A					L						X
054	WRAP MODE 45 XXX	ADDENDUM	49	17		3.0				X										N, O						
055	(NSP FRM SYNC LOCK)	ADDENDUM	48	19		4.0														P						
056	COMM TDRS 46	ADDENDUM	51	20		1.0	*													Q						
057	COMM STDN-HI 47	ADDENDUM	51	21		1.0	*													Q						
058	COMM STDN-LO 48	ADDENDUM	51	22		1.0	*													Q						
059	COMM SGLS 49	ADDENDUM	51	23		1.0	*													Q						
060	THROT ABT 50	V93X0994X	13	8		1.0	*			X										R						
061	THROT NOM 51	V93X0995X	13	9		1.0	*			X										R						
062	(MSG LINE)	V93X0050X	2	25		46.0									G											X
063	(BUFFER MSG)	V93X0054X	48	25		4.0									G											X
064	(SPL)	V93X0056X	2	26		49.0									G											X
065	(BFS)	V98X0015X	35	2		3.0						X			G											X

TABLE 4.2.35-7. BFS OVERRIDE (4.2.35) I-LOADS

BFS NAME	MSID	ENG UNITS	DT	PR	D	S	PARA	MC	CAT	LAST CR	R E V
FRCS_DUMP_TIMER_R	V97U3751C	SEC	F	S	M	C	4.2.35	00	QFR	92463C	
FRCS_DUMP_TIMER	V97U3752C	SEC	F	S	M	C	4.2.35	00	QFR	92463C	
WRAP_MODE_INIT	V97U7459C	ND	D		D	C	3.3.3	00	ZF9	90476F	
							4.2.35				
RTLS_POSTMECO_RCS_PLUSX_TIME	V97U9785C	SEC	F	S	M	C	4.2.35	00	QRM	92364D	
ENTRY_OMS_BURN_TIME	V99U9571C	SEC	F	S	M	C	3.3.1.9	00	QTO	90655	
							4.2.35				
AFT_RCS_DUMP_TIMER	V99U9574C	SEC	F	S	M	C	4.2.35	00	QTR	92463C	
MANUAL_OMS_DT	V99U9717C	SEC	F	S	M	C	4.2.35	00	QRP	90705H	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.35-8. BFS OVERRIDE (4.2.35) K-LOADS

BFS NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PARA	LAST CR	R E V
-------------------------	------	----	-------------	-----------	----	--------	---	------	---------	-------------

NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.36 GLOBAL POSITIONING SYSTEM STATUS (PFS)

TITLE: GPS STATUS

TYPE: SPEC/055

AVAILABILITY: OPS 1, 2, 3, 6, 8 and 9

4.2.36.1 Purpose, Operation, and Organization

The Global Positioning System Status Display provides the crew with the capability to monitor and control GPS operations. The display is structured to control and display information for the nominal arrangement of three receivers installed on the Orbiter. All information associated with receivers which are not installed shall be blanked with the exception of "NI" (Not Installed) being displayed (provided that flight GPS input has occurred) in the appropriate receiver status fields (refer to note (2), below). Execution of item entries associated with the uninstalled receivers shall generate an "ILLEGAL ENTRY" message. The display utilizes the bit array GPS_INSTALLED to determine the presence/absence of each of three receiver LRUs. The values of each of the three bits in the bit array GPS_INSTALLED indicates which GPS LRU has been installed: 0 for not installed, 1 for installed. For example, "(0, 1, 0)" indicates receiver "2" is installed and data will be displayed in column 2 of the GPS STATUS display (refer to Figure 4.2.36-1). For this single GPS installed configuration, data and Item Entry fields for columns 1 and 3 are blanked.

The GPS Status Display format is shown in Figure 4.2.36-1. The upper left quadrant of the display groups parameters specific to commanding the operation of each individual GPS receiver's software. The lower right portion of the display is also receiver software related but affects all receivers installed. The lower left quadrant displays the condition of the GPC navigation software's GPS selection filter (SF), quality assessment data and status, receiver data good, crew quality assessment override and crew receiver deselect. The upper right quadrant displays data derived from the selected GPS state. Parameters related to the use of the selected GPS state in resetting the navigation state and the UPP state are directly displayed below the derived GPS data.

Executing Item Entries which control the availability of a selected GPS state for guidance (Items 32, 33, and 34) and which control the resetting of the navigation state with the selected GPS state (Items 35, 36, and 37) (see Notes 18 and 19) will be subject to the control of an I-Load parameter, GPS_LOCKOUT. This parameter will permit or prohibit the execution of the Item Entries in those Operational Sequences where the display is active as follows: if the value of GPS_LOCKOUT is 1 or less, executing these Item Entries will result in an "ILLEGAL ENTRY" message being generated; if the value of GPS_LOCKOUT is 2, executing these Item Entries will only be permitted in OPS 2 and OPS 8; if the value of GPS_LOCKOUT is 3 or greater, executing these Item Entries will be permitted in all OPS in which the display is active except G&C OPS 1, G&C OPS 9, and Major Mode 601.

The following statements summarizes the operation of the GPS receiver. Receiver operation commands from the display are sent to the receiver through the GPS SOP.

The software requirements for the GPS Status Display are based on the following GPS receiver operations and are provided here for information. They are also reproduced here from the Navigation Aids Subsystem Operating Program FSSR, STS 83-0014, GPS SOP requirements section. In the case of a conflict between the following and the information provided in the GPS SOP, the GPS SOP shall take precedence.

1. The GPS receiver operating system modes are as follows:
 - OFF mode
 - INIT mode
 - TEST mode
 - NAV mode

The GPS receiver OFF mode is controlled by a Power On Panel Switch and cannot be commanded by the crew through the GPC GPS Status Display (G6.51).

The INIT, TEST and NAV modes can be commanded by the crew through the GPC GPS Status Display (G6.51).

2. When the receiver is powered up while it is not under GPC control, the receiver will automatically mode to Power-On Self Test, to INIT, and then to NAV.

Upon power up under GPC control, the GPS receiver will perform Power-On Self Test, transition to the INIT mode, and remain in INIT until commanded to TEST or NAV.

The receiver is under GPC control when it receives valid data with a valid header from the GPC.

3. Test mode can be commanded by the crew through execution of a display item entry on the GPS Status Display. In TEST mode, the GPS receiver performs full commanded self test using the GPS R/P Built-In-Test (BIT) capability for fault isolation and identification. After the first 6 seconds in TEST mode, the receiver will mode itself to BIT during which period (about 2 minutes) there is no output from the receiver. All GPS receiver data, including the data header, received by the GPC will be zero. When BIT is complete, the receiver will again output valid header and data (BIT FAULT LOG WORDS). The results of the self-test (pass or fail) will be in the fifth bit of word 1 in the Bit Fault Log and will be available for display to the crew. Upon completion of the commanded BIT, the receiver will remain in the TEST mode and will not automatically transition to INIT or NAV. If the receiver is commanded to INIT or NAV during the first 6 seconds of TEST mode, the receiver will not complete the commanded BIT and will transition to the new commanded mode immediately.

Note that the commanded selftest, BIT, is different than the Power-On Self Test in Item 2 above.

4. INIT mode can be commanded by the crew through execution of a display item entry on the GPS Status Display. Initialization operations occur when the receiver is in the INIT mode. The initialization mode allows the timing and frequency standard to attain stable operation as required to activate the digital interfaces with the Orbiter software. Data sent from the GPC to GPS is used to initialize the receiver position and velocity state. Lever arm correction data and GPS measurement residual edit criteria are also collected by the receiver via GPC to GPS data. Upon completion of INIT mode, the receiver will remain in INIT and will not automatically transition to NAV, except as indicated in (2.).
5. When the receiver is commanded to INIT by the crew or as a result of moding the GPS I/O control to flight GPS I/O in G9, initialization data will be provided to the receiver and the initialization data available flag (Bit 8 of GPS_CONTROL_WORD) will be set ON at the same time the receiver is commanded to INIT.

On receipt of the INIT command from the GPC, the receiver will use the accompanying state information to perform INIT. On completion of INIT, the receiver will set the initialization complete flag to ON (Bit 17 of NAV_MODE_WORD) and sequence to the next commanded mode. Note that if the initialization data available flag is set to ON without the GPC also commanding the INIT mode, the receiver will interpret the data block from the GPC as invalid and the aiding data will not be used for initialization.

When the initialization data is sent to the receiver, the initialization data available flag and the aiding data available flag will be set to ON, and the announced reset, and filter restart flags will be set to OFF.

6. NAV mode can be commanded by the crew through execution of a display item entry on the GPS Status Display. NAV mode occurs when the GPS receiver is in satellite tracking and navigation operation, providing position and velocity.

There are three navigation submodes: aided (INS), unaided (PVA), and Prelaunch Standby (STA).

The receiver will be in the Prelaunch Standby NAV submode when it is commanded to the NAV mode in: G9 prior to launch; in OPS 1 prior to Major Mode 102; and following transition to G9 after landing. In this nav submode, the receiver will be aided by the GPC with a position vector, a zero velocity vector and attitude aiding data. In the PASS GPS software requirements, the Prelaunch Standby submode is also referred to as the Stationary submode since it is a nav submode which can occur both prelaunch and post landing.

The receiver will be in either the INS or PVA nav submode when it is commanded to NAV in all other OPS. The INS submode occurs when there are valid aiding states provided to the receiver by the GPC. When there are no valid aiding states being provided, the receiver downmodes to the PVA nav submode. Determination of aiding depends on: rate of aiding (must be between 4 and 100 Hertz); senescence of data (< 2 seconds old); validity of data; and reasonableness checks on the aiding data. The receiver will transition from the PVA to INS NAV submodes when it receives valid aiding data over four GPC to GPS input cycles in a one second period.

7. During aided NAV submode operation, the GPS receiver navigation filter is aided by the Orbiter GPC IMU data in the form of a reference state which is computed by the Reference State Processing Principal Function (4.18). Two commands from the GPC, the first of which is controlled by the crew through GPS Status Display item entry, are provided to communicate with the GPS receiver navigation filter.
 - a. Filter Restart: Commands the receiver to reinitialize its state to the GPC reference state and restart its navigation filter. Upon detecting a change from an OFF to an ON state for this command, the receiver performs the necessary internal actions and sends a completion bit to the GPS SOP. The command is then turned OFF by the SOP when the GPC is notified of the task completion by the receiver. The receiver then receives the OFF command and resets its internal parameters to wait for the next OFF to ON transition for the command. Filter restart commands will not be sent to the receiver when it is in the PVA NAV submode. They will be sent only in the INS NAV submode.

- b. Announced Reset: Commands the receiver to reconfigure its navigation algorithm due to a discontinuity (jump) in the position and velocity aiding states. This command is not crew controlled. Upon detecting a change from an OFF to an ON state for this command, the receiver performs the necessary internal actions and sends a completion bit to the GPS SOP. The command is then turned OFF by the SOP when the GPC is notified of the task completion by the receiver. The receiver then receives the OFF command and resets its internal parameters to wait for the next OFF to ON transition for the command. The minimum time between announced resets shall be greater than two seconds due to the mechanization of the GPS receiver interface messages.
8. GPC navigation covariance information is set to zero indicating GPC data is not applicable.
 9. The receiver only acknowledges and enters a commanded mode which is not currently active. For example, commanding TEST mode when the receiver is already in TEST will not restart the receiver self test process. Similarly, commanding INIT when the receiver is already in INIT mode will not restart the receiver initialization processes.
 10. Deleted.
 11. The GPS receiver updates its output buffers at the following rates:
 - NAV Mode: 10 Hertz if unaided, and at aiding rate for valid aiding
 - INIT Mode: 1 Hertz
 - TEST Mode: 1 Hertz except during Self Test (BIT) when it is not updatedThe GPS receiver high rate navigation solution is provided to the GPC.
 12. If the receiver is commanded to a new mode before it has completed its current mode functions, the receiver will complete the current mode functions and then transition to whatever mode is being commanded at that time. The only exception to this is if the receiver is commanded to INIT or NAV during the first 6 seconds of TEST mode. In this case the receiver will not complete its TEST mode functions and will transition to the new commanded mode immediately.
 13. The receiver will send all zeros to the GPC for the output data from its non-used sixth channel.
 14. The mode command protocol assumes the following: The mode command is sent to the receiver. Receiver gets data appropriate to that mode, with the correct headers, on the same I/O pass with the GPC.
 15. The receiver will be capable of operating under conditions of no GPC-GPS I/O, no aiding data from the GPC, and with stale or static GPC aiding data during OPS transitions. In the later case, the aiding data valid flags will be ON but the data will be stale or static.
 16. During receiver selftest, the receiver will provide an I/O capability with the GPC to avoid two successive COMMFAULTS and a FCOS I/O bypass situation. During execution of this mode, the receiver will return invalid data and Header information of '0000'. Valid self test data will be sent to the GPC upon completion of selftest.

17. The navigation data validity bit indicates valid data when the following conditions are satisfied:
 - The Kalman filter estimated error is less than 1000 meters
 - The receiver is in the NAV mode
 - The receiver Performance Monitor (PM) did not detect a critical failure in the previous second
18. The receiver will be capable of receiving Baro altimeter and radar altimeter aiding data simultaneously from the GPC. The GPC software will set either the BARO altimeter data good or the radar altimeter data good to ON (both will not be on simultaneously) to indicate to the receiver which altitude aiding data has preference.
19. The receiver will be capable of deselecting satellites upon command from the GPC.

Notes (1) through (22) describe the GPS STATUS display requirements and correspond to the numbered labels of Figure 4.2.36-1.

Note that Item Entries 1 through 9, 23 through 25 and 40 through 42 are not used and execution of these items will result in an "ILLEGAL ENTRY" message being generated.

The following table summarizes the legality of Item Entries by GN&C OPS and/or Major Mode. A necessary condition for legality in a particular OPS or Major Mode is determined by the other GPS software that must be running to accomplish the function of the Item Entry:

- Interfacing with the GPS SOP (4.17) only is required, legal in all GN&C OPS and Major Modes.
- Interfacing with GPS REF STATE PROC (4.18) (either as a direct display output or an indirect link in a series of variable assignments) is required, legal in all GNC OPS and Major Modes except GN&C OPS 9 and Major Mode 101 (GPS REF STATE PROC does not run in OPS 9 or in Major Mode 101 until NAV INIT (Event 14)).
- Interfacing with GPS RCVR STATE PROC (4.21) or Navigation (ONORBIT/REND NAV (4.126), ENTRY NAV (4.127), PRELAND NAV (4.144), or RTLS NAV (4.205)) is required, ILLEGAL in GN&C OPS 1, GN&C OPS 9, and Major Mode 601.

LEGALITY OF ITEM ENTRIES BY OPS, MAJOR MODE

Item Entry	GN&C OPS 9	MAJOR MODE 101	MAJOR MODES 102 to 106 and 601	MAJOR MODES 602 and 603	GN&C OPS 2	GN&C OPS 8	GN&C OPS 3	Keyboard Processing Addendum Reference
1 - 9	NO	NO	NO	NO	NO	NO	NO	
10	YES	NO	NO	NO	NO	NO	NO	R
11 - 19	YES	YES	YES	YES	YES	YES	YES	
20 - 22	NO	NO	YES	YES	YES	YES	YES	V
23 - 25	NO	NO	NO	NO	NO	NO	NO	
26 - 37	NO	NO	NO	YES	YES	YES	YES	P
38	NO	NO	NO	YES	NO	NO	YES	S
39	NO	NO	NO	YES	YES	YES	YES	P
40 - 42	NO	NO	NO	NO	NO	NO	NO	
43 - 50	YES	YES	YES	YES	YES	YES	YES	
> 50	NO	NO	NO	NO	NO	NO	NO	

Notes 1 through 9 refer to the receiver commands and display parameters specific to the operation of each individual GPS receiver's software.

(1) GPS1, GPS2, GPS3

Item 10 provides the capability to control GPS receiver I/O in GNC OPS 9. "Item 10 + X EXEC" (where X = 0, 1, or 2) controls execution of one of the following three GPS receiver I/O options:

- 0) Disabled GPS receiver I/O, indicated by a "0" being displayed beside Item 10. When in GNC OPS 9, all GPS cyclical processing functions shall be suspended.
- 1) 6.25 Hz non-commfaultable GPS to GPC input only, indicated by a "1" being displayed beside Item 10.
- 2) Flight GPS I/O of 1.04 Hz GPS to GPC input and 6.25 Hz GPC to GPS output indicated by a "2" being displayed beside Item 10. When GPS_IO_CNTL transitions to two, while in GNC OPS 9, the default setting of the mode command will be INIT.

The following receiver I/O option transitions shall be legal in GNC OPS 9. Any other attempted I/O option transition will result in an "ILLEGAL ENTRY" message being generated and the prior I/O option will be unchanged.

GPS Receiver I/O Option Prior to "ITEM 10 + X EXEC"	Allowed GPS Receiver I/O Options (i.e., Legal Values of X)
0	1
1	0, 2
2	0

GPS I/O shall initially be disabled in GNC OPS 9 and a "0" shall be displayed beside Item 10. If no GPS receivers are installed, GPS_INSTALLED = (OFF, OFF, OFF), then GPS receiver I/O is disabled in all OPS and attempts to execute Item 10 shall cause an "ILLEGAL ENTRY" message to be generated. Otherwise, the first execution of Item 10, "ITEM 10 + 1 EXEC", enables 6.25 Hz input only and a "1" is displayed beside Item 10. A subsequent Item 10 execution, with GPS_IO_CNTL equal to 1, may be with two values, either "ITEM 10 + 0 EXEC" or "ITEM 10 + 2 EXEC". "ITEM 10 + 2 EXEC" enables flight GPS I/O and a "2" is displayed beside the Item. "ITEM 10 + 0 EXEC", valid when GPS_IO_CNTL equals 1 or 2, returns the GPS I/O to the disabled state and completes the sequence and a "0" is displayed beside the Item. The legal sequences may be repeated indefinitely in GNC OPS 9.

During GNC OPS 9, GPS cyclical processing functions shall suspend operations when the GPS_IO_CNTL is set to 0. If in GNC OPS 9 and GPS_IO_CNTL is set to 1 or 2, GPS cyclical processing functions (normally required to run in GNC OPS 9) shall resume or continue operations respectively.

For all other GN&C OPS and provided that at least one receiver is installed, flight GPS I/O shall be enabled and a "2" shall be driven beside Item 10. Attempts to execute Item 10 in any OPS other than GNC OPS 9 shall cause an "ILLEGAL ENTRY" message to be generated. Upon transition to GNC OPS 9 from any other GN&C OPS in which GPS I/O was enabled, flight GPS I/O shall be in effect.

The GPS1, GPS2, and GPS3 column headers identify the item entries and display parameters associated with a GPS receiver.

A parameter status field for each of the three receivers shall be displayed next to the GPS column headers which will provide information on:

- Receiver state eligible for selection and actually selected ("*"). See the following paragraph for a summary of when a receiver state is eligible for selection.
- Receiver state eligible for selection, but not actually selected ("⌘"). This condition only exists when three receiver states are eligible for the selection filter.
- Receiver state not eligible for selection due to a QA 4 dilemma ("?"). This condition applies when the QA 4 dilemma is set and will override a down arrow due to all other conditions.
- Receiver state not eligible for selection, and no QA 4 dilemma exists ("↓").
- Data is missing for a GPS receiver ("M"), reflecting the commfault.

A receiver state is eligible for selection if all of the following are true:

- the receiver data is valid (data good is on),
- the receiver has not been deselected by the crew,
- the receiver has not failed the QA 4 dilemma,
- and, one or more of the following are true:
 - the receiver has passed the QA1, QA3 and QA4 quality assessment checks,
 - the quality assessment failure check is overridden (QA 1, QA 3, and QA 4 fail are overridden by Item Entries 29, 30 and 31 (for GPS receivers 1, 2 and 3 respectively) on the GPS STATUS Display (see Section 4.2.36 of STS 83-0020V1, note 12)),
 - the GPS to G&C command is in “FORCE” (Item Entry 34 on the GPS STATUS Display (see Section 4.2.36 of STS 83-0020V1, note 18) or Item Entry 49 on the HORIZ SIT Display (see Section 4.2.9 of STS 83-0020V1, note 25)).

The corresponding fields for uninstalled receivers will remain blank.

(2) STAT

This field displays the status of each GPS receiver. Possible status indications are described in the following table, and are shown in the order of precedence. In addition, if a receiver processor failure occurs, a CLASS 3 alarm will be annunciated by GAX for all operational sequences, except for OPS 9. “RPF” and “M” will be displayed double overbright. STAT is active regardless of the presence (installation) of the corresponding receiver. STAT is not to be confused with MODE of note (3), below.

Valid status of each GPS receiver is dependent on flight GPS input occurring (and the GPS SOP executing). In GNC OPS 9, the status will initially be blank until flight GPS input processing is initially commanded.

Display	Message Description
NI	Receiver is not installed
M	Communication fault
BIT	Receiver Built-In-Test in progress
RPF	Receiver processor failure
BATT	GPS battery low
DGF	GPS data good failure
(blank)	Nominal operation - No GPS related anomaly

Note: All characters shall be displayed right justified.

(3) MODE

This field displays the current operating mode of the receiver. The displayed mode combines information from the receiver mode and its navigation submode. If the receiver is in the self-test mode, "TEST" is displayed in the mode field. If the receiver is in the initialization mode, "INIT" is displayed if the receiver is in the INIT mode as a result of crew command or as a result of moding the GPS I/O control to flight GPS I/O in G9 or if the receiver is in the INIT mode without the crew command, due to possible power outage, single event upset or any other situation that causes a temporary loss of current receiver state vector information. If the receiver is in the navigation mode, the navigation submode, "PVA" or "INS" is displayed in the mode field (see discussion of receiver modes and submodes above). If the receiver is reporting prelaunch standby or stationary mode, then a three character mnemonic representing the last, crew selected, IMU calibration site or landing site is displayed in the mode field (prior to launch the IMU calibration site, as selected on SPEC 104, is displayed and post liftoff, the first three characters of the last selected runway on SPEC 50 is displayed). When the receiver is reporting prelaunch standby or stationary mode, the site location will supercede "INS" or "PVA" but not INIT or TEST. The receiver will normally be in prelaunch standby nav submode only in MM901 and MM101.

The latest valid receiver mode is displayed. If the receiver is not installed the displayed mode, which is initialized to blank at an OPS transition, will remain blank. If the receiver is powered off or failed at an OPS transition, the displayed mode will remain blank until the receiver enters a valid mode. Once the receiver is in a valid mode, the displayed mode will not be blank for that OPS, since the latest valid mode remains on the display, even if the receiver is powered off or if it fails. If the mode field is blank the STAT parameter of note (2) should be referenced for further information. During a communications fault the receiver MODE indication will remain in the operating mode last displayed.

Display	Message Description
INIT	Initialization mode
TEST	Self-Test mode
INS	Inertial Navigation System navigation submode
PVA	Position, Velocity, Acceleration navigation submode
site	3 character vehicle location mnemonic
(blank)	Receiver is not in an operating mode

(4) S/TEST

Items 11, 12, and 13 provide the capability to command a self-test for the associated GPS receiver. An asterisk "*", shall be displayed while self-test is being commanded. "BIT" will be driven in the receiver status field while the self-test is in progress. "BIT" will be removed from the receiver status field on completion of the self-test. The receiver will remain in S/TEST upon completion of S/TEST until commanded to "INIT" or "NAV" mode upon which time the asterisk will be removed. Reentering an Item Entry to command a S/TEST while the receiver is already in S/TEST will not result in a restart of the S/TEST and will result in an "ILLEGAL ENTRY" message being generated. A new S/TEST can be commanded only when a receiver is in INIT or NAV mode. The Item Entries of notes (4), (5), and (6) for an individual receiver are mutually exclusive.

A parameter status indicator provides feedback on the progress and completion of the commanded self-test. The parameter status indicator (for each GPS receiver) is initially an up arrow "↑" and will be blanked while a self-test is in progress. Upon completion of the self-test, an up arrow "↑" will be shown if the self-test completed successfully or a down arrow "↓" will be shown if the GPS receiver failed the self-test.

The up arrow or down arrow will remain shown on the display until that GPS receiver enters either INIT mode or NAV mode.

For the uninstalled receiver, executing Item Entries 11, 12 or 13 will result in an "ILLEGAL ENTRY" message being generated.

Items 11 - 13 will be legal only when GPS I/O for flight is enabled (GPS_IO_CNTL equals 2 and a "2" displayed by Item 10). Attempts to execute Items 11 - 13 while GPS_IO_CNTL equals 0 or 1 will result in an "ILLEGAL ENTRY" message being generated.

(5) INIT

Items 14, 15, and 16 provide the capability to command the initialization of a GPS receiver. An asterisk "*", shall be displayed while initialization operations are in progress and while the receiver remains in the "INIT" mode. No indication is given by the receiver when it completes the initialization mode. Commanding INIT mode while the receiver is in INIT mode will result in an "ILLEGAL ENTRY" message being generated. The receiver will remain in the "INIT" mode until commanded to S/TEST or NAV mode, at which time the asterisk will be removed. The Item Entries of notes (4), (5), and (6) for an individual receiver are mutually exclusive.

For the uninstalled receiver, executing Item Entries 14, 15 or 16 will result in an "ILLEGAL ENTRY" message being generated.

Items 14 - 16 will be legal only when GPS I/O for flight is enabled (GPS_IO_CNTL equals 2 and a "2" displayed by Item 10). Attempts to execute Items 14 - 16 while GPS_IO_CNTL equals 0 or 1 will result in an "ILLEGAL ENTRY" message being generated.

(6) NAV

Items 17, 18, and 19 provide the capability to mode the GPS receiver to the navigation mode. An asterisk "*", shall be displayed once the receiver is commanded to the navigation mode. The receiver will remain in the NAV mode until commanded to S/TEST or INIT mode, at which time the asterisk will be removed. Commanding NAV mode while the receiver is in NAV mode will result in an "ILLEGAL ENTRY" message being generated. If a receiver is commanded to NAV before a commanded S/TEST or INIT has been completed, the receiver will transition to the NAV mode when it completes the S/TEST or INIT mode. The Item Entries of notes (4), (5), and (6) for an individual receiver are mutually exclusive.

For the uninstalled receiver, executing Item Entries 17, 18 or 19 will result in an "ILLEGAL ENTRY" message being generated.

Items 17 - 19 will be legal only when GPS I/O for flight is enabled (GPS_IO_CNTL equals 2 and a "2" displayed by Item 10). Attempts to execute Items 17 - 19 while GPS_IO_CNTL equals 0 or 1 will result in an "ILLEGAL ENTRY" message being generated.

(7) RESTART

Items 20, 21, and 22 provide the capability to command each GPS receiver to restart its navigation filter. This option is available only when the receiver is in the INS NAV submode, indicated by "INS" being displayed in the MODE field. An "ILLEGAL ENTRY" message will be generated if the RESTART command is entered and the receiver is not in the INS NAV submode. An asterisk "*", shall be displayed in the associated Item Entry field while the filter restart operations are in progress for that receiver and the asterisk will be removed upon receiver completion of the restart. If the receiver is in the S/TEST or INIT modes, commanding a receiver filter restart will result in an "ILLEGAL ENTRY" message being generated.

For the uninstalled receiver, executing Item Entries 20, 21 or 22 will result in an "ILLEGAL ENTRY" message being generated.

Executing Item Entries 20, 21 or 22 in GNC OPS 9 or Major Mode 101 will result in an "ILLEGAL ENTRY" message being generated.

(8) Deleted.

(9) GDOP

This field displays the geometric dilution of precision (GDOP) computed in each GPS receiver. GDOP is a function of GPS satellite geometry. Displayed values of GDOP range from 1 to 15, with a smaller number indicating a more favorable satellite geometry.

The GDOP data will be blank: (1) in GN&C OPS 9, OPS 1 and MM601 when it is determined by the GPS SOP to be static; and (2) in GN&C OPS 2, OPS 3, OPS 8, MM602 and MM603 when GPS data is determined by the GPS RCVR State Proc to be invalid.

The corresponding fields for uninstalled receivers will remain blank.

Notes (10) through (14) collectively describe the condition or state of the GPS state selection filter and associated parameters used by the GPC navigation software.

(10) DG FAIL

This field indicates whether the receiver data used by the GPS receiver state processing principal function is valid. Validity is determined by the GPS data good indicator from the GPS SOP being ON and the receiver state time tag being no older than the time tag from the previous navigation cycle. If the receiver data used by the GPS receiver state processing principal function is invalid, a down arrow, “↓”, is displayed double overbright, otherwise the status field is blanked.

The following information provides an overview of how and where the supporting requirements are functionally implemented. The GPS data good indicator from the GPS SOP (GPS_DG_SOP(I)) is set to ON by passing the following checks at least once after an OPS transition (except the transition from OPS 1 to OPS 6 when the GPS data good indicator will retain its OPS 1 value): the receiver provided data good indicator is ON based on the receiver’s Kalman filter estimated error being less than 1000 meters, the receiver being in the NAV mode, and the receiver performance monitor not having detected a critical failure in the previous second; the receiver state time tag is not more than an I-Loaded period of time older than current time; and the receiver state has been bracketed with IMU data. Once the GPS data good indicator from the GPS SOP is set ON, it remains ON until a transition to a new GNC OPS occurs. The receiver provided data good is set to ON only when the receiver is in the navigation mode (see Note 3), and is not applicable in TEST or INIT.

When the receiver provided data good (GPS_NAV_DATA_VALID(I) in GPS SOP section 4.17.6.1.2) is OFF, new data from the GPS receiver (including the receiver state time tag) is not updated (see GPS SOP section 4.17.6.7). This failure to update the receiver state time tag causes the displayed data good to be set OFF (see GPS RCVR STATE PROC section 4.3.3.3).

These parameters are blanked in GNC OPS 9, OPS 1, and Major Mode 601.

The corresponding fields for uninstalled receivers will remain blank.

(11) DES RCVR

Items 26, 27, and 28 provide the capability for each GPS receiver to be deselected or reselected (toggle) for use by the GPS selection filter. Deselection is indicated by an asterisk “*” adjacent to the DES item number. A blank next to a DES item number indicates that the associated receiver has not been deselected (either initial value or reselection). The asterisk settings for these items are driven by the GPS RCVR STATE PROC (4.21).

If a GPS receiver is not installed (GPS_INSTALLED(I) = 0 for the specific receiver), then execution of the associated Item Entry shall result in an “ILLEGAL ENTRY” message being generated.

Execution of Item Entries 26, 27, or 28 in GN&C OPS 1, GN&C OPS 9, or Major Mode 601 shall result in an “ILLEGAL ENTRY” message being generated. GPS receivers can also be deselected or reselected from HORIZ SIT DISP (6.21) in GN&C OPS 3, and in Major Modes 602 and 603. GPS receivers can also be deselected or reselected from REL NAV DISP (6.11) in GN&C OPS 2. Deselection or reselection will carry over OPS transitions in the GNC Major Function base.

(12) QA OVERRIDE

Items 29, 30, 31 allow the crew to override the outcome of the software quality assessments and force a given receiver's state to be a candidate for GPS state vector selection. The QA override does not override a receiver data good failure or a deselection of a receiver by the crew, however. The QA override forces a GPS receiver state to be a candidate even though that state may have failed any of three quality assessment checks (indicated by a down arrow next to one or more of the QA1, QA3, and QA4 checks of Note 14). Note that forcing a receiver state estimate to be a candidate for GPS state vector selection does not prevent the calculation of QA data. An asterisk, "*", is displayed if the override has been selected. A down arrow, "↓", is commanded by the application software to be displayed in the parameter status field, indicating that the override command is not being honored, when for that receiver QA override is set and any one of the following conditions exists: (1) receiver data good failure (2) receiver deselection, or (3) a receiver dilemma.

Note that Items 29, 30, and 31 will not override a QA 4 dilemma and force a given receiver's state to be a candidate for GPS state vector selection.

The override applies continuously until it is removed by again executing the Item Entry, at which time the parameter field is blanked. Executing Item Entries 29, 30, or 31 in GNC OPS 9, OPS 1, or Major Mode 601 will result in an "ILLEGAL ENTRY" message being generated.

For an uninstalled receiver, executing Item Entries 29, 30 or 31 will result in an "ILLEGAL ENTRY" message being generated.

These parameters are blanked in GNC OPS 9, OPS 1, and Major Mode 601.

(13) SELECTION FILTER CANDIDATE

The SF CAND fields display the status of each receiver's state estimate as a candidate for GPS state vector selection. An asterisk, "*", in the status field indicates that the state for the given receiver is a candidate for GPS state selection. A down arrow, "↓", will be commanded by the application software to be displayed in the status field to indicate that the state for the given receiver is not a candidate for GPS state selection. In order to be a candidate for selection the following condition must exist as determined by the application software. The receiver can not have been deselected (see Note 11); it has valid data as indicated by the receiver (see Note 10) and it has passed QA1, QA3, and QA4 quality assessments (see Note 14) or the QA override for that receiver (see Note 12) has been set, or it has been forced (see Note 18).

These parameters are blanked in GNC OPS 9, OPS 1, and Major Mode 601.

The corresponding field for uninstalled receivers will remain blank.

(14) QA 1, QA 2, QA 3, and QA 4

This note discusses all four Quality Assessments and the display of data on the GPS Status Display. This note also discusses the interaction of GAX message driven as a result of failure of one or more of QA1, QA3, and QA4 Quality Assessments (as information only).

QA 1 FOM (P 1σ)

This field displays the Figure of merit (FOM), for each receiver's state. The FOM is an estimate of the GPS receiver's state error magnitude based on the following information: covariance matrix, ephemeris versus almanac usage, clock age, Selective Availability (SA), and age of ionospheric correction. Estimated error for FOM range from 1 to 9 and are described in the following table.

The FOM data is from the GPS SOP in GN&C OPS 9, GN&C OPS 1, and Major Mode 601. For the remaining GN&C OPS and Major Modes, the FOM data is from the GPS Receiver State Processing Principal Function.

FOM	Estimated error (m)
1	$e \leq 25$
2	$25 < e \leq 50$
3	$50 < e \leq 75$
4	$75 < e \leq 100$
5	$100 < e \leq 200$
6	$200 < e \leq 500$
7	$500 < e \leq 1000$
8	$1000 < e \leq 5000$
9	$5000 < e$

The applications software will provide an integer from 0 to 9 which shall be converted to display a one sigma standard position error in feet as indicated below:

FOM Integer	Position error (P), one sigma (1 σ) to be displayed (feet)
0	(blank)
1	75
2	175
3	250
4	325
5	650
6	1650
7	3275
8	16400
9	99999

The output position error derived from FOM is blanked if the FOM integer value is 0 (0 is an initialization value, not provided by hardware input).

These one sigma position errors were approximated by converting the maximum estimated error from meters to feet and then rounding to the closest multiple of 25 feet.

The FOM represents the first level of quality assessment (QA1) to be performed on the GPS receiver state vector estimate. If the FOM has passed the I-Loaded tolerance test for an I-Loaded number of consecutive cycles, the appropriate parameter status indicator field next to the displayed position error shall be blank. Otherwise, a down arrow “↓” shall be displayed in double overbright in this field. The down arrow is displayed if the failure condition exists, regardless of the state of the QA override discrete or the GPS to G&C FORCE discrete. If a receiver state estimate fails the QA1 FOM quality assessment check, it is excluded as a candidate from the GPS state vector selection process, unless forced to be a candidate for selection by the crew (see Notes 12 and 18).

The corresponding fields for uninstalled receivers will remain blank.

The one sigma position error and its corresponding parameter status indicator will be blank: (1) in GN&C OPS 9, OPS 1 and MM601 when they are determined by the GPS SOP to be static; and (2) in GN&C OPS 2, OPS 3, OPS 8, MM602 and MM603 when GPS data is determined by the GPS RCVR State Proc to be invalid.

QA2 POS & VEL

This section displays the maximum position (POS) and maximum velocity (VEL) residual ratios. The ratios give the crew an indication as to how well the GPS and NAV states agree only and are not used to determine candidacy for GPS state vector selection. The position and velocity residual ratios are computed by differencing the navigation state and the individual GPS state in UVW coordinates, and dividing each of the UVW difference components by a corresponding UVW I-Load derived tolerance. The calculation of UVW position and velocity QA2 residuals shall be in a coordinate system that is GNC Major Mode dependent. In GNC Major Modes 304, 305, 602, and 603, the UVW coordinate system shall be an earth relative coordinate system. For all other major modes where these residuals are computed, the UVW coordinate system shall be an inertial coordinate system. The actual QA2 calculations use all six components of position and velocity, but only the maximum position and velocity residual ratio is displayed.

The data is static when the receiver is in the TEST or INIT mode and the display field will be blank in GN&C OPS 1, GN&C OPS 9 and Major Mode 601.

The corresponding fields for uninstalled receivers will be blank for all OPS. The corresponding fields for receivers which have invalid data (GPS_DG_SF = OFF) shall be blank.

QA3 POS & VEL

This section displays the QA3 position (POS) and velocity (VEL) residual ratios. These ratios are computed as follows: (1) The position and velocity differences between the current GPS receiver orbiter state estimate which has been propagated to the current navigation filter time and that receiver's valid state estimate from the previous navigation cycle which has been propagated to the current navigation filter time is computed; (2) the ratios are then computed

by dividing the position and velocity differences by pre-mission determined I-Load tolerances. The QA3 test gives the crew an indication of the stability of the receiver position and velocity estimates. The GPS receiver state processing QA3 software tests the vector magnitude of the position and velocity difference against pre-mission determined I-Loads. If the QA3 test for either a position or velocity ratio fails (ratio > 1) that receiver's state is then excluded as a candidate from the GPS state vector selection process, unless forced to be a candidate for selection by the crew (see Notes 12 and 18). A down arrow, "↓", shall then be displayed next to the associated ratio value for a QA3 test failure. The down arrow is displayed if the failure condition exists, regardless of the state of the QA override discrete or the GPS to G&C FORCE discrete. The down arrow is removed when the failure condition no longer exists. If the QA3 blanking flag for a receiver is ON, the QA3 position and velocity ratios and their corresponding status indicators for that receiver are blanked.

The data is static when the receiver is in the TEST or INIT mode and the display field will be blank in GN&C OPS 1, GN&C OPS 9 and Major Mode 601.

The corresponding fields for uninstalled receivers will be blank for all OPS. The corresponding fields for receivers which have invalid data (GPS_DG_SF = OFF) shall be blank.

QA4 POS & VEL

A GPS receiver is available for QA 4 processing (receiver to receiver residual ratio calculations) if the receiver data is determined to be valid. Receiver data is valid if its DG FAIL status is showing a blank (see Note 10) and the receiver is selected (see Note 11). However, QA4 failure/dilemma detection will only be performed on receiver which passes QA1 check or has its QA Override set ON.

Display of QA 4 Ratios and Status Indicators: This section displays the Quality Assessment 4 (QA 4) position (POS) and velocity (VEL) residual ratios for comparison of GPS receiver to GPS receiver. Column 1 displays the differences between GPS receiver 1 and 2; column 2 displays the differences between 2 and 3; and column 3 displays the differences between 3 and 1. Data is displayed whenever the receiver data used by the GPS receiver state processing principal function is valid (DG FAIL blank, see Note (10)) for both GPS receivers in the associated pair. If data for either GPS receiver in the pair of receivers being compared is invalid, then the QA 4 data and the associated status indicators shall be blanked for that pair of receivers.

When receiver state data is valid for only one GPS receiver, the QA 4 data and the associated status indicators shall be blanked for all pairs of receivers.

The down arrow, "↓", is removed when the limit exceedance condition no longer exists for each GPS receiver pair combination or when at least one receiver in a pair combination is deselected, or has failed its QA1 check and its QA Override reset to OFF.

The data is static when the receiver is in the TEST or INIT mode. The display fields shall be blank in GN&C OPS 1, GN&C OPS 9 and Major Mode 601.

This section is applicable only when three GPS receivers are installed. For zero or one GPS receiver installed, all QA 4 fields shall be blanked.

QA 4 Fail: At the three GPS receivers available for QA 4 level, if any QA 4 receiver to receiver comparisons are failed, and it can be determined which receiver is inconsistent with the remaining two receivers, then that receiver fails QA 4 and is excluded as a candidate from the GPS state vector selection process, unless forced to be a candidate by the crew (see Notes 12 and 18). A down arrow, “↓”, shall be displayed to the right of the difference to indicate the two GPS receiver pairs which exceeded the position or velocity difference limit. For example, if GPS receiver 2 were to have failed, then a down arrow, “↓”, should appear for pair 1 - 2 data (column 1) and pair 2 - 3 (column 2). The identification of GPS receiver 2 as common to the two columns displaying a down arrow, “↓”, would show that GPS receiver 2 has failed the QA 4 test. GPS receiver 2 would also show a down arrow, “↓”, next to the GPS column header (see Note 1). If the number of GPS receivers available for QA 4 changes, on a later execution cycle, to be less than 3, then the QA 4 fail indicator is set to off (to indicate no failure).

QA 4, 3 GPS in Dilemma: At the three GPS receivers available for QA 4 level, if all three QA 4 receiver to receiver pair comparisons fail, then all three GPS receivers are declared to be in dilemma. When all three GPS receivers are in dilemma, question marks will appear by the GPS column header for all three GPS receivers. The dilemma established at the three GPS receiver level will be reassessed at each subsequent execution cycle as long as there are at least two receivers with valid data for QA4 processing. In a rare scenario where at least two receivers transition from data valid to invalid on the same execution cycle, the three GPS level dilemma established on the prior execution cycle will be latched until either:

- If two or more GPS receivers are later available for QA 4 processing, and conditions no longer exist for a QA 4 dilemma on that execution cycle.
- Or, two GPS receivers are deselected.

For a QA 4 dilemma, neither the GPS to GNC FORCE command (see Note 18) nor the QA override (see Note 12) will override the QA 4 dilemma and force a given receiver’s state to be a candidate for GPS state vector selection. The crew must resolve the dilemma and then deselect GPS receivers until only a single GPS receiver remains selected.

QA 4, 2 GPS in Dilemma: At the two GPS receivers available for QA 4 level, a down arrow, “↓”, shall be displayed by the appropriate QA 4 ratio if the remaining GPS receiver pair has exceeded the position or velocity difference limit. Both remaining receivers shall be removed from the candidate set for the GPS state vector selection on the current execution cycle and a question mark will appear by the GPS column header of each receiver. If one of the two GPS receivers that were available for QA 4 on the prior execution cycle has receiver data transition from valid (on prior cycle) to receiver data invalid, then the prior two GPS level dilemma will remain set until either:

- Two or more GPS receivers are later available for QA 4 processing, and conditions no longer exist for a QA 4 dilemma on that execution cycle.
- Or, one or two GPS receivers in dilemma is deselected.

GAX Annunciation of Quality Assessment Failures/Dilemma

This section of this note discusses the GAX message annunciation driven as a result of failure of QA1, QA3 and QA4 checks (as information only).

Four GAX messages are annunciated based on QA failures and dilemmas (reference Appendix B of STS 83-0020 Volume 3). These four GAX messages are:

MML no.	Message Text Major	Message Text Minor	Discussion
V94X6021X	RM DLMA	GPS	Message is annunciated whenever there is a QA 4 dilemma for GPS 1, GPS 2, or GPS 3.
V94X6022X	G55 GPS QA	1	Message is annunciated whenever there is a failure of QA 1, QA 3 or QA 4 for GPS 1.
V94X6023X	G55 GPS QA	2	Message is annunciated whenever there is a failure of QA 1, QA 3 or QA 4 for GPS 2.
V94X6024X	G55 GPS QA	3	Message is annunciated whenever there is a failure of QA 1, QA 3 or QA 4 for GPS 3.

Annunciation for QA failures for a specific GPS receiver do not occur while that specific receiver is deselected.

A subsequent failure of another QA for the same GPS receiver will not result in another annunciation until all three QA's for that GPS have been concurrently passed. If a QA failure condition exists (for an I-Loaded number of cycles) following the time a GPS receiver is reselected, then the GAX annunciation for that GPS receiver will re-occur.

If the receiver data used by the GPS receiver state processing principal function is invalid (DG FAIL showing a down arrow, see Note (10)), then internal counters used to determine a QA failure remain static. If a QA failure triggered a GAX annunciation prior to the data becoming invalid (DG FAIL showing a down arrow) and any QA is still failed once the data is again valid (DG FAIL showing a blank), then no additional GAX annunciation will occur.

The "RM DLMA GPS" CRT message annunciation for GPS is triggered by a dilemma among all GPS receivers available for QA 4 failure/dilemma detection. Receivers are available for QA 4 failure/dilemma detection if the receiver data is valid (DG FAIL showing a blank), the receiver is selected, and it passes QA1 check or its QA override is set. GPS receivers in dilemma will have a question mark, "?", next to the GPS column header (see Note (1)).

Notes 15 through 17 describe the performance parameters relating to the “selected” GPS state.

(15) TIME SINCE LAST SELECTION FILTER UPDATE

This field displays the minutes since the last selection of a GPS state by the GPS state vector selection software function. It indicates the time since at least one of the criteria defined in Note 13 has been satisfied by any receiver so that a GPS state was chosen by the GPS state selection function. Note that a selected GPS state can still be available for use by navigation or guidance if the conditions of Note 13 have not been satisfied. This state will be the last selected state propagated to current navigation time. Should the time since the last selection of a GPS state exceed a pre-mission defined value, GAX will annunciate a class 3 message and an alert tone and the time will be displayed double overbright. The time will be reset to zero at OPS transitions after an On-Orbit IPL, when GPS receiver data updates the selected state, and when all three receivers are not available (each receiver is either deselected or bypassed).

The field will be blank when no selected state is available, as indicated by GPS_SV_SEL_AVAIL = OFF. The field will also be blank in GNC OPS 9, OPS 1, and Major Mode 601.

(16) GPS MINUS NAV

This section displays the components of the position and velocity vector differences between the selected GPS state estimate and the orbiter navigation filter state estimate in UVW coordinates: altitude (ΔH), downrange (ΔDR), and crossrange (ΔCR) for both position and velocity. The calculation of UVW position and velocity vector differences shall be in a coordinate system that is GNC Major Mode dependent. In GNC Major Modes 304, 305, 602, and 603, the UVW coordinate system shall be an earth relative coordinate system. For all other major modes where these vector differences are computed, the UVW coordinate system shall be an inertial coordinate system. Units are ft and ft/sec for position and velocity respectively. The data fields are blanked when no GPS state is available. The field will also be blank in GNC OPS 9, OPS 1, and Major Mode 601.

(17) GEODETIC COORDINATES

This section displays the geodetic coordinates of the selected GPS state: altitude (ALT), latitude (LAT), and longitude (LON). Altitude is displayed in nautical miles. Latitude is displayed in degrees from the equator with an “N” or “S” displayed in the field before the LAT title for northern ($LAT \geq 0$) or southern ($LAT < 0$) hemisphere. Longitude is displayed in degrees from the Greenwich meridian with an “E” or “W” displayed in the field before the LON title if the orbiter is east ($LON \geq 0$) or west ($LON < 0$) of the Greenwich meridian respectively. In Major Mode 304, 305, 602, and 603, altitude is displayed with units of kilo-feet. In all other Major Modes, altitude is displayed with units of nautical miles. The data fields are blanked when no GPS state is available. The field will also be blank in GNC OPS 9, OPS 1, and Major Mode 601.

Notes 18 and 19 describe the capabilities for commanding the use of the selected GPS state for guidance and control and for commanding the use of this selected GPS state to reset the baseline navigation filter states.

(18) GPS TO GUIDANCE AND CONTROL (G&C)

Items 32, 33, and 34 set the GPS to Guidance and Control Auto/Inhibit/Force command (GPS_TO_GC_AIF). An asterisk, “*”, next to the item number set by the application software represents the selected setting. The three item entries are mutually exclusive and the asterisk, “*”, is indicated next to the appropriate setting in response to feedback to the command from the application software.

Selecting Item 32 (“AUTO”) commands the application software to automatically reset/update the user parameter (UPP) state vector with the selected GPS state every navigation cycle (when a selected state is available), rather than resetting the UPP state with the selected navigation filter state. Item 33 (“INHIBIT”) inhibits the application software from using the selected GPS state to reset the UPP state. Item 34 sets the command to “FORCE”. In this setting the command performs two functions in the application software: (1) it forces the GPS receiver states from all installed receiver states, that are determined by the receiver to have good data (receiver data good is on), are not in a QA 4 dilemma, and are not deselected by the crew (Item 26, 27, or 28 (DES RCVR)), to be processed by the GPS state selection filter, forcing a selection of a GPS state; and (2) it forces the use of this selected state in resetting the UPP state for guidance. Unlike the GPS to Navigation Force command, which is a onetime force, the GPS to guidance and control “FORCE” condition remains active until either item 32 or 33 is selected.

If Item 32 is executed (GPS_TO_GC_AIF = AUTO is selected) and no selected GPS state vector is available, indicated by GPS_SV_SEL_AVAIL = OFF, the application software will command a down arrow, “↓”, to be displayed in the status field before the Item 32 label. The down arrow will then be removed once a selected state becomes available. If Item 34 is executed (GPS_TO_GC_AIF = FORCE is selected) and no selected GPS state is available and all installed receivers are either deselected or indicate that their state data is not good (receiver data good is off), the application software will command a down arrow, “↓”, to be displayed in the status field before the Item 32 label. The down arrow will then be removed once the state of a receiver, which has not been deselected is indicated as good by the receiver, since the GPS to G&C FORCE setting will force a selected state to be made available on that navigation cycle. The down arrow is also removed when Item 33 (GPS_TO_GC_AIF = INHIBIT is selected) is executed.

In preland, if TACAN (for one GPS receiver installed) is not in FORCE and GPS_TO_GC_AIF is in “AUTO”, MLS data good, and a selected GPS state is available, the application software will command a down arrow in the parameter status indicator field before the Item 32 label, indicating to the crew that the processing of MSBLS measurements by the application software and using the MSBLS derived navigation state for guidance has precedence over the “automatic” use of the selected GPS state in providing the state for guidance. If GPS_TO_GC_AIF is in “FORCE”, however, no down arrow will appear in the parameter status indicator field before the Item 32 label and the application software will use the selected GPS state (when available) for guidance.

If TACAN is in FORCE, TACAN measurements will be processed and the setting of GPS_TO_GC_AIF controls the application software as described in Note (18) paragraphs 2 and 3 above.

See Note (29) of Section 4.2.9 (HORIZ SIT DISP) for discussion of interaction of MLS A/I/F measurement processing command with GPS to G&C A/I/F command. The GPS to Guidance and Control command will initially be set to "INHIBIT". It will also be set to "INHIBIT" at OPS transitions. The GPS to G&C command can also be set on SPEC 50 (Section 4.2.9) with the setting there also shown on the GPS STATUS display.

These Item Entries will be allowed or not allowed in a given Operational Sequence depending on the value of the GPS_LOCKOUT I-Load parameter. If the value of GPS_LOCKOUT is 1 or smaller, execution of Items 32, 33, and 34 will not be permitted in any OPS that this display is active and an "ILLEGAL ENTRY" message will be generated. If GPS_LOCKOUT has a value of 2, execution of these Item Entries will be permitted in OPS 2 and OPS 8. In all other OPS for which the display is active, execution of these Item Entries will cause an "ILLEGAL ENTRY" message to be generated. If GPS_LOCKOUT has a value of 3 or greater, execution of these Item Entries will be permitted in all OPS that the display is active, except GNC OPS 9, OPS 1, and Major Mode 601.

The following Tables describe the values of and use of GPS_LOCKOUT and what Item Entries are permitted on the GPS Status Display for different I-Load values.

GPS_LOCKOUT DESCRIPTION AND USE:

GPS_LOCKOUT VALUE	DESCRIPTION
0	<ul style="list-style-type: none"> • No GPS receivers installed
1	<ul style="list-style-type: none"> • GPS receivers installed • Capability to use selected GPS state in the onboard system locked out
2	<ul style="list-style-type: none"> • GPS receivers installed • Use of selected GPS state in the onboard system allowed in OPS 2 and OPS 8
≥ 3	<ul style="list-style-type: none"> • GPS receivers installed • Use of selected GPS state in the onboard system allowed in OPS 2, OPS 8, OPS 3, Major Mode 602 and Major Mode 603.

LEGALITY OF GPS STATUS DISPLAY ITEM ENTRIES
WITH DEPENDENCY ON GPS_LOCKOUT

• GPS_LOCKOUT VALUE	0	1	2	≥ 3
• GPS_TO_NAV_AI (Items 35, 36), GPS_TO_NAV_FORCE (Items 37), and GPS_TO_GC_AIF (Items 32, 33, 34) Legality	I	I	2, 8	2, 3, 8, 602, 603

- “I” indicates Item Entry results in an “ILLEGAL ENTRY” message being generated.
 - A number indicates the OPS or Major Mode in which the Item Entry is available (NOT Illegal)
- Note that all of the above Item Entries are ILLEGAL in GNC OPS 9, OPS 1, and Major Mode 601, regardless of the value of GPS_LOCKOUT

(19) GPS TO NAV COMMAND

Items 35, 36, and 37 set the GPS to Navigation Auto/Inhibit command and the GPS to Navigation Force command. While in GN&C Major Mode 201 or OPS 8, executing Item 35 (GPS to Navigation Auto/Inhibit command is set to “AUTO”) allows the navigation filter state to be automatically reset/updated with the selected GPS state (when available). Automatic “AUTO” reset/update of the navigation filter state is not permitted in Major Mode 202. Automatic updates occur at an I-Load specified time interval. Also, the automatic GPS updates to navigation will be terminated, even though the GPS to Navigation Auto/Inhibit command is in “AUTO”, if the selected GPS residual ratio edit flag is ON, or the time since the selected GPS state was last updated with receiver data is greater than or equal to an I-loaded limit. While in OPS 3 or OPS 6, executing Item 35 (GPS to Navigation Auto/Inhibit command is set to “AUTO” and MLS measurements not available) allows the navigation filter state to be automatically reset/updated with the selected GPS state (when available)., Automatic updates occur at one of two I-Load specified time intervals, depending on whether or not the orbiter is above an I-Loaded altitude for changing GPS update rates. Also, the automatic GPS updates to navigation will be terminated, even though the GPS to Navigation Auto/Inhibit command is in “AUTO”, if the selected GPS residual ratio edit flag is ON, the orbiter is at or below an I-Loaded lower limit altitude for automatic GPS updates, or the time since the selected GPS state was last updated with receiver data is greater than or equal to an I-Loaded limit. Executing Item 36 (GPS to Navigation Auto/Inhibit command is set to “INHIBIT”) inhibits the resetting of the navigation filter state(s) with the selected GPS state. Items 35 and 36 are mutually exclusive.

Executing Item 37 (GPS to Navigation Force command is set to “FORCE”) forces the navigation filter state to be automatically reset/updated with the selected GPS state (when available) on the next navigation cycle, the FORCE command taking precedence over the setting of the GPS to Navigation Auto/Inhibit command on that cycle. While the FORCE command is being executed, the setting of the GPS to Navigation Auto/Inhibit command remains as set by the crew. The “FORCE” command is removed by navigation after the navigation reset is executed, so that the previous setting of the GPS to Navigation Auto/Inhibit

command again controls the resetting of the navigation state with the selected GPS state on subsequent navigation cycles. Note that the “FORCE” is a one-time force.

An asterisk, “*”, next to the item number represents the selected setting. Note that only one setting will be indicated on a given navigation cycle. The indication is FORCE if the GPS to Navigation Force Command was selected. If the GPS to Navigation Force Command was not selected, the indication is either AUTO or INHIBIT, depending on the selection of the GPS to Navigation Auto/Inhibit Command.

The initial setting of the GPS to Navigation Auto/Inhibit command is “INHIBIT”. It will also be set to “INHIBIT” at OPS transitions. The initial setting of the GPS to Navigation Force command is “OFF” and it will be set to “OFF” at OPS transitions. The GPS to Navigation commands can also be set on SPEC 50 (Section 4.2.9) with the setting there also shown on the STATUS display in GN&C OPS 3 and Major Mode 602 and 603. The GPS to Navigation commands can also be set on SPEC 33 (Section 4.2.23) with the setting there also shown on the GPS STATUS Display in GN&C OPS 2.

These Item Entries will be allowed or not allowed in a given Operational Sequence depending on the value of the GPS_LOCKOUT I-Load parameter. If the value of GPS_LOCKOUT is 1 or smaller, execution of Items 35, 36, and 37 will not be permitted in any OPS that this display is active and an “ILLEGAL ENTRY” message will be generated. If GPS_LOCKOUT has a value of 2, execution of these Item Entries will be permitted in OPS 2 and OPS 8. In all other OPS for which the display is active, execution of these Item Entries will cause an “ILLEGAL ENTRY” message to be generated. If GPS_LOCKOUT has a value of 3 or greater, execution of these Item Entries will be permitted in all OPS that the display is active, except GNC OPS 9, OPS 1, and Major Mode 601. See Tables in Note 18.

In GNC Major Mode 202, if GPS_TO_NAV_AI is in “AUTO” and GPS_TO_NAV_FORCE is “OFF” then no GPS state will be incorporated into Navigation and the application software shall command a down arrow, “↓”, in the parameter status indicator field immediately to the left of Item Entry 35. At all other times, the parameter status indicator shall be blank. The GPS state will be incorporated into Navigation in GNC Major Mode 202 if the GPS_TO_NAV_FORCE is commanded to “FORCE”.

Notes 20 through 22 describe capabilities for commanding an override of the user parameter state metering function, the display of the satellites being tracked by the receivers and the deselection of certain satellites from the GPS constellation that the receiver will track.

(20) METERING OVERRIDE

Item Entry 38 (METERING OVERRIDE) shall toggle the discrete controlling the override of navigation principal function metering of the updates to the user parameter reset state. The user parameter reset state is used by the user parameter navigation computation functions and is eventually used by guidance. Depending on the configuration of the navigation system as determined by item entries (GPS_TO_GC_AIF, see Note (18), and MLS_AIF, see Note (29) of Section 4.2.9 (HORIZ SIT DISP)), either the selected GPS state or the baseline navigation state can be used to update the user parameter reset state. The updates to the user parameter reset state, defined as the difference between the user parameter reset state from the previous navigation cycle propagated to current time and either the baseline navigation state or the selected GPS state as determined by the crew, are metered to be within values defined by pre-mission altitude dependent I-Loads to limit guidance transients. Metering of the updates to the

user parameter reset state occurs under the following conditions: continuous metering limit checking when the selected GPS state is being used to update the user parameter reset state; metering until the update to the user parameter state lies within the I-Load tolerance, when switching from using the selected GPS state to using the baseline navigation state to update the user parameter reset state; metering until the update to the user parameter state lies within the I-Load tolerances, when using the baseline navigation state to update the user parameter reset state and the baseline navigation state has been reset to the selected GPS state. Item 38 is initialized OFF, with no asterisk being displayed (blank), so that metering is being performed under the conditions defined above. When toggled to ON, with an asterisk being displayed, metering is overridden and the updates to the user parameter state are not limited. In this case, the user parameter reset state is either the selected GPS state or the baseline navigation state as determined by prior Item Entries (GPS_TO_GC_AIF, see Note (18), and MLS_AIF, see Note (29) of Section 4.2.9 (HORIZ SIT DISP)).

Execution of Item 38 in any OPS or major mode other than GN&C OPS 3, and Major Modes 602 and 603 will result in an "ILLEGAL ENTRY" message being generated.

(21) SATELLITES TRACKED

This section shall display the GPS satellites being tracked in State 3 or 5 by each receiver. Up to a maximum of six receiver channels can be displayed. If the receiver has less than six channels, the data will be blanked for the nonexistent channels. The order of the satellite number displayed reflects a one-to-one correspondence to the receiver channel tracking that satellite. Values displayed include "blank" (no satellites being tracked in State 3 or 5) and 1 to 63.

This data will be blank when the receiver is not in the NAV mode or when it is experiencing a communication fault.

The corresponding fields for uninstalled receivers will remain blank.

(22) DESELECT SATELLITES

Item Entries 43 to 50 allow the crew to deselect satellites, valid satellite ID's being 1 to 63, as candidates for selection by the GPS receivers by building, based on Item Entries, a derived health status word. The "+" delineator deselects satellites and the "-" delineator removes satellites from being deselected as described below.

As an example, "ITEM 43 + 23 EXEC" will indicate to all GPS receivers that satellite ID 23 should not be used as a candidate for selection. If another satellite was previously deselected by Item Entry 43, an "ILLEGAL ENTRY" message will be generated, the displayed data is unchanged and no change to deselected satellites occurs. If this satellite, ID 23 in this example, is currently deselected by another Item Entry, one of Item Entries 44 to 50 in this example, an "ILLEGAL ENTRY" message will be generated, the displayed data is unchanged and no change to deselect satellites occurs.

"ITEM 43 - 23 EXEC" will indicate to all GPS receivers that satellite 23 should once again be considered as a candidate for selection. If satellite 23 was previously deselected by Item Entry 43, then "ITEM 43 - 23 EXEC" will result in a blank being displayed, and satellite 23 being available for selection. If satellite 23 is not currently deselected by Item Entry 43, then an "ILLEGAL ENTRY" message will be generated, the displayed data is unchanged and there is no change to deselected satellites.

Entry of satellite number of 0, less than - 63, or greater than + 63 will cause an “ILLEGAL ENTRY” message to be issued.

All satellites are initialized as available for selection. Satellite deselection information for Item Entries 43 to 50 shall be maintained in the GNC major function base.

(23) GPS TIME ADJUST ENA

Item Entry 39 (GPS TIME ADJUST ENA 39) shall allow the crew to enable the logic to apply a bias in the time conversion algorithm between the GPC and GPS such that the resultant latency of the GPS aiding state timetag is adjusted to the I-Loaded GPC_GPS_TARGET value at every GPS announced reset.

Item 39 is a toggle item and will default to Inhibit. This parameter will be initialized in OPS 1 and will carry over between OPS transitions. Execution of Item 39 in GN&C OPS 1, OPS 9, or Major Mode 601 will result in an "ILLEGAL ENTRY" message being generated.

4.2.36.2 GPS STATUS Keyboard Processing Addendum

- A) GPS Receiver Self Test. The destinations for these signals are VU and the GPS SOP. The SOP sends the signals to the GPS LRUs to command the receiver to TEST mode and initiate the receiver self-test. The receiver will remain in TEST mode after completing self-test until commanded to initialization or navigation mode. See Tables under Note C.
- B) GPS Receiver Initialization. The destinations for these signals are VU and the GPS SOP which sends the signals to the GPS LRUs to perform navigation initialization. The receiver will remain in the initialization mode until commanded to self-test or navigation mode. See Tables under Note C.
- C) GPS Receiver Navigation. The destinations for these signals are VU and the GPS SOP which sends the signals to the GPS LRUs to transition to the navigation mode. The receiver will remain in the navigation mode until commanded to self-test or initialization mode.

The three signals, (GPS_MODE_CMD₁ (V93U1223C), GPS_MODE_CMD₂ (V93U1224C), GPS_MODE_CMD₃ (V93U1225C)), are applicable to Keyboard Processing Addendum references A, B and C. Each is a command signal with three states as follows:

Signal/State	Function desired
V93U1223C/0	GPS 1 SELF TEST MODE
V93U1223C/1	GPS 1 INIT MODE
V93U1223C/2	GPS 1 NAV MODE

Signal/State	Function desired
V93U1224C/0	GPS 2 SELF TEST MODE
V93U1224C/1	GPS 2 INIT MODE
V93U1224C/2	GPS 2 NAV MODE

Signal/State	Function desired
V93U1225C/0	GPS 3 SELF TEST MODE
V93U1225C/1	GPS 3 INIT MODE
V93U1225C/2	GPS 3 NAV MODE

The default values of these mode commands at OPS transitions are as follows:

- OPS 0 to GNC OPS 9 following an IPL: INIT
- OPS 0 to OPS 3 (Event 3A): NAV
- OPS 0 to OPS 2 (Event 84): NAV
- GNC OPS 9 to OPS 1 (Event 1): NAV

At OPS 0 to GNC OPS 9 transitions other than following an IPL and at OPS 901 mode recalls, the setting of the mode command will be unchanged by the transition or mode recall. At all other OPS transitions and at OPS 201, 301, and 801 mode recalls, the default setting of the mode command will be NAV. This default setting will cause the receiver to mode to NAV mode if it was not in NAV at termination of the previous OPS (TEST or INIT), after it completes the activities associated with its last GPC commanded mode.

When GPS_IO_CNTL transitions to the two state, while in GNC OPS 9, the default setting of the mode command will be INIT.

- D) GPS Receiver Restart. The destination for these signals is the GPS SOP which sends signals to the GPS LRUs to perform a receiver filter restart. During a receiver filter restart, the receiver navigation Kalman filter is reinitialized to restart its navigation process. Execution of Item 20, 21 or 22 when the corresponding receiver is not in INS NAV submode, indicated by GPS_MODE_DISP (V94J0928C, V94J0929C, V94J0930C) not “INS”, will result in an “ILLEGAL ENTRY” message being generated. The default setting shall be OFF.
- E) Deleted.
- F) Deselect Receiver. The destinations for these signals are GPS RCVR STATE PROC (4.21), GAX (4.110), HORIZ SIT DISP (6.21) and REL NAV DISP (6.11). The default setting shall be off. These signals shall be maintained in the GNC major function base.
- G) Quality Assessment Override. Destination for these signals is GPS RCVR STATE PROC, which will enable the state estimate from the specific receiver to remain a candidate for GPS state vector selection independent of its passing or failing QA1, QA3 and QA4 checks. The default setting shall be OFF.
- H) GPS to Guidance and Control Command (GPS_TO_GC_AIF). The destinations for this signal are ONORB/REND NAV (4.126), ENTRY NAV (4.127), PRELAND NAV (4.144) and RTLS NAV (4.205). The GPS to guidance and control A/I/F command signal is defined by one signal for keyboard processing (V93J1200C) which has three states (the default setting shall be INHIBIT):

Signal/State	Function Desired
V93J1200C/0	AUT (Auto Selected)
V93J1200C/1	INH (Inhibit Selected)
V93J1200C/2	FOR (Force Selected)

Setting the states of this command signal, in a given Operational Sequence, shall depend on the value of the GPS_LOCKOUT I-Load parameter. If the value of GPS_LOCKOUT is 1 or less, this signal will remain in “INHIBIT” for all OPS in which this display is active. If GPS_LOCKOUT has a value of 2, all of the above states defined for this signal will be permitted in OPS 2 and OPS 8. In all other OPS for which the display is active, the signal will remain in “INHIBIT”. If GPS_LOCKOUT has a value of 3 or greater, all of the states defined for this command signal will be permitted in all OPS that the display is active, except GNC OPS 9, OPS 1, and Major Mode 601.

- I) GPS to Navigation Auto/Inhibit/Force Commands. the GPS to Navigation Auto/Inhibit/Force commands consist of two signals: the GPS to Navigation Auto/Inhibit command, V93X1202X; and the GPS to Navigation Force command, V93X1201X. Destinations for these signals are ONORB/REND NAV (4.126), ENTRY NAV (4.127), and PRELAND NAV (4.144) and RTLS NAV (4.205). The states of these command signals are given below. Note that the GPS to Navigation Force command (V93X1201X) may be active (that is set to “FORCE”) independent of the state of the GPS to Navigation Auto/Inhibit command. The “FORCE” state of the GPS to Navigation Force command is reset to the inactive state after one NAV cycle.

The states for the GPS to Navigation Auto/Inhibit command (GPS_TO_NAV_AI) are as follows (the default setting shall be INHIBIT):

Signal/State	Function Desired
V93X1202X/OFF	AUT (Auto Selected)
V93X1202X/ON	INH (Inhibit Selected)

The states for the GPS to Navigation Force command (GPS_TO_NAV_FORCE) are as follows (the default setting shall be Force Deselected):

Signal/State	Function Desired
V93X1201X/OFF	Force Deselected
V93X1201X/ON	FOR (Force Selected)

Setting the states of these command signals, in a given Operational Sequence, shall depend on the value of the GPS_LOCKOUT I-Load parameter. If the value of GPS_LOCKOUT is 1 or less, these signals will remain in “INHIBIT” for all OPS in which this display is active. If GPS_LOCKOUT has a value of 2, all of the states defined for these signals will be permitted in OPS 2 and OPS 8. In all other OPS for which the display is active, the signals will remain in “INHIBIT”. If GPS_LOCKOUT has a value of 3 or greater, all of the above states defined for these command signals will be permitted in all OPS that the display is active, except GNC OPS 9, OPS 1, and Major Mode 601.

- J) Metering Override. Destinations for this signal are ENT NAV (4.127), PRELAND NAV (4.144), RTLS NAV (4.205), and CRT (6.51).
- K) If GPS_IO_CNTRL does not equal 2, this Item Entry shall generate an “ILLEGAL ENTRY” message.
- L) Deselected Satellites. This Keyboard Processing Addendum Note utilizes a variable CREW_DESELECT_SAT_FLWD to retain information on each deselected satellite. CREW_DESELECT_SAT_FLWD will be initialized at the overlay of the GNC major function base from Mass Memory as follows:
- Bits 1 to 63 are set OFF (corresponds to satellites numbers 1 to 63).
 - Bit 64 is set OFF.

The table below summarizes the action taken to be taken based on the input value in Item Entries 43 to 50, the value of CREW_DESELECT_SAT_FLWD, and the values of prior Item Entries.

Processing is done using the value entered via the keyboard, referred to as “X” in the table below, and the integer “I” corresponding to each Item Entry 43 (I = 1), 44 (I = 2), 45 (I = 3), 46 (I = 4), 47 (I = 5), 48 (I = 6), 49 (I = 7), and 50 (I = 8).

Current Value of Item Entry	Previous Value of CREW_DESELECT_SAT_CRT(I)	Previous Deselect Status of Satellite Note (1)	“ILLEGAL ENTRY” Message Generated	Final Output Deselect Status of Satellite Note (2)	Final Output CREW_DESELECT_SAT_CRT(I)
X = 0	any	not applicable	YES	retain previous value	retain previous value
+63 ≥ X ≥ +1	0	satellite not deselected	no	set bit X to ON	X
+63 ≥ X ≥ +1	not 0	not applicable	YES	retain previous value	retain previous value
+63 ≥ X ≥ +1	0	satellite deselected	YES	retain previous value	0 (previous value)
-1 ≥ X ≥ -63	0	not applicable	YES	retain previous value	0 (previous value)
-1 ≥ X ≥ -63	-X	deselected	no	set bit X to OFF	0
-1 ≥ X ≥ -63	not equal -X	not applicable	YES	retain previous value	retain previous value

Note (1): If CREW_DESELECT_SAT_FLWD(X) = OFF, then the satellite is available for selection; else if = ON, then the satellite is deselected via a different Item Entry in the range of 43 to 50 and may not be deselected a second time via another Item Entry in the range of 43 to 50.

Note (2): Update the specified bit in CREW_DESELECT_SAT_FLWD.

CREW_DESELECT_SAT_CRT and its previous values shall be initialized to 0 (these variables shall be in the GNC major function base).

After data has been processed, the following assignments are made to send the satellite deselect commands to the GPS SOP (4.17):

CREW_DESELECT_SAT(1) (V94M6062P) = CREW_DESELECT_SAT_FLWD(1 - 16)
CREW_DESELECT_SAT(2) (V94M6063P) = CREW_DESELECT_SAT_FLWD(17 - 32)
CREW_DESELECT_SAT(3) (V94M6064P) = CREW_DESELECT_SAT_FLWD(33 - 48)
CREW_DESELECT_SAT(4) (V94M6065P) = CREW_DESELECT_SAT_FLWD(49 - 64)

- M) If GPS_INSTALLED(1) = OFF, this Item Entry shall generate an “ILLEGAL ENTRY” message.
- N) If GPS_INSTALLED(2) = OFF, this Item Entry shall generate an “ILLEGAL ENTRY” message.
- O) If GPS_INSTALLED(3) = OFF, this Item Entry shall generate an “ILLEGAL ENTRY” message.
- P) This Item Entry shall generate an “ILLEGAL ENTRY” message in OPS 9, OPS 1, and Major Mode 601.
- Q) If no GPS receivers are installed, indicated by GPS_INSTALLED = (OFF, OFF, OFF), execution of Item Entries 10, 32, 33, 34, 35, 36, 37, 38, 39, 43, 44, 45, 46, 47, 48, 49, and 50 shall cause an “ILLEGAL ENTRY” message to be generated.
- R) This Item Entry shall generate an “ILLEGAL ENTRY” message in all OPS except OPS 9.
- S) This Item Entry shall generate an “ILLEGAL ENTRY” message in GNC OPS 9, OPS 1, OPS 2, OPS 8 and Major Mode 601.
- T) GPS I/O. Destinations for this signal are the GPS SOP, VU and the GPS Status Display. The GPS I/O control signal is defined by one signal for keyboard processing (V93J1231C) which has three states as shown in the following table. The default value of this signal shall be 0 in OPS 9. The value of this signal shall be 0 in OPS 1/6, 2, 3, and 8 when GPS_INSTALLED = (OFF, OFF, OFF). The value of this signal shall be driven to 2 on transition to OPS 1 when GPS_INSTALLED₁ = ON or GPS_INSTALLED₂ = ON or GPS_INSTALLED₃ = ON. This signal shall be protected and carried across all GN&C OPS transitions.

Signal/State	Function Desired
V93J1231C/0	No GPS Input/Output
V93J1231C/1	GPS Inputs to GPC only
V93J1231C/2	GPS Input/Output

The following receiver I/O option transitions shall be legal in GNC OPS 9. Any other attempted I/O option transition will result in an “ILLEGAL ENTRY” message being generated and the prior I/O option will be unchanged.

GPS Receiver I/O Option Prior To “ITEM 10 + X EXEC”	Allowed GPS Receiver I/O Options (i.e., Legal Values of X)
0	1
1	0, 2
2	0

- U) A deselected satellite number of 0 will result in an “ILLEGAL ENTRY” message.
- V) In GN&C OPS 9 and Major Mode 101, execution of this Item Entry shall be illegal and shall result in an “ILLEGAL ENTRY” message being generated.
- W) Execution of this ITEM ENTRY will generate an “ILLEGAL ENTRY” message when the corresponding GPS_MODE_CURRENT (V90U3021C, V90U3022C, V90U3023C) or GPS_MODE_CMD (V93U1223C, V93U1224C, V93U1225C) is in TEST.
- X) Execution of this ITEM ENTRY will generate an “ILLEGAL ENTRY” message when the corresponding GPS_MODE_CURRENT (V90U3021C, V90U3022C, V90U3023C) or GPS_MODE_CMD (V93U1223C, V93U1224C, V93U1225C) is in INIT.
- Y) Execution of this ITEM ENTRY will generate an “ILLEGAL ENTRY” message when the corresponding GPS_MODE_CURRENT (V90U3021C, V90U3022C, V90U3023C) or GPS_MODE_CMD (V93U1223C, V93U1224C, V93U1225C) is in NAV.

4.2.36.3 GPS STATUS CRT Processing Addendum

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word “STAT” being inserted in the FORMAT TYPE column, and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT display processing Table 4.2.36-2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is identified by the default code.

When the “M” PSI is displayed (for Commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)	∅ = blank	
Blank (default)	↓	M	∅
1	↓ ↑	M	∅
2	↑	M	∅
3	↓		∅
4	↑		∅
5	↓	?	∅
6	↓ ↑		∅
7		M	∅
8	↓	?	M ∅
9		?	M ∅

- A) GPS Receiver Status. The receiver status signal is set by the GPS SOP in response to GPS to GPC input data. The following table describes the receiver status conditions displayed for each GPS receiver. (NI will be displayed for non-installed receivers only).

All character strings are displayed right justified.

GPS LRU 1 Receiver Status:

Signal/State	Display	Message Description
V94J0932C/0	NI	Receiver Not Installed
V94J0932C/1	M	LRU Communications Fault
V94J0932C/2	BIT	Receiver Built-In-Test in progress
V94J0932C/3	RPF	Receiver processor failure
V94J0932C/4	BATT	Low receiver battery indication
V94J0932C/5	DGF	Data Good has Failed (Receiver DG is off)
V94J0932C/6	(blank)	No receiver anomaly

GPS LRU 2 Receiver Status:

Signal/State	Display	Message Description
V94J0933C/0	NI	Receiver Not Installed
V94J0933C/1	M	LRU Communications Fault
V94J0933C/2	BIT	Receiver Built-In-Test in progress
V94J0933C/3	RPF	Receiver processor failure
V94J0933C/4	BATT	Low receiver battery indication
V94J0933C/5	DGF	Data Good has Failed (Receiver DG is off)
V94J0933C/6	(blank)	No receiver anomaly

GPS LRU 3 Receiver Status:

Signal/State	Display	Message Description
V94J0934C/0	NI	Receiver Not Installed
V94J0934C/1	M	LRU Communications Fault
V94J0934C/2	BIT	Receiver Built-In-Test in progress
V94J0934C/3	RPF	Receiver processor failure
V94J0934C/4	BATT	Low receiver battery indication
V94J0934C/5	DGF	Data Good has Failed (Receiver DG is off)
V94J0934C/6	(blank)	No receiver anomaly

The “RPF” and “M” shall be displayed double overbright. The RPF condition will result in a CLASS 3 alarm annunciated by GAX in all OPS except OPS 9.

- B) GPS Receiver Mode. This signal is a result of GPS_MODE_DISP (V94J0928C, V94J0929C, and V94J0930C), and is received from the GPS SOP. The following table describes the receiver modes that will be displayed.

Display	Message Description
INIT	Initialization Mode
TEST	Self-Test Mode
INS	Inertial Navigation System Navigation Submode
PVA	Position, Velocity, Acceleration Navigation Submode
site	3 character vehicle location mnemonic
(blank)	Receiver is not in an operating mode

- C) Receiver Self Test, Initialization, Navigation and Restart. These signals are received from the GPS SOP. The receiver self test, initialization, and navigation modes are determined by three feedback signals from the GPS_SOP. These signals are GPS_MODE_CMD_RCVD₁ (V94J0925C), GPS_MODE_CMD_RCVD₂ (V94J0926C), GPS_MODE_CMD_RCVD₃ (V94J0927C). Each of the feedback signals has three states that determine where the indicators “*” are driven.

Signal/State	Indicator To Be Driven For
V94J0925C/0	GPS 1 SELF TEST
V94J0925C/1	GPS 1 INIT
V94J0925C/2	GPS 1 NAV

Signal/State	Indicator To Be Driven For
V94J0926C/0	GPS 2 SELF TEST
V94J0926C/1	GPS 2 INIT
V94J0926C/2	GPS 2 NAV

Signal/State	Indicator To Be Driven For
V94J0927C/0	GPS 3 SELF TEST
V94J0927C/1	GPS 3 INIT
V94J0927C/2	GPS 3 NAV

The restart feedbacks for the three receivers are determined by the three signals GPS_FILT_RESTART₁ (V90X3269X), GPS_FILT_RESTART₂ (V90X3270X), GPS_FILT_RESTART₃ (V90X3271X). Each of these signals has two states that determine when the indicators are driven.

Signal/State	Indicator To Be Driven For
V90X3269X/0	blank for GPS 1 RESTART not in progress
V90X3269X/1	*for GPS 1 RESTART in progress
V90X3270X/0	blank for GPS 2 RESTART not in progress
V90X3270X/1	*for GPS 2 RESTART in progress
V90X3271X/0	blank for GPS 3 RESTART not in progress
V90X3271X/1	*for GPS 3 RESTART in progress

D) QA 4 Blanking for GPS Pair 1 - 2. Data comparing GPS receivers 1 and 2 shall be blanked if any one of the following conditions is true:

- The signal GPS_DG_SF(1) (MSID V94X0986X, GPS 1 DG NAV) is equal to a down arrow (“↓”).
- The signal GPS_DG_SF(2) (MSID V94X0987X, GPS 2 DG NAV) is equal to a down arrow (“↓”).
- GPS receiver 1 is not installed (GPS_INSTALLED(1) = OFF).
- The OPS is GN&C OPS 1 or GN&C OPS 9.
- The Major Mode is 601.

E) Time since last GPS State Selection. The time in minutes from the last selection of a GPS state by the navigation GPS state vector software is provided by the GPS RCVR STATE PROC principal function. The time will be displayed double overbright when the GPS_OFF_ALERT (V94X1134X) is ON.

- F) QA 4 Blanking for GPS Pair 2 - 3. Data comparing GPS receivers 2 and 3 shall be blanked if any one of the following conditions is true:
- The signal GPS_DG_SF(2) (MSID V94X0987X, GPS 2 DG NAV) is equal to a down arrow (“↓”).
 - The signal GPS_DG_SF(3) (MSID V94X0988X, GPS 3 DG NAV) is equal to a down arrow (“↓”).
 - GPS receiver 3 is not installed (GPS_INSTALLED(3) = OFF).
 - The OPS is GN&C OPS 1 or GN&C OPS 9.
 - The Major Mode is 601.
- G) QA 4 Blanking for GPS Pair 3 - 1. Data comparing GPS receivers 3 and 1 shall be blanked if any one of the following conditions is true:
- The signal GPS_DG_SF(1) (MSID V94X0986X, GPS 1 DG NAV) is equal to a down arrow (“↓”).
 - The signal GPS_DG_SF(3) (MSID V94X0988X, GPS 3 DG NAV) is equal to a down arrow (“↓”).
 - GPS receiver 1 is not installed (GPS_INSTALLED(1) = OFF).
 - The OPS is GN&C OPS 1 or GN&C OPS 9.
 - The Major Mode is 601.
- H) GPS to Guidance and Control Display Flag. The GPS to Guidance and Control A/I/F display is defined by one signal for display processing (V94J1042C) which has three states given below for determining where the indicator is to be driven. Sources for this signal (GPS_AIF_RCVD) are ENTRY NAV (4.127), PRELAND NAV (4.144), ONORBIT/REND NAV (4.126), and RTLS NAV (4.205).

Signal/State	Indicator to be Driven After
V94J1042C/0	AUT (Auto Selected)
V94J1042C/1	INH (Inhibit Selected)
V94J1042C/2	FOR (Force Selected)

- I) GPS to Navigation A/I/F Display Flag. The GPS to Navigation A/I/F display is defined by one signal, the GPS to Navigation Auto/Inhibit/Force signal, V90J3463C, which has three states shown below for determining where the indicators are to be driven. Sources for this signal (GPS_TO_NAV_AIF) are ONORB/REND NAV (4.126), ENTRY NAV (4.127), PRELAND NAV (4.144), and RTLS NAV (4.205).

The states for the GPS to Navigation Auto/Inhibit/Force signal are defined as follows:

Signal/State	Indicator to be Driven After
V90J3463C/0	AUT (Auto Selected)
V90J3463C/1	INH (Inhibit Selected)
V90J3463C/2	FOR (Force Selected)

- J) Deleted.
- K) If GPS_INSTALLED(1) = OFF, this field shall be blanked.
- L) If GPS_INSTALLED(2) = OFF, this field shall be blanked.
- M) If GPS_INSTALLED(3) = OFF, this field shall be blanked.
- N) This field shall be blanked in GNC OPS 1, GNC OPS 9 and Major Mode 601.
- O) Deleted.
- P) If GPS_SV_SEL_AVAIL = OFF, this field shall be blanked.
- Q) The sources for this signal are ENTRY NAV (4.127), PRELAND NAV (4.144), ONORBIT/REND NAV (4.126), and RTLS NAV (4.205).
- R) This field shall be blanked when GPS_DG_SF(I) (V94X0986X, V94X0987X, and V94X0988X) is OFF.
- S) If QA3_BLANKING (1) = ON, this field shall be blanked.
- T) If QA3_BLANKING (2) = ON, this field shall be blanked.
- U) If QA3_BLANKING (3) = ON, this field shall be blanked.
- V) Deleted.
- W) If the CREW_DESELECT_SAT_CRT(1) (MSID V93U3371C) equals 0, the field locations X = 36 - 38, Y = 23 (SAT DES 43) shall be blanked.
- If the CREW_DESELECT_SAT_CRT(2) (MSID V93U3372C) equals 0, the field locations X = 40 - 42, Y = 23 (SAT DES 44) shall be blanked.
- If the CREW_DESELECT_SAT_CRT(3) (MSID V93U3373C) equals 0, the field locations X = 44 - 46, Y = 23 (SAT DES 45) shall be blanked.
- If the CREW_DESELECT_SAT_CRT(4) (MSID V93U3374C) equals 0, the field locations X = 48 - 50, Y = 23 (SAT DES 46) shall be blanked.
- If the CREW_DESELECT_SAT_CRT(5) (MSID V93U3375C) equals 0, the field locations X = 36 - 38, Y = 24 (SAT DES 47) shall be blanked.
- If the CREW_DESELECT_SAT_CRT(6) (MSID V93U3376C) equals 0, the field locations X = 40 - 42, Y = 24 (SAT DES 48) shall be blanked.

If the CREW_DESELECT_SAT_CRT(7) (MSID V93U3377C) equals 0, the field locations X = 44 - 46, Y = 24 (SAT DES 49) shall be blanked.

If the CREW_DESELECT_SAT_CRT(8) (MSID V93U3378C) equals 0, the field locations X = 48 - 50, Y = 24 (SAT DES 50) shall be blanked.

- X) Figure of Merit Position Error. The application software will provide an integer which shall be converted to display one sigma standard position error in feet as indicated below:

FOM Integer	Position error (P), one sigma (1σ) to be displayed (feet)
0	(blank)
1	75
2	175
3	250
4	325
5	650
6	1650
7	3275
8	16400
9	99999

The output position error derived from FOM shall be blanked if the FOM integer value is 0 (0 is an initialization value, not updated by hardware input).

The sources for figure of merit position error are GPS SOP (4.17) in GN&C OPS 1, GN&C OPS 9, and Major Mode 601, and GPS RCVR STATE PROC (4.21) in GN&C OPS 2, GN&C OPS 8, GN&C OPS 3, Major Mode 602, and Major Mode 603.

- Y) Altitude Units. The characters “NM” shall be displayed for Major Modes 201, 202, 301, 302, 303, and 801. For all other major modes, this field shall be blanked.
- Z) GPS Figure of Merit Status Indicator. Sources for the GPS FOM status indicator are GPS SOP (4.17) in GN&C OPS 1, GN&C OPS 9, and Major Mode 601, and GPS RCVR STATE PROC (4.21) GN&C OPS 2, GN&C OPS 8, GN&C OPS 3, Major Mode 602, and Major Mode 603.

AA) GPS 1 Satellites Tracked Blanking. The associated field shall be blanked if the blanking flag is ON, or GPS_MODE_CURRENT (V90U3021C) for GPS 1 is not equal to NAV, or GPS_RCVR_STATUS(1) (V94J0932C) is equal to “M” (commfault).

CRT Signal Name	MSID	Associated Field Coordinates	
		X	Y
GPS 1 SAT C1 BLANK	V94X0185X	34	19
GPS 1 SAT C2 BLANK	V94X0186X	37	19
GPS 1 SAT C3 BLANK	V94X0187X	40	19
GPS 1 SAT C4 BLANK	V94X0188X	43	19
GPS 1 SAT C5 BLANK	V94XX0189	46	19
GPS 1 SAT C6 BLANK	V94X0202X	49	19

BB) GPS 2 Satellites Tracked Blanking. The associated field shall be blanked if the blanking flag is ON, or GPS_MODE_CURRENT (V90U3022C) for GPS 2 is not equal to NAV, or GPS_RCVR_STATUS(2) (V94J0933C) is equal to “M” (commfault).

CRT Signal Name	MSID	Associated Field Coordinates	
		X	Y
GPS 2 SAT C1 BLANK	V94X0190X	34	20
GPS 2 SAT C2 BLANK	V94X0191X	37	20
GPS 2 SAT C3 BLANK	V94X0192X	40	20
GPS 2 SAT C4 BLANK	V94X0193X	43	20
GPS 2 SAT C5 BLANK	V94X0194X	46	20
GPS 2 SAT C6 BLANK	V94X0203X	49	20

CC) GPS 3 Satellites Tracked Blanking. The associated field shall be blanked if the blanking flag is ON , or GPS_MODE_CURRENT (V90U3023C) for GPS 3 is not equal to NAV, or GPS_RCVR_STATUS(3) (V94J0934C) is equal to “M” (commfault).

CRT Signal Name	MSID	Associated Field Coordinates	
		X	Y
GPS 3 SAT C1 BLANK	V94X0195X	34	21
GPS 3 SAT C2 BLANK	V94X0196X	37	21
GPS 3 SAT C3 BLANK	V94X0197X	40	21
GPS 3 SAT C4 BLANK	V94X0198X	43	21
GPS 3 SAT C5 BLANK	V94X0199X	46	21
GPS 3 SAT C6 BLANK	V94X0204X	49	21

DD) GPS TO NAV EXEC STATUS Blanking. This field shall be blanked in all OPS except GNC OPS 2.

EE) Units of altitude are NM in all Major Modes except 304, 305, 602, and 603. In Major Modes 304, 305, 602, and 603, the units of altitude are kilo-feet.

FF) Summary of GPS Receiver Status. Information shall be displayed to the crew indicating which GPS receivers are selected, candidates for selection, determined to fail the QA 4 dilemma, or currently commfaulted. Information is provided by two inputs per GPS receiver, SEL_RCVR (MSID’s V94X1037X, V94X1038X or V94X1039X) and GPS_DISP_FAIL_DIL (MSID’s V94J6090C, V94J6091C or V94J6092C).

If SEL_RCVR is on for the I’t h GPS receiver, then an asterisk, “*” is displayed.

If SEL_RCVR is off for the I’t h GPS receiver, then the parameter status indicator GPS_DISP_FAIL_DIL shall be displayed showing either a blank, “↓”, “?”, or “M”.

GG) CREW DES RCVR RCVD and GPS TIME ADJ ENBL In GNC Major Function Base. The copy of crew deselect receiver command and GPS time adjust command from GPS RCVR STATE PROC (4.21) and GPS SOP (4.17), respectively is carried across OPS transitions to insure display information is always correct.

HH) This field shall be blanked if FOM_GDOP_STATIC(1) (V94X6142X) equals ON while in GN&C OPS 9, OPS 1 or Major Mode 601.

II) This field shall be blanked if FOM_GDOP_STATIC(2) (V94X6143X) equals ON while in GN&C OPS 9, OPS 1 or Major Mode 601.

JJ) This field shall be blanked if FOM_GDOP_STATIC(3) (V94X6144X) equals ON while in GN&C OPS 9, OPS 1 or Major Mode 601.

KK) This field shall be blanked if GPS-DG_SF(1) (V94X0986X) equals OFF while in GN&C OPS 2, OPS 3, OPS 8, Major Mode 602 or Major Mode 603.

LL) This field shall be blanked if GPS_DG_SF(2) (V94X0987X) equals OFF while in GN&C OPS 2, OPS 3, OPS 8, Major Mode 602 or Major Mode 603.

MM) This field shall be blanked if GPS_DG_SF(3) (V94X0988X) equals OFF while in GN&C OPS 2, OPS 3, OPS 8, Major Mode 602 or Major Mode 603.

4.2.36.4 GPS STATUS Figure/Table References

Figure 4.2.36-1	GPS STATUS DISPLAY (PFS)
Table 4.2.36-1	Keyboard Processing Table
Table 4.2.36-2	CRT Display Processing Table
Table 4.2.36-3	CRT Display Processing Background Requirements N/A
Table 4.2.36-4	Mission Design Background Constants N/A
Table 4.2.36-5	Input Functional Parameters
Table 4.2.36-6	Output Functional Parameters
Table 4.2.36-7	I-Loads
Table 4.2.36-8	K-Loads
Table 4.2.36-9	Constants

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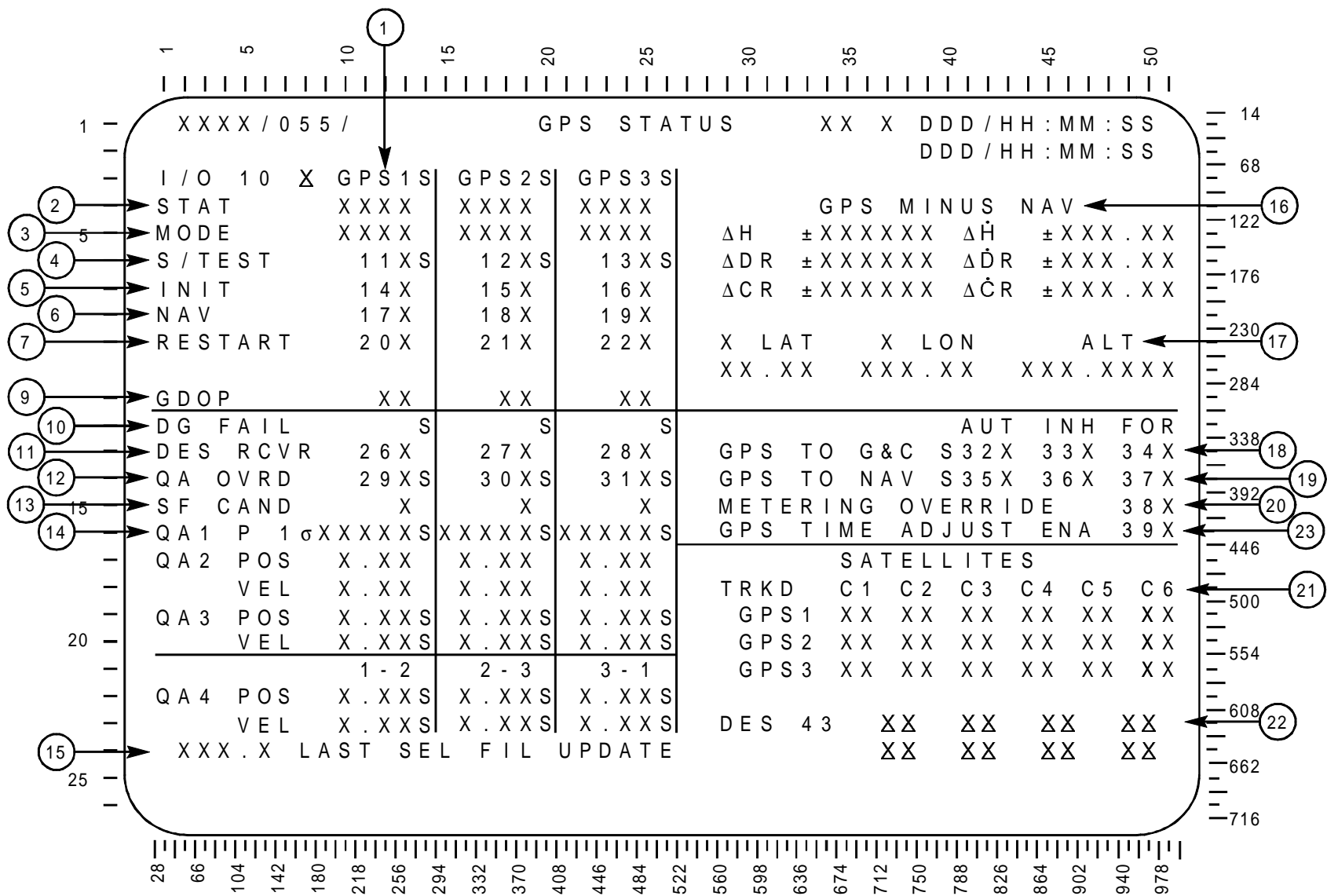


FIGURE 4.2.36-1. GPS STATUS Display

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Table 4.2.36-1. GPS STATUS (PFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
001	I/O 10	V93J1231C	2.0	DEC			10			R, Q, T	4.17, CRT, VU	GPS I/O CONTROL	
002	GPS 1 S/TEST 11	V93U1223C	0.0	CTRL			11			A, K, M, W	4.17, VU	GPS 1 MODE CMD	
003	GPS 2 S/TEST 12	V93U1224C	0.0	CTRL			12			A, K, N, W	4.17, VU	GPS 2 MODE CMD	
004	GPS 3 S/TEST 13	V93U1225C	0.0	CTRL			13			A, K, O, W	4.17, VU	GPS 3 MODE CMD	
005	GPS 1 INIT 14	V93U1223C	0.0	CTRL			14			B, K, M, X	4.17, VU	GPS 1 MODE CMD	
006	GPS 2 INIT 15	V93U1224C	0.0	CTRL			15			B, K, N, X	4.17, VU	GPS 2 MODE CMD	
007	GPS 3 INIT 16	V93U1225C	0.0	CTRL			16			B, K, O, X	4.17, VU	GPS 3 MODE CMD	
008	GPS 1 NAV 17	V93U1223C	0.0	CTRL			17			C, K, M, Y	4.17, VU	GPS 1 MODE CMD	
009	GPS 2 NAV 18	V93U1224C	0.0	CTRL			18			C, K, N, Y	4.17, VU	GPS 2 MODE CMD	
010	GPS 3 NAV 19	V93U1225C	0.0	CTRL			19			C, K, O, Y	4.17, VU	GPS 3 MODE CMD	
011	GPS 1 RESTART 20	V93X1220X	0.0	CTRL			20			D, M, V	4.17	GPS 1 FLTR RESTART CMD	
012	GPS 2 RESTART 21	V93X1221X	0.0	CTRL			21			D, N, V	4.17	GPS 2 FLTR RESTART CMD	
013	GPS 3 RESTART 22	V93X1222X	0.0	CTRL			22			D, O, V	4.17	GPS 3 FLTR RESTART CMD	
014	GPS 1 DES 26	V93X1205X	0.0	CTRL		X	26			F, M, P	4.17, 4.21, 4.110, 6.11, 6.21	DESELECT GPS 1 RCVR CMD	
015	GPS 2 DES 27	V93X1206X	0.0	CTRL		X	27			F, N, P	4.17, 4.21, 4.110, 6.11, 6.21	DESELECT GPS 2 RCVR CMD	
016	GPS 3 DES 28	V93X1207X	0.0	CTRL		X	28			F, O, P	4.17, 4.21, 4.110, 6.11, 6.21	DESELECT GPS 3 RCVR CMD	
017	GPS 1 QA OVRD 29	V93X1227X	0.0	CTRL			29			G, M, P	4.21	QA OVERRIDE RCVR 1 CMD	
018	GPS 2 QA OVRD 30	V93X1228X	0.0	CTRL			30			G, N, P	4.21	QA OVERRIDE RCVR 2 CMD	
019	GPS 3 QA OVRD 31	V93X1229X	0.0	CTRL			31			G, O, P	4.21	QA OVERRIDE RCVR 3 CMD	
020	GPS TO G&C AUT 32	V93J1200C	0.0	CTRL			32			H, P, Q	NAV	GPS TO G&C A/I/F CMD	
021	GPS TO G&C INH 33	V93J1200C	0.0	CTRL			33			H, P, Q	NAV	GPS TO G&C A/I/F CMD	
022	GPS TO G&C FOR 34	V93J1200C	0.0	CTRL			34			H, P, Q	NAV	GPS TO G&C A/I/F CMD	
023	GPS TO NAV AUT 35	V93X1202XB	0.0	CTRL			35			I, P, Q	NAV	GPS TO NAV AUTO/INHIBIT CMD	
024	GPS TO NAV INH 36	V93X1202XB	0.0	CTRL			36			I, P, Q	NAV	GPS TO NAV AUTO/INHIBIT CMD	
025	GPS TO NAV FOR 37	V93X1201XB	0.0	CTRL			37			I, P, Q	NAV	GPS TO NAV FORCE CMD	
026	METERING OVRD 38	V93X1534X	0.0	CTRL			38			J, Q, S	NAV, CRT	CREW OVERRIDE UPP RESET MTRNG	
027	GPS TIME ADJUST ENA 39	V93X1111X	0.0	CTRL		X	39			P, Q	4.17	GPS TIME ADJUST CMD	
028	SAT DES 1 43	V93U3371C	3.0	DEC		X	43	-63	+63	L, Q, U	CRT	CREW SAT DES 1 CMD	

Table 4.2.36-1. GPS STATUS (PFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
029	SAT DES 2 44	V93U3372C	3.0	DEC		X	44	-63	+63	L, Q, U	CRT	CREW SAT DES 2 CMD	
030	SAT DES 3 45	V93U3373C	3.0	DEC		X	45	-63	+63	L, Q, U	CRT	CREW SAT DES 3 CMD	
031	SAT DES 4 46	V93U3374C	3.0	DEC		X	46	-63	+63	L, Q, U	CRT	CREW SAT DES 4 CMD	
032	SAT DES 5 47	V93U3375C	3.0	DEC		X	47	-63	+63	L, Q, U	CRT	CREW SAT DES 5 CMD	
033	SAT DES 6 48	V93U3376C	3.0	DEC		X	48	-63	+63	L, Q, U	CRT	CREW SAT DES 6 CMD	
034	SAT DES 7 49	V93U3377C	3.0	DEC		X	49	-63	+63	L, Q, U	CRT	CREW SAT DES 7 CMD	
035	SAT DES 8 50	V93U3378C	3.0	DEC		X	50	-63	+63	L, Q, U	CRT	CREW SAT DES 8 CMD	

Table 4.2.36-2. GPS STATUS (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	S	B	S	I	F	R	S	L	B	D	Add Ref	Source	Nomenclature	CRT		
			X	Y		CHAR	BILEVEL																	TYPE	
							1	0																	
001	(OPS)	V93X0040X	2	1		5.0															UI	OPS FUNCTION PAGE	X		
002	(SPEC)	V93X0042X	7	1		4.0																UI	SPEC FUNCTION PAGE	X	
003	(DISP)	V93X0044X	10	1		4.0																UI	DISPLAY FUNCTION PAGE	X	
004	(UL)	V92X5032X	34	1		2.0	UL						X									UI	UPLINK ACTIVITY IND	X	
005	(GPC)	V93X0048X	36	1		2.0																UI	GPC DRIVER	X	
006	(MT)	V91W1990C	39	1		12.0																FCOS	MISSION ELAPSED TIME	X	
007	(CRT TIMER)	V91W1987C	39	2		12.0																FCOS	DISPLAY CRT TIMER, GNC	X	
008	I/O 10	V93J1231C	7	3		2.0																KYBD	GPS I/O CONTROL		
009	GPS 1 SEL	V94X1037X	14	3		1.0	*				X											K, N, FF	4.21	GPS 1 SEL	
010	GPS 1 DISPLAY STATUS(S)	V94J6090C	14	3		1.0					X											K, N, FF	8 5.3	GPS 1 DISPLAY STATUS	
011	GPS 2 SEL	V94X1038X	20	3		1.0	*				X											L, N, FF	4.21	GPS 2 SEL	
012	GPS 2 DISPLAY STATUS(S)	V94J6091C	20	3		1.0					X											L, N, FF	8 5.3	GPS 2 DISPLAY STATUS	
013	GPS 3 SEL	V94X1039X	26	3		1.0	*				X											M, N, FF	4.21	GPS 3 SEL	
014	GPS 3 DISPLAY STATUS(S)	V94J6092C	26	3		1.0					X											M, N, FF	8 5.3	GPS 3 DISPLAY STATUS	
015	GPS 1 STAT XXXX	V94J0932C	10	4		4.0						X		A								A	4.17	GPS 1 RCVR STATUS FOR DISPLAY	
016	GPS 2 STAT XXXX	V94J0933C	16	4		4.0						X		A								A	4.17	GPS 2 RCVR STATUS FOR DISPLAY	
017	GPS 3 STAT XXXX	V94J0934C	22	4		4.0						X		A								A	4.17	GPS 3 RCVR STATUS FOR DISPLAY	
018	GPS 1 MODE XXXX	V94J0928C	10	5		4.0					X			A								B, K	4.17	GPS 1 MODE	
019	GPS 2 MODE XXXX	V94J0929C	16	5		4.0					X			A								B, L	4.17	GPS 2 MODE	
020	GPS 3 MODE XXXX	V94J0930C	22	5		4.0					X			A								B, M	4.17	GPS 3 MODE	
021	GPS 1 S/TEST 11	V94J0925C	13	6		1.0					X			A								C, K	4.17	GPS 1 MODE CMD FDBK	
022	GPS 1 S/TEST(S)	V94J6059C	14	6		1.0					X			A								K	6 4.17	GPS RECEIVER 1 FAIL SELF-TEST IND	
023	GPS 2 S/TEST 12	V94J0926C	19	6		1.0					X			A								C, L	4.17	GPS 2 MODE CMD FDBK	
024	GPS 2 S/TEST(S)	V94J6060C	20	6		1.0					X			A								L	6 4.17	GPS RECEIVER 2 FAIL SELF-TEST IND	
025	GPS 3 S/TEST 13	V94J0927C	25	6		1.0					X			A								C, M	4.17	GPS 3 MODE CMD FDBK	
026	GPS 3 S/TEST(S)	V94J6061C	26	6		1.0					X			A								M	6 4.17	GPS RECEIVER 3 FAIL SELF-TEST IND	
027	GPS 1 INIT 14	V94J0925C	13	7		1.0					X			A								C, K	4.17	GPS 1 MODE CMD FDBK	
028	GPS 2 INIT 15	V94J0926C	19	7		1.0					X			A								C, L	4.17	GPS 2 MODE CMD FDBK	
029	GPS 3 INIT 16	V94J0927C	25	7		1.0					X			A								C, M	4.17	GPS 3 MODE CMD FDBK	
030	GPS 1 NAV 17	V94J0925C	13	8		1.0					X			A								C, K	4.17	GPS 1 MODE CMD FDBK	

Table 4.2.36-2. GPS STATUS (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	S	B	S	I	F	R	S	L	B	D	Add Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
031	GPS 2 NAV 18	V94J0926C	19	8		1.0					X									C, L	4.17	GPS 2 MODE CMD FDBK		
032	GPS 3 NAV 19	V94J0927C	25	8		1.0					X									C, M	4.17	GPS 3 MODE CMD FDBK		
033	GPS 1 RESTART 20	V90X3269X	13	9		1.0	*				X									C, K	4.17, 4.18	GPS 1 FILTER RESTART FLAG		
034	GPS 2 RESTART 21	V90X3270X	19	9		1.0	*				X									C, L	4.17, 4.18	GPS 2 FILTER RESTART FLAG		
035	GPS 3 RESTART 22	V90X3271X	25	9		1.0	*				X									C, M	4.17, 4.18	GPS 3 FILTER RESTART FLAG		
036	GPS 1 GDOP	V94H0921C	11	11		3.0					X									K, HH, KK	4.17	GPS 1 CURRENT GDOP		
037	GPS 2 GDOP	V94H0922C	17	11		3.0					X									L, II, LL	4.17	GPS 2 CURRENT GDOP		
038	GPS 3 GDOP	V94H0923C	23	11		3.0					X									M, JJ, MM	4.17	GPS 3 CURRENT GDOP		
039	GPS 1 DG FAIL(S)	V94X0986X	14	12		1.0					X	X								K, N	3 4.21	GPS 1 DG NAV		
040	GPS 2 DG FAIL(S)	V94X0987X	20	12		1.0					X	X								L, N	3 4.21	GPS 2 DG NAV		
041	GPS 3 DG FAIL(S)	V94X0988X	26	12		1.0					X	X								M, N	3 4.21	GPS 3 DG NAV		
042	GPS 1 DES RCVR 26	V94X0964X	13	13		1.0	*													GG	4.21	DESELECT GPS RCVR 1 FDBK		
043	GPS 2 DES RCVR 27	V94X0965X	19	13		1.0	*													GG	4.21	DESELECT GPS RCVR 2 FDBK		
044	GPS 3 DES RCVR 28	V94X0966X	25	13		1.0	*													GG	4.21	DESELECT GPS RCVR 3 FDBK		
045	GPS 1 QA1 P 1σ	V94H1082C	8	16		6.0			FT		X									K, X, HH, KK	4.17,4.21	GPS 1 NAV FOM		
046	GPS 1 QA1 FOM(S)	V94X1155X	14	14		1.0					X	X								K, HH, KK, Z	3 4.17,4.21	GPS 1 FAIL FOM DISP		
047	GPS 2 QA1 P 1σ	V94H1083C	14	16		6.0			FT		X									L, X, II, LL	4.17,4.21	GPS 2 NAV FOM		
048	GPS 2 QA1 FOM(S)	V94X1156X	20	14		1.0					X	X								L, II, LL, Z	3 4.17,4.21	GPS 2 FAIL FOM DISP		
049	GPS 3 QA1 P 1σ	V94H1084C	20	16		6.0			FT		X									M, X, JJ, MM	4.17,4.21	GPS 3 NAV FOM		
050	GPS 3 QA1 FOM(S)	V94X1157X	26	16		1.0					X	X								M, JJ, MM, Z	3 4.17,4.21	GPS 3 FAIL FOM DISP		
051	GPS 1 QA2 POS	V94H1073C	9	17		5.2					X									K, N, R	4.21	GPS 1 DELR RATIO QA2 DISP		
052	GPS 2 QA2 POS	V94H0977C	15	17		5.2					X									L, N, R	4.21	GPS 2 DELR RATIO QA2 DISP		
053	GPS 3 QA2 POS	V94H1074C	21	17		5.2					X									M, N, R	4.21	GPS 3 DELR RATIO QA2 DISP		
054	GPS 1 QA2 VEL	V94L1075C	9	18		5.2					X									K, N, R	4.21	GPS 1 DELV RATIO QA2 DISP		
055	GPS 2 QA2 VEL	V94L0978C	15	18		5.2					X									L, N, R	4.21	GPS 2 DELV RATIO QA2 DISP		
056	GPS 3 QA2 VEL	V94L1076C	21	18		5.2					X									M, N, R	4.21	GPS 3 DELV RATIO QA2 DISP		
057	GPS 1 QA3 POS	V94H1079C	9	19		5.2					X									K, N, R, S	4.21	GPS 1 DELR RATIO QA3 DISP		
058	GPS 1 QA3 POS (S)	V94X1118X	14	19		1.0					X	X								K, N, R, S	3 4.21	GPS 1 FAIL QA3 POS CHK		
059	GPS 2 QA3 POS	V94H0979C	15	19		5.2					X									L, N, R, T	4.21	GPS 2 DELR RATIO QA3 DISP		
060	GPS 2 QA3 POS(S)	V94X0991X	20	19		1.0					X	X								L, N, R, T	3 4.21	GPS 2 FAIL QA3 POS CHK		

Table 4.2.36-2. GPS STATUS (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNIT S	STATUS	BANK	SIZES	INTELS	FILTERS	RELEASES	LARGE	BLOCKS	DOWN	ADD Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL																TYPE
							1	0															
061	GPS 3 QA3 POS	V94H1078C	21	19		5.2													M, N, R, U	4.21	GPS 3 DELR RATIO QA3 DISP		
062	GPS 3 QA3 POS(S)	V94X1119X	26	19		1.0													M, N, R, U 3	4.21	GPS 3 FAIL QA3 POS CHK		
063	GPS 1 QA3 VEL	V94L1079C	9	20		5.2													K, N, S, R	4.21	GPS 1 DELV RATIO QA3 DISP		
064	GPS 1 QA3 VEL(S)	V94X1120X	14	20		1.0													K, N, R, S 3	4.21	GPS 1 FAIL QA3 VEL CHK		
065	GPS 2 QA3 VEL	V94L0980C	15	20		5.2													L, N, R, T	4.21	GPS 2 DELV RATIO QA3 DISP		
066	GPS 2 QA3 VEL (S)	V94X0992X	20	20		1.0													L, N, R, T 3	4.21	GPS 2 FAIL QA3 VEL CHK		
067	GPS 3 QA3 VEL	V94L1081C	21	20		5.2													M, N, R, U	4.21	GPS 3 DELV RATIO QA3 DISP		
068	GPS 3 QA3 VEL (S)	V94X1121X	26	20		1.0													M, N, R, U 3	4.21	GPS 3 FAIL QA3 VEL CHK		
069	QA4 POS DIFF RATIO 1 2	V94H6084C	9	22		5.2													D, K, N	4.21	GPS QA4 POS DIFF RATIO 1 2		
070	QA4 POS 1 2 CHK	V94X6076X	14	22		1.0													D, K, N 3	4.21	GPS FAIL QA4 POS 1 2 CHK		
071	QA4 POS DIFF RATIO 2 3	V94H6085C	15	22		5.2													F, K, N	4.21	GPS QA4 POS DIFF RATIO 2 3		
072	QA4 POS 2 3 CHK	V94X6077X	20	22		1.0													F, K, N 3	4.21	GPS FAIL QA4 POS 2 3 CHK		
073	QA4 POS DIFF RATIO 3 1	V94H6086C	21	22		5.2													G, K, N	4.21	GPS QA4 POS DIFF RATIO 3 1		
074	QA4 POS 3 1 CHK	V94X6078X	26	22		1.0													G, K, N 3	4.21	GPS FAIL QA4 POS 3 1 CHK		
075	QA4 VEL DIFF RATIO 1 2	V94H6087C	9	23		5.2													D, K, N	4.21	GPS QA4 VEL DIFF RATIO 1 2		
076	QA4 VEL 1 2 CHK	V94X6079X	14	23		1.0													D, K, N 3	4.21	GPS FAIL QA4 VEL 1 2 CHK		
077	QA4 VEL DIFF RATIO 2 3	V94H6088C	15	23		5.2													F, K, N	4.21	GPS QA4 VEL DIFF RATIO 2 3		
078	QA4 VEL 2 3 CHK	V94X6080X	20	23		1.0													F, K, N 3	4.21	GPS FAIL QA4 VEL 2 3 CHK		
079	QA4 VEL DIFF RATIO 3 1	V94H6089C	21	23		5.2													G, K, N	4.21	GPS QA4 VEL DIFF RATIO 3 1		
080	QA4 VEL 3 1 CHK	V94X6081X	26	23		1.0													G, K, N 3	4.21	GPS FAIL QA4 VEL 3 1 CHK		
081	GPS 1 QA OVRD 29	V94X0967X	13	14		1.0	*												K, N	4.21	GPS 1 QA OVERRIDE FDBK		
082	GPS 1 QA OVRD (S)	V94X0970X	14	14		1.0													K, N 3	4.21	GPS 1 QA OVERRIDE STATUS IND		
083	GPS 2 QA OVRD 30	V94X0968X	19	14		1.0	*												L, N	4.21	GPS 2 QA OVERRIDE FDBK		
084	GPS 2 QA OVRD (S)	V94X0971X	20	14		1.0													L, N 3	4.21	GPS 2 QA OVERRIDE STATUS IND		
085	GPS 3 QA OVRD 31	V94X0969X	25	14		1.0	*												M, N	4.21	GPS 3 QA OVERRIDE FDBK		
086	GPS 3 QA OVRD (S)	V94X0972X	26	14		1.0													M, N 3	4.21	GPS 3 QA OVERRIDE STATUS IND		
087	GPS 1 SF CAND	V94X1034X	13	15		1.0	*												K, N	4.21	GPS 1 SEL FILTER CANDIDATE		
088	GPS 2 SF CAND	V94X1035X	19	15		1.0	*												L, N	4.21	GPS 2 SEL FILTER CANDIDATE		
089	GPS 3 SF CAND	V94X1036X	25	15		1.0	*												M, N	4.21	GPS 3 SEL FILTER CANDIDATE		
090	LAST SEL FIL UPDATE	V94W0981C	1	24		6.1													MIN	4.21	TIME SINCE LAST GPS SEL		

Table 4.2.36-2. GPS STATUS (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	STATUS	BANK	SIZES	INTELS	FRAGMENTS	SILENCES	BLANKS	DWH	Add Ref	Source	Nomenclature	CRT		
			X	Y		CHAR	BILEVEL															TYPE	
							1	0															
091	DELTA H	V94H0099C	33	5		7.0		DEC	FT									N, P	4.21	GPS SEL DELR UVW U COMP			
092	DELTA HDOT	V94L0996C	45	5		7.2		DEC	FPS									N, P	4.21	GPS SWL DELV UVW UDOT COMP			
093	DELTA DR	V94H0994C	33	6		7.0		DEC	FT									N, P	4.21	GPS SEL DELR UVW V COMP			
094	DELTA DRDOT	V94L0997C	45	6		7.2		DEC	FPS									N, P	4.21	GPS SWL DELV UVW VDOT COMP			
095	DELTA CR	V94H0995C	33	7		7.0		DEC	FT									N, P	4.21	GPS SEL DELR UVW W COMP			
096	DELTA CRDOT	V94L0998C	45	7		7.2		DEC	FPS									N, P	4.21	GPS SWL DELV UVW WDOT COMP			
097	X LAT	V94J0999C	29	9		1.0		CHAR										N, P	4.21	GPS SEL LAT IND			
098	X LON	V94J1009C	37	9		1.0		CHAR										N, P	4.21	GPS SEL LON IND			
099	LAT XX.XX	V94H1008C	28	10		6.2		DEC	DEG									N, P	4.21	GPS SEL LAT DISP			
100	LON XXX.XX	V94H1010C	35	10		7.2		DEC	DEG									N, P	4.21	GPS SEL LON DISP			
101	ALT XXX.XX	V94H1011C	43	10		7.2		DEC	ADD									N, P, EE	4.21	GPS SEL ALT DISP			
102	ALT UNITS XX	ADDENDUM	50	10		2.0		CHAR										Y	GPS STATUS DISP	4.21	ALTITUDE UNITS, NM OR BLANK		
103	GPS TO G&C AUT 32	V94J1042C	43	13		1.0		CHAR										H, N	NAV		GPS TO G&C AUT/INH/FOR FLAG FDBK		
104	GPS TO G&C (S)	V94X1041X	40	13		1.0		STAT		X								N, Q	3	NAV		GPS TO G&C EXEC STATUS	
105	GPS TO G&C INH 33	V94J1042C	47	13		1.0		CHAR										H, N	NAV		GPS TO G&C AUT/INH/FOR FLAG FDBK		
106	GPS TO G&C FOR 34	V94J1042C	51	13		1.0		CHAR										H, N	NAV		GPS TO G&C AUT/INH/FOR FLAG FDBK		
107	GPS TO NAV AUT 35	V90J3463C	43	14		1.0		CHAR										I, N	NAV		GPS TO NAV AUTO/INHIBIT/FORCE FDBK		
108	GPS TO NAV (S)	V94X6082X	40	14		1.0		STAT										DD	3	4.126		GPS TO NAV EXEC STATUS	
109	GPS TO NAV INH 36	V90J3463C	47	14		1.0		CHAR										I, N	NAV		GPS TO NAV AUTO/INHIBIT/FORCE FDBK		
110	GPS TO NAV FOR 37	V90J3463C	51	14		1.0		CHAR										I, N	NAV		GPS TO NAV AUTO/INHIBIT/FORCE FDBK		
111	METERING OVERRIDE 38	V93X1534X	51	15		1.0	*	BLVL											KYBD			CREW OVERRIDE UPP RESET MTRNG	
112	GPS TIME ADJUST ENA 39	V94X0220X	51	16		1.0	*	BLVL										GG	4.17			GPS TIME ADJ CMD RCVD	
113	GPS 1 SAT C1 TRKD	V94U0938C	34	19		3.0		DEC										X	4.17			GPS 1 SAT NO 1 TRACKED	
114	GPS 1 SAT C2 TRKD	V94U0939C	37	19		3.0		DEC										X	4.17			GPS 1 SAT NO 2 TRACKED	
115	GPS 1 SAT C3 TRKD	V94U0940C	40	19		3.0		DEC										X	4.17			GPS 1 SAT NO 3 TRACKED	
116	GPS 1 SAT C4 TRKD	V94U0941C	43	19		3.0		DEC										X	4.17			GPS 1 SAT NO 4 TRACKED	

Table 4.2.36-2. GPS STATUS (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	STATUS	BLOCK	SIZES	INTELS	FRATES	SIGNALS	LEVELS	BANDS	DIVERS	Add Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL																TYPE
							1	0															
117	GPS 1 SAT C5 TRKD	V94U0942C	46	19		3.0													K, AA	4.17	GPS 1 SAT NO 5 TRACKED		
118	GPS 1 SAT C6 TRKD	V94U0943C	49	19		3.0													K, AA	4.17	GPS 1 SAT NO 6 TRACKED		
119	GPS 2 SAT C1 TRKD	V94U0944C	34	20		3.0													L, BB	4.17	GPS 2 SAT NO 1 TRACKED		
120	GPS 2 SAT C2 TRKD	V94U0945C	37	20		3.0													L, BB	4.17	GPS 2 SAT NO 2 TRACKED		
121	GPS 2 SAT C3 TRKD	V94U0946C	40	20		3.0													L, BB	4.17	GPS 2 SAT NO 3 TRACKED		
122	GPS 2 SAT C4 TRKD	V94U0947C	43	20		3.0													L, BB	4.17	GPS 2 SAT NO 4 TRACKED		
123	GPS 2 SAT C5 TRKD	V94U0948C	46	20		3.0													L, BB	4.17	GPS 2 SAT NO 5 TRACKED		
124	GPS 2 SAT C6 TRKD	V94U0949C	49	20		3.0													L, BB	4.17	GPS 2 SAT NO 6 TRACKED		
125	GPS 3 SAT C1 TRKD	V94U0950C	34	21		3.0													M, CC	4.17	GPS 3 SAT NO 1 TRACKED		
126	GPS 3 SAT C2 TRKD	V94U0951C	37	21		3.0													M, CC	4.17	GPS 3 SAT NO 2 TRACKED		
127	GPS 3 SAT C3 TRKD	V94U0952C	40	21		3.0													M, CC	4.17	GPS 3 SAT NO 3 TRACKED		
128	GPS 3 SAT C4 TRKD	V94U0953C	43	21		3.0													M, CC	4.17	GPS 3 SAT NO 4 TRACKED		
129	GPS 3 SAT C5 TRKD	V94U0954C	46	21		3.0													M, CC	4.17	GPS 3 SAT NO 5 TRACKED		
130	GPS 3 SAT C6 TRKD	V94U0955C	49	21		3.0													M, CC	4.17	GPS 3 SAT NO 6 TRACKED		
131	SAT DES 1 43	V93U3371C	36	23		3.0													W	KYBD	CREW SAT DES 1 CMD		
132	SAT DES 2 44	V93U3372C	40	23		3.0													W	KYBD	CREW SAT DES 2 CMD		
133	SAT DES 3 45	V93U3373C	44	23		3.0													W	KYBD	CREW SAT DES 3 CMD		
134	SAT DES 4 46	V93U3374C	48	23		3.0													W	KYBD	CREW SAT DES 4 CMD		
135	SAT DES 5 47	V93U3375C	36	24		3.0													W	KYBD	CREW SAT DES 5 CMD		
136	SAT DES 6 48	V93U3376C	40	24		3.0													W	KYBD	CREW SAT DES 6 CMD		
137	SAT DES 7 49	V93U3377C	44	24		3.0													W	KYBD	CREW SAT DES 7 CMD		
138	SAT DES 8 50	V93U3378C	48	24		3.0													W	KYBD	CREW SAT DES 8 CMD		
139	(MSG LINE)	V93X0050X	1	25		44.0														UI	MESSAGE LINE		
140	(BUFFER MSG)	V93X0054X	45	25		4.0														UI	BUFFER MESSAGE INDICATOR		
141	(SPL)	V93X0056X	2	26		49.0														UI	SCRATCH PAD LINE		

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TABLE 4.2.36-5. INPUT FUNCTIONAL PARAMETERS FOR GPS STATUS DISPLAY (REF 5.3 SPEC.) (G6.51)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
CREW_DESELECT_RCVR(1)	V93X1205XB	DESELECT GPS 1 RCVR CMD	HORIZ SIT DISP		BD		92817C	
CREW_DESELECT_RCVR(1)	V93X1205XC	DESELECT GPS 1 RCVR CMD	REL NAV DISP		BD		92817C	
CREW_DESELECT_RCVR(2)	V93X1206XB	DESELECT GPS 2 RCVR CMD	HORIZ SIT DISP		BD		92817C	
CREW_DESELECT_RCVR(2)	V93X1206XC	DESELECT GPS 2 RCVR CMD	REL NAV DISP		BD		92817C	
CREW_DESELECT_RCVR(3)	V93X1207XB	DESELECT GPS 3 RCVR CMD	HORIZ SIT DISP		BD		92817C	
CREW_DESELECT_RCVR(3)	V93X1207XC	DESELECT GPS 3 RCVR CMD	REL NAV DISP		BD		92817C	
CREW_DESELECT_SAT_CRT(1)	V93U3371C	CREW SAT DES 1 CMD	GPS STATUS DISP		HXS		92067D	
CREW_DESELECT_SAT_CRT(2)	V93U3372C	CREW SAT DES 2 CMD	GPS STATUS DISP		HXS		92067D	
CREW_DESELECT_SAT_CRT(3)	V93U3373C	CREW SAT DES 3 CMD	GPS STATUS DISP		HXS		92067D	
CREW_DESELECT_SAT_CRT(5)	V93U3374C	CREW SAT DES 5 CMD	GPS STATUS DISP		HXS		92067D	
CREW_DESELECT_SAT_CRT(6)	V93U3376C	CREW SAT DES 6 CMD	GPS STATUS DISP		HXS		92067D	
CREW_DESELECT_SAT_CRT(7)	V93U3377C	CREW SAT DES 7 CMD	GPS STATUS DISP		HXS		92067D	
CREW_DESELECT_SAT_CRT(8)	V93U3378C	CREW SAT DES 8 CMD	GPS STATUS DISP		HXS		92067D	
CREW_DES_RCVR_RCVD(1)	V94X0964X	DESELECT GPS RCVR 1 FDBK	GPS RCVR STATE PROC		BD		92067D	
CREW_DES_RCVR_RCVD(2)	V94X0965X	DESELECT GPS RCVR 2 FDBK	GPS RCVR STATE PROC		BD		92067D	
CREW_DES_RCVR_RCVD(3)	V94X0966X	DESELECT GPS RCVR 3 FDBK	GPS RCVR STATE PROC		BD		92067D	
CREW_METERING_OVERRIDE	V93X1534X	CREW OVERRIDE UPP RESET MTRNG	GPS STATUS DISP		BD		92067D	
CREW_QA_OVERRIDE_RCVD(1)	V94X0967X	GPS 1 QA OVERRIDE FDBK	GPS RCVR STATE PROC		BD		91051K	
CREW_QA_OVERRIDE_RCVD(2)	V94X0968X	GPS 2 QA OVERRIDE FDBK	GPS RCVR STATE PROC		BD		91051K	
CREW_QA_OVERRIDE_RCVD(3)	V94X0969X	GPS 3 QA OVERRIDE FDBK	GPS RCVR STATE PROC		BD		91051K	
CREW_QA_OVRD_STATUS_IND(1)	V94X0970X	GPS 1 QA OVERRIDE STATUS IND	GPS RCVR STATE PROC		BD		91051K	
CREW_QA_OVRD_STATUS_IND(2)	V94X0971X	GPS 2 QA OVERRIDE STATUS IND	GPS RCVR STATE PROC		BD		91051K	
CREW_QA_OVRD_STATUS_IND(3)	V94X0972X	GPS 3 QA OVERRIDE STATUS IND	GPS RCVR STATE PROC		BD		91051K	
DELR_RATIO_QA2_DISPLAY(1)	V94H1073C	GPS 1 DELR RATIO QA2 DISP	GPS RCVR STATE PROC		SPL		91051K	
DELR_RATIO_QA2_DISPLAY(2)	V94H0977C	GPS 2 DELR RATIO QA2 DISP	GPS RCVR STATE PROC		SPL		91051K	
DELR_RATIO_QA2_DISPLAY(3)	V94H1074C	GPS 3 DELR RATIO QA2 DISP	GPS RCVR STATE PROC		SPL		91051K	
DELR_RATIO_QA3_DISPLAY(1)	V94H1077C	GPS 1 DELR RATIO QA3 DISP	GPS RCVR STATE PROC		SPL		91051K	
DELR_RATIO_QA3_DISPLAY(2)	V94H0979C	GPS 2 DELR RATIO QA3 DISP	GPS RCVR STATE PROC		SPL		91051K	
DELR_RATIO_QA3_DISPLAY(3)	V94H1078C	GPS 3 DELR RATIO QA3 DISP	GPS RCVR STATE PROC		SPL		91051K	
DELR_RATIO_QA4_1_2	V94H6084C	GPS QA4 POS DIFF RATIO 1 2	GPS RCVR STATE PROC		SPL		92067D	
DELR_RATIO_QA4_1_3	V94H6086C	GPS QA4 POS DIFF RATIO 1 3	GPS RCVR STATE PROC		SPL		92067D	
DELR_RATIO_QA4_2_3	V94H6085C	GPS QA4 POS DIFF RATIO 2 3	GPS RCVR STATE PROC		SPL		92067D	
DELV_RATIO_QA2_DISPLAY(1)	V94L1075C	GPS 1 DELV RATIO QA2 DISP	GPS RCVR STATE PROC		SPL		91051K	
DELV_RATIO_QA2_DISPLAY(2)	V94L0978C	GPS 2 DELV RATIO QA2 DISP	GPS RCVR STATE PROC		SPL		91051K	
DELV_RATIO_QA2_DISPLAY(3)	V94L1076C	GPS 3 DELV RATIO QA2 DISP	GPS RCVR STATE PROC		SPL		91051K	
DELV_RATIO_QA3_DISPLAY(1)	V94L1079C	GPS 1 DELV RATIO QA3 DISP	GPS RCVR STATE PROC		SPL		91051K	

TABLE 4.2.36-5. INPUT FUNCTIONAL PARAMETERS FOR GPS STATUS DISPLAY (REF 5.3 SPEC.) (G6.51)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
DELV_RATIO_QA3_DISPLAY(2)	V94L0980C	GPS 2 DELV RATIO QA3 DISP	GPS RCVR STATE PROC		SPL		91051K	
DELV_RATIO_QA3_DISPLAY(3)	V94L1081C	GPS 3 DELV RATIO QA3 DISP	GPS RCVR STATE PROC		SPL		91051K	
DELV_RATIO_QA4_1_2	V94L6087C	GPS QA4 VEL DIFF RATIO 1 2	GPS RCVR STATE PROC		SPL		92067D	
DELV_RATIO_QA4_1_3	V94L6089C	GPS QA4 VEL DIFF RATIO 1 3	GPS RCVR STATE PROC		SPL		92067D	
DELV_RATIO_QA4_2_3	V94L6088C	GPS QA4 VEL DIFF RATIO 2 3	GPS RCVR STATE PROC		SPL		92067D	
DT_GPS_OFF_MIN	V94W0981C	TIME SINCE LAST GPS SEL	GPS RCVR STATE PROC	MIN	SPL		93017G	*
FOM_GDOP_STATIC(1)	V94X6142X	GPS 1 FOM/GDOP STATIC FLAG	GPS SOP		BD		92369B	
FOM_GDOP_STATIC(2)	V94X6143X	GPS 2 FOM/GDOP STATIC FLAG	GPS SOP		BD		92369B	
FOM_GDOP_STATIC(3)	V94X6144X	GPS 3 FOM/GDOP STATIC FLAG	GPS SOP		BD		92369B	
FOM_NAV(1)	V94H1082CA	GPS 1 NAV FOM	GPS RCVR STATE PROC		HXS		92067D	
FOM_NAV(1)	V94H1082CB	GPS 1 NAV FOM	GPS SOP		HXS		92067D	
FOM_NAV(2)	V94H1083CA	GPS 2 NAV FOM	GPS RCVR STATE PROC		HXS		92067D	
FOM_NAV(2)	V94H1083CB	GPS 2 NAV FOM	GPS SOP		HXS		92067D	
FOM_NAV(3)	V94H1084CA	GPS 3 NAV FOM	GPS RCVR STATE PROC		HXS		92067D	
FOM_NAV(3)	V94H1084CB	GPS 3 NAV FOM	GPS SOP		HXS		92067D	
GDOP_NEW(1)	V94H0921C	GPS 1 CURRENT GDOP	GPS SOP		HXS		91051K	
GDOP_NEW(2)	V94H0922C	GPS 2 CURRENT GDOP	GPS SOP		HXS		91051K	
GDOP_NEW(3)	V94H0923B	GPS 3 CURRENT GDOP	GPS SOP		HXS		91051K	
GPS_AIF_EXEC	V94X1041XA	GPS TO G&C EXEC STATUS	ENT NAV		BD		91051K	
GPS_AIF_EXEC	V94X1041XB	GPS TO G&C EXEC STATUS	PRELAND NAV		BD		91051K	
GPS_AIF_EXEC	V94X1041XC	GPS TO G&C EXEC STATUS	ORB/RND NAV		BD		91051K	
GPS_AIF_EXEC	V94X1041XD	GPS TO G&C EXEC STATUS	RTLS NAV		BD		92067D	
GPS_AIF_RCVD	V94J1042CA	GPS TO G&C AUT/INH/FOR FLAG FDBK	ENT NAV		HXS		91051K	
GPS_AIF_RCVD	V94J1042CB	GPS TO G&C AUT/INH/FOR FLAG FDBK	PRELAND NAV		HXS		91051K	
GPS_AIF_RCVD	V94J1042CC	GPS TO G&C AUT/INH/FOR FLAG FDBK	ORB/RND NAV		HXS		91051K	
GPS_AIF_RCVD	V94J1042CD	GPS TO G&C AUT/INH/FOR FLAG FDBK	RTLS NAV		HXS		92067D	
GPS_DG_SF(1)	V94X0986X	GPS 1 DG NAV	GPS RCVR STATE PROC		BD		92369B	
GPS_DG_SF(2)	V94X0987X	GPS 2 DG NAV	GPS RCVR STATE PROC		BD		92369B	
GPS_DG_SF(3)	V94X0988X	GPS 3 DG NAV	GPS RCVR STATE PROC		BD		92369B	
GPS_DISP_FAIL_DIL(1)	V94J6090CC	GPS 1 DISPLAY STATUS	GPS STATUS SPEC		VAR		92067D	
GPS_DISP_FAIL_DIL(2)	V94J6091CC	GPS 2 DISPLAY STATUS	GPS STATUS SPEC		VAR		92067D	
GPS_DISP_FAIL_DIL(3)	V94J6092CC	GPS 3 DISPLAY STATUS	GPS STATUS SPEC		VAR		92067D	
GPS_FAIL_FOM_DISP(1)	V94X1155XA	GPS 1 FAIL FOM DISP	GPS RCVR STATE PROC		BD		92067D	
GPS_FAIL_FOM_DISP(1)	V94X1155XB	GPS 1 FAIL FOM DISP	GPS SOP		BD		92067D	
GPS_FAIL_FOM_DISP(2)	V94X1156XA	GPS 2 FAIL FOM DISP	GPS RCVR STATE PROC		BD		92067D	
GPS_FAIL_FOM_DISP(2)	V94X1156XB	GPS 2 FAIL FOM DISP	GPS SOP		BD		92067D	
GPS_FAIL_FOM_DISP(3)	V94X1157XA	GPS 3 FAIL FOM DISP	GPS RCVR STATE PROC		BD		92067D	
GPS_FAIL_FOM_DISP(3)	V94X1157XB	GPS 3 FAIL FOM DISP	GPS SOP		BD		92067D	
GPS_FAIL_QA3_R(1)	V94X1118X	GPS 1 FAIL QA3 POS CHK	GPS RCVR STATE PROC		BD		91051K	
GPS_FAIL_QA3_R(2)	V94X0991X	GPS 2 FAIL QA3 POS CHK	GPS RCVR STATE PROC		BD		91051K	
GPS_FAIL_QA3_R(3)	V94X1119X	GPS 3 FAIL QA3 POS CHK	GPS RCVR STATE PROC		BD		91051K	
GPS_FAIL_QA3_V(1)	V94X1120X	GPS 1 FAIL QA3 VEL CHK	GPS RCVR STATE PROC		BD		91051K	
GPS_FAIL_QA3_V(2)	V94X0992X	GPS 2 FAIL QA3 VEL CHK	GPS RCVR STATE PROC		BD		91051K	
GPS_FAIL_QA3_V(3)	V94X1121X	GPS 3 FAIL QA3 VEL CHK	GPS RCVR STATE PROC		BD		91051K	
GPS_FAIL_QA4_R_1_2	V94X6076X	GPS FAIL QA4 POS 1 2 CHK	GPS RCVR STATE PROC		BD		92067D	
GPS_FAIL_QA4_R_1_3	V94X6078X	GPS FAIL QA4 POS 1 3 CHK	GPS RCVR STATE PROC		BD		92067D	

TABLE 4.2.36-5. INPUT FUNCTIONAL PARAMETERS FOR GPS STATUS DISPLAY (REF 5.3 SPEC.) (G6.51)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
GPS_FAIL_QA4_R_2_3	V94X6077X	GPS FAIL QA4 POS 2 3 CHK	GPS RCVR STATE PROC		BD		92067D	
GPS_FAIL_QA4_V_1_2	V94X6079X	GPS FAIL QA4 VEL 1 2 CHK	GPS RCVR STATE PROC		BD		92067D	
GPS_FAIL_QA4_V_1_3	V94X6081X	GPS FAIL QA4 VEL 1 3 CHK	GPS RCVR STATE PROC		BD		92067D	
GPS_FAIL_QA4_V_2_3	V94X6080X	GPS FAIL QA4 VEL 2 3 CHK	GPS RCVR STATE PROC		BD		92067D	
GPS_FAIL_ST(1)	V94J6059C	GPS 1 FAIL SELF-TEST IND	GPS SOP		VAR		92067D	
GPS_FAIL_ST(2)	V94J6060C	GPS 2 FAIL SELF-TEST IND	GPS SOP		VAR		92067D	
GPS_FAIL_ST(3)	V94J6061C	GPS 3 FAIL SELF-TEST IND	GPS SOP		VAR		92067D	
GPS_FILT_RESTART(1)	V90X3269XA	GPS 1 FILTER RESTART FLAG	GPS SOP		BD		92049C	
GPS_FILT_RESTART(1)	V90X3269XB	GPS1 FILTER RESTART FLAG	GPS REF STATE PROC		BD		92049C	
GPS_FILT_RESTART(2)	V90X3270XA	GPS 2 FILTER RESTART FLAG	GPS SOP		BD		92049C	
GPS_FILT_RESTART(2)	V90X3270XB	GPS2 FILTER RESTART FLAG	GPS REF STATE PROC		BD		92049C	
GPS_FILT_RESTART(3)	V90X3271XA	GPS 3 FILTER RESTART FLAG	GPS SOP		BD		92049C	
GPS_FILT_RESTART(3)	V90X3271XB	GPS3 FILTER RESTART FLAG	GPS REF STATE PROC		BD		92049C	
GPS_IO_CNTL	V93J1231C	GPS I/O CONTROL	GPS STATUS DISP		HXS		92056D	
GPS_MODE_CMD_RCVD(1)	V94J0925C	GPS 1 MODE CMD FDBK	GPS SOP		HXS		91051K	
GPS_MODE_CMD_RCVD(2)	V94J0926C	GPS 2 MODE CMD FDBK	GPS SOP		HXS		91051K	
GPS_MODE_CMD_RCVD(3)	V94J0927C	GPS 3 MODE CMD FDBK	GPS SOP		HXS		91051K	
GPS_MODE_CURRENT(1)	V90U3021C	GPS 1 CURRENT OPERATING MODE	GPS SOP		VAR		92132C	
GPS_MODE_CURRENT(2)	V90U3022C	GPS 2 CURRENT OPERATING MODE	GPS SOP		VAR		92132C	
GPS_MODE_CURRENT(3)	V90U3023C	GPS 3 CURRENT OPERATING MODE	GPS SOP		VAR		92132C	
GPS_MODE_DISP(1)	V94J0928C	GPS 1 MODE	GPS SOP		VAR		91051K	
GPS_MODE_DISP(2)	V94J0929C	GPS 2 MODE	GPS SOP		VAR		91051K	
GPS_MODE_DISP(3)	V94J0930C	GPS 3 MODE	GPS SOP		VAR		91051K	
GPS_NAV_AIF_EXEC	V94X6082X	GPS TO NAV EXEC STATUS	ORB/RND NAV		BD		92067D	
GPS_OFF_ALERT	V94X1134X	NO GPS SEL FOR MIN I-LOADED TIME	GPS RCVR STATE PROC		BD		91051K	
GPS_RCVR_STATUS(1)	V94J0932C	GPS 1 RCVR STATUS FOR DISPLAY	GPS SOP		VAR		92067D	
GPS_RCVR_STATUS(2)	V94J0933C	GPS 2 RCVR STATUS FOR DISPLAY	GPS SOP		VAR		92067D	
GPS_RCVR_STATUS(3)	V94J0934C	GPS 3 RCVR STATUS FOR DISPLAY	GPS SOP		VAR		92067D	
GPS_SEL_ALT_DISP	V94H1011C	GPS SEL ALT DISP	GPS RCVR STATE PROC	NM	SPL		91051K	
GPS_SEL_DELR_UVW(1)	V94H0099C	GPS SEL DELR UVW U COMP	GPS RCVR STATE PROC	FT	SPL		92144C	
GPS_SEL_DELR_UVW(2)	V94H0994C	GPS SEL DELR UVW V COMP	GPS RCVR STATE PROC	FT	SPL		91051K	
GPS_SEL_DELR_UVW(3)	V94H0995C	GPS SEL DELR UVW W COMP	GPS RCVR STATE PROC	FT	SPL		91051K	
GPS_SEL_DELV_UVW(1)	V94L0996C	GPS SEL DELV UVW UDOT COMP	GPS RCVR STATE PROC	FT/S	SPL		91051K	
GPS_SEL_DELV_UVW(2)	V94L0997C	GPS SEL DELV UVW VDOT COMP	GPS RCVR STATE PROC	FT/S	SPL		91051K	
GPS_SEL_DELV_UVW(3)	V94L0998C	GPS SEL DELV UVW WDOT COMP	GPS RCVR STATE PROC	FT/S	SPL		91051K	
GPS_SEL_LAT_DISP	V94H1008C	GPS SEL LAT DISP	GPS RCVR STATE PROC	DEG	SPL		91051K	
GPS_SEL_LAT_IND	V94J0999C	GPS SEL LAT IND	GPS RCVR STATE PROC		VAR		91051K	
GPS_SEL_LON_DISP	V94H1010C	GPS SEL LON DISP	GPS RCVR STATE PROC	DEG	SPL		91051K	
GPS_SEL_LON_IND	V94J1009C	GPS SEL LON IND	GPS RCVR STATE PROC		VAR		91051K	
GPS_SV_SEL_AVAIL	V90X3081XC	GPS SEL STATE VCTR AVAIL FLAG	GPS RCVR STATE PROC		BD		92132C	
GPS_TIME_ADJ_ENBL	V94X0220X	GPS TIME ADJ CMD RCVD	GPS SOP	EVENT	BD		93017G	*
GPS_TO_NAV_AIF	V90J3463CA	GPS TO NAV AUTO/INHIBIT/FORCE FDBK	ENT NAV		HXS		92132C	
GPS_TO_NAV_AIF	V90J3463CB	GPS TO NAV AUTO/INHIBIT/FORCE FDBK	PRELAND NAV		HXS		92132C	
GPS_TO_NAV_AIF	V90J3463CC	GPS TO NAV AUTO/INHIBIT/FORCE FDBK	ORB/RND NAV		HXS		92132C	
GPS_TO_NAV_AIF	V90J3463CD	GPS TO NAV AUTO/INHIBIT/FORCE FDBK	RTLS NAV		HXS		92132C	
QA3_BLANKING(1)	V94X0181X	GPS1 QA3 BLANKING FLAG	GPS RCVR STATE PROC		BD		92049C	

TABLE 4.2.36-5. INPUT FUNCTIONAL PARAMETERS FOR GPS STATUS DISPLAY (REF 5.3 SPEC.) (G6.51)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
QA3_BLANKING(2)	V94X0182X	GPS2 QA3 BLANKING FLAG	GPS RCVR STATE PROC		BD		92049C	
QA3_BLANKING(3)	V94X0183X	GPS3 QA3 BLANKING FLAG	GPS RCVR STATE PROC		BD		92049C	
SATS_BLANKING_FLAG(1,1)	V94X0185X	GPS 1 SAT 1 DISP BLANKING	GPS SOP		BD		92281D	
SATS_BLANKING_FLAG(1,2)	V94X0186X	GPS 1 SAT 2 DISP BLANKING	GPS SOP		BD		92281D	
SATS_BLANKING_FLAG(1,3)	V94X0187X	GPS 1 SAT 3 DISP BLANKING	GPS SOP		BD		92281D	
SATS_BLANKING_FLAG(1,4)	V94X0188X	GPS 1 SAT 4 DISP BLANKING	GPS SOP		BD		92281D	
SATS_BLANKING_FLAG(1,5)	V94X0189X	GPS 1 SAT 5 DISP BLANKING	GPS SOP		BD		92281D	
SATS_BLANKING_FLAG(1,6)	V94X0202X	GSP 1 SAT 6 DISP BLANKING	GPS SOP		BD		92281D	
SATS_BLANKING_FLAG(2,1)	V94X0190X	GPS 2 SAT 1 DISP BLANKING	GPS SOP		BD		92281D	
SATS_BLANKING_FLAG(2,2)	V94X0191X	GPS 2 SAT 2 DISP BLANKING	GPS SOP		BD		92281D	
SATS_BLANKING_FLAG(2,3)	V94X0192X	GPS 2 SAT 3 DISP BLANKING	GPS SOP		BD		92281D	
SATS_BLANKING_FLAG(2,4)	V94X0193X	GSP 2 SAT 4 DISP BLANKING	GPS SOP		BD		92281D	
SATS_BLANKING_FLAG(2,5)	V94X0194X	GPS 2 SAT 5 DISP BLANKING	GPS SOP		BD		92281D	
SATS_BLANKING_FLAG(2,6)	V94X0203X	GPS 2 SAT 6 DISP BLANKING	GPS SOP		BD		92281D	
SATS_BLANKING_FLAG(3,1)	V94X0195X	GSP 3 SAT 1 DISP BLANKING	GPS SOP		BD		92281D	
SATS_BLANKING_FLAG(3,2)	V94X0196X	GSP 3 SAT 2 DISP BLANKING	GPS SOP		BD		92281D	
SATS_BLANKING_FLAG(3,3)	V94X0197X	GPS 3 SAT 3 DISP BLANKING	GPS SOP		BD		92281D	
SATS_BLANKING_FLAG(3,4)	V94X0198X	GPS 3 SAT 4 DISP BLANKING	GPS SOP		BD		92281D	
SATS_BLANKING_FLAG(3,5)	V94X0199X	GPS 3 SAT 5 DISP BLANKING	GPS SOP		BD		92281D	
SATS_BLANKING_FLAG(3,6)	V94X0204X	GPS 3 SAT 6 DISP BLANKING	GPS SOP		BD		92281D	
SATS_TRACKED(1,1)	V94U0938C	GPS 1 SAT NO 1 TRACKED	GPS SOP		HXS		91051K	
SATS_TRACKED(1,2)	V94U0939C	GPS 1 SAT NO 2 TRACKED	GPS SOP		HXS		91051K	
SATS_TRACKED(1,3)	V94U0940C	GPS 1 SAT NO 3 TRACKED	GPS SOP		HXS		91051K	
SATS_TRACKED(1,4)	V94U0941C	GPS 1 SAT NO 4 TRACKED	GPS SOP		HXS		91051K	
SATS_TRACKED(1,5)	V94U0942C	GPS 1 SAT NO 5 TRACKED	GPS SOP		HXS		91051K	
SATS_TRACKED(1,6)	V94U0943C	GPS 1 SAT NO 6 TRACKED	GPS SOP		HXS		91051K	
SATS_TRACKED(2,1)	V94U0944C	GPS 2 SAT NO 1 TRACKED	GPS SOP		HXS		91051K	
SATS_TRACKED(2,2)	V94U0945C	GPS 2 SAT NO 2 TRACKED	GPS SOP		HXS		91051K	
SATS_TRACKED(2,3)	V94U0946C	GPS 2 SAT NO 3 TRACKED	GPS SOP		HXS		91051K	
SATS_TRACKED(2,4)	V94U0947C	GPS 2 SAT NO 4 TRACKED	GPS SOP		HXS		91051K	
SATS_TRACKED(2,5)	V94U0948C	GPS 2 SAT NO 5 TRACKED	GPS SOP		HXS		91051K	
SATS_TRACKED(2,6)	V94U0949C	GPS 2 SAT NO 6 TRACKED	GPS SOP		HXS		91051K	
SATS_TRACKED(3,1)	V94U0950C	GPS 3 SAT NO 1 TRACKED	GPS SOP		HXS		91051K	
SATS_TRACKED(3,2)	V94U0951C	GPS 3 SAT NO 2 TRACKED	GPS SOP		HXS		91051K	
SATS_TRACKED(3,3)	V94U0952C	GPS 3 SAT NO 3 TRACKED	GPS SOP		HXS		91051K	
SATS_TRACKED(3,4)	V94U0953C	GPS 3 SAT NO 4 TRACKED	GPS SOP		HXS		91051K	
SATS_TRACKED(3,5)	V94U0954C	GPS 3 SAT NO 5 TRACKED	GPS SOP		HXS		91051K	
SATS_TRACKED(3,6)	V94U0955C	GPS 3 SAT NO 6 TRACKED	GPS SOP		HXS		91051K	
SEL_CMD(1)	V94X1034X	GPS 1 SEL FILTER CANDIDATE	GPS RCVR STATE PROC		BD		92067D	
SEL_CMD(2)	V94X1035X	GPS 2 SEL FILTER CANDIDATE	GPS RCVR STATE PROC		BD		92067D	
SEL_CMD(3)	V94X1036X	GPS 3 SEL FILTER CANDIDATE	GPS RCVR STATE PROC		BD		92067D	
SEL_RCVR(1)	V94X1037X	GPS 1 SEL	GPS RCVR STATE PROC		BD		92067D	
SEL_RCVR(2)	V94X1038X	GPS 2 SEL	GPS RCVR STATE PROC		BD		92067D	
SEL_RCVR(3)	V94X1039X	GPS 3 SEL	GPS RCVR STATE PROC		BD		92067D	
	V94X1133X	ILLEGAL ENTRY MSG(GPS STATUS DISP)	UI				91051K	

TABLE 4.2.36-5. INPUT FUNCTIONAL PARAMETERS FOR GPS STATUS DISPLAY (REF 5.3 SPEC.) (G6.51)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
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NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.36-6. OUTPUT FUNCTIONAL PARAMETERS FROM GPS STATUS DISPLAY (REF 5.3 SPEC.) (G6.51)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
CREW_DESELECT_RCVR(1)	V93X1205XA	DESELECT GPS 1 RCVR CMD	GAX GPS RCVR STATE PROC GPS SOP HORIZ SIT DISP REL NAV DISP		BD		92817C	
CREW_DESELECT_RCVR(2)	V93X1206XA	DESELECT GPS 2 RCVR CMD	GAX GPS RCVR STATE PROC GPS SOP HORIZ SIT DISP REL NAV DISP		BD		92817C	
CREW_DESELECT_RCVR(3)	V93X1207XA	DESELECT GPS 3 RCVR CMD	GAX GPS RCVR STATE PROC GPS SOP HORIZ SIT DISP REL NAV DISP		BD		92817C	
CREW_DESELECT_SAT(1)	V94M6062P	CREW DESELECT SATELLITE WORD 1	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GPS SOP		HMD		93017G	*
CREW_DESELECT_SAT(2)	V94M6063P	CREW DESELECT SATELLITE WORD 2	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GPS SOP		HMD		93017G	*
CREW_DESELECT_SAT(3)	V94M6064P	CREW DESELECT SATELLITE WORD 3	GPS SOP TLM		HMD		92067D	
CREW_DESELECT_SAT(4)	V94M6065P	CREW DESELECT SATELLITE WORD 4	GPS SOP TLM		HMD		92067D	
CREW_DESELECT_SAT_CRT(1)	V93U3371C	CREW SAT DES 1 CMD	GPS STATUS DISP		HXS		92067D	
CREW_DESELECT_SAT_CRT(2)	V93U3372C	CREW SAT DES 2 CMD	GPS STATUS DISP		HXS		92067D	
CREW_DESELECT_SAT_CRT(3)	V93U3373C	CREW SAT DES 3 CMD	GPS STATUS DISP		HXS		92067D	
CREW_DESELECT_SAT_CRT(5)	V93U3374C	CREW SAT DES 5 CMD	GPS STATUS DISP		HXS		92067D	
CREW_DESELECT_SAT_CRT(6)	V93U3376C	CREW SAT DES 6 CMD	GPS STATUS DISP		HXS		92067D	
CREW_DESELECT_SAT_CRT(7)	V93U3377C	CREW SAT DES 7 CMD	GPS STATUS DISP		HXS		92067D	
CREW_DESELECT_SAT_CRT(8)	V93U3378C	CREW SAT DES 8 CMD	GPS STATUS DISP		HXS		92067D	
CREW_METERING_OVERRIDE	V93X1534X	CREW OVERRIDE UPP RESET MTRNG	ENT NAV GPS RCVR STATE PROC GPS STATUS DISP PRELAND NAV RTLS NAV		BD		92067D	
GPS_FILT_RESTART_CMD(1)	V93X1220X	GPS 1 FILT RESTART CMD	GPS SOP		BD		91051K	
GPS_FILT_RESTART_CMD(2)	V93X1221X	GPS 2 FILT RESTART CMD	GPS SOP		BD		91051K	
GPS_FILT_RESTART_CMD(3)	V93X1222X	GPS 3 FILT RESTART CMD	GPS SOP		BD		91051K	

TABLE 4.2.36-6. OUTPUT FUNCTIONAL PARAMETERS FROM GPS STATUS DISPLAY (REF 5.3 SPEC.) (G6.51)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
GPS_IO_CNTL	V93J1231C	GPS I/O CONTROL	GPS SOP GPS STATUS DISP		HXS		92056D	
GPS_MODE_CMD(1)	V93U1223C	GPS 1 MODE CMD	VU GPS SOP		HXS		92069B	
GPS_MODE_CMD(2)	V93U1224C	GPS 2 MODE CMD	VU GPS SOP		HXS		92069B	
GPS_MODE_CMD(3)	V93U1225C	GPS 3 MODE CMD	VU GPS SOP		HXS		92069B	
GPS_TIME_ADJ_CMD	V93X1111X	GPS TIME ADJUST CMD	GPS SOP	ND	BD		92817C	
GPS_TO_GC_AIF	V93J1200CB	GPS TO G&C A/I/F CMD	ENT NAV ORB/RND NAV PRELAND NAV RTLS NAV		HXS		92067D	
GPS_TO_NAV_AI	V93X1202XB	GPS TO NAV AUTO/INHIBIT CMD	ENT NAV ORB/RND NAV PRELAND NAV RTLS NAV		BD		92067D	
GPS_TO_NAV_FORCE	V93X1201XB	GPS TO NAV FORCE CMD	ENT NAV ORB/RND NAV PRELAND NAV RTLS NAV		BD		92067D	
QA_OVERRIDE(1)	V93X1227X	QA OVERRIDE RCVR 1 CMD	GPS RCVR STATE PROC		BD		91051K	
QA_OVERRIDE(2)	V93X1228X	QA OVERRIDE RCVR 2 CMD	GPS RCVR STATE PROC		BD		91051K	
QA_OVERRIDE(3)	V93X1229X	QA OVERRIDE RCVR 3 CMD	GPS RCVR STATE PROC		BD		91051K	
	V94X0308X	CREW DESELECT SATELLITE # 1	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0309X	CREW DESELECT SATELLITE # 2	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0310X	CREW DESELECT SATELLITE # 3	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0311X	CREW DESELECT SATELLITE # 4	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0312X	CREW DESELECT SATELLITE # 5	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*

TABLE 4.2.36-6. OUTPUT FUNCTIONAL PARAMETERS FROM GPS STATUS DISPLAY (REF 5.3 SPEC.) (G6.51)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V94X0313X	CREW DESELECT SATELLITE # 6	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0314X	CREW DESELECT SATELLITE # 7	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0315X	CREW DESELECT SATELLITE # 8	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0316X	CREW DESELECT SATELLITE # 9	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0317X	CREW DESELECT SATELLITE # 10	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0318X	CREW DESELECT SATELLITE # 11	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0319X	CREW DESELECT SATELLITE # 12	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0320X	CREW DESELECT SATELLITE # 13	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0321X	CREW DESELECT SATELLITE # 14	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0322X	CREW DESELECT SATELLITE # 15	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0323X	CREW DESELECT SATELLITE # 16	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*

TABLE 4.2.36-6. OUTPUT FUNCTIONAL PARAMETERS FROM GPS STATUS DISPLAY (REF 5.3 SPEC.) (G6.51)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V94X0324X	CREW DESELECT SATELLITE # 17	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0325X	CREW DESELECT SATELLITE # 18	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0326X	CREW DESELECT SATELLITE # 19	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0327X	CREW DESELECT SATELLITE # 20	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0328X	CREW DESELECT SATELLITE # 21	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0329X	CREW DESELECT SATELLITE # 22	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0330X	CREW DESELECT SATELLITE # 23	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0331X	CREW DESELECT SATELLITE # 24	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0332X	CREW DESELECT SATELLITE # 25	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0333X	CREW DESELECT SATELLITE # 26	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0334X	CREW DESELECT SATELLITE # 27	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*

TABLE 4.2.36-6. OUTPUT FUNCTIONAL PARAMETERS FROM GPS STATUS DISPLAY (REF 5.3 SPEC.) (G6.51)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V94X0335X	CREW DESELECT SATELLITE # 28	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0336X	CREW DESELECT SATELLITE # 29	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0337X	CREW DESELECT SATELLITE # 30	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0338X	CREW DESELECT SATELLITE # 31	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0339X	CREW DESELECT SATELLITE # 32	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V94X0340X	CREW DESELECT SATELLITE # 33	TLM		BD		92067D	
	V94X0341X	CREW DESELECT SATELLITE # 34	TLM		BD		92067D	
	V94X0342X	CREW DESELECT SATELLITE # 35	TLM		BD		92067D	
	V94X0343X	CREW DESELECT SATELLITE # 36	TLM		BD		92067D	
	V94X0344X	CREW DESELECT SATELLITE # 37	TLM		BD		92067D	
	V94X0345X	CREW DESELECT SATELLITE # 38	TLM		BD		92067D	
	V94X0346X	CREW DESELECT SATELLITE # 39	TLM		BD		92067D	
	V94X0347X	CREW DESELECT SATELLITE # 40	TLM		BD		92067D	
	V94X0348X	CREW DESELECT SATELLITE # 41	TLM		BD		92067D	
	V94X0349X	CREW DESELECT SATELLITE # 42	TLM		BD		92067D	
	V94X0350X	CREW DESELECT SATELLITE # 43	TLM		BD		92067D	
	V94X0351X	CREW DESELECT SATELLITE # 44	TLM		BD		92067D	
	V94X0352X	CREW DESELECT SATELLITE # 45	TLM		BD		92067D	
	V94X0353X	CREW DESELECT SATELLITE # 46	TLM		BD		92067D	
	V94X0354X	CREW DESELECT SATELLITE # 47	TLM		BD		92067D	
	V94X0355X	CREW DESELECT SATELLITE # 48	TLM		BD		92067D	
	V94X0356X	CREW DESELECT SATELLITE # 49	TLM		BD		92067D	
	V94X0357X	CREW DESELECT SATELLITE # 50	TLM		BD		92067D	
	V94X0358X	CREW DESELECT SATELLITE # 51	TLM		BD		92067D	
	V94X0359X	CREW DESELECT SATELLITE # 52	TLM		BD		92067D	
	V94X0360X	CREW DESELECT SATELLITE # 53	TLM		BD		92067D	
	V94X0361X	CREW DESELECT SATELLITE # 54	TLM		BD		92067D	
	V94X0362X	CREW DESELECT SATELLITE # 55	TLM		BD		92067D	
	V94X0363X	CREW DESELECT SATELLITE # 56	TLM		BD		92067D	
	V94X0364X	CREW DESELECT SATELLITE # 57	TLM		BD		92067D	
	V94X0365X	CREW DESELECT SATELLITE # 58	TLM		BD		92067D	

TABLE 4.2.36-6. OUTPUT FUNCTIONAL PARAMETERS FROM GPS STATUS DISPLAY (REF 5.3 SPEC.) (G6.51)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V94X0366X	CREW DESELECT SATELLITE # 59	TLM		BD		92067D	
	V94X0367X	CREW DESELECT SATELLITE # 60	TLM		BD		92067D	
	V94X0368X	CREW DESELECT SATELLITE # 61	TLM		BD		92067D	
	V94X0369X	CREW DESELECT SATELLITE # 62	TLM		BD		92067D	
	V94X0370X	CREW DESELECT SATELLITE # 63	TLM		BD		92067D	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
(HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

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TABLE 4.2.36-7. GPS STATUS DISPLAY (REF 5.3 SPEC.) (G6.51) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
GPS_INSTALLED(1)	V97U2924C	ND	D		M	X	G4.17 G4.20 G4.21 G4.23 G4.24 G4.25 G6.11 G6.21 G6.31 G6.51 V5.1.4	00	GPI	92292B	
GPS_INSTALLED(2)	V97U2831C	ND	D		M	X	G4.17 G4.20 G4.21 G4.23 G4.24 G4.25 G6.11 G6.21 G6.31 G6.51 V5.1.4	00	GPI	92292B	
GPS_INSTALLED(3)	V97U2925C	ND	D		M	X	G4.17 G4.20 G4.21 G4.23 G4.24 G4.25 G6.11 G6.21 G6.31 G6.51 V5.1.4	00	GPI	92292B	
GPS_LOCKOUT	V97U3563C	ND	I	S	M	P	G4.123 G4.139 G4.148 G6.11 G6.21 G6.51	00	GPI	92292B	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.36-8. GPS STATUS DISPLAY (REF 5.3 SPEC.) (G6.51) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.36-9. GPS STATUS DISPLAY (REF 5.3 SPEC.) (G6.51) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.37 GLOBAL POSITIONING SYSTEM STATUS (BFS)

TITLE: GPS STATUS

TYPE: SPEC/055

AVAILABILITY: BFS GN&C OPS 1, 3 and 6

4.2.37.1 Purpose, Operation, and Organization

This display provides the crew the capability to monitor the GPS receiver(s) for either the single receiver installed or the three receivers installed hardware configurations. The on-board hardware configuration is indicated by the I-Load Derived Parameter NUM_GPS_INSTALLED (See Table 4.2.37-10). This display cannot be called up if there is no GPS hardware on board the vehicle, which is indicated by a value of zero for NUM_GPS_INSTALLED. If NUM_GPS_INSTALLED is equal to zero, an attempt to call up SPEC 055 shall result in an “ILLEGAL ENTRY” message being displayed and the input rejected. When there is only one GPS receiver installed, which is indicated by a value of one for NUM_GPS_INSTALLED, the character string “NI” shall be displayed at normal intensity in the STAT fields for GPS1 and GPS3 indicating that these GPS receivers are not installed. All other data fields and status indicators pertaining to GPS1 and GPS3 shall be blanked when NUM_GPS_INSTALLED equals one. Furthermore, when NUM_GPS_INSTALLED equals one, execution of item 14, 16, 20, 22, 26, 28, 29, or 31 shall result in an “ILLEGAL ENTRY” message being displayed and the input rejected. When NUM_GPS_INSTALLED equals one, the following described data fields are applicable to GPS2 only; when NUM_GPS_INSTALLED equals three, the following described data fields are applicable for GPS1, GPS2 and GPS3:

- (1) The GPS parameter status indicator shall display the navigation status of each receiver. The determination of which symbol to display for each receiver shall be made by examining the NAV variables GPS1IND, GPS2IND, and GPS3IND according to the table below.

VALUE OF GPS _x IND; x = 1, 2, 3	DISPLAY	MESSAGE DESCRIPTION
0	∅	Receiver data available for NAV use
1	↓	Receiver data not available for NAV use
2	?	Receiver data available for NAV use but rejected due to a receiver-to-receiver miscomparison

- (2) The STAT field shall display the status of the GPS receivers. The status messages are GPS mode dependent, with the exception of a communication fault. The recognized modes for the GPS receiver are Init mode, Test mode and Navigation mode. The Navigation mode has three submodes: aided (INS), unaided (PVA), and Prelaunch Standby (STA). Paragraph (3) discusses the GPS modes in more detail. All the possible status messages which can be displayed are described in the following table. The determination of which status message to display for which receiver shall be made by examining the GPS_INPUT_HIP variables GPS1STAT, GPS2STAT, GPS3STAT according to the table below. In the following table, the GPS mode is shown under the message description to aid in understanding the relationship between mode and status. However, this interdependency of status and mode is accounted for in the GPS_INPUT_HIP so that the display need only examine the GPS1STAT, GPS2STAT and GPS3STAT variables. Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements for GPS1STAT, GPS2STAT and GPS3STAT variables.

GPS_INPUT_HIP VARIABLE	DISPLAY	MESSAGE DESCRIPTION
GPS1STAT	Display for GPS1	
0	⌘	<u>Mode</u> Init: STAT field not supported by BFS Test: STAT field not supported by BFS Nav: GPS 1 receiver healthy
1	M	N/A: GPS 1 is Communication faulted
2	BIT	Test: Not supported by BFS
3	RPF	Nav: GPS 1 Receiver/Processor (R/P) failure
4	BATT	Nav: GPS 1 R/P battery voltage low
5	DGF	Nav: GPS 1 Data Good Fail
GPS2STAT	Display for GPS2	
0	⌘	<u>Mode</u> Init: STAT field not supported by BFS Test: STAT field not supported by BFS Nav: GPS 2 receiver healthy
1	M	N/A: GPS 2 is Communication faulted
2	BIT	Test: Not supported by BFS
3	RPF	Nav: GPS 2 Receiver/Processor (R/P) failure
4	BATT	Nav: GPS 2 R/P battery voltage low
5	DGF	Nav: GPS 2 Data Good Fail
GPS3STAT	Display for GPS3	
0	⌘	<u>Mode</u> Init: STAT field not supported by BFS Test: STAT field not supported by BFS Nav: GPS 3 receiver healthy
1	M	N/A: GPS 3 is Communication faulted
2	BIT	Test: Not supported by BFS
3	RPF	Nav: GPS 3 Receiver/Processor (R/P) failure
4	BATT	Nav: GPS 3 R/P battery voltage low
5	DGF	Nav: GPS 3 Data Good Fail

1 NOTE: “BIT”, “BATT”, and “DGF” shall be displayed at normal intensity. “M” and “RPF” shall be displayed at double overbright intensity.

2 NOTE: When NUM_GPS_INSTALLED equals one, the character string “NI” shall be displayed at normal intensity and take priority over GPS1STAT and GPS3STAT.

3 NOTE: All character strings shall be displayed right justified.

- (3) The MODE field shall display the current operating modes of the GPS receivers. There are three basic operating modes for the receiver: 1) Initialization, 2) Test, and 3) Navigation. The Navigation mode has three submodes: aided (INS), unaided (PVA), and Prelaunch Standby (STA). When any one of the GPS receivers is not in the Initialization mode, Test mode or one of the three recognized Navigation submodes, the MODE field for that GPS receiver shall be blanked. The determination of which mode to display for each receiver shall be made by examining the GPS_INPUT_HIP variables GPS1MODE, GPS2MODE, and GPS3MODE according to the table below. Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements for GPS1MODE, GPS2MODE, and GPS3MODE variables.

GPS_INPUT_HIP VARIABLE	DISPLAY	MESSAGE DESCRIPTION
GPS1MODE	Display for GPS1	
0	∅	GPS1 receiver is not in a recognized mode
1	INIT	GPS1 receiver in Initialization mode
2	TEST	GPS1 receiver in Self-Test mode
3	INS	GPS1 receiver in aided Navigation submode
4	PVA	GPS1 receiver in unaided Navigation submode
5	STA	GPS1 receiver in Prelaunch Standby Navigation submode
GPS2MODE	Display for GPS2	
0	∅	GPS2 receiver is not in a recognized mode
1	INIT	GPS2 receiver in Initialization mode
2	TEST	GPS2 receiver in Self-Test mode
3	INS	GPS2 receiver in aided Navigation submode
4	PVA	GPS2 receiver in unaided Navigation submode
5	STA	GPS2 receiver in Prelaunch Standby Navigation submode
GPS3MODE	Display for GPS3	
0	∅	GPS3 receiver is not in a recognized mode
1	INIT	GPS3 receiver in Initialization mode
2	TEST	GPS3 receiver in Self-Test mode
3	INS	GPS3 receiver in aided Navigation submode
4	PVA	GPS3 receiver in unaided Navigation submode
5	STA	GPS3 receiver in Prelaunch Standby Navigation submode

1 NOTE: All character strings shall be displayed right justified.

- (4) Items 14 (GPS 1 INIT 14), 15 (GPS 2 INIT 15), and 16 (GPS 3 INIT 16) shall provide the capability to command each respective receiver to the INIT mode. When a receiver is commanded to the INIT mode, an asterisk (*) shall be displayed next to the appropriate item number. A blank next to the item number shall indicate that the receiver is not being commanded to the INIT mode, but rather is being commanded to the NAV mode. When BFS is not engaged (i.e., when BFSTATE \neq 1), an attempt to execute item 14, 15 or item 16 shall result in an "ILLEGAL ENTRY" message and the input shall be rejected. When NUM_GPS_INSTALLED equals one, an attempt to execute item 14 or item 16 shall result in an "ILLEGAL ENTRY" message and the input shall be rejected. The crew entered INIT mode command for each GPS receiver shall be conveyed to the GPS_OUTPUT_HIP and GPS_REF_STATE_PROC tasks via the GPS1INIT, GPS2INIT, and GPS3INIT interface variables.

To the right of each INIT mode command status field shall be an INIT mode command result field, which shall display the result of the most-recently commanded initialization attempt. If the initialization was successful, the result field shall be blanked. If the initialization attempt failed, the result field shall display a down arrow (\downarrow). Success of an initialization attempt is determined by the GPS_INPUT_HIP and the GPS_OUTPUT_HIP. If the receiver responded to the initialization command within the allotted time, the initialization is deemed successful, and the INIT mode command and result is cleared. If the receiver does not respond correctly to the initialization command within the allotted time, the initialization is deemed to have failed, the INIT mode command is cleared and the results is set to failed. This processing is accomplished in the GPS_INPUT_HIP and the GPS_OUTPUT_HIP so that the display need only examine the values of the INIT mode command variables (GPS1INIT, GPS2INIT, GPS3INIT) and the INIT mode result variables (GPS1IFL, GPS2IFL, GPS3IFL). Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements for the GPS1INIT, GPS2INIT, GPS3INIT, GPS1IFL, GPS2IFL, and GPS3IFL variables.

- (5) The DG FAIL status indicator shall display each GPS receiver's assessment of its own navigation state data validity. For each GPS receiver, the data good flag shall be examined. These flags are provided by the GPS_INPUT_HIP as GPS1DGB, GPS2DGB and GPS3DGB. If the data good flag is Off for a particular GPS receiver, a down arrow (\downarrow) shall be displayed in the status indicator field corresponding to that receiver. If the data good flag is On for a particular GPS receiver, its corresponding status indicator shall be blanked.

Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements for the GPS1DGB, GPS2DGB, and GPS3DGB variables.

- (6) Items 26 (GPS 1 DES RCVR 26), 27 (GPS 2 DES RCVR 27), and 28 (GPS 3 DES RCVR 28) provide the capability to deselect/re-select (toggle) the GPS receivers respectively for GPS1, GPS2 and GPS3. When a GPS receiver is deselected an asterisk (*) shall be displayed next to the appropriate item number (e.g. item 26 entry for GPS1 results in an asterisk being displayed next to item 26). A blank next to item 26, 27 or 28 shall indicate that the particular GPS receiver corresponding to the item number has not been deselected or has been re-selected. When NUM_GPS_INSTALLED equals one, an attempt to execute item 26 or item 28 shall result in an "ILLEGAL ENTRY" message and the input shall be rejected. The crew entered deselect/re-select status for each GPS receiver shall be conveyed to the GPS_INPUT_HIP and GPS_TIME_ADJ tasks via the GPS1DES, GPS2DES, and GPS3DES interface variables.

These variables shall also be available to the BFS GAX and the BFS HORIZ SIT display. If a GPS receiver is manually deselected via item entry on either the PASS GPS STATUS display or the PASS HORIZ SIT, it does not need to be manually deselected on the BFS GPS STATUS display as Items 26, 27 and 28 shall be DK listened. The GPS STATUS display shall also maintain the correct deselect/re-select status of all three GPS receivers when deselect/re-select item entries are made on the BFS HORIZ SIT display. Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements for the GPS1DES, GPS2DES, and GPS3DES variables.

- (7) Item 29 (GPS 1 QA1 OVRD 29), 30 (GPS 2 QA1 OVRD 30), 31 (GPS 3 QA1 OVRD 31) shall provide the capability to override/not-override (toggle) the GPS_INPUT_HIP Figure of Merit (FOM) threshold test for GPS 1, GPS 2, and GPS 3, respectively. When a QA1 override is in place, an asterisk (*) shall be displayed next to the appropriate item number. When a QA1 override is not in place, the field shall be blanked. When NUM_GPS_INSTALLED equals one, an attempt to execute item 29 or item 31 shall result in an "ILLEGAL ENTRY" message and the input shall be rejected. The crew entered QA1 override status for each GPS receiver shall be conveyed to the GPS_INPUT_HIP task via the GPS1OVRD, GPS2OVRD, and GPS3OVRD interface variables. Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements for the GPS1OVRD, GPS2OVRD, and GPS3OVRD variables.
- (8) The Figure of Merit 1s Position Error (QA1 P 1 σ) field shall display each GPS receiver's estimate of maximum navigational error in feet in its own computed vehicle position vector. The values for these fields shall be obtained from the GPS_INPUT_HIP variables GPS1ERR, GPS2ERR and GPS3ERR. Refer to the BFS HIP PRD (MG038106, section 3.2.5.2.4) for the computations of GPS1ERR, GPS2ERR and GPS3ERR. Whenever a particular GPS receiver is not in one of the three navigation submodes (i.e., INS, PVA, or STA) or indicates a Receiver/Processor fail, its corresponding P 1s data field shall be blanked. The determination of whether to display or blank the P 1s field is made by the GPS_INPUT_HIP so that the display need only examine the GPS1BLK, GPS2BLK, and GPS3BLK blanking control variables. If the blanking control variable for a particular receiver is On, then the P 1s field corresponding to that receiver shall be blanked. If the blanking control variable for a particular receiver is Off, then the P 1s data corresponding to that receiver shall be displayed in its P 1s field. Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements for the GPS1ERR, GPS2ERR, GPS3ERR, GPS1BLK, GPS2BLK, and GPS3BLK variables.

If a particular GPS receiver's estimate of position error has passed the I-Loaded threshold test for an I-Loaded number of consecutive cycles, the parameter status indicator field for the P 1 σ field corresponding to that particular GPS receiver shall be blank. Otherwise, a down arrow (\downarrow) shall be displayed in this field. The information to drive the P 1 σ parameter status indicators is obtained by examining the GPS_INPUT_HIP failure flags ERR1FAIL, ERR2FAIL and ERR3FAIL corresponding to GPS1, GPS2 and GPS3. If the failure flag is On for a particular receiver, then a down arrow (\downarrow) shall be displayed in the corresponding receiver's parameter status indicator field. The down arrow (\downarrow) shall be blanked if the failure flag for a particular GPS receiver is Off. Whenever the P 1 σ field for a particular receiver is blanked because the GPS_INPUT_HIP blanking control variable is set to On (GPS1BLK, GPS2BLK and GPS3BLK), then the corresponding parameter status indicator for that particular receiver shall also be blanked.

- (9) The GPS MINUS NAV fields shall display the vector from the current navigation state to the current selected GPS state as calculated prior to possible replacement of the navigation state with the selected GPS state. Both the position and velocity vector differences shall be displayed in UVW coordinates of altitude (ΔH), downrange (ΔDR), and crossrange (ΔCR) in units of feet, and altitude velocity ($\Delta Hdot$), downrange velocity ($\Delta DRdot$), and crossrange velocity ($\Delta CRdot$) in units of feet per second. In Major Modes 304, 305, 602, and 603, the velocity difference is calculated using earth-relative velocities, while in all other Major Modes, the velocity difference is calculated using inertial velocities. The values for the GPS MINUS NAV fields shall be obtained from the NAV variables DRGPSU, DRGPSV, DRGPSW, DVGPSU, DVGPSV, and DVGPSW. The determination of whether to display or blank the GPS MINUS NAV fields is made by NAV so that the display need only examine the NAV selected GPS state validity variable: GPSDG. If GPSDG = Off, the GPS MINUS NAV fields shall be blanked. Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements for the DRGPSU, DRGPSV, DRGPSW, DVGPSU, DVGPSV, DVGPSW, and GPSDG variables.

In order to insure homogeneity of displayed data as determined by NAV, these fields shall be updated at their normal display rate only when the variable GPSDERIV is ON.

- (10) The LAT, LON and ALT fields, the LAT/LON direction fields, and the ALT units field shall display the selected GPS current estimate of vehicle latitude, longitude and altitude. The values for these fields shall be obtained from the NAV variables GPSSLAT, GPSSLON, and GPSSALT. Whenever a selected GPS state is not available, the LAT, LON and ALT data fields, the LAT/LON direction fields, and the ALT units field shall be blanked. The determination of whether to display or blank the LAT, LON and ALT data fields, the LAT/LON direction fields, and the ALT units field is made by NAV so the display need only examine the NAV selected GPS state validity variable: GPSDG. If the selected GPS state availability variable is Off, then the LAT, LON and ALT data fields, the LAT/LON direction fields, and the ALT units field shall be blanked. If the selected GPS availability variable is On, then the LAT, LON and ALT data and LAT/LON direction fields shall be displayed. The altitude data, GPSSALT, computed by NAV, is the Orbiter altitude above the geodetic ellipsoid. In Major Modes 101, 102, 304, 305, 602, and 603, the altitude is provided to the GPS STATUS display in the units of thousands of feet. In Major Modes 103, 104, 105, 106, 301, 302, 303, and 601, the altitude is in the units of nautical miles. A display units control variable is also provided by NAV: NMBLANK. When the display units control variable is OFF, the unit of measure for altitude will be nautical miles, and "NM" shall be displayed to the right of the altitude data. When the display units control variable is ON, the unit of measure for altitude will be thousands of feet, and the altitude units field shall be blanked, implicitly indicating the units. No data conversions are required by the display for the altitude data. The LAT direction field shall be located above the LAT data field and shall be used to indicate North "N" or South "S" latitude. The latitude variable, GPSSLAT, shall be examined and if it is positive or equal to zero then the character "N" shall be displayed in the LAT direction field. For a negative latitude, the character "S" shall be displayed in the LAT direction field. The LON direction field shall be located above the LON data field and shall be used to indicate East "E" or West "W" longitude. The longitude variable, GPSSLON, shall be examined and if it is positive or equal to zero then the character "E" shall be displayed in the LON direction field. For a negative longitude, the character "W" shall be displayed in the LON direction field.

In order to insure homogeneity of displayed data as determined by NAV, these fields shall be updated at their normal display rate only when the variable GPSDERIV is ON.

- (11) The SATELLITES TRKD fields shall display the GPS satellite number of each satellite tracked by each receiver in either state 3 (code tracking only) or state 5 (code and carrier tracking). The value of each of these fields shall be obtained from the GPS_INPUT_HIP variables GPS1SATx, GPS2SATx, and GPS3SATx, where x takes on the values of 1, 2, 3, 4, 5, and 6. The determination of whether to display or blank each SATELLITES TRKD field is made by the GPS_INPUT_HIP so that the display need only examine the GPS_INPUT_HIP satellite blanking control variables: GPS1SBx, GPS2SBx, and GPS3SBx, where x takes on the values 1, 2, 3, 4, 5, and 6. If the satellite blanking control variable is On, the field shall be blanked. Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements for the GPS1SATx, GPS2SATx, GPS3SATx, GPS1SBx, GPS2SBx, and GPS3SBx variables.
- (12) Items 20 (GPS 1 RESTART 20), 21 (GPS 2 RESTART 21), and 22 (GPS 3 RESTART 22) shall provide the capability to command each respective GPS receiver to restart its navigation filter. This option is available only when the corresponding receiver is in the INS Nav submode, indicated by “INS” being displayed in the MODE field. An asterisk “*” shall be displayed next to the appropriate item number in the presence of the RESTART command and shall be removed once the RESTART command is cleared automatically by either the GPS_INPUT_HIP or the GPS_OUTPUT_HIP. Any attempt to execute any one of these items when BFS is not engaged (i.e., when BFSTATE is not equal to 1) or when the corresponding receiver is not in the INS Nav submode shall result in an “ILLEGAL ENTRY” message and the input shall be rejected. When only one receiver is installed, NUM_GPS_INSTALLED = 1, an attempt to execute item 20 or item 22 shall result in an “ILLEGAL ENTRY” message and the input shall be rejected. The crew entered RESTART command for each receiver shall be conveyed to the GPS_OUTPUT_HIP and GPS_REF_STATE_PROC tasks via the GPS1FILT, GPS2FILT and GPS3FILT interface variables. Refer to the BFS HIP PRD (MG038106, section 3.3.3) for initialization requirements for the GPS1FILT, GPS2FILT and GPS3FILT variables.
- (13) Items 43 to 50 allow the crew to deselect satellites from selection consideration by all installed GPS receivers. The “+” or “-” delineator between the item entries and the satellite ID will deselect or remove the previous deselect command, respectively. For example, “Item 43 + 14 EXEC” will indicate to all installed GPS receivers that satellite ID 14 should not be used as a candidate for selection and subsequent “Item 43 - 14 EXEC” will remove the deselect command. A derived health status word (SATDESEL), based on the item entries and the valid satellite IDs (1-63), is used to set the appropriate deselect commands (SATDES1, SATDES2, SATDES3 and SATDES4) for output to the GPS Output HIP. In the example above “Item 43 + 14 EXEC” will set bit 14 of SATDESEL to 1, indicating this satellite is deselected. Subsequent “Item 43 - 14 EXEC” will remove the deselect command by resetting bit 14 of SATDESEL to 0. The display shall be initialized without the presence of any satellite deselect commands upon entry into OPS 1 or OPS 3 from OPS 0 and shall thereafter reflect crew inputs. If a satellite is deselected via item entry on the PASS GPS STATUS display, it shall also be deselected in the BFS as items 43 to 50 shall be DK listened.

The satellite deselect command shall only be honored if the satellite is not currently deselected and the item entry entered is not currently being used to deselect another satellite. The satellite ID shall be saved in SATDESID(I) where the “I” corresponds to the item entry used with items 43 (I = 1), 44 (I = 2), 45 (I = 3), 46 (I = 4), 47 (I = 5), 48 (I = 6), 49 (I = 7) and 50 (I = 8). The deselected satellite ID's shall be displayed to the right of item 43 in the order from left to right and top to bottom, corresponding to items 43 to 50. Execution of this command outside of

the conditions specified above shall result in an “ILLEGAL ENTRY” message and the input shall be rejected.

Removal of the satellite deselect command shall only be honored for a currently deselected satellite if requested via the same item entry used to deselect the satellite. This command shall reset the appropriate SATDESID(I) value to zero and remove the satellite ID from the display. Execution of this command outside of the conditions specified above shall result in an “ILLEGAL ENTRY” message and the input shall be rejected.

- (14) Item Entry 39 (GPS TIME ADJUST ENA 39) shall allow the crew to enable the logic to apply a bias in the time conversion algorithm between the GPC and GPS such that the resultant latency of the GPS aiding state timetag is adjusted to the I-Loaded GPC_GPS_TARGET value at every GPS announced reset.

Item 39 is a toggle item and will default to Inhibit. This parameter will be DK-listen. Execution of Item 39 in GN&C OPS 1 or Major Mode 601 will result in an "ILLEGAL ENTRY" message being generated.

ERROR CONDITIONS

Legal Item Numbers: Items 14-16, 20-22, 26-31, 39, and 43-50 are the only legal executable item numbers on the BFS GPS Status Display. If any other item number is executed, an operator error shall result, the input rejected, and an “ILLEGAL ENTRY” message shall be displayed.

4.2.37.2 GPS Status Keyboard Processing Addendum

- A. When NUM_GPS_INSTALLED equals one, an attempt to execute this item entry shall result in an “ILLEGAL ENTRY” message and the input shall be rejected.
- B. When BFSTATE does not equal one, an attempt to execute this item entry shall result in an “ILLEGAL ENTRY” message and the input shall be rejected.
- C. Entry of a satellite ID number of 0 (zero), greater than +63, or less than –63 shall result in an “ILLEGAL ENTRY” message and the input shall be rejected.
- D. Execution of a deselect command on any one of the currently deselected satellites, whether using the same item entry or not, shall result in an “ILLEGAL ENTRY” message and the input shall be rejected.

Execution of a deselect command via the same item entry that is already commanding deselection of a satellite, whether it’s the same satellite ID or not, shall result in an “ILLEGAL ENTRY” message and the input shall be rejected.

- E. Removal of the deselect command for a satellite that is not currently deselected by the same item entry shall result in an “ILLEGAL ENTRY” and the input shall be rejected.
- F. The parameter SATDESEL shall be used to determine the deselect status of each satellite. SATDESEL shall be comprised of 64 bits with each bit location representing the deselect status of the corresponding satellite ID. Upon a valid satellite deselect command, the satellite ID shall be used to set the corresponding bit of SATDESEL to one. Upon a valid satellite deselect

removal command, the satellite ID shall be used to reset the corresponding bit of SATDESEL to zero. Finally, the following assignments shall be made for output to the GPS Output HIP:

SATDES1 = SATDESEL₁₋₁₆
 SATDES2 = SATDESEL₁₇₋₃₂
 SATDES3 = SATDESEL₃₃₋₄₈
 SATDES4 = SATDESEL₄₉₋₆₄

- G. Execution of a filter restart command when the corresponding GPS receiver is not in an INS nav submode (GPSxMODE is not equal to 3) shall result in an "ILLEGAL ENTRY" message and the input shall be rejected.
- H. This item entry shall generate an "ILLEGAL ENTRY" message in OPS 1 and Major Mode 601.

4.2.37.3 GPS Status CRT Display Processing Addendum.

The table below presents the stand-alone parameter status indicators (PSI) that can be displayed for a parameter. PSI requirements are identified by the word "STAT" being inserted in the FORMAT TYPE column, and a numeric code appearing as an entry (right justified) in the ADD REF column of CRT display processing Table 4.2.37-2. The numeric code, corresponding to one of those listed in the table, indicates the specific status processing to be performed. If there is no numeric code entry, the status processing is defined by the default code.

When the "M" PSI is displayed (for Commfault, I/O error resulting in missing data), the associated parameter value data field shall be blanked unless specified otherwise.

Numeric Code	PSI Symbol(s)			
Blank (default)	↓		M	∅
1	↓	↑	M	∅
2		↑	M	∅
3	↓			∅
4		↑		∅
5	↓		?	∅
6	↓	↑		∅
7			M	∅
8	↓		?	M ∅
9			?	M ∅

∅ = blank

The following alpha code(s) appear (left justified) in the ADD REF column of Table 4.2.37-2 whenever it is necessary to define any special processing requirements not otherwise covered therein:

- A. GPS STAT Blanking. When NUM_GPS_INSTALLED equals one, the character string "NI" shall be displayed at normal intensity in the GPS1 STAT and GPS3 STAT fields instead of the

blinking shown in the table in paragraph 4.2.37.1(2), and the blanking requirements shown in that table shall apply to GPS2 STAT only. When NUM_GPS_INSTALLED equals three, the blanking requirements shown in the table in paragraph 4.2.37.1(2) shall apply to the STAT field for all three GPS receivers.

- B. GPS DES RCVR. For an installed GPS receiver, the corresponding deselect discrete (V98X0089X for GPS1, V98X0623X for GPS2, or V98X0664X for GPS3) shall be set or reset only by item entry. If a discrete is set (i.e., a “1” state of the signal), an asterisk (*) shall be displayed after the corresponding DES RCVR item number as shown in figure 4.2.37-1, and a blank shall be displayed when the discrete is reset (i.e., a “0” state of the signal).

Besides the BFS GPS STATUS DISPLAY, these variables have three other sources of input: the BFS HORIZONTAL SITUATION DISPLAY, the PASS GPS STATUS DISPLAY (by DK Listen), and the PASS HORIZONTAL SITUATION DISPLAY (by DK Listen).

- C. GPS MODE Blanking. For an installed receiver, its MODE field shall be blanked if its GPS_INPUT_HIP mode variable (GPS1MODE for GPS1, GPS2MODE for GPS2, and GPS3MODE for GPS3) equals zero.
- D. GPS DG FAIL Blanking. For an installed GPS receiver, its DG FAIL parameter status indicator shall be blanked if the receiver’s data good flag from the GPS_INPUT_HIP is ON (i.e., GPSxDGB = 1, where x = receiver number).
- E. GPS STAT Intensity Level. If a communication fault or receiver/processor failure occurs for an installed GPS receiver (i.e., the GPSxSTAT variable for that receiver equals one or three) then the “M” or “RPF” displayed in the corresponding STAT field as required in the table in paragraph 4.2.37.1(2) shall be displayed at double overbright intensity. All other STAT fields shown in that table shall be at normal intensity.
- F. Additional Blanking. The indicated fields for an installed GPS receiver shall be blanked if the receiver’s blanking control variable from GPS_INPUT_HIP is ON (i.e., GPSxBLK = 1, where x = receiver number).
- G. This field shall be blanked when NUM_GPS_INSTALLED = 1.
- H. GPS Latitude Direction. When not required to be blanked, the GPS Latitude Direction field shall show “N” if the latitude variable GPSSLAT is positive or equal to zero, and shall show “S” otherwise.
- I. GPS Longitude Direction. When not required to be blanked, the GPS Longitude Direction field shall show “E” if the longitude variable GPSSLON is positive or equal to zero, and shall show “W” otherwise.
- J. Selected State Blanking. The indicated fields shall be blanked if the selected GPS state validity flag from NAV is OFF (i.e., GPSDG = 0).
- K. GPS QA1 OVRD. For an installed GPS receiver, the corresponding QA1 override discrete (V98X2925X for GPS1, V98X2926X for GPS2, or V98X2927X for GPS3) shall be set or reset only by item entry. If a discrete is set (i.e., a “1” state of the signal), an asterisk (*) shall be displayed after the corresponding QA1 OVRD item number as shown in figure 4.2.37-1, and a blank shall be displayed when the discrete is reset (i.e., a “0” state of the signal).

- L. GPS INIT Command and Result. For an installed GPS receiver, the corresponding INIT mode command discrete (V98X2919X for GPS1, V98X29920X for GPS2, or V98X2921X for GPS3) shall be set only by item entry after BFS engage, and will be reset automatically by the flight software following completion of processing. If a discrete is set (i.e., a “1” state of the signal), an asterisk (*) shall be displayed after the corresponding INIT command item number as shown in figure 4.2.37-1, and a blank shall be displayed when the discrete is reset (i.e., a “0” state of the signal).

For an installed GPS receiver, the corresponding INIT mode failure discrete (V98X2922X for GPS1, V98X2923X for GPS2, or V98X2924X for GPS3) shall be set or reset by either the GPS_OUTPUT_HIP or the GPS_INPUT_HIP, respectively. If a discrete is set (i.e., a “1” state of the signal), a down arrow (↓) shall be displayed two fields to the right of the corresponding INIT command item number as shown in figure 4.2.37-1, and a blank shall be displayed when the discrete is reset (i.e., “0” state of the signal).

- M. GPS Navigation Display Status. The navigation availability status shall be displayed according to the requirements in the table in paragraph 4.2.37.1(1)
- N. Satellites Tracked Blanking. The associated field shall be blanked when the blanking control variable is ON.

GPS INPUT HIP Blanking Control Variable	MSID	Associated Field Coord	
		X	Y
GPS1SB1	V98X2956X	34	19
GPS1SB2	V98X2957X	37	19
GPS1SB3	V98X2958X	40	19
GPS1SB4	V98X2959X	43	19
GPS1SB5	V98X2960X	46	19
GPS1SB6	V98X2961X	49	19
GPS2SB1	V98X2962X	34	20
GPS2SB2	V98X2963X	37	20
GPS2SB3	V98X2964X	40	20
GPS2SB4	V98X2965X	43	20
GPS2SB5	V98X2966X	46	20
GPS2SB6	V98X2967X	49	20
GPS3SB1	V98X2968X	34	21
GPS3SB2	V98X2969X	37	21
GPS3SB3	V98X2970X	40	21
GPS3SB4	V98X2971X	43	21
GPS3SB5	V98X2972X	46	21
GPS3SB6	V98X2973X	49	21

- O. GPS Altitude Units. When not otherwise required to be blanked, this field shall display “NM” when the NAV variable NMBLANK is OFF, indicating that the altitude unit of measure is nautical miles. When NMBLANK is ON, this field shall be blanked, implicitly indicating that the altitude unit of measure is thousands of feet.
- P. In order to insure homogeneity of displayed data as determined by NAV, this field shall be updated at its normal display rate only when the variable GPSDERIV is ON.
- Q. GPS Filter Restart Command. For an installed GPS receiver, the corresponding Filter Restart command discrete (V98X7258X for GPS1, V98X7259X for GPS2, or V98X7260X for GPS3) shall be set only by item entry after BFS engage, and will be reset automatically by the flight software following completion of processing. If a discrete is set (i.e., a “1” state of the signal), an asterisk (*) shall be displayed after the corresponding Filter Restart command item number as shown in figure 4.2.37-1, and a blank shall be displayed when the discrete is reset (i.e., a “0” state of the signal).
- R. GPS Satellite Deselect Display.
- The field locations X = 36 - 38, Y = 23 (SAT DES 43) shall display the content of SATDESID(1) if greater than 0 and blank if equal to 0.
- The field locations X = 40 - 42, Y = 23 (SAT DES 44) shall display the content of SATDESID(2) if greater than 0 and blank if equal to 0.
- The field locations X = 44 - 46, Y = 23 (SAT DES 45) shall display the content of SATDESID(3) if greater than 0 and blank if equal to 0.
- The field locations X = 48 - 50, Y = 23 (SAT DES 46) shall display the content of SATDESID(4) if greater than 0 and blank if equal to 0.
- The field locations X = 36 - 38, Y = 24 (SAT DES 47) shall display the content of SATDESID(5) if greater than 0 and blank if equal to 0.
- The field locations X = 40 - 42, Y = 24 (SAT DES 48) shall display the content of SATDESID(6) if greater than 0 and blank if equal to 0.
- The field locations X = 44 - 46, Y = 24 (SAT DES 49) shall display the content of SATDESID(7) if greater than 0 and blank if equal to 0.
- The field locations X = 48 - 50, Y = 24 (SAT DES 50) shall display the content of SATDESID(8) if greater than 0 and blank if equal to 0.
- S. GPS Time Adjustment.
- The field next to Item 39 shall be blanked when GPS TIME ADJUST CMD (V98X1642X) equals OFF (GPS Time Adjustment is disabled). The field shall contain an asterisk (*) when GPS TIME ADJUST CMD equals ON. This item entry is valid in GN&C OPS3 and Major Modes 602 and 603.

4.2.37.4 GPS Status Figure/Table References

Figure 4.2.37-1 GPS Status Display (BFS)

Table 4.2.37-1 Keyboard Processing Table

Table 4.2.37-2 CRT Display Processing Table

Table 4.2.37-3 CRT Display Processing Background Requirements N/A

Table 4.2.37-4 Mission Design Background Constants N/A

Table 4.2.37-5 Input Functional Parameters N/A

Table 4.2.37-6 Output Functional Parameters N/A

Table 4.2.37-7 I-Loads

Table 4.2.37-8 K-Loads

Table 4.2.37-9 Constants N/A

Table 4.2.37-10 GPS Status Display I-Load Derived Parameters

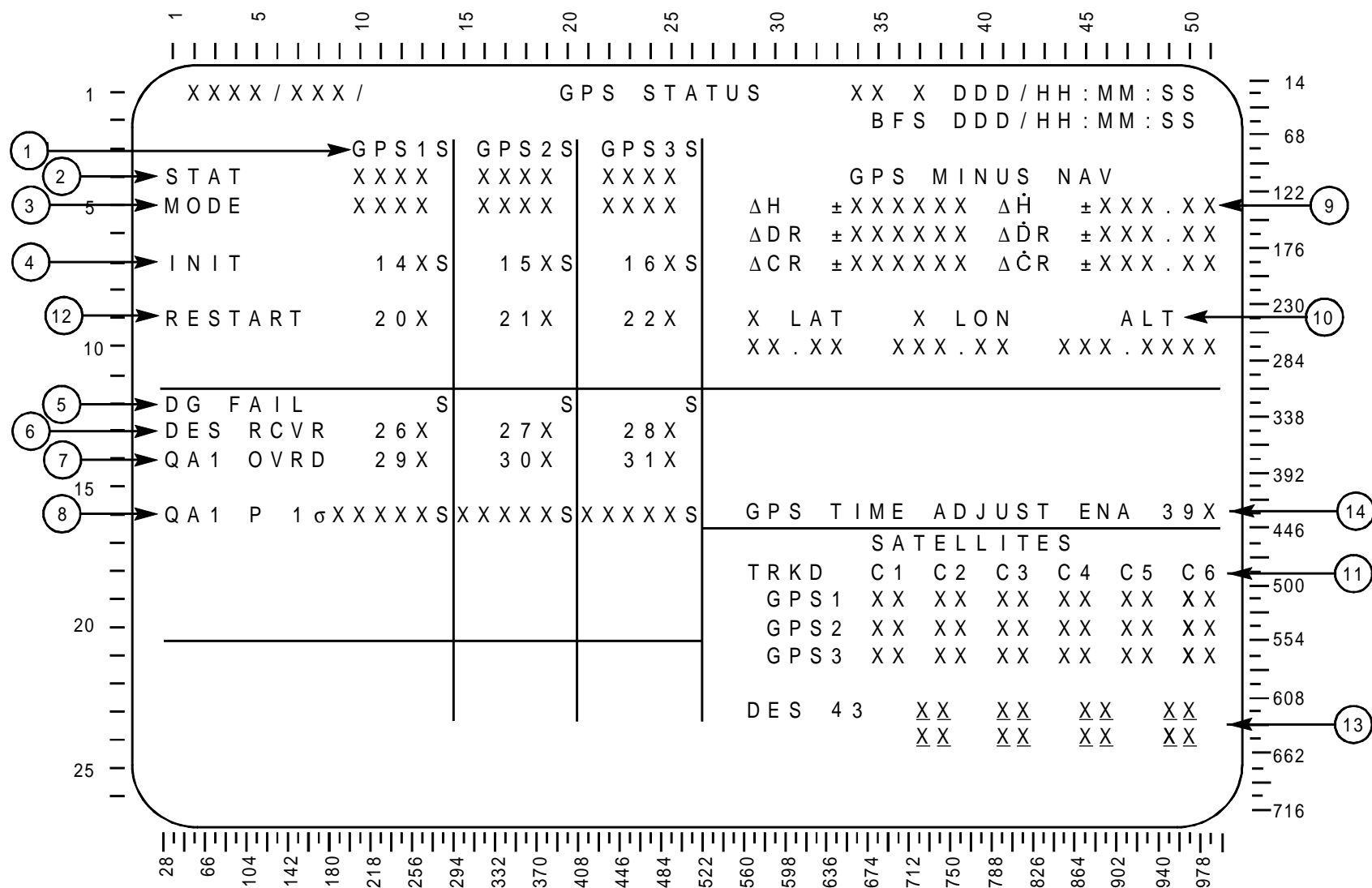


FIGURE 4.2.37-1.GPS Status Display (BFS)

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Table 4.2.37-1. GPS STATUS (BFS) KEYBOARD PROCESSING														
Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination		Nomenclature	C R T
								MIN	MAX		PFS	BFS		
001	GPS1 INIT CMD 14	V98X2919X	0.0	CTRL			14			A, B	GPS OUTPUT, NAV	GPS 1 INIT MODE CMD	X	
002	GPS2 INIT CMD 15	V98X2920X	0.0	CTRL			15			B	GPS OUTPUT, NAV	GPS 2 INIT MODE CMD	X	
003	GPS3 INIT CMD 16	V98X2921X	0.0	CTRL			16			A,B	GPS OUTPUT, NAV	GPS 3 INIT MODE CMD	X	
004	GPS1 RESTART 20	V98X7258X	0.0	CTRL			20			A, B, G	GPS OUTPUT, NAV	GPS 1 FILT RESTART CMD	X	
005	GPS2 RESTART 21	V98X7259X	0.0	CTRL			21			B, G	GPS OUTPUT, NAV	GPS 2 FILT RESTART CMD	X	
006	GPS3 RESTART 22	V98X7260X	0.0	CTRL			22			A, B, G	GPS OUTPUT, NAV	GPS 3 FILT RESTART CMD	X	
007	GPS1 DES RCVR 26	V98X0089X	0.0	CTRL		X	26			A	GPS INPUT, GPS TIME ADJ	GPS 1 DESELECT RCVR CMD	X	
008	GPS2 DES RCVR 27	V98X0623X	0.0	CTRL		X	27				GPS INPUT, GPS TIME ADJ	GPS 2 DESELECT RCVR CMD	X	
009	GPS3 DES RCVR 28	V98X0664X	0.0	CTRL		X	28			A	GPS INPUT, GPS TIME ADJ	GPS 3 DESELECT RCVR CMD	X	
010	GPS1 QA1 OVRD 29	V98X2925X	0.0	CTRL			29			A	GPS INPUT	GPS 1 QA1 OVRD CMD	X	
011	GPS2 QA1 OVRD 30	V98X2926X	0.0	CTRL			30				GPS INPUT	GPS 2 QA1 OVRD CMD	X	
012	GPS3 QA1 OVRD 31	V98X2927X	0.0	CTRL			31			A	GPS INPUT	GPS 3 QA1 OVRD CMD	X	
013	GPS TIME ADJUST ENA 39	V98X1642X	0.0	CTRL		X	39			H	GPS TIME ADJ	GPS TIME ADJUST CMD	X	
014	SAT DES 1 43	V98J7261C	3.0	DEC		X	43	-63	+63	C, D, E, F	CRT	CREW SAT DES 1 CMD	X	
015	SAT DES 2 44	V98J7262C	3.0	DEC		X	44	-63	+63	C, D, E, F	CRT	CREW SAT DES 2 CMD	X	
016	SAT DES 3 45	V98J7263C	3.0	DEC		X	45	-63	+63	C, D, E, F	CRT	CREW SAT DES 3 CMD	X	
017	SAT DES 4 46	V98J7264C	3.0	DEC		X	46	-63	+63	C, D, E, F	CRT	CREW SAT DES 4 CMD	X	
018	SAT DES 5 47	V98J7265C	3.0	DEC		X	47	-63	+63	C, D, E, F	CRT	CREW SAT DES 5 CMD	X	
019	SAT DES 6 48	V98J7266C	3.0	DEC		X	48	-63	+63	C, D, E, F	CRT	CREW SAT DES 6 CMD	X	
020	SAT DES 7 49	V98J7267C	3.0	DEC		X	49	-63	+63	C, D, E, F	CRT	CREW SAT DES 7 CMD	X	
021	SAT DES 8 50	V98J7268C	3.0	DEC		X	50	-63	+63	C, D, E, F	CRT	CREW SAT DES 8 CMD	X	

Table 4.2.37-2. GPS STATUS (BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	S	B	S	I	F	R	S	L	B	D	Add Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
001	(OPS)	V93X0040X	2	1		5.0														MI	OPS FUNCTION PAGE	X		
002	(SPEC)	V93X0042X	7	1		4.0														MI	SPEC FUNCTION PAGE	X		
003	(DISP)	V93X0044X	10	1		4.0														MI	DISPLAY FUNCTION PAGE	X		
004	(UL)	V92X5032X	34	1		2.0	UL						X							MI	UPLINK ACTIVITY IND	X		
005	(GPC)	V93X0048X	36	1		2.0														MI	GPC DRIVER	X		
006	(MT)	V91W1990C	39	1		12.0														BOS	MISSION ELAPSED TIME	X		
007	(CRT TIMER)	V91W1987C	39	2		12.0														BOS	DISPLAY CRT TIMER,GNC	X		
008	GPS1 NAV STATUS (S)	V98J2916C	14	3		1.0				X										G, M 5	NAV	GPS 1 NAVIGATION STATUS	X	
009	GPS1 STAT XXXX	V98J0088C	10	4		4.0				X	X									A, E	GPS INPUT	GPS 1 STATUS	X	
010	GPS1 MODE XXXX	V98J0090C	10	5		4.0				X										C, G	GPS INPUT	GPS 1 MODE	X	
011	GPS1 INIT CMD 14	V98X2919X	13	7		1.0	*			X										G, L	KYBD	GPS 1 INIT MODE CMD	X	
012	GPS1 INIT FAIL (S)	V98X2922X	14	7		1.0				X										G, L 3	GPS OUTPUT	GPS 1 INIT CMD RESULT	X	
013	GPS 1 RESTART 20	V98X7258X	13	9		1.0	*			X										G, Q	GPS INPUT, GPS OUTPUT, KYBD	GPS 1 FILT RESTART CMD	X	
014	GPS1 DG FAIL (S)	V98J0289C	14	12		1.0				X										D, G 3	GPS INPUT	GPS 1 DATA GOOD FAIL	X	
015	GPS1 DES RCVR 26	V98X0089X	13	13		1.0	*			X										B, G	KYBD	GPS 1 DESELECT RCVR	X	
016	GPS QA1 OVRD 29	V98X2925X	13	14		1.0	*			X										G, K	KYBD	GPS 1 QA1 OVRD CMD	X	
017	GPS1 P 1σ	V98J0091C	8	16		6.0				X										F, G	GPS INPUT	GPS 1 MAX NAV ERR	X	
018	GPS1 P 1σ (S)	V98J0092C	14	16		1.0				X										F, G 3	GPS INPUT	GPS 1 MAX NAV ERR STATUS	X	
019	GPS2 NAV STATUS (S)	V98J2917C	20	3		1.0				X										M 5	NAV	GPS 2 NAVIGATION STATUS	X	
020	GPS2 STAT XXXX	V98J0622C	16	4		4.0				X	X									A, E	GPS INPUT	GPS 2 STATUS	X	
021	GPS2 MODE XXXX	V98J0624C	16	5		4.0				X										C	GPS INPUT	GPS 2 MODE	X	
022	GPS2 INIT CMD 15	V98X2920X	19	7		1.0	*			X										L	KYBD	GPS 2 INIT MODE CMD	X	
023	GPS2 INIT FAIL (S)	V98X2923X	20	7		1.0				X										L 3	GPS OUTPUT	GPS 2 INIT CMD RESULT	X	
024	GPS2 RESTART 21	V98X7259X	19	9		1.0	*			X										Q	GPS INPUT, GPS OUTPUT, KYBD	GPS 2 FILT RESTART CMD	X	
025	GPS2 DG FAIL (S)	V98J0290C	20	12		1.0				X										D 3	GPS INPUT	GPS 2 DATA GOOD FAIL	X	

Table 4.2.37-2. GPS STATUS (BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	S	B	S	I	F	R	S	L	B	D	Add Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
026	GPS2 DES RCVR 27	V98X0623X	19	13		1.0	*													B	KYBD	GPS 2 DESELECT RCVR	X	
027	GPS2 QA1 OVRD 30	V98X2926X	19	14		1.0	*													K	KYBD	GPS 2 QA1 OVRD CMD	X	
028	GPS2 P 1σ	V98J0625C	14	16		6.0														F	GPS INPUT	GPS 2 MAX NAV ERR	X	
029	GPS2 P 1σ (S)	V98J0626C	20	16		1.0														F 3	GPS INPUT	GPS 2 MAX NAV ERR STATUS	X	
030	GPS3 NAV STATUS (S)	V98J2918C	26	3		1.0														G, M 5	NAV	GPS 3 NAVIGATION STATUS	X	
031	GPS3 STAT XXXX	V98J0662C	22	4		4.0						X								A, E	GPS INPUT	GPS 3 STATUS	X	
032	GPS3 MODE XXXX	V98J0663C	22	5		4.0														C, G	GPS INPUT	GPS 3 MODE	X	
033	GPS3 INIT CMD 16	V98X2921X	25	7		1.0	*													G, L	KYBD	GPS 3 INIT MODE CMD	X	
034	GPS3 INIT FAIL (S)	V98X2924X	26	7		1.0														G, L 3	GPS OUTPUT	GPS 3 INIT CMD RESULT	X	
035	GPS3 RESTART 22	V98X7260X	25	9		1.0	*													G, Q	GPS INPUT, GPS OUTPUT, KYBD	GPS 3 FILT RESTART CMD	X	
036	GPS3 DG FAIL (S)	V98J0291C	26	12		1.0														D, G 3	GPS INPUT	GPS 3 DATA GOOD FAIL	X	
037	GPS3 DES RCVR 28	V98X0664X	25	13		1.0	*													B, G	KYBD	GPS 3 DESELECT RCVR	X	
038	GPS3 QA1 OVRD 31	V98X2927X	25	14		1.0	*													G, K	KYBD	GPS 3 QA1 OVRD CMB	X	
039	GPS3 P 1σ	V98J0665C	20	16		6.0														F, G	GPS INPUT	GPS 3 MAX NAV ERR	X	
040	GPS3 P 1σ (S)	V98J0666C	26	16		1.0														F, G 3	GPS INPUT	GPS 3 MAX NAV ERR STATUS	X	
041	SEL GPS DELTA H	V98H2928C	33	5		7.0														J, P	NAV	SEL GPS MINUS NAV UVW U	X	
042	SEL GPS DELTA DR	V98H2929C	33	6		7.0														J, P	NAV	SEL GPS MINUS NAV UVW V	X	
043	SEL GPS DELTA CR	V98H2930C	33	7		7.0														J, P	NAV	SEL GPS MINUS NAV UVW W	X	
044	SEL GPS DELTA HDOT	V98L2931C	45	5		7.2														J, P	NAV	SEL GPS MINUS NAV UVW UDOT	X	
045	SEL GPS DELTA DRDOT	V98L2932C	45	6		7.2														J, P	NAV	SEL GPS MINUS NAV UVW VDOT	X	
046	SEL GPS DELTA CRDOT	V98L2933C	45	7		7.2														J, P	NAV	SEL GPS MINUS NAV UVW WDOT	X	
047	SEL GPS LAT DIRECTION	ADDENDUM	29	9		1.0														H, J, P	NAV	GPS SEL LATITUDE DIRECTION	X	
048	SEL GPS LON DIRECTION	ADDENDUM	37	9		1.0														I, J, P	NAV	GPS SEL LONGITUDE DIRECTION	X	
049	SEL GPS LAT	V98H2934C	28	10		6.2														J, P	NAV	GPS SEL LATITUDE	X	
050	SEL GPS LON	V98H2935C	35	10		7.2														J, P	NAV	GPS SEL LONGITUDE	X	

Table 4.2.37-2. GPS STATUS (BFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	S	B	S	I	F	R	S	L	B	D	Add Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL																	TYPE
			1	0																				
051	SEL GPS ALT	V98H2936C	43	10		7.2					X									J, P	NAV	GPS SEL ALTITUDE	X	
052	SEL GPS ALT UNITS	V98X2937X	50	10		2.0					X									J, O, P	NAV	GPS SEL ALTITUDE UNITS	X	
053	GPS TIME ADJUST ENA 39	V98X1642X	51	16		1.0	*													S	KYBD	GPS TIME ADJUST CMD		
054	GPS1 SAT TRKD C1	V98U2938C	34	19		3.0					X			A						N, G	GPS INPUT	GPS 1 SAT NO 1 TRACKED	X	
055	GPS1 SAT TRKD C2	V98U2939C	37	19		3.0					X			A						N, G	GPS INPUT	GPS 1 SAT NO 2 TRACKED	X	
056	GPS1 SAT TRKD C3	V98U2940C	40	19		3.0					X			A						N, G	GPS INPUT	GPS 1 SAT NO 3 TRACKED	X	
057	GPS1 SAT TRKD C4	V98U2941C	43	19		3.0					X			A						N, G	GPS INPUT	GPS 1 SAT NO 4 TRACKED	X	
058	GPS1 SAT TRKD C5	V98U2942C	46	19		3.0					X			A						N, G	GPS INPUT	GPS 1 SAT NO 5 TRACKED	X	
059	GPS1 SAT TRKD C6	V98U2943C	49	19		3.0					X			A						N, G	GPS INPUT	GPS 1 SAT NO 6 TRACKED	X	
060	GPS2 SAT TRKD C1	V98U2944C	34	20		3.0					X			A						N	GPS INPUT	GPS 2 SAT NO 1 TRACKED	X	
061	GPS2 SAT TRKD C2	V98U2945C	37	20		3.0					X			A						N	GPS INPUT	GPS 2 SAT NO 2 TRACKED	X	
062	GPS2 SAT TRKD C3	V98U2946C	40	20		3.0					X			A						N	GPS INPUT	GPS 2 SAT NO 3 TRACKED	X	
063	GPS2 SAT TRKD C4	V98U2947C	43	20		3.0					X			A						N	GPS INPUT	GPS 2 SAT NO 4 TRACKED	X	
064	GPS2 SAT TRKD C5	V98U2948C	46	20		3.0					X			A						N	GPS INPUT	GPS 2 SAT NO 5 TRACKED	X	
065	GPS2 SAT TRKD C6	V98U2949C	49	20		3.0					X			A						N	GPS INPUT	GPS 2 SAT NO 6 TRACKED	X	
066	GPS3 SAT TRKD C1	V98U2950C	34	21		3.0					X			A						N, G	GPS INPUT	GPS 3 SAT NO 1 TRACKED	X	
067	GPS3 SAT TRKD C2	V98U2951C	37	21		3.0					X			A						N, G	GPS INPUT	GPS 3 SAT NO 2 TRACKED	X	
068	GPS3 SAT TRKD C3	V98U2952C	40	21		3.0					X			A						N, G	GPS INPUT	GPS 3 SAT NO 3 TRACKED	X	
069	GPS3 SAT TRKD C4	V98U2953C	43	21		3.0					X			A						N, G	GPS INPUT	GPS 3 SAT NO 4 TRACKED	X	
070	GPS3 SAT TRKD C5	V98U2954C	46	21		3.0					X			A						N, G	GPS INPUT	GPS 3 SAT NO 5 TRACKED	X	
071	GPS3 SAT TRKD C6	V98U2955C	49	21		3.0					X			A						N, G	GPS INPUT	GPS 3 SAT NO 6 TRACKED	X	
072	SAT DES 1 43	V98J7261C	36	23		3.0					X			E						R	KYBD	CREW SAT DES 1 CMD	X	
073	SAT DES 2 44	V98J7262C	40	23		3.0					X			E						R	KYBD	CREW SAT DES 2 CMD	X	
074	SAT DES 3 45	V98J7263C	44	23		3.0					X			E						R	KYBD	CREW SAT DES 3 CMD	X	
075	SAT DES 4 46	V98J7264C	48	23		3.0					X			E						R	KYBD	CREW SAT DES 4 CMD	X	
076	SAT DES 5 47	V98J7265C	36	24		3.0					X			E						R	KYBD	CREW SAT DES 5 CMD	X	
077	SAT DES 6 48	V98J7266C	40	24		3.0					X			E						R	KYBD	CREW SAT DES 6 CMD	X	
078	SAT DES 7 49	V98J7267C	44	24		3.0					X			E						R	KYBD	CREW SAT DES 7 CMD	X	
079	SAT DES 8 50	V98J7268C	48	24		3.0					X			E						R	KYBD	CREW SAT DES 8 CMD	X	
080	(MSG LINE)	V93X0050X	2	25		46.0								G							MI	MESSAGE LINE	X	
081	(BUFFER MSG)	V93X0054X	48	25		4.0								G							MI	BUFFER MESSAGE INDICATOR	X	
082	(SPL)	V93X0056X	2	26		49.0								G							MI	SCRATCH PAD LINE	X	
083	(BFS)	V98X0015X	35	2		3.0						X		G							MI	BFS IDENTIFIER BFS	X	

TABLE 4.2.37-7. BFS GPS STATUS DISPLAY (4.2.37) I-LOADS

BFS NAME	MSID	ENG UNITS	DT	PR	D	S	PARA	MC	CAT	LAST CR	R E V
----------	------	-----------	----	----	---	---	------	----	-----	---------	-------------

NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.37-8. BFS GPS STATUS DISPLAY (4.2.37) K-LOADS

BFS NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PARA	LAST CR	R E V
-------------------------	------	----	-------------	-----------	----	--------	---	------	---------	-------------

NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

Table 4.2.37-10. GPS Status Display I-Load Derived Parameters				
FSSR Name	MSID	ENG Units	Data Type	Precision
NUM_GPS_INSTALLED	I90U0669C	Non-Dimensional	Integer	Single

4.2.38 XXXXXX TRAJ 1 (PFS)

TITLE: XXXXXX TRAJ 1 - The title of this display is partially dynamic to indicate the major mode and abort mode in which the display is presented. The XXXXXX is driven LAUNCH for MM101. For MM102, it is driven ASCENT except when an abort mode has been selected. When an abort mode is selected, it reflects the abort mode (ATO or RTLS).

TYPE: OPS/1011, 1021

AVAILABILITY: PFS, OPS 1

4.2.38.1 Purpose, Operation, and Organization

The XXXXXX TRAJ 1 display provides the trajectory information following the SSME start command. The display comes up automatically at MM101 transition and is available throughout MM101 and MM102. This display also provides the crew with the capability to monitor the automated contingency abort mode processing for two and three main engine out failure scenarios and manual control to invoke the two-engine-out contingency abort. Display of the snapshot inertial velocities at the time of the first and second SSME failure is provided. In addition, it also allows the crew to manually initiate or terminate single engine roll control, to enable or inhibit contingency yaw steering, as well as to enable Droop Guidance for scenarios with one SSME out. When a second main engine failure is confirmed, the crew will not be able to terminate single engine roll control due to ASC DAP (4.176) and ABT CNTL SEQ (4.192) requirements, even though this item entry will be accepted on the display. The display will be up as LAUNCH TRAJ 1 during OPS 1 prior to liftoff and as ASCENT TRAJ 1 until MM103, when it will be replaced by ASCENT TRAJ 2 unless an abort mode is selected. The display will be changed to an appropriate display upon transition to the abort mode. The display format is presented in Figure 4.2.38-1.

- (1) The central plot (curved line) is a plot of velocity relative to the launch site (VR) vs. altitude (H) from the mission trajectory, active in MM102. Tick marks on the curved line correspond to LVLH pitch angles of 70, 60, 50, and 40 degrees. The current vehicle state from navigation is shown by a moving, double overbright, and large up-pointing triangle. The predicted state for 20 seconds in the future is indicated by a double overbright circle.
- (2) "PC < 50" (SRB chamber pressure less than 50 psi) is displayed double overbright and flashing whenever that discrete is set by the SRB SEP Sequencer.
- (3) A digital readout of percent commanded throttle level (%) (THROT XXX) to the engines (K_CMD) (V90U1948C) shall be displayed. This field shall be blanked in MM 101.
- (4) "SRB SEP INH" shall be displayed, double overbright and flashing, in the XXXXXXXXXXXX position if the SRB AUTO SEP INHIBIT CREW ALERT discrete (V90U8340X) is set by the

SRB SEP sequencer. "ET SEP INH" shall be displayed, double overbright, in the upper XXXXXXXXXXXX position if the ET AUTO SEP INHIBIT CREW ALERT discrete (V90X8259X) is set by the ET SEP sequencer. "ET SEP MAN" shall be displayed, double overbright, in the lower XXXXXXXXXXXX position if the SEL ET SEP MNL ENABLE discrete (V90X7556X) is set by GN&C Switch RM.

- (5) The following information and crew item entry controls shall be provided to support the automated contingency abort processing which is a function of the main engine(s) failure scenario.
- a. For the three-engine-out contingency abort mode (3EO), a character field shall display a color word describing the contingency abort mode region. The character string shall be initialized to "BLUE" at normal intensity upon transition to MM 101. The color word shall be displayed cyclically, but there shall be two different ways of determining how the 3EO color word will be displayed.

The first way shall be when the ENA_CONT_3EO_GUID flag (an I-Load) is set ON. This flag enables contingency 3EO guidance which calculates a region index (CONT_3EO_REGION) which shall determine the appropriate color to display for automatic contingency 3EO maneuvers. Based on this index, the color to be displayed shall be (BLANK), BLUE, or GREEN.

When ENA_CONT_3EO_GUID = ON, the function of contingency 3EO guidance shall normally only be to compute the current value of the 3EO region index. If three SSME's fail requiring a contingency abort (CONT_3EO_START = ON), the 3EO color word field (3EO XXXXXX) shall be displayed double overbright to indicate the automatic maneuver is actually being performed. When CONT_3EO_START = ON, the 2EO color word field (2EO XXXXXX, see (5b) and (5c) below) shall become static. The intensity of the 2EO color word field shall also become static.

The second way of displaying the 3EO color word shall be when the ENA_CONT_3EO_GUID flag is set to OFF. This will only occur if it has been determined pre-flight to disable the automatic 3EO maneuver logic. In this case, the crew will have to perform manual 3EO procedures. These procedures are different than the automatic maneuvers and the index that determines the 3EO color word is also different for this case. If ENA_CONT_3EO_GUID = OFF, the 3EO color field shall be based on the CONT_3EO_MODE index computed by Powered Contingency Guidance. The displayed color word shall be (BLANK), BLUE, or GREEN.

When ENA_CONT_3EO_GUID = OFF, the 3EO color word shall be displayed at normal intensity.

- b. For the two-engine-out contingency abort mode (2EO), a character field shall display a color word describing the contingency abort mode region. The color word to be displayed cyclically shall be based on the current value of CONT_2EO_MODE to display (BLANK), BLUE or GREEN.
- c. Item 2 (ARM) allows the crew to toggle the abort "ARM" on or off for the contingency abort processing. Item 2 shall be initialized in MM101 to off and thereafter reflect crew input until an abort is initiated. Arming the selected abort mode shall be indicated by

displaying an asterisk to the right of item 2 and making the two-engine-out contingency abort mode region color word (2EO XXXXXX) field double overbright. When item 2 execution results in setting the “ARM” to off, the two-engine-out contingency abort mode region color word (2EO XXXXXX) shall be displayed at normal intensity and the asterisk next to item 2 blanked.

Item 2 (ARM) shall be legal only in MM102 for this display. Execution in MM101 shall be treated as an operator error, input rejected and the “ILLEGAL ENTRY” CRT message output.

If item 2 is executed when the CONT_2EO_MODE is equal to zero (2EO color word is BLANK), the input shall be rejected and an “ILLEGAL ENTRY” CRT message output.

- d. Item 4 (ABORT) allows the crew to invoke the automated contingency abort guidance when armed via item 2. An asterisk shall appear to the right of item 4 when it is successfully executed by the crew, otherwise it shall remain blank. Item 4 shall be initialized to blank in MM 101.

For the item 4 EXEC to be legal, item 2 must have been executed and CONT_2EO_ARM must have been set on. If item 4 EXEC is performed and CONT_2EO_ARM = OFF, an “ILLEGAL ENTRY” message shall be displayed and the input rejected as an operator error.

If item 4 EXEC is performed and CONT_2EO_ARM = ON, then CONT_2EO_START shall be set on and CONT_SERC shall be set to on. Also PRPLT_DUMP_ARM and PRPLT_DUMP_START shall both be set on, and PRPLT_DUMP_STOP shall be set off. In addition the ORBITER_DUMP_ENA shall be set on and the ORBITER_DUMP_INH shall be set off. An asterisk shall be displayed next to item 4 indicating the abort mode has been invoked. The two-engine-out contingency abort mode region color word shall become static and remain double overbright.

The three-engine-out contingency abort mode region color word character string shall continue to update cyclically when CONT_2EO_START is set to ON and ENA_CONT_3EO_GUID = ON. The three-engine-out contingency abort mode region color word character string shall become static when CONT_2EO_START is set to ON and ENA_CONT_3EO_GUID = OFF.

Once item 2 and item 4 have been correctly executed, any further attempt to execute item 2 or 4 shall result in an “ILLEGAL ENTRY” message and the input shall be rejected as an operator error.

- (6) Item 5 (YAW STEER) shall provide status of the Yaw Steering configuration by displaying the character string “ENA” or “INH” to the right of the item number. This item allows the crew to toggle the yaw steering configuration. This item shall be initialized in MM 101 to “ENA” and updated cyclically based on CONT_YAW_ENA changes.

Each execution of item 5 shall cause the discrete CONT_YAW_ENA to toggle on or off to enable/inhibit the yaw steering capability. Item 5 shall be legal in MM 101 and MM 102 for this display.

Once item 2 and item 4 have been correctly executed, any further attempt to execute item 5 shall result in an "ILLEGAL ENTRY" message and the input shall be rejected as an operator error.

- (7) Item 6 (SERC) provides the capability to toggle the "SINGLE ENGINE ROLL CONTROL" configuration. An asterisk shall be displayed after the item number based on CONT_SERC = ON. If CONT_SERC = OFF, the asterisk shall be blanked. Each execution of the item 6 control shall cause the discrete CONT_SERC to toggle on or off. Item 6 shall be illegal until transition to MM 102, and the asterisk shall be initialized blank, i.e., CONT_SERC = OFF.

The character string "ON" shall be displayed double overbright to the right of "SERC" when the discrete ENA_RCS_CNTL = ON. Otherwise the character string shall be blanked.

- (8) The inertial velocity in feet per second at the time the first main engine failure is confirmed shall be displayed. Both the nomenclature character string and data field shall be initialized blank in MM 101. They shall remain blank until one or more of the three main engine fail shutdown discrettes is set on by SSME OPS at which time the V_INERTIAL_MAG is snapshot for display and TLM as the FIRST_EO_VI. The character string "1ST EO VI" and FIRST_EO_VI value shall be displayed continuously.
- (9) The inertial velocity in feet per second at the time the second main engine failure is confirmed shall be displayed. Both the double overbright nomenclature character string and data field shall be initialized blank in MM 101. They shall remain blank until the second SSME failure is recognized by ASC_RECON via SSME failure shutdown discrettes, at which time the V_INERTIAL_MAG is snapshot for display and TLM as the SECOND_EO_VI. The character string "2ND EO VI" and SECOND_EO_VI value shall be displayed continuously in double overbright.
- (10) Item 7 (DROOP 1EO) provides capability to enable Droop Guidance with one SSME out. The character string "INH" shall be displayed if DRP_ENA = OFF. The character string "ENA" shall be displayed if DRP_ENA = ON.

Each execution of item 7 (DROOP 1EO) shall cause the discrete DRP_ENA to toggle INH or ENA. This item 7 (DROOP 1EO) shall be initialized in MM 101 to INH. Once two engines have failed (SSME_FAILS > 3), the INH/ENA field shall be blanked and any further attempt to execute item 7 shall result in an "ILLEGAL ENTRY" message and the input shall be rejected as an operator error.

- (11) The only functional item entries on this display are 2, 4, 5, 6 and 7. Execution of any other item number shall result in an operator error and output the "ILLEGAL ENTRY" CRT message.

4.2.38.2 XXXXXX TRAJ 1 (PFS) Keyboard Processing Addendum.

- A. Execution of item 2 (ARM) shall be legal in MM 102 only for this display. Execution in any other major modes shall be treated as an operator error with inputs rejected and the "ILLEGAL ENTRY" CRT message being output.

CONT_2EO_ARM(V93X6680X) shall be initialized to OFF.

CONT_2EO_START(V93X6681X) shall be initialized to OFF.

Item 2 shall be a toggle function. Each execution of item 2 shall toggle the CONT_2EO_ARM(V93X6680X) discrete and send it to PW CONT GUID (4.5), TLM, and CRT (6.52, 6.53, and 6.54).

Upon execution of item 2 when CONT_2EO_MODE(V90J2077C) = 0 (ZERO) then an "ILLEGAL ENTRY" message shall be displayed and the input shall be rejected as an operator error.

Upon execution of item 4 when CONT_2EO_ARM(V93X6680X) = OFF then an "ILLEGAL ENTRY" message shall be displayed and the input shall be rejected as an operator error.

Upon execution of item 4 when CONT_2EO_ARM(V93X6680X) = ON the following functions shall be performed:

IF CONT_2EO_ARM(V93X6680X) = ON
THEN SET CONT_2EO_START(V93X6681X) = ON
Destinations for the CONT_2EO_ARM(V93X6680X) are PW CONT GUID (4.5), TLM, and CRT (6.52, 6.53, and 6.54). Destinations for the CONT_2EO_START(V93X6681X) are GRTLS DAP (4.227), PW CONT GUID (4.5), MSC, TLM, HORIZ SIT DISP (6.21), HORIZ SIT SPEC FUNCTION (5.7), A/E ATT PROC (4.226) and CRT (6.52, 6.53, and 6.54).

AND SET CONT_SERC(V93X6682X) = ON
Destinations are ASC DAP (4.176), ABT CNTL SEQ (4.192), TLM, MSC, ASC 2STG GUID (4.2), CRT (6.52, 6.53, and 6.54) and GC STEER (4.175).

AND SET PRPLT_DUMP_ARM(V93X5350X) = ON
SET PRPLT_DUMP_START(V93X5351X) = ON
SET PRPLT_DUMP_STOP(V93X5352X) = OFF
Destinations for all three are OVERRIDE SPEC FUNCTION (5.21) and OVERRIDE DISPLAY (6.47).

AND SET ORBITER_DUMP_ENA(V93X6980X) = ON
SET ORBITER_DUMP_INH(V93X6981X) = OFF
Destinations for ORBITER_DUMP_ENA(V93X6980X) are ABT CNTL SEQ (4.192) and OVERRIDE SPEC FUNCTION (5.21).
Destination for ORBITER_DUMP_INH(V93X6981X) is ABT CNTL SEQ (4.192).

IF CONT_2EO_START(V93X6681X) = ON
THEN execution of items 2 and 4 shall become illegal and if executed an "ILLEGAL ENTRY" message shall be displayed and the input shall be rejected as an operator error.

B. Execution of item 5 (YAW STEER) shall be legal in MM 101 and MM 102 for this display.

Item 5 shall be a toggle function. Each execution of item 5 shall cause the discrete CONT_YAW_ENA(V93X6600X) to toggle on or off to enable/inhibit the yaw steering capability.

IF CONT_2EO_START(V93X6681X) = ON
THEN execution of item 5 shall become illegal and if executed an "ILLEGAL ENTRY" message shall be displayed and the input shall be rejected as an operator error.

CONT_YAW_ENA (V93X6600X) flag shall be initialized to ON.

Destinations for CONT_YAW_ENA(V93X6600X) are PW CONT GUID (4.5), TLM, and CRT (6.52, 6.53, and 6.54).

- C. Execution of item 6 (SERC) shall be illegal prior to MM 102 and its execution shall result in an “ILLEGAL ENTRY” CRT message with the input rejected as an operator error.

Item 6 shall be a toggle function. Each execution of item 6 shall cause the discrete CONT_SERC(V93X6682X) to toggle on or off to control the single engine roll control capability.

CONT_SERC(V93X6682X) shall be initialized to OFF.

Destinations for CONT_SERC(V93X6682X) are ASC DAP (4.176), ABT CNTL SEQ (4.192), TLM, ASC 2STG GUID (4.2), MSC, CRT (6.52, 6.53, and 6.54) and GC STEER (4.175).

- D. Execution of item 7 (DROOP 1EO) shall be legal in MM 101 and MM 102 for this display.

The flag DRP_ENA(V93X2932X) shall be initialized to OFF (INH).

Item 7 shall be a toggle function. Each execution of item 7 shall cause the discrete DRP_ENA(V93X2932X) to toggle INH or ENA.

Once two engines have failed ($SSME_FAILS(V90J1763C) > 3$), the INH/ENA field shall be blanked and any further attempt to execute item 7 shall result in an “ILLEGAL ENTRY” message and the input shall be rejected as an operator error.

Destinations for DRP_ENA(V93X2932X) are ASC 2STG GUID (4.2), TLM, and CRT (6.52 and 6.53).

4.2.38.3 XXXXXX TRAJ 1 (PFS) CRT Display Processing Addendum.

All necessary processing for dynamic symbols on this display is defined in the Appendix B.4.160 (XXXXXX TRAJ DIP) of this FSSR.

- A. Chamber Pressure. When the LH/RH SRB PC 50 PSI FLAG discrete (V90X8332X) is set ON by the SRB SEP SEQ (4.115), a character string “PC < 50” is displayed double overbright and flashing (only in MM 102).
- B. SRB SEP Inhibit Flag. When the SRB AUTO SEP INHIBIT CREW ALERT discrete (V90X8340X) (in MM 102) is set ON by the SRB sequencer, a character string “SRB SEP INH” will be displayed double overbright and flashing.
- C. Dynamic Display Title. The thirteen character title of this display is defined by the integer value of Display Title ID (V94J3910C) as follows:

Value	Title
1	“LAUNCH TRAJ 1”
2	“ASCENT TRAJ 1”
3	“ RTLS TRAJ 1”
5	“ ATO TRAJ 1”

- D. Vehicle Predicted Position. Display a circle with a radius of 5 AUs double overbright at the location specified by dynamic data. Display location shall be initialized to X = 400 AUs, Y = 400 AUs (off-screen).
- E. Vehicle Current Position. Display the up-pointing triangle (symbol, 7F) double overbright at the location specified by dynamic data. Display location shall be initialized to X = 400 AUs, Y = 400 AUs (off-screen).
- F. ET SEP Inhibit Flag. When the ET AUTO SEP INHIBIT CREW ALERT discrete (V90X8259X) is set ON by the ET SEP sequencer, “ET SEP INH” will be displayed double overbright.
- G. ET SEP Manual Flag. When the SEL ET SEP MNL ENABLE discrete (V90X7556X) is set ON by GN&C Switch RM, “ET SEP MAN” will be displayed double overbright.
- H. Throttle Setting. This field shall be blanked in MM 101. Sources for K_CMD (V90U1948C) are ASC 1STG GUID (4.1) and SBTC SOP (4.55).
- I. 3EO Abort Region Color Word Character String. The 3EO contingency abort region color word character string shall be initialized to “BLUE” at normal intensity upon transition to MM 101. The MSID for ENA_CONT_3EO_GUID is V97U8599C. The MSID for CONT_3EO_START is V90X0909X.

When ENA_CONT_3EO_GUID = ON, the logic is as follows:

CONT_3EO_REGION (V90J0108C)	Character String To Be Displayed
-1	BLUE
102	BLUE
1	GREEN
0	(BLANK)

If CONT_3EO_START = OFF, the 3EO contingency abort color word character string shall be displayed at normal intensity and continue to be updated cyclically.

If CONT_3EO_START = ON, the 3EO contingency abort color word character string shall be displayed double overbright and continue to be updated cyclically. When CONT_3EO_START = ON, the 2EO color word field shall become static. The intensity of the 2EO color word field shall also become static.

Source for CONT_3EO_REGION and CONT_3EO_START is CONT 3EO GUID (4.6).

When ENA_CONT_3EO_GUID = OFF, the logic is as follows:

Value of CONT_3EO_MODE (V90J2088C)	Character String To Be Displayed
1	BLUE
2	GREEN
0	(BLANK)

When ENA_CONT_3EO_GUID = OFF, the 3EO contingency abort color word character string shall be displayed at normal intensity and continue to be updated cyclically.

Source for CONT_3EO_MODE(V90J2088C) is PW CONT GUID (4.5).

When ENA_CONT_3EO_GUID = OFF, the following shall apply:

IF CONT_2EO_ARM(V93X6680X) = ON
 AND CONT_2EO_START(V93X6681X) = ON
 THEN the 3EO contingency abort region color word character string shall become static, i.e., no longer cyclically updated.

Source for CONT_2EO_ARM(V93X6680X) and CONT_2EO_START(V93X6681X) is KEYBOARD (6.52).

- J. 2EO Contingency Abort Region Color Word Character String and Item 2 (ARM) and Item 4 (ABORT) Indicators. The 2EO contingency abort region color word character string shall be initialized to “BLUE” at normal intensity upon transition to MM 101.

The character string to be displayed thereafter shall be displayed at normal intensity and determined from the logic in the following table:

Value of CONT_2EO_MODE (V90J2077C)	Character String To Be Displayed
0	(BLANK)
1	BLUE
2	GREEN

Source of CONT_2EO_MODE(V90J2077C) is PW CONT GUID (4.5).

IF CONT_2EO_ARM (V93X6680X) = ON
 THEN the 2EO contingency abort mode region color word character string shall be displayed double overbright.
 AND an Asterisk shall be displayed next to item 2.

IF CONT_2EO_ARM(V93X6680X) = ON
AND CONT_2EO_START(V93X6681X) = ON
THEN the 2EO contingency abort region color word character string shall become static,
i.e., no longer cyclically updated, and shall remain double overbright.
AND an Asterisk shall be displayed next to item 4.

IF CONT_2EO_ARM(V93X6680X) = OFF
THEN the 2EO contingency abort mode region color word character string shall be
displayed at normal intensity.
AND the Asterisk shall be blanked next to item 2.

Source for CONT_2EO_ARM(V93X6680X) and CONT_2EO_START(V93X6681X) is
KEYBOARD (6.52).

K. ARM and ABORT Items Initialization. Item 2 (ARM) and item 4 (ABORT) shall be initialized
OFF (blank) in MM 101, i.e., no asterisk displayed by either item number.

L. YAW STEER Item Initialization. Item 5 (YAW STEER) shall be initialized in MM 101 to
“ENA”.

M. SERC Item Initialization. Item 6 (SERC) shall be initialized OFF (blank) in MM 101, i.e., no
asterisk displayed by the item number. Sources for CONT_SERC (V93X6682X) are ASC
DAP (4.176) and Keyboard (6.52).

N. SERC Status. The single engine roll status character string shall be initialized OFF (blank).

IF ENA_RCS_CNTL(V90X1739X) = ON
THEN the status character string “ON” shall be displayed double overbright, otherwise this
field shall be blanked.

O. First Inertial Velocity Nomenclature Character String and Data. The nomenclature character
string field and inertial velocity data field shall be initialized blank in MM 101.

IF IN MM 102

AND (ME1_FAIL_SHUTDOWN(V95X1207X) = ON
OR ME2_FAIL_SHUTDOWN(V95X1208X) = ON
OR ME3_FAIL_SHUTDOWN(V95X1209X) = ON)
THEN display the nomenclature character string “1ST EO VI”
AND SET FIRST_EO_VI(V90L0480C) = V_INERTIAL_MAG(V95L0510C)
(one time snapshot) for display and TLM.

The nomenclature character string and FIRST_EO_VI value shall continue to be displayed.

Source for ME1_FAIL_SHUTDOWN(V95X1207X), ME2_FAIL_SHUTDOWN
(V95X1208X) and ME3_FAIL_SHUTDOWN(V95X1209X) is SSME OPS (4.165).

Source for V_INERTIAL_MAG(V95L0510C) is ASC UPP (4.19).

P. Second Inertial Velocity Nomenclature Character String and Data. The nomenclature character
string field and inertial velocity data field shall be initialized blank in MM 101.

IF IN MM 102 AND

(SSME_FAILS (V90J1763C) > 3 AND SSME_FAILS (V90J1763C) < 7))

THEN display the nomenclature character string “2ND EO VI” at double overbright intensity AND SET SECOND_EO_VI (V90L3820C) = V_INERTIAL_MAG(V95L0510C) (one time snapshot) for display (at double overbright intensity) and TLM.

The nomenclature character string and SECOND_EO_VI value shall continue to be displayed in double overbright.

Source for SSME_FAILS (V90J1763C) is ASC DAP (4.176).

Source for V_INERTIAL_MAG (V95L0510C) is ASC UPP (4.19).

- Q. Item 7 (DROOP 1EO) Indicator. The character string “INH” shall be displayed if DRP_ENA (V93X2932X) = OFF. The character string “ENA” shall be displayed if DRP_ENA (V93X2932X) = ON. The character string ENA/INH shall be blanked if two SSMEs have failed (SSME_FAILS (V90J1763C) > 3).

- R. DROOP Item Initialization. Item 7 (DROOP 1EO), shall be initialized OFF (INH) in MM 101.

4.2.38.4 XXXXXX TRAJ 1 Figure/Table References

Figure 4.2.38-1	XXXXXXX TRAJ 1 Display (PFS) Generic
Table 4.2.38-1	Keyboard Processing Table
Table 4.2.38-2	CRT Display Processing Table
Table 4.2.38-3	CRT Display Processing Background Requirements N/A
Table 4.2.38-4	Mission Design Background Constants N/A
Table 4.2.38-5	Input Functional Parameters
Table 4.2.38-6	Output Functional Parameters
Table 4.2.38-7	I-Loads
Table 4.2.38-8	K-Loads
Table 4.2.38-9	Constants

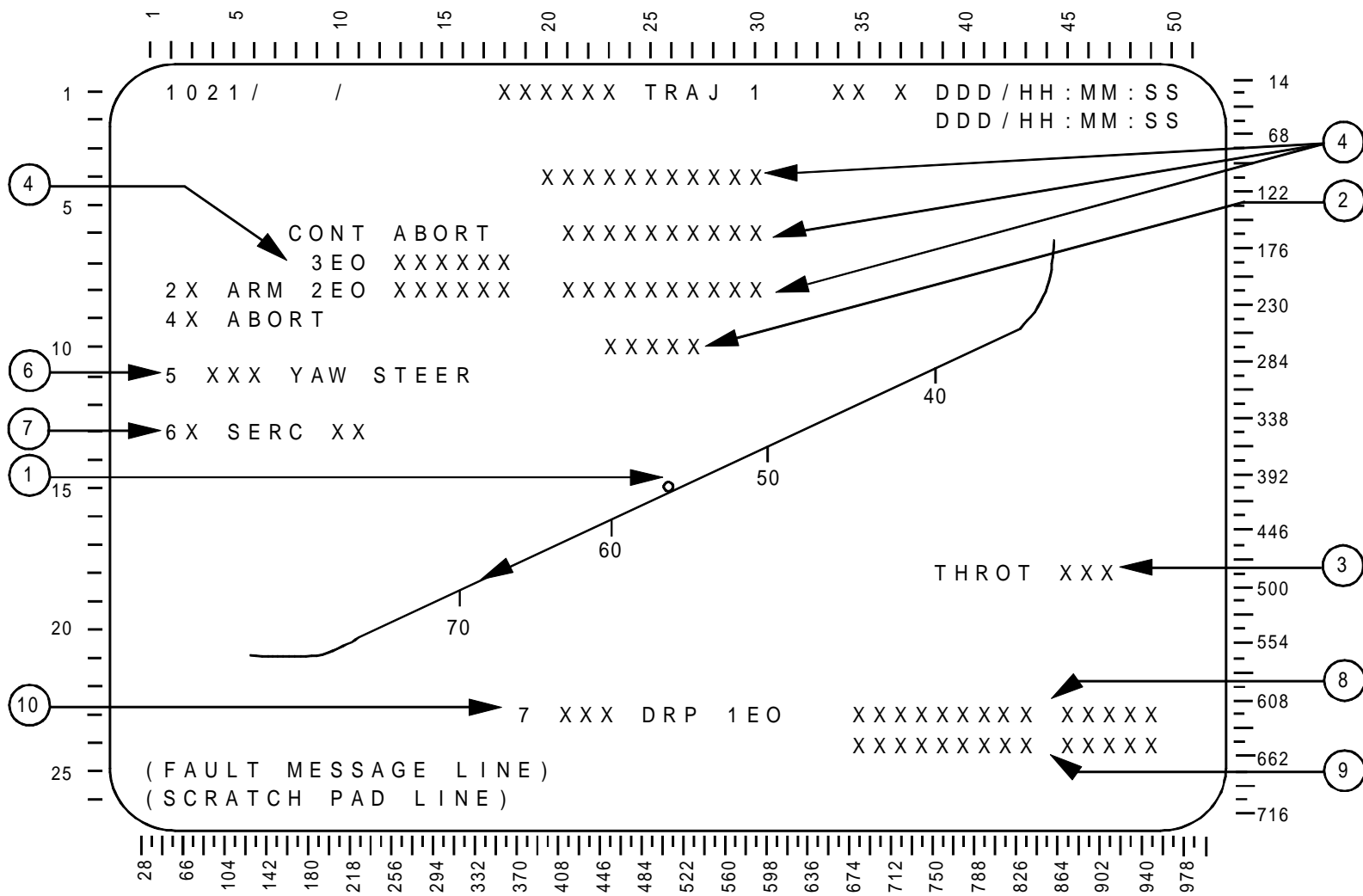


FIGURE 4.2.38-1.XXXXXX TRAJ 1 Display (PFS) Generic

Table 4.2.38-1. XXXXXX TRAJ 1 (PFS) KEYBOARD PROCESSING													
Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D I K E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T	
							MIN	MAX					
001	2X ARM	V93X6680X	0.0	CTRL			2		A	ADDENDUM	CONTINGENCY 2-ENG OUT ARM FLAG		
002	4X ABORT	V93X6681X	0.0	CTRL			4		A	ADDENDUM	CONTINGENCY 2-ENG OUT START FLAG		
003	5 XXX YAW STEER	V93X6600X	0.0	CTRL			5		B	ADDENDUM	CONTINGENCY YAW ENABLE FLAG		
004	6X SERC	V93X6682X	0.0	CTRL			6		C	ADDENDUM	CONT SINGLE ENG ROLL CNTL FLAG		
005	7 XXX DRP 1EO	V93X2932X	0.0	CTRL			7		D	ADDENDUM	DROOP GUIDANCE ENABLE FLAG		

Table 4.2.38-2. XXXXXX TRAJ 1 (PFS) CRT DISPLAY PROCESSING																								
Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E N S	I N T E R S	F L A S H	R A T E	S I G N E R	L E A D E R H	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
001	(OPS)	V93X0040X	2	1		5.0															UI	OPS FUNCTION PAGE	X	
002	(SPEC)	V93X0042X	7	1		4.0															UI	SPEC FUNCTION PAGE	X	
003	(DISP)	V93X0044X	11	1		4.0															UI	DISPLAY FUNCTION PAGE	X	
004	(TITLE)	V94J3910C	18	1		13.0														C	XXXXXX TRAJ DIP	ASC DISPLAY DYNAMIC TITLE INTEGER	X	
005	(UL)	V92X5032X	34	1		2.0	UL							X	E						UI	UPLINK ACTIVITY IND	X	
006	(GPC)	V93X0048X	36	1		2.0									B						UI	GPC DRIVER	X	
007	(MT)	V91W1990C	39	1		12.0									A						FCOS	MISSION ELAPSED TIME	X	
008	(CRT TIMER)	V91W1987C	39	2		12.0									A						FCOS	DISPLAY CRT TIMER,GNC	X	
009	XXXXX (PC < 50)	V90X8332X	23	10		5.0							X	X	A					A	SRB SEP	LH/RH SRB PC 50 PSI FLAG	X	
010	THROT XXX	V90U1948C	44	18		4.0									A					H	ADDENDUM	COMMANDED SSME THROTTLE SETTING	X	
011	XXXXXXXXXXXX (SRB SEP INH)	V90X8340X	20	4		11.0	SRB SEP INH						X	X						B	SRB SEP	SRB AUTO SEP INHIBIT CREW ALERT	X	

Table 4.2.38-2. XXXXXX TRAJ 1 (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S I T Y	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
012	XXXXXXXXXX (ET SEP INH)	V90X8259X	21	6		10.0	ET SEP INH						X							F	ET SEP	ET AUTO SEP INHIBIT CREW ALERT		
013	XXXXXXXXXX (ET SEP MAN)	V90X7556X	21	8		10.0	ET SEP MAN						X							G	GN&C SW RM	SEL ET SEP MNL ENABLE		
014	(CUR VEH X POS)	V94U1282C										X	X		A					E	XXXXXX TRAJ DIP	ASC TRAJ 1 ALT/VEL X COORD	X	
015	(CUR VEH Y POS)	V94U1283C										X	X		A					E	XXXXXX TRAJ DIP	ASC TRAJ 1 ALT/VEL Y COORD	X	
016	(PRED VEH X POS)	V94U1280C											X		A					D	XXXXXX TRAJ DIP	ASC TRAJ 1 ALT/VEL PRED X COORD	X	
017	(PRED VEH Y POS)	V94U1281C											X		A					D	XXXXXX TRAJ DIP	ASC TRAJ 1 ALT/VEL PRED Y COORD	X	
018	3 EO XXXXXX	ADDENDUM	13	7		6.0					X		X		A				I	ADDENDUM	3 ENG OUT ABORT COLOR CHAR STRING			
019	2 EO XXXXXX	ADDENDUM	13	8		6.0					X		X		A				J	ADDENDUM	2 ENG OUT ABORT COLOR CHAR STRING			
020	2X RM	V93X6680X	3	8		1.0					X				A			X	J,K	ADDENDUM	CONTINGENCY 2-ENG OUT ARM FLAG			
021	4X ABORT	V93X6681X	3	9		1.0					X				A			X	J,K	ADDENDUM	CONTINGENCY 2-ENG OUT START FLAG			
022	5 XXX YAW STEER	V93X6600X	4	11		3.0	ENA	INH							A			X	L	KYBD	CONTINGENCY YAW ENABLE FLAG			
023	6X SERC	V93X6682X	3	13		1.0	*				X				A			X	M	KYBD, ASC DAP	CONT SINGLE ENG ROLL, CNTL FLAG			
024	SERC XX	V90X1739X	10	13		2.0	ON				X		X		A			X	N	ASC DAP	ENABLE RCS CONTROL DISCRETE			
025	XXXXXXXXXX (1ST EO VI)	ADDENDUM	35	23		9.0					X				A				O	ADDENDUM	FIRST EO VI NOMENCLATURE CHAR STRING			
026	XXXXXX (FIRST EO VI)	V90L0480C	44	23		6.0									A			X	O	ADDENDUM	FIRST ENG OUT INERTIAL VELOCITY			
027	XXXXXXXXXX (2ND EO VI)	ADDENDUM	35	24		9.0					X		X		A				P	ADDENDUM	SECOND EO VI NOMENCLATURE CHAR STRING			

Table 4.2.38-2. XXXXXX TRAJ 1 (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
028	XXXXX (SECOND EO VI)	V90L3820C	44	24		6.0			DEC	FPS										X	P	ADDENDUM	SECOND ENG OUT INERTIAL VELOCITY	
029	7 XXX DRP 1EO	V93X2932X	21	23		3.0	ENA	INH	BLVL											X	Q,R	KYBD	DROOP GUIDANCE ENABLE FLAG	
030	(MSG LINE)	V93X0050X	1	25		44.0			CHAR													UI	MESSAGE LINE	X
031	(BUFFER MSG)	V93X0054X	45	25		4.0			CHAR													UI	BUFFER MESSAGE INDICATOR	X
032	(SPL)	V93X0056X	2	26		49.0			CHAR													UI	SCRATCH PAD LINE	X

TABLE 4.2.38-5. INPUT FUNCTIONAL PARAMETERS FOR XXXXXX TRAJ 1 DISPLAY (PFS) (G6.52)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
A1_PRED_X	V94U1280C	ASC TRAJ 1 ALT/VEL PRED X COORD	XXXXXX TRAJ DIP	AU	VAR		93012D	
A1_PRED_Y	V94U1281C	ASC TRAJ 1 ALT/VEL PRED Y COORD	XXXXXX TRAJ DIP	AU	VAR		93012D	
A1_STATE_X	V94U1282C	ASC TRAJ 1 ALT/VEL X COORD	XXXXXX TRAJ DIP	AU	VAR		93012D	
A1_STATE_Y	V94U1283C	ASC TRAJ 1 ALT/VEL Y COORD	XXXXXX TRAJ DIP	AU	VAR		93012D	
CONT_2EO_ARM	V93X6680XA	CONTINGENCY 2-ENG OUT ARM FLAG	XXXXXX TRAJ 1 DISP		BD		93017G	*
CONT_2EO_MODE	V90J2077C	CONTINGENCY 2-ENG OUT MODE INDEX	PW CONT GUID		HXS		93017G	*
CONT_2EO_START	V93X6681XA	CONTINGENCY 2-ENG OUT START FLAG	XXXXXX TRAJ 1 DISP		BD		93017G	*
CONT_3EO_MODE	V90J2088C	CONTINGENCY 3-ENG OUT MODE INDEX	PW CONT GUID		HXS		93017G	*
CONT_3EO_REGION	V90J0108C	CONTINGENCY 3 E/O REGION INDEX	CONT 3E/O GUID				93017G	*
CONT_3EO_START	V90X0909X	CONTINGENCY 3 E/O START FLAG	CONT 3E/O GUID		BD		93017G	*
CONT_SERC	V93X6682X	CONT SINGLE ENG ROLL CNTL FLAG	XXXXXX TRAJ 1 DISP		BD		93017G	*
CONT_SERC	V93X6682XA	CONT SINGLE ENG ROLL CNTL FLAG	ASC DAP		BD		93017G	*
CONT_YAW_ENA	V93X6600X	CONTINGENCY YAW ENABLE FLAG	XXXXXX TRAJ 1 DISP		BD		93017G	*
DISP_TITLE	V94J3910C	ASC DISPLAY DYNAMIC TITLE INTEGER	XXXXXX TRAJ DIP				93012D	
DRP_ENA	V93X2932X	DROOP GUIDANCE ENABLE FLAG	XXXXXX TRAJ 1 DISP		BD		93017G	*
ENA_RCS_CNTL	V90X1739X	ENABLE RCS CONTROL DISCRETE	ASC DAP		BD		93017G	*
K_CMD	V90U1948CB	COMMANDED SSME THROTTLE SETTING	ASC 1STG GUID	PCT			93017G	*
K_CMD	V90U1948CE	COMMANDED SSME THROTTLE SETTING	SBTC SOP	PCT			93012D	
ME1_FAIL_SHUTDOWN	V95X1207X	MPS E1 FAIL FLAG	SSME OPS		BD		93017G	*
ME2_FAIL_SHUTDOWN	V95X1208X	MPS E2 FAIL FLAG	SSME OPS		BD		93017G	*
ME3_FAIL_SHUTDOWN	V95X1209X	MPS E3 FAIL FLAG	SSME OPS		BD		93017G	*
MM_CODE_101/MM_101	V90X8155X	MAJOR MODE 101 FLAG	MSC				93012D	
MM_CODE_102/MM_102	V90X8158X	MAJOR MODE 102 FLAG	MSC				93012D	
SSME_FAILS	V90J1763C	SSME FAILURE STATUS FLAG	ASC DAP		HXS		93017G	*
V_INERTIAL_MAG	V95L0510CA	MAG OF VEHICLE INERTIAL VELOCITY	ASC UP	FT/S			93090E	
	V90X7556X	SEL ET SEP MNL ENABLE	GN&C SW RM		BD		93017G	*
	V90X8259X	ET AUTO SEP INHIBIT CREW ALERT	ET SEP SEQ		BD		93017G	*
	V90X8332X	LH/RH SRB PC 50 PSI FLAG	SRB SEP SEQ		BD		93017G	*
	V90X8340X	SRB AUTO SEP INHIBIT CREW ALERT	SRB SEP SEQ		BD		93017G	*
	V94X4860X	ILL ENTRY MSG(XXXXXX TRAJ 1 DISP)	UI				93012D	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.38-6. OUTPUT FUNCTIONAL PARAMETERS FROM XXXXXX TRAJ 1 DISPLAY (PFS) (G6.52)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
CONT_2EO_ARM	V93X6680XA	CONTINGENCY 2-ENG OUT ARM FLAG	DL FMT 21/1 PW CONT GUID RTLS TRAJ 2 DISP XXXXXX TRAJ 1 DISP XXXXXX TRAJ 2 DISP		BD		93017G	*
CONT_2EO_START	V93X6681XA	CONTINGENCY 2-ENG OUT START FLAG	A/E ATT PROC ASC BRG DISP ASC BRG SPEC DL FMT 21/1 GRTLS DAP HORIZ SIT DISP HORIZ SIT SPEC MSC PW CONT GUID RTLS TRAJ 2 DISP XXXXXX TRAJ 1 DISP XXXXXX TRAJ 2 DISP		BD		93017G	*
CONT_SERC	V93X6682X	CONT SINGLE ENG ROLL CNTL FLAG	ABT CNTL SEQ ASC 2STG GUID ASC DAP DL FMT 21/1 G/C STEER MSC RTLS TRAJ 2 DISP XXXXXX TRAJ 1 DISP XXXXXX TRAJ 2 DISP		BD		93017G	*
CONT_YAW_ENA	V93X6600X	CONTINGENCY YAW ENABLE FLAG	DL FMT 21/1 PW CONT GUID RTLS TRAJ 2 DISP XXXXXX TRAJ 1 DISP XXXXXX TRAJ 2 DISP		BD		93017G	*
DRP_ENA	V93X2932X	DROOP GUIDANCE ENABLE FLAG	ASC 2STG GUID DL FMT 21/A XXXXXX TRAJ 1 DISP XXXXXX TRAJ 2 DISP		BD		93017G	*
FIRST_EO_VI	V90L0480C	FIRST ENG OUT INERTIAL VELOCITY	DL FMT 21/1 RTLS TRAJ 2 DISP XXXXXX TRAJ 2 DISP	FT/S	SPL		93017G	*
ORBITER_DUMP_ENA	V93X6980XD	ORBITER DUMP ENABLE	ABT CNTL SEQ OVERRIDE SPEC				93012D	
ORBITER_DUMP_INH	V93X6981XB	ORBITER DUMP INHIBIT	ABT CNTL SEQ				93012D	
PRPLT_DUMP_ARM	V93X5350XC	ORB PRPLNT DUMP ARM CMD	OVERRIDE DISP OVERRIDE SPEC				93012D	
PRPLT_DUMP_START	V93X5351XC	ORB PRPLNT DUMP START CMD	OVERRIDE DISP OVERRIDE SPEC				93012D	

TABLE 4.2.38-6. OUTPUT FUNCTIONAL PARAMETERS FROM XXXXXX TRAJ 1 DISPLAY (PFS) (G6.52)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
PRPLT_DUMP_STOP	V93X5352XC	ORB PRPLNT DUMP STOP CMD	VERRIDE DISP				93012D	
			VERRIDE SPEC					
SECOND_EO_VI	V90L3820C	SECOND ENG OUT INERTIAL VELOCITY	DL FMT 21/1	FT/S	SPL		93017G	*
			RTLS TRAJ 2 DISP					
			XXXXXX TRAJ 2 DISP					
	V90M2965PE	CGGB_CGG_C01_FLAG_HALFWORD_2	DL FMT 21/A				93017G	*
	V99M1855PD	CONT MNVR DISCRETES	DL FMT 21/1				93017G	*

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
(HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

TABLE 4.2.38-7. XXXXXX TRAJ 1 DISPLAY (PFS) (G6.52) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
A1_CHAR_STRING(01,1)	V97U7102C	ND	SY		M	C	G6.52	00	DF1	93012D	
A1_CHAR_STRING(01,2)	V97U7103C	AU	I	S	M	C	G6.52	00	DAG	93012D	
A1_CHAR_STRING(01,3)	V97U7104C	AU	I	S	M	C	G6.52	00	DAG	93012D	
A1_CHAR_STRING(02,1)	V97U7105C	ND	CH		M	C	G6.52	00	DF1	93012D	
A1_CHAR_STRING(02,2)	V97U7106C	AU	I	S	M	C	G6.52	00	DAG	93012D	
A1_CHAR_STRING(02,3)	V97U7107C	AU	I	S	M	C	G6.52	00	DAG	93012D	
A1_CHAR_STRING(03,1)	V97U7108C	ND	SY		M	C	G6.52	00	DF1	93012D	
A1_CHAR_STRING(03,2)	V97U7109C	AU	I	S	M	C	G6.52	00	DAG	93012D	
A1_CHAR_STRING(03,3)	V97U7110C	AU	I	S	M	C	G6.52	00	DAG	93012D	
A1_CHAR_STRING(04,1)	V97U7111C	ND	CH		M	C	G6.52	00	DF1	93012D	
A1_CHAR_STRING(04,2)	V97U7112C	AU	I	S	M	C	G6.52	00	DAG	93012D	
A1_CHAR_STRING(04,3)	V97U7113C	AU	I	S	M	C	G6.52	00	DAG	93012D	
A1_CHAR_STRING(05,1)	V97U7114C	ND	SY		M	C	G6.52	00	DF1	93012D	
A1_CHAR_STRING(05,2)	V97U7115C	AU	I	S	M	C	G6.52	00	DAG	93012D	
A1_CHAR_STRING(05,3)	V97U7116C	AU	I	S	M	C	G6.52	00	DAG	93012D	
A1_CHAR_STRING(06,1)	V97U7117C	ND	CH		M	C	G6.52	00	DF1	93012D	
A1_CHAR_STRING(06,2)	V97U7118C	AU	I	S	M	C	G6.52	00	DAG	93012D	
A1_CHAR_STRING(06,3)	V97U7119C	AU	I	S	M	C	G6.52	00	DAG	93012D	
A1_CHAR_STRING(07,1)	V97U7120C	ND	SY		M	C	G6.52	00	DF1	93012D	
A1_CHAR_STRING(07,2)	V97U7121C	AU	I	S	M	C	G6.52	00	DAG	93012D	
A1_CHAR_STRING(07,3)	V97U7122C	AU	I	S	M	C	G6.52	00	DAG	93012D	
A1_CHAR_STRING(08,1)	V97U7123C	ND	CH		M	C	G6.52	00	DF1	93012D	
A1_CHAR_STRING(08,2)	V97U7124C	AU	I	S	M	C	G6.52	00	DAG	93012D	
A1_CHAR_STRING(08,3)	V97U7125C	AU	I	S	M	C	G6.52	00	DAG	93012D	
A1_SOLID_LINE(01,1)	V97U7149C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(01,2)	V97U7150C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(01,3)	V97U7151C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(01,4)	V97U7152C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(02,1)	V97U7153C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(02,2)	V97U7154C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(02,3)	V97U7155C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(02,4)	V97U7156C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(03,1)	V97U7157C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(03,2)	V97U7158C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(03,3)	V97U7159C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(03,4)	V97U7160C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(04,1)	V97U7161C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(04,2)	V97U7162C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(04,3)	V97U7163C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(04,4)	V97U7164C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(05,1)	V97U7165C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(05,2)	V97U7166C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(05,3)	V97U7167C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(05,4)	V97U7168C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(06,1)	V97U7169C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(06,2)	V97U7170C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(06,3)	V97U7171C	AU	I	S	M	C	G6.52	00	DAM	93012D	

TABLE 4.2.38-7. XXXXXX TRAJ 1 DISPLAY (PFS) (G6.52) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
A1_SOLID_LINE(06,4)	V97U7172C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(07,1)	V97U7173C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(07,2)	V97U7174C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(07,3)	V97U7175C	AU	I	S	M	C	G6.52	00	DAM	93012D	
A1_SOLID_LINE(07,4)	V97U7176C	AU	I	S	M	C	G6.52	00	DAM	93012D	
ENA_CONT_3EO_GUID	V97U8599C	ND	D		D	P	G3.3 G6.52 G6.53 G6.54	00	A3E	93012D	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

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TABLE 4.2.38-8. XXXXXX TRAJ 1 DISPLAY (PFS) (G6.52) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.38-9. XXXXXX TRAJ 1 DISPLAY (PFS) (G6.52) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.39 XXXXXX TRAJ 2 (PFS)

TITLE: XXXXXX TRAJ 2 - The title of this display is partially dynamic to indicate the abort mode in which the display is presented. The XXXXXX is driven ASCENT for MM103 except when an ATO or TAL abort mode is selected. When an abort mode is selected, it reflects the abort mode (ATO or TAL).

TYPE: OPS/1031

AVAILABILITY: PFS, OPS 1

4.2.39.1 Purpose, Operation, and Organization

The XXXXXX TRAJ 2 display provides the trajectory information during the second-stage boost. The display comes up automatically at MM103 transition (SRB separation) and is available throughout MM103. This display also provides the crew with the capability to monitor the automated contingency abort mode processing for two and three main engine out failure scenarios and manual control to invoke the two engine out contingency abort. Display of the snapshot inertial velocities at the time of the first and second SSME failure is provided. In addition, it also allows the crew to manually initiate or terminate single engine roll control, to enable or inhibit contingency yaw steering, as well as to enable Droop Guidance for scenarios with one SSME out. When a second main engine failure is confirmed, the crew will not be able to terminate single engine roll control due to ASC DAP (4.176) and ABT CNTL SEQ (4.192) requirements, even though this item entry will be accepted on the display. The display will be up as ASCENT TRAJ 2 unless an ATO or TAL abort mode is selected. The display will be changed to the RTLS TRAJ 2 display upon transition to MM601 following an RTLS abort. The display format is presented in Figure 4.2.39-1.

- (1) The central plot is a plot of inertial velocity (VI) vs. altitude (H) above the ellipsoid. The scribe lines represent nominal ascent and TAL trajectories. Abort regions may be indicated along the plot as RTLS, GO, etc. The current vehicle state from navigation is shown by a moving, double overbright, and large up-pointing triangle. Predicted states for 30 and 60 seconds in the future are indicated by moving and double overbright circles.
- (2) The scale across the top is an inertial velocity (VI) scale. The limits are mission dependent but are 1000 FPS apart. A nominal cutoff (CO) mark will be indicated on it. For a TAL abort, the scale represents the delta velocity to go biased between the mission dependent limits. The CO tick mark represents a zero delta velocity to go and will be the TAL MECO indicator. Either present velocity from navigation or TAL delta velocity to go are indicated by a moving, double overbright, and large down-pointing triangle.

A four character field "FINE" shall be displayed to indicate when guidance is in fine countdown.

- (3) The following digital readouts shall be displayed:

PRPLT XX - Percent propellant remaining in the ET (%).

TMECO XX:XX - Predicted time of MECO, from ASC 2STG GUID (4.2) in minutes and seconds from lift off. This data field shall be blanked whenever a contingency abort is initiated.

THROT XXX - Percent commanded throttle level (%) to the engines (K_CMD) (V90U1948C) from ASC 2STG GUID (4.2), PW CONT GUID (4.5), or SBTC SOP (4.55).

TGO XX:XX - Time to go to MECO from ASC 2STG GUID (4.2) in minutes and seconds. This data field shall be blanked whenever a contingency abort is initiated.

DROOP ALT XXX - The predicted droop altitude from ASC 2STG GUID (4.2) must be divided by 1000 to convert from units of feet (FT) to thousands of feet (KFT). Only the truncated integer portion of the resultant division shall be displayed. Additionally, if the droop altitude violation flag (S_DRP_FLASH) is set, and the contingency two-engine-out start flag (CONT_2EO_START) has not been set, the nomenclature string "DROOP ALT" and the digital display of PRED_DROOP_ALT (XXX) shall both be displayed double overbright and flash indicating the predicted droop altitude is below the minimum target altitude.

- (4) "ET SEP INH" shall be displayed, double overbright, in the upper XXXXXXXXXXXX position if the ET AUTO SEP INHIBIT CREW ALERT discrete (V90X8259X) is set by the ET SEP sequencer. "ET SEP MAN" shall be displayed, double overbright, in the lower XXXXXXXXXXXX position if the SEL ET SEP MNL ENABLE discrete (V90X7556X) is set by GN&C Switch RM.
- (5) The following information and crew item entry controls shall be provided to support the automated contingency abort processing which is a function of the main engine(s) failure scenario.
 - a. For the three-engine-out contingency abort mode (3EO), a character field shall display a color word describing the contingency abort mode region. The color word shall be displayed cyclically, but there shall be two different ways of determining how the 3EO color word will be displayed.

The first way shall be when the ENA_CONT_3EO_GUID flag (an I-Load) is set ON. This flag enables Contingency 3EO Guidance which calculates a region index (CONT_3EO_REGION) which shall determine the appropriate color to display for automatic contingency 3EO maneuvers. Based on this index, the color to be displayed shall be (BLANK), BLUE, GREEN, ORANGE, YELLOW, or RED.

When ENA_CONT_3EO_GUID = ON, the function of Contingency 3EO guidance shall normally only be to compute the current value of the 3EO region index. If three SSME's fail requiring a contingency abort (CONT_3EO_START = ON), the 3EO color word field (3EO XXXXXX) shall be displayed double overbright to indicate the automatic maneuver is actually being performed. When CONT_3EO_START = ON, the 2EO color word field (2EO XXXXXX, see (5b) and (5c) below) shall become static. The intensity of the 2EO color word field shall also become static.

The second way of displaying the 3EO color word shall be when the ENA_CONT_3EO_GUID flag is set to OFF. This will only occur if it has been determined pre-flight to disable the automatic 3EO maneuver logic. In this case, the crew will have to perform manual 3EO procedures. These procedures are different than the automatic maneuvers and the index that determines the 3EO color word is also different for this case. If ENA_CONT_3EO_GUID = OFF, the 3EO color field shall be based and

the CONT_3EO_MODE index computed by Powered Contingency Guidance. The displayed color word shall be (BLANK), BLUE or GREEN.

When ENA_CONT_3EO_GUID = OFF, the 3EO color word shall be displayed at normal intensity.

- b. For the two-engine-out contingency abort mode (2EO), a character field shall display a color word describing the contingency abort mode region. The color word to be displayed cyclically is a function of the type of abort and shall be based on the current value of CONT_2EO_MODE to display (BLANK), BLUE or GREEN.
- c. Item 2 (ARM) allows the crew to toggle the abort “ARM” on or off for the contingency abort processing based on the two-engine-out contingency abort mode displayed. Arming the selected abort mode shall be indicated by displaying an asterisk to the right of item 2 and the two-engine-out contingency abort mode region color word (2EO XXXXXX) field double overbright. If an item 2 execution results in setting the “ARM” to off then the two-engine-out contingency abort mode region color word (2EO XXXXXX) shall be displayed at normal intensity and the asterisk next to item 2 blanked.

If item 2 is executed when the CONT_2EO_MODE is equal to zero (2EO color word is BLANK), the input shall be rejected and an “ILLEGAL ENTRY” CRT message output.

- d. Item 4 (ABORT) allows the crew to invoke the automated contingency abort as indicated by the two-engine-out contingency mode region color word, which is displayed double overbright when armed via item 2. An asterisk shall appear to the right of item 4 when it is successfully executed by the crew; otherwise, it shall remain blank.

For the item 4 EXEC to be legal, item 2 must have been executed and CONT_2EO_ARM must have been set on. If item 4 EXEC is performed and CONT_2EO_ARM = OFF, an “ILLEGAL ENTRY” message shall be displayed and the input rejected as an operator error.

If item 4 EXEC is performed and CONT_2EO_ARM = ON, then CONT_2EO_START shall be set on and CONT_SERC shall be set on. Also PRPLT_DUMP_ARM and PRPLT_DUMP_START shall both be set on, and PRPLT_DUMP_STOP shall be set off. In addition the ORBITER_DUMP_ENA shall be set on and the ORBITER_DUMP_INH shall be set off. An asterisk shall be displayed next to item 4 indicating the abort mode has been invoked. The two-engine-out contingency abort mode region color word character string shall become static and remain double overbright.

The three-engine-out contingency abort mode region color word character string shall continue to update cyclically when CONT_2EO_START is set to ON and ENA_CONT_3EO_GUID = ON. The three-engine-out contingency abort mode region color word character string shall become static when CONT_2EO_START is set to ON and ENA_CONT_3EO_GUID = OFF.

Once item 2 and item 4 have been correctly executed, any further attempt to execute items 2 or 4 shall result in an “ILLEGAL ENTRY” message and the input shall be rejected as an operator error.

- (6) Item 5 (YAW STEER) shall provide status of the Yaw Steering configuration by displaying the character string “ENA” or “INH” to the right of the item number. This item allows the crew to toggle the yaw steering configuration. This item shall be updated cyclically based on CONT_YAW_ENA changes.

Each execution of item 5 shall cause the discrete CONT_YAW_ENA to toggle on or off to enable/inhibit the yaw steering capability.

Once item 2 and item 4 have been correctly executed, any further attempt to execute item 5 shall result in an “ILLEGAL ENTRY” message and the input shall be rejected as an operator error.

- (7) Item 6 (SERC) provides the capability to toggle the “SINGLE ENGINE ROLL CONTROL” configuration. An asterisk shall be displayed after the item number based on CONT_SERC = ON. If CONT_SERC = OFF, the asterisk shall be blanked. Each execution of the item 6 control shall cause the discrete CONT_SERC to toggle on or off. The Ascent DAP can set CONT_SERC = ON, one time only, if sensed acceleration drops below a threshold value. For this case, the asterisk shall be displayed next to item 6 (SERC) and the toggle function shall be valid.

The character string “ON” shall be displayed double overbright to the right of “SERC” when the discrete ENA_RCS_CNTL = ON. Otherwise the character string shall be blanked.

- (8) The inertial velocity in feet per second at the time the first main engine failure is confirmed shall be displayed. Both the nomenclature character string and the data field shall remain blank until one or more of the three main engine fail shutdown discretely is set on by SSME OPS at which time the V_INERTIAL_MAG is snapshot for display and TLM as the FIRST_EO_VI. The character string “1ST EO VI” and FIRST_EO_VI value shall be displayed continuously. If the FIRST_EO_VI value is already set prior to MM 103, the character string “1ST EO VI” and FIRST_EO_VI value shall be displayed continuously throughout MM 103.
- (9) The inertial velocity in feet per second at the time the second main engine failure is confirmed shall be displayed. Both the nomenclature character string and the data field shall remain blank until the second SSME failure is recognized by ASC_RECON via SSME failure shutdown discretely or the automatic second SSME failure recognition logic, at which time the V_INERTIAL_MAG is snapshot for display and TLM as the SECOND_EO_VI. The character string “2ND EO VI” and SECOND_EO_VI value shall be displayed continuously in double overbright. If the SECOND_EO_VI value is already set prior to MM 103, the character string “2ND EO VI” and SECOND_EO_VI value shall be displayed continuously in double overbright throughout MM 103.
- (10) Item 7 (DROOP 1EO) provides capability to enable Droop Guidance with one SSME out. The character string “INH” shall be displayed if DRP_ENA = OFF. The character string “ENA” shall be displayed if DRP_ENA = ON.

Each execution of item 7 shall cause the discrete DRP_ENA to toggle INH or ENA. Once Droop Guidance has been engaged (S_CDROOP = ON) or two engines have failed (SSME_FAILS > 3), the INH/ENA field shall be latched blank and any further attempt to execute item 7 shall result in an “ILLEGAL ENTRY” message and the input shall be rejected as an operator error.

- (11) The only functional item entries on this display are 2, 4, 5, 6 and 7. Execution of any other item number shall result in an operator error and output the "ILLEGAL ENTRY" CRT message.
- (12) The text field "DROOP ENGAGED" shall be displayed, double overbright, in the XXXXXXXXXXXXXX position only if the Droop Control command flag (S_CDROOP) is set, and the contingency two-engine-out start flag (CONT_2EO_START) has not been set. Otherwise the field is blank.

4.2.39.2 XXXXXX TRAJ 2 (PFS) Keyboard Processing Addendum.

- A. Item 2 shall be a toggle function. Each execution of item 2 shall toggle the CONT_2EO_ARM(V93X6680X) discrete and send it to PW CONT GUID (4.5), TLM, and CRT (6.53 and 6.54).

Upon execution of item 2 when CONT_2EO_MODE(V90J2077C) = 0 (ZERO) then an "ILLEGAL ENTRY" message shall be displayed and the input shall be rejected as an operator error.

Upon execution of item 4 when CONT_2EO_ARM(V93X6680X) = OFF then an "ILLEGAL ENTRY" message shall be displayed and the input shall be rejected as an operator error.

Upon execution of item 4 when CONT_2EO_ARM(V93X6680X) = ON the following functions shall be performed:

IF CONT_2EO_ARM(V93X6680X) = ON
THEN SET CONT_2EO_START(V93X6681X) = ON
Destinations for the CONT_2EO_ARM(V93X6680X) are PW CONT GUID (4.5), TLM, and CRT (6.53 and 6.54). Destinations for the CONT_2EO_START(V93X6681X) are GRTLS DAP (4.227), PW CONT GUID (4.5), MSC, TLM, HORIZ SIT DISP (6.21), HORIZ SIT SPEC FUNCTION (5.7), A/E ATT PROC(4.226) and CRT (6.53 and 6.54).

AND SET CONT_SERC(V93X6682X) = ON
Destinations are ASC DAP (4.176), ABT CNTL SEQ (4.192), TLM, MSC, ASC 2STG GUID (4.2), CRT (6.53 and 6.54) and GC STEER (4.175).

AND SET PRPLT_DUMP_ARM(V93X5350X) = ON
SET PRPLT_DUMP_START(V93X5351X) = ON
SET PRPLT_DUMP_STOP(V93X5352X) = OFF

Destinations for all three are OVERRIDE SPEC FUNCTION (5.21) and OVERRIDE DISPLAY (6.47).

AND SET ORBITER_DUMP_ENA(V93X6980X) = ON
SET ORBITER_DUMP_INH(V93X6981X) = OFF
Destinations for ORBITER_DUMP_ENA(V93X6980X) are ABT CNTL SEQ (4.192) and OVERRIDE SPEC FUNCTION (5.21).
Destination for ORBITER_DUMP_INH(V93X6981X) is ABT CNTL SEQ (4.192).

IF CONT_2EO_START(V93X6681X) = ON
THEN execution of items 2 and 4 shall become illegal and if executed an "ILLEGAL ENTRY" message shall be displayed and the input shall be rejected as an operator error.

- B. Item 5 shall be a toggle function. Each execution of item 5 shall cause the discrete CONT_YAW_ENA(V93X6600X) to toggle on or off to enable/inhibit the yaw steering capability.

IF CONT_2EO_START(V93X6681X) = ON
THEN execution of item 5 shall become illegal and if executed an "ILLEGAL ENTRY" message shall be displayed and the input shall be rejected as an operator error.

Destinations for CONT_YAW_ENA(V93X6600X) are PW CONT GUID (4.5), TLM, and CRT (6.53 and 6.54).

- C. Item 6 shall be a toggle function. Each execution of item 6 shall cause the discrete CONT_SERC(V93X6682X) to toggle on or off to control the single engine roll control capability.

Destinations for CONT_SERC (V93X6682X) are ASC DAP (4.176), ABT CNTL SEQ (4.192), TLM, MSC, ASC 2STG GUID (4.2), CRT (6.53 and 6.54) and GC STEER (4.175).

- D. Item 7 shall be a toggle function. Each execution of item 7 shall cause the discrete DRP_ENA(V93X2932X) to toggle INH or ENA.

Once Droop Guidance has been engaged (S_CDROOP(V90X8087X) = ON) or two engines have failed (SSME_FAILS(V90J1763C) > 3), the INH/ENA field shall be latched blank and any further attempt to execute item 7 shall result in an "ILLEGAL ENTRY" message and the input shall be rejected as an operator error.

Destinations for DRP_ENA(V93X2932X) are ASC 2STG GUID (4.2), TLM, and CRT (6.53).

4.2.39.3 XXXXXX TRAJ 2 (PFS) CRT Display Processing Addendum.

All necessary processing for dynamic symbols on this display is defined in the Appendix B.4.160 (XXXXXX TRAJ DIP) of this FSSR.

- A. Time of MECO. Time of MECO in seconds input from ASC 2STG GUID (4.2) shall be converted and displayed in minutes and seconds from liftoff.

IF S_BLANK_TMECO(V90X7001X) = ON
Then the time of MECO (TMECO) data field shall be blanked.

Source for S_BLANK_TMECO(V90X7001X) is PW CONT GUID (4.5).

- B. Time to Go to MECO. Time to go to MECO in seconds input from ASC 2STG GUID (4.2) shall be converted and displayed in minutes and seconds.

IF S_BLANK_TMECO(V90X7001X) = ON
Then the time to go to MECO (TGO) data field shall be blanked.

Source for S_BLANK_TMECO(V90X7001X) is PW CONT GUID (4.5).

- C. Dynamic Display Title. The thirteen character title of this display is defined by the integer value of Display Title ID (V94J3910C) as follows:

Value	Title
6	“ASCENT TRAJ 2”
7	“ TAL TRAJ 2”
8	“ ATO TRAJ 2”

- D. Vehicle Predicted Position. Display a circle with a radius of 5 AUs double overbright at the location specified by dynamic data for both 30 and 60 second predictors. Display locations shall be initialized to X = 400 AUs, Y = 400 AUs (off-screen).
- E. Vehicle Current Position. Display the up-pointing triangle (symbol, 7F) double overbright at the location specified by dynamic data. Display location shall be initialized to X = 400 AUs, Y = 400 AUs (off-screen).
- F. ET SEP Inhibit Flag. When the ET AUTO SEP INHIBIT CREW ALERT discrete (V90X8259X) is set ON by the ET SEP sequencer, “ET SEP INH” will be displayed double overbright.
- G. ET SEP Manual Flag. When the SEL ET SEP MNL ENABLE discrete (V90X7556X) is set ON by GN&C SWITCH RM, “ET SEP MAN” will be displayed double overbright.
- H. Throttle Setting. The source for K_CMD (V90U1948C) is ASC 2STG GUID (4.2), PW CONT GUID (4.5) or SBTC SOP (4.55).
- I. VI Scale. Display the down-pointing triangle symbol (06) double overbright on the CRT field specified by the variable X position data and the constant Y position data.
- J. 3EO Abort Region Color Word Character String. The MSID for ENA_CONT_3EO_GUID is V97U8599C. The MSID for CONT_3EO_START is V90X0909X.

When ENA_CONT_3EO_GUID = ON, the logic is as follows:

CONT_3EO_REGION (V90J0108C)	Character String To Be Displayed
-1	BLUE
102	BLUE
1	GREEN
2	ORANGE
3	YELLOW
4	RED
0	(BLANK)

If CONT_3EO_START = OFF, the 3EO contingency abort color word character string shall be displayed at normal intensity and continue to be updated cyclically.

If CONT_3EO_START = ON, the 3EO contingency abort color word character string shall be displayed double overbright and continue to be updated cyclically. When CONT_3EO_START = ON, the 2EO color word field shall become static. The intensity of the 2EO color word field shall also become static.

Source for CONT_3EO_REGION and CONT_3EO_START is CONT 3EO GUID (4.6).

When ENA_CONT_3EO_GUID = OFF, the logic is as follows:

Value of CONT_3EO_MODE (V90J2088C)	Character String To Be Displayed
1	BLUE
2	GREEN
0	(BLANK)

When ENA_CONT_3EO_GUID = OFF, the 3EO contingency abort color word character string shall be displayed at normal intensity and continue to be updated cyclically.

Source for CONT_3EO_MODE(V90J2088C) is PW CONT GUID (4.5).

When ENA_CONT_3EO_GUID = OFF, the following shall apply:

IF CONT_2EO_ARM(V93X6680X) = ON
 AND CONT_2EO_START(V93X6681X) = ON
 THEN the 3EO contingency abort region color word character string shall become static, i.e., no longer cyclically updated.

Sources for CONT_2EO_ARM(V93X6680X) and CONT_2EO_START(V93X6681X) are PW CONT GUID (4.5) and KEYBOARD (6.52 or 6.53).

K. 2EO Contingency Abort Region Color Word Character String and Item 2 (ARM) and Item 4 (ABORT) Indicators.

The character string to be displayed shall be displayed at normal intensity and determined from the logic in the following table:

Value of CONT_2EO_MODE (V90J2077C)	Character String To Be Displayed
0	(BLANK)
1	BLUE
2	GREEN

Source for CONT_2EO_MODE(V90J2077C) is PW CONT GUID (4.5).

- IF CONT_2EO_ARM(V93X6680X) = ON
THEN the 2EO contingency abort mode region color word character string shall be displayed double overbright.
AND an Asterisk shall be displayed next to item 2.
- IF CONT_2EO_ARM(V93X6680X) = ON
AND CONT_2EO_START(V93X6681X) = ON
THEN the 2EO contingency abort region color word character string shall become static, i.e., no longer cyclically updated, and shall remain double overbright.
- IF CONT_2EO_ARM(V93X6680X) = OFF
THEN the 2EO contingency abort mode region color word character string shall be displayed at normal intensity.
AND the Asterisk shall be blanked next to item 2.

Sources for CONT_2EO_ARM(V93X6680X) and CONT_2EO_START(V93X6681X) are PW CONT GUID (4.5) and KEYBOARD (6.52 or 6.53).

L. SERC Status.

IF ENA_RCS_CNTL(V90X1739X) = ON THEN the status character string "ON" shall be displayed double overbright, otherwise this field shall be blanked.

M. First Inertial Velocity Nomenclature Character String and Data.

IF (ME1_FAIL_SHUTDOWN(V95X1207X) = ON
 OR ME2_FAIL_SHUTDOWN(V95X1208X) = ON
 OR ME3_FAIL_SHUTDOWN(V95X1209X) = ON)
 THEN display the nomenclature character string “1ST EO VI”
 AND SET FIRST_EO_VI(V90L0480C) = V_INERTIAL_MAG(V95L0510C)
 (one time snapshot) for display and TLM if not already set; otherwise display
 FIRST_EO_VI.

The nomenclature character string and FIRST_EO_VI value shall continue to be displayed.

ELSE blank the nomenclature character string field and inertial velocity data field.

Source for ME1_FAIL_SHUTDOWN(V95X1207X), ME2_FAIL_SHUTDOWN
 (V95X1208X) and ME3_FAIL_SHUTDOWN(V95X1209X) is SSME OPS (4.165).

Source for V_INERTIAL_MAG(V95L0510C) is ASC UPP (4.19).

N. Second Inertial Velocity Nomenclature Character String and Data.

IF (AUTO_2ND_OUT (V90X1744X)
 OR (SSME_FAILS (V90J1763C) > 3 AND SSME_FAILS (V90J1763C) < 7))
 THEN display the nomenclature character string “2ND EO VI” at double overbright intensity.
 AND SET SECOND_EO_VI (V90L3820C) = V_INERTIAL_MAG(V95L0510C)
 (one time snapshot) for display (at double overbright intensity) and TLM if not already
 set; otherwise, display SECOND_EO_VI (at double overbright intensity).

The nomenclature character string and SECOND_EO_VI value shall continue to be displayed.

ELSE blank the nomenclature character string field and inertial velocity data field

Source for SSME_FAILS (V90J1763C) and AUTO_2ND_OUT (V90X1744X) is ASC DAP
 (4.176).

Source for V_INERTIAL_MAG (V95L0510C) is ASC UPP (4.19).

O. FINE Countdown Indicator. The four character string “FINE” shall be displayed when
 S_MECO (V90X1963X) = ON and MECO_CONFIRMED (V90X8561X) = OFF if
 CONT_2EO_START (V93X6681X) = OFF. “FINE” shall be displayed when S_FCD
 (V90X2086X) = ON if CONT_2EO_START (V93X6681X) = ON.

Source for S_MECO (V90X1963X) is ASC 2STG GUID (4.2). Source for
 MECO_CONFIRMED (V90X8561X) is SSME OPS (4.165). Source for S_FCD
 (V90X2086X) is PW CONT GUID (4.5). Source for CONT_2EO_START (V93X6681X) is
 KEYBOARD (6.52 or 6.53).

P. Droop Altitude. The predicted droop altitude PRED_DROOP_ALT (V90H8086C) from ASC
 2STG GUID (4.2) must be divided by 1000 to convert from units of feet (FT) to thousands of
 feet (KFT). Only the truncated integer portion of the resultant division shall be displayed.
 Additionally, if the droop altitude violation flag (S_DRP_FLASH) (V90X8088X) = ON from

ASC 2STG GUID (4.2), and the contingency two-engine-out start flag (CONT_2EO_START) (V93X6681X) = OFF from keyboard (6.52 or 6.53), the nomenclature string “DROOP ALT” and the digital display of PRED_DROOP_ALT (XXX) shall both be displayed double overbright and flash indicating the predicted droop altitude is below the minimum target altitude.

- Q. Droop Engaged Character String. The character string “DROOP ENGAGED” shall be displayed double overbright if the Droop Control command flag (S_CDROOP) (V90X8087X) = ON from ASC 2STG GUID (4.2), and the contingency two-engine-out start flag (CONT_2EO_START) (V93X6681X) = OFF from keyboard (6.52 or 6.53). Otherwise it shall be blank.
- R. Item 7 (1 ENGINE OUT DROOP) Indicator. The character string “INH” shall be displayed if DRP_ENA = OFF. The character string “ENA” shall be displayed if DRP_ENA(V93X2932X) = ON. The character string ENA/INH shall be latched blank if S_CDROOP(V90X8087X) = ON or if two SSMEs have failed (SSME_FAILS(V90J1763C) > 3).

4.2.39.4 XXXXXX TRAJ 2 Figure/Table References

Figure 4.2.39-1	XXXXXX TRAJ 2 Display (PFS) Generic
Table 4.2.39-1	Keyboard Processing Table
Table 4.2.39-2	CRT Display Processing Table
Table 4.2.39-3	CRT Display Processing Background Requirements, Design Dependent
Table 4.2.39-4	Mission Design Background Constants N/A
Table 4.2.39-5	Input Functional Parameters
Table 4.2.39-6	Output Functional Parameters
Table 4.2.39-7	I-Loads
Table 4.2.39-8	K-Loads
Table 4.2.39-9	Constants

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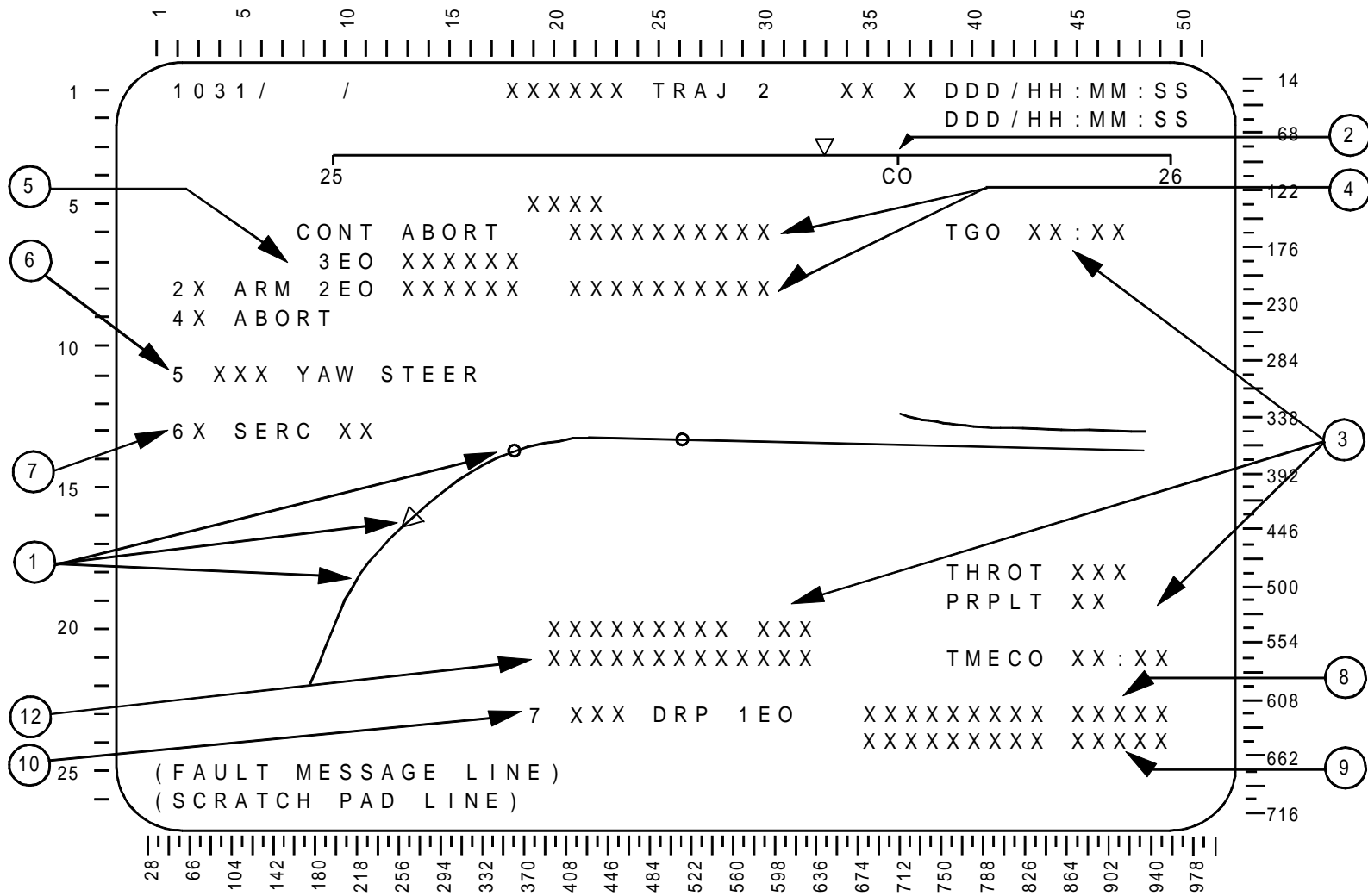


FIGURE 4.2.39-1.XXXXXX TRAJ 2 (PFS) Generic

Table 4.2.39-1. XXXXXX TRAJ 2 (PFS) KEYBOARD PROCESSING

Seq	CRT Signal Name	M/S ID	CHAR	TYPE	UNITS	DK	ITEM	Item No. Limits		Add Ref	Destination	Nomenclature	CRT
								MIN	MAX				
001	2X ARM	V93X6680X	0.0	CTRL			2			A	ADDENDUM	CONTINGENCY 2-ENG OUT ARM FLAG	
002	4X ABORT	V93X6681X	0.0	CTRL			4			A	ADDENDUM	CONTINGENCY 2-ENG OUT START FLAG	
003	5 XXX YAW STEER	V93X6600X	0.0	CTRL			5			B	ADDENDUM	CONTINGENCY YAW ENABLE FLAG	
004	6X SERC	V93X6682X	0.0	CTRL			6			C	ADDENDUM	CONT SINGLE ENG ROLL CNTL FLAG	
005	7 XXX DRP 1EO	V93X2932X	0.0	CTRL			7			D	ADDENDUM	DROOP GUIDANCE ENABLE FLAG	

Table 4.2.39-2. XXXXXX TRAJ 2 (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	STARS	BLANK	SIZE	INTE	FLAS	RATES	SIGN	LEAD	BERR	DOWN	Add Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
001	(OPS)	V93X0040X	2	1		5.0															UI	OPS FUNCTION PAGE	X	
002	(SPEC)	V93X0042X	7	1		4.0															UI	SPEC FUNCTION PAGE	X	
003	(DISP)	V93X0044X	11	1		4.0															UI	DISPLAY FUNCTION PAGE	X	
004	(TITLE)	V94J3910C	18	1		13.0														C	XXXXXX TRAJ DIP	ASC DISPLAY DYNAMIC TITLE INTEGER	X	
005	(UL)	V92X5032X	34	1		2.0	UL						X								UI	UPLINK ACTIVITY IND	X	
006	(GPC)	V93X0048X	36	1		2.0															UI	GPC DRIVER	X	
007	(MT)	V91W1990C	39	1		12.0															FCOS	MISSION ELAPSED TIME	X	
008	(CRT TIMER)	V91W1987C	39	2		12.0															FCOS	DISPLAY CRT TIMER,GNC	X	
009	TGO XX:XX	V90W1941C	43	6		5.0														B	ASC 2STG GUID	TIME TO GO TO ENGINE CUTOFF		
010	TMECO XX:XX	V90W1970C	45	21		5.0														A	ASC 2STG GUID	PREDICTED SSME C/O TIME IN MET		

Table 4.2.39-2. XXXXXX TRAJ 2 (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	STATUS	BLANK	SIZE	INTE	FLAS	RATE	SIGN	LEAD	BRAN	DOWN	Add Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
011	THROT XXX	V90U1948C	44	18		4.0			DEC	PCT										H	ADDENDUM	COMMANDED SSME THROTTLE SETTING		
012	PRPLT XX	V94U1325C	44	19		3.0			DEC	PCT											XXXXXX TRAJ DIP	ET PROPELLANT REMAINING	X	
013	XXXXXXXXXX (ET SEP INH)	V90X8259X	21	6		10.0		ET SEP INH	BLVL				X							F	ET SEP	ET AUTO SEP INHIBIT CREW ALERT		
014	XXXXXXXXXX (ET SEP MAN)	V90X7556X	21	8		10.0		ET SEP MAN	BLVL				X							G	GN&C SW RM	SEL ET SEP MNL ENABLE		
015	(CUR VEH X POS)	V94U1288C							DEC			X	X							E	XXXXXX TRAJ DIP	ASC TRAJ 2 ALT/VEL X COORD	X	
016	(CUR VEH Y POS)	V94U1289C							DEC			X	X							E	XXXXXX TRAJ DIP	ASC TRAJ 2 ALT/VEL Y COORD	X	
017	(PRED VEH X1 POS)	V94U1284C							DEC				X							D	XXXXXX TRAJ DIP	ASC TRAJ 2 ALT/VEL PRED X POS 30	X	
018	(PRED VEH Y1 POS)	V94U1285C							DEC				X							D	XXXXXX TRAJ DIP	ASC TRAJ 2 ALT/VEL PRED Y POS 30	X	
019	(PRED VEH X2 POS)	V94U1286C							DEC				X							D	XXXXXX TRAJ DIP	ASC TRAJ 2 ALT/VEL PRED X POS 60		
020	(PRED VEH Y2 POS)	V94U1287C							DEC				X							D	XXXXXX TRAJ DIP	ASC TRAJ 2 ALT/VEL PRED Y POS 60		
021	(X POS OF INRTL VEL)	V94U1290C							DEC			X	X							I	XXXXXX TRAJ DIP	X COORD OF INERTIAL VELOCITY		
022	FINE	ADDENDUM	19	5		4.0			CHAR											O	ADDENDUM	FINE COUNTDOWN CHAR STRING		
023	3 EO XXXXXX	ADDENDUM	13	7		6.0			CHAR				X							J	ADDENDUM	3 ENG OUT ABORT COLOR CHAR STRING		
024	2 EO XXXXXX	ADDENDUM	13	8		6.0			CHAR				X							K	ADDENDUM	2 ENG OUT ABORT COLOR CHAR STRING		
025	2X ARM	V93X6680X	3	8		1.0			BLVL										X	J,K	ADDENDUM	CONTINGENCY 2-ENG OUT ARM FLAG		
026	4X ABORT	V93X6681X	3	9		1.0	*		BLVL										X	J,K	ADDENDUM	CONTINGENCY 2-ENG OUT START FLAG		

Table 4.2.39-2. XXXXXX TRAJ 2 (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	STATUS	BLANK	SIZE	INTE	FLAS	RATE	SIGN	LEAD	BRAN	DOWN	Add Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
027	5 XXX YAW STEER	V93X6600X	4	11		3.0	ENA	INH	BLVL											X	KYBD	CONTINGENCY YAW ENABLE FLAG		
028	6X SERC	V93X6682X	3	13		1.0	*		BLVL		X									X	KYBD, ASC DAP	CONT SINGLE ENG ROLL CNTL FLAG		
029	SERC XX	V90X1739X	10	13		2.0	ON		BLVL		X	X							X	L	ASC DAP	ENABLE RCS CONTROL DISCRETE		
030	XXXXXXXXX (1ST EO VI)	ADDENDUM	35	23		9.0			CHAR		X									M	ADDENDUM	FIRST EO VI NOMENCLATURE CHAR STRING		
031	(FIRST EO VI)	V90L0480C	44	23		6.0			DEC	FPS	X								X	M	ADDENDUM	FIRST ENG OUT INERTIAL VELOCITY		
032	XXXXXXXXX (2ND EO VI)	ADDENDUM	35	24		9.0			CHAR		X	X								N	ADDENDUM	SECOND EO VI NOMENCLATURE CHAR STRING		
033	(SECOND EO VI)	V90L3820C	44	24		6.0			DEC	FPS	X	X							X	N	ADDENDUM	SECOND ENG OUT INERTIAL VELOCITY		
034	7 XXX DRP 1EO	V93X2932X	21	23		3.0	ENA	INH	BLVL		X								X	R	KYBD	DROOP GUIDANCE ENABLE FLAG		
035	XXXXXXXXX (DROOP ALT)	ADDENDUM	20	20		9.0			CHAR			X	X							P	ADDENDUM	DROOP ALT CHAR STRING		
036	XXX (PRED DROOP ALT)	V90H8086C	29	20		4.0			DEC	KFT		X	X							P	ASC 2STG GUID	PREDICTED MINIMUM DROOP ALTITUDE		
037	XXXXXXXXXXXXX (DROOP ENGAGED)	ADDENDUM	20	21		13.0			CHAR		X	X								Q	ADDENDUM	DROOP ENGAGED CHAR STRING		
038	(MSG LINE)	V93X0050X	1	25		44.0			CHAR												UI	MESSAGE LINE		X
039	(BUFFER MSG)	V93X0054X	45	25		4.0			CHAR												UI	BUFFER MESSAGE INDICATOR		X
040	(SPL)	V93X0056X	2	26		49.0			CHAR												UI	SCRATCH PAD LINE		X

Table 4.2.39-3. XXXXXX TRAJ 2 CRT DISPLAY PROCESSING BACKGROUND REQUIREMENTS, DESIGN-DEPENDENT

VECTORS				
VECTOR ID	ORIGIN		TERMINAL	
	X(AU)	Y(AU)	X(AU)	Y(AU)
VI scale	213/-299	110/256	963/451	110/256
Symbol (18) used for the following tick marks: VI scale ticks at Y = 119/247, X = 213/-299 and 963/451				
Design dependent location of dynamic symbol: Down-pointing triangle (symbol 06) on VI scale centered at Y = 101/265.				
NOTES				
<ol style="list-style-type: none"> 1. X, Y position values of design dependent data preceding the “/” are AU coordinates with respect to the origin being at the upper left corner of the CRT. X, Y position values following the “/” are the equivalent AU coordinates with the origin at the center of the CRT. 2. Vector AU coordinates for the VI scale specify the endpoints of the scales. 				

TABLE 4.2.39-5. INPUT FUNCTIONAL PARAMETERS FOR XXXXXX TRAJ 2 DISPLAY (PFS) (G6.53)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
A2_PRED_X_30	V94U1284C	ASC TRAJ 2 ALT/VEL PRED X POS_30	XXXXXX TRAJ DIP	AU	VAR		93012D	
A2_PRED_X_60	V94U1286C	ASC TRAJ 2 ALT/VEL PRED X POS_60	XXXXXX TRAJ DIP	AU	VAR		93012D	
A2_PRED_Y_30	V94U1285C	ASC TRAJ 2 ALT/VEL PRED Y POS_30	XXXXXX TRAJ DIP	AU	VAR		93012D	
A2_PRED_Y_60	V94U1287C	ASC TRAJ 2 ALT/VEL PRED Y POS_60	XXXXXX TRAJ DIP	AU	VAR		93012D	
A2_STATE_X	V94U1288C	ASC TRAJ 2 ALT/VEL X COORD	XXXXXX TRAJ DIP	AU	VAR		93012D	
A2_STATE_Y	V94U1289C	ASC TRAJ 2 ALT/VEL Y COORD	XXXXXX TRAJ DIP	AU	VAR		93012D	
A2_VI_X	V94U1290C	X COORD OF INERTIAL VELOCITY	XXXXXX TRAJ DIP	AU	VAR		93012D	
AUTO_2ND_OUT	V90X1744X	AUTO RECOG OF 2ND ENG OUT FLAG	ASC DAP		BD		93017G	*
CONT_2EO_ARM	V93X6680XA	CONTINGENCY 2-ENG OUT ARM FLAG	XXXXXX TRAJ 1 DISP		BD		93017G	*
CONT_2EO_ARM	V93X6680XB	CONTINGENCY 2-ENG OUT ARM FLAG	PW CONT GUID		BD		93017G	*
CONT_2EO_ARM	V93X6680XC	CONTINGENCY 2-ENG OUT ARM FLAG	XXXXXX TRAJ 2 DISP		BD		93017G	*
CONT_2EO_MODE	V90J2077C	CONTINGENCY 2-ENG OUT MODE INDEX	PW CONT GUID		HXS		93017G	*
CONT_2EO_START	V93X6681XA	CONTINGENCY 2-ENG OUT START FLAG	XXXXXX TRAJ 1 DISP		BD		93017G	*
CONT_2EO_START	V93X6681XB	CONTINGENCY 2-ENG OUT START FLAG	PW CONT GUID		BD		93090E	
CONT_2EO_START	V93X6681XC	CONTINGENCY 2-ENG OUT START FLAG	XXXXXX TRAJ 2 DISP		BD		93017G	*
CONT_3EO_MODE	V90J2088C	CONTINGENCY 3-ENG OUT MODE INDEX	PW CONT GUID		HXS		93017G	*
CONT_3EO_REGION	V90J0108C	CONTINGENCY 3 E/O REGION INDEX	CONT 3E/O GUID		BD		93017G	*
CONT_3EO_START	V90X0909X	CONTINGENCY 3 E/O START FLAG	CONT 3E/O GUID		BD		93017G	*
CONT_SERC	V93X6682X	CONT SINGLE ENG ROLL CNTL FLAG	XXXXXX TRAJ 1 DISP		BD		93017G	*
CONT_SERC	V93X6682XA	CONT SINGLE ENG ROLL CNTL FLAG	ASC DAP		BD		93017G	*
CONT_SERC	V93X6682XB	CONT SINGLE ENG ROLL CNTL FLAG	XXXXXX TRAJ 2 DISP		BD		93017G	*
CONT_YAW_ENA	V93X6600X	CONTINGENCY YAW ENABLE FLAG	XXXXXX TRAJ 1 DISP		BD		93017G	*
CONT_YAW_ENA	V93X6600XA	CONTINGENCY YAW ENABLE FLAG	XXXXXX TRAJ 2 DISP		BD		93017G	*
DISP_TITLE	V94J3910C	ASC DISPLAY DYNAMIC TITLE INTEGER	XXXXXX TRAJ DIP		BD		93012D	
DRP_ENA	V93X2932X	DROOP GUIDANCE ENABLE FLAG	XXXXXX TRAJ 1 DISP		BD		93017G	*
DRP_ENA	V93X2932XA	DROOP GUIDANCE ENABLE FLAG	XXXXXX TRAJ 2 DISP		BD		93017G	*
ENA_RCS_CNTL	V90X1739X	ENABLE RCS CONTROL DISCRETE	ASC DAP		BD		93017G	*
FIRST_EO_VI	V90L0480C	FIRST ENG OUT INERTIAL VELOCITY	XXXXXX TRAJ 1 DISP	FT/S	SPL		93017G	*
K_CMD	V90U1948CA	COMMANDED SSME THROTTLE SETTING	ASC 2STG GUID	PCT			93017G	*
K_CMD	V90U1948CE	COMMANDED SSME THROTTLE SETTING	SBTC SOP	PCT			93012D	
K_CMD	V90U1948CF	COMMANDED SSME THROTTLE SETTING	PW CONT GUID	PCT			93017G	*
ME1_FAIL_SHUTDOWN	V95X1207X	MPS E1 FAIL FLAG	SSME OPS		BD		93017G	*
ME2_FAIL_SHUTDOWN	V95X1208X	MPS E2 FAIL FLAG	SSME OPS		BD		93017G	*
ME3_FAIL_SHUTDOWN	V95X1209X	MPS E3 FAIL FLAG	SSME OPS		BD		93017G	*
MECO_CONFIRMED	V90X8561X	MECO CONFIRMED FLAG	SSME OPS		BD		93017G	*
PRED_DROOP_ALT	V90H8086C	PREDICTED MINIMUM DROOP ALTITUDE	ASC 2STG GUID	FT			93012D	

TABLE 4.2.39-5. INPUT FUNCTIONAL PARAMETERS FOR XXXXXX TRAJ 2 DISPLAY (PFS) (G6.53)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
PRPLT	V94U1325C	ET PROPELLANT REMAINING	XXXXXX TRAJ DIP	PCT	VAR		93012D	
SECOND_EO_VI	V90L3820C	SECOND ENG OUT INERTIAL VELOCITY	XXXXXX TRAJ 1 DISP	FT/S	SPL		93017G	*
SSME_FAILS	V90J1763C	SSME FAILURE STATUS FLAG	ASC DAP		HXS		93017G	*
S_BLANK_TMECO	V90X7001X	BLANK TMECO FIELD FLAG	PW CONT GUID		BD		93012D	
S_CDROOP	V90X8087X	DROOP CONTROL CMD	ASC 2STG GUID		BD		93017G	*
S_DRP_FLASH	V90X8088X	DROOP VIOLATION IND	ASC 2STG GUID		BD		93012D	
S_FCD	V90X2086XB	FINE COUNTDOWN IND	PW CONT GUID		BD		93012D	
S_MECO	V90X1963XB	FINE COUNT DOWN DISCRETE	ASC 2STG GUID				93017G	*
TGO	V90W1941CA	TIME TO GO TO VELOCITY CUTOFF	ASC 2STG GUID	S			93017G	*
TMET_MECO	V90W1970CA	PREDICTED SSME C/O TIME IN MET	ASC 2STG GUID				93017G	*
V_INERTIAL_MAG	V95L0510CA	MAG OF VEHICLE INERTIAL VELOCITY	ASC UPP	FT/S			93090E	
	V90X7556X	SEL ET SEP MNL ENABLE	GN&C SW RM		BD		93017G	*
	V90X8259X	ET AUTO SEP INHIBIT CREW ALERT	ET SEP SEQ		BD		93017G	*
	V94X4861X	ILL ENTRY MSG(XXXXXX TRAJ 2 DISP)	UI				93012D	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.39-6. OUTPUT FUNCTIONAL PARAMETERS FROM XXXXXX TRAJ 2 DISPLAY (PFS) (G6.53)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
CONT_2EO_ARM	V93X6680XC	CONTINGENCY 2-ENG OUT ARM FLAG	DL FMT 21/1 PW CONT GUID RTLS TRAJ 2 DISP XXXXXX TRAJ 2 DISP		BD		93017G	*
CONT_2EO_START	V93X6681XC	CONTINGENCY 2-ENG OUT START FLAG	A/E ATT PROC ASC BRG DISP ASC BRG SPEC DL FMT 21/1 GRTLS DAP HORIZ SIT DISP HORIZ SIT SPEC MSC PW CONT GUID RTLS TRAJ 2 DISP XXXXXX TRAJ 2 DISP		BD		93017G	*
CONT_SERC	V93X6682XB	CONT SINGLE ENG ROLL CNTL FLAG	ABT CNTL SEQ ASC 2STG GUID ASC DAP DL FMT 21/1 G/C STEER MSC RTLS TRAJ 2 DISP XXXXXX TRAJ 2 DISP		BD		93017G	*
CONT_YAW_ENA	V93X6600XA	CONTINGENCY YAW ENABLE FLAG	DL FMT 21/1 PW CONT GUID RTLS TRAJ 2 DISP XXXXXX TRAJ 2 DISP		BD		93017G	*
DRP_ENA	V93X2932XA	DROOP GUIDANCE ENABLE FLAG	ASC 2STG GUID DL FMT 21/A XXXXXX TRAJ 2 DISP		BD		93017G	*
FIRST_EO_VI	V90L0480CA	FIRST ENG OUT INERTIAL VELOCITY	DL FMT 21/1 RTLS TRAJ 2 DISP	FT/S	SPL		93017G	*
ORBITER_DUMP_ENA	V93X6980XE	ORBITER DUMP ENABLE	ABT CNTL SEQ OVERRIDE SPEC				93012D	
ORBITER_DUMP_INH	V93X6981XC	ORBITER DUMP INHIBIT	ABT CNTL SEQ				93012D	
PRPLT_DUMP_ARM	V93X5350XD	ORB PRPLNT DUMP ARM CMD	OVERRIDE DISP OVERRIDE SPEC				93012D	
PRPLT_DUMP_START	V93X5351XD	ORB PRPLNT DUMP START CMD	OVERRIDE DISP OVERRIDE SPEC				93012D	
PRPLT_DUMP_STOP	V93X5352XD	ORB PRPLNT DUMP STOP CMD	OVERRIDE DISP OVERRIDE SPEC				93012D	
SECOND_EO_VI	V90L3820CA	SECOND ENG OUT INERTIAL VELOCITY	DL FMT 21/1 RTLS TRAJ 2 DISP	FT/S	SPL		93017G	*
	V90M2965PF	CGGB_CGG_C01_FLAG_HALFWORD_2	DL FMT 21/A				93017G	*
	V99M1855PE	CONT MNVR DISCRETES	DL FMT 21/1				93017G	*

TABLE 4.2.39-6. OUTPUT FUNCTIONAL PARAMETERS FROM XXXXXX TRAJ 2 DISPLAY (PFS) (G6.53)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
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NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
 (HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

TABLE 4.2.39-7. XXXXXX TRAJ 2 DISPLAY (PFS) (G6.53) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
A2_CHAR_STRING(01,1)	V97U7309C	ND	CH		M	C	G6.53	00	DF2	93012D	
A2_CHAR_STRING(01,2)	V97U7310C	AU	I	S	M	C	G6.53	00	DAF	93012D	
A2_CHAR_STRING(01,3)	V97U7311C	AU	I	S	M	C	G6.53	00	DAF	93012D	
A2_CHAR_STRING(02,1)	V97U7312C	ND	CH		M	C	G6.53	00	DF2	93012D	
A2_CHAR_STRING(02,2)	V97U7313C	AU	I	S	M	C	G6.53	00	DAF	93012D	
A2_CHAR_STRING(02,3)	V97U7314C	AU	I	S	M	C	G6.53	00	DAF	93012D	
A2_CHAR_STRING(03,1)	V97U7315C	ND	CH		M	C	G6.53	00	DF2	93012D	
A2_CHAR_STRING(03,2)	V97U7316C	AU	I	S	M	C	G6.53	00	DAI	93012D	
A2_CHAR_STRING(03,3)	V97U7317C	AU	I	S	M	C	G6.53	00	DF2	93012D	
A2_CHAR_STRING(04,1)	V97U7318C	ND	SY		M	C	G6.53	00	DF2	93012D	
A2_CHAR_STRING(04,2)	V97U7319C	AU	I	S	M	C	G6.53	00	DAI	93012D	
A2_CHAR_STRING(04,3)	V97U7320C	AU	I	S	M	C	G6.53	00	DF2	93012D	
A2_CHAR_STRING(05,1)	V97U7321C	ND	CH		M	C	G6.53	00	DAI	93012D	
A2_CHAR_STRING(05,2)	V97U7322C	AU	I	S	M	C	G6.53	00	DF2	93012D	
A2_CHAR_STRING(05,3)	V97U7323C	AU	I	S	M	C	G6.53	00	DF2	93012D	
A2_CHAR_STRING(06,1)	V97U7324C	ND	CH		M	C	G6.53	00	DAI	93012D	
A2_CHAR_STRING(06,2)	V97U7325C	AU	I	S	M	C	G6.53	00	DAI	93012D	
A2_CHAR_STRING(06,3)	V97U7326C	AU	I	S	M	C	G6.53	00	DF2	93012D	
A2_CHAR_STRING(07,1)	V97U7327C	ND	SY		M	C	G6.53	00	DF2	93012D	
A2_CHAR_STRING(07,2)	V97U7328C	AU	I	S	M	C	G6.53	00	DAF	93012D	
A2_CHAR_STRING(07,3)	V97U7329C	AU	I	S	M	C	G6.53	00	DAF	93012D	
A2_SOLID_LINE(01,1)	V97U7369C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(01,2)	V97U7370C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(01,3)	V97U7371C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(01,4)	V97U7372C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(02,1)	V97U7373C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(02,2)	V97U7374C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(02,3)	V97U7375C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(02,4)	V97U7376C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(03,1)	V97U7377C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(03,2)	V97U7378C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(03,3)	V97U7379C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(03,4)	V97U7380C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(04,1)	V97U7381C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(04,2)	V97U7382C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(04,3)	V97U7383C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(04,4)	V97U7384C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(05,1)	V97U7385C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(05,2)	V97U7386C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(05,3)	V97U7387C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(05,4)	V97U7388C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(06,1)	V97U7389C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(06,2)	V97U7390C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(06,3)	V97U7391C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(06,4)	V97U7392C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(07,1)	V97U7393C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(07,2)	V97U7394C	AU	I	S	M	C	G6.53	00	DAN	93012D	

TABLE 4.2.39-7. XXXXXX TRAJ 2 DISPLAY (PFS) (G6.53) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
A2_SOLID_LINE(07,3)	V97U7395C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(07,4)	V97U7396C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(08,1)	V97U7397C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(08,2)	V97U7398C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(08,3)	V97U7399C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(08,4)	V97U7400C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(09,1)	V97U7401C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(09,2)	V97U7402C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(09,3)	V97U7403C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(09,4)	V97U7404C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(10,1)	V97U7405C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(10,2)	V97U7406C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(10,3)	V97U7407C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(10,4)	V97U7408C	AU	I	S	M	C	G6.53	00	DAN	93012D	
A2_SOLID_LINE(11,1)	V97U7409C	AU	I	S	M	C	G6.53	00	DAO	93012D	
A2_SOLID_LINE(11,2)	V97U7410C	AU	I	S	M	C	G6.53	00	DAO	93012D	
A2_SOLID_LINE(11,3)	V97U7411C	AU	I	S	M	C	G6.53	00	DAO	93012D	
A2_SOLID_LINE(11,4)	V97U7412C	AU	I	S	M	C	G6.53	00	DAO	93012D	
A2_SOLID_LINE(12,1)	V97U7413C	AU	I	S	M	C	G6.53	00	DAO	93012D	
A2_SOLID_LINE(12,2)	V97U7414C	AU	I	S	M	C	G6.53	00	DAO	93012D	
A2_SOLID_LINE(12,3)	V97U7415C	AU	I	S	M	C	G6.53	00	DAO	93012D	
A2_SOLID_LINE(12,4)	V97U7416C	AU	I	S	M	C	G6.53	00	DAO	93012D	
A2_SOLID_LINE(13,1)	V97U7417C	AU	I	S	M	C	G6.53	00	DAO	93012D	
A2_SOLID_LINE(13,2)	V97U7418C	AU	I	S	M	C	G6.53	00	DAO	93012D	
A2_SOLID_LINE(13,3)	V97U7419C	AU	I	S	M	C	G6.53	00	DAO	93012D	
A2_SOLID_LINE(13,4)	V97U7420C	AU	I	S	M	C	G6.53	00	DAO	93012D	
ENA_CONT_3EO_GUID	V97U8599C	ND	D		D	P	G3.3	00	A3E	93012D	
							G6.52				
							G6.53				
							G6.54				

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

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TABLE 4.2.39-8. XXXXXX TRAJ 2 DISPLAY (PFS) (G6.53) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.39-9. XXXXXX TRAJ 2 DISPLAY (PFS) (G6.53) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.40 RTLS TRAJ 2 (PFS)

TITLE: RTLS TRAJ2
TYPE: OPS/6011
AVAILABILITY: PFS, OPS 6

4.2.40.1 Purpose, Operation and Organization.

The RTLS TRAJ 2 display provides the crew with trajectory information during MM 601. This display comes up automatically at transition to MM 601 and stays up through ET separation until MM 602. This display also provides the crew with the capability to monitor the automated contingency abort mode processing for two and three main engine out failure scenarios and manual control to invoke the two-engine-out contingency abort. Display of the snapshot inertial velocities at the time of the first and second SSME failure is provided. In addition, it also allows the crew to manually initiate or terminate single engine roll control, and to enable or inhibit contingency yaw steering. When a second main engine failure is confirmed, the crew will not be able to terminate single engine roll control due to ASC DAP (4.176) and ABT CNTL SEQ (4.192) requirements, even though this item entry will be accepted on the display.

- (1) The central plot is a plot of the horizontal component of relative velocity vs altitude (H). The two lines in the center and left represent the preflight predicted boundaries for RTLS abort trajectories. A vertical line intersects the RTLS trajectories where the horizontal relative velocity is zero. The right most line is the nominal ascent profile line. The current vehicle state from navigation is shown by a moving, double overbright, and large up-pointing triangle. Predicted states in the figure are indicated by moving and overbright circles.
- (2) Associated with the central plot (same scale) are the $q = 2$ line and the $q = 10$ line. The $q = 2$ line is the altitude vs. velocity line which, if the vehicle is on or below this line, q is greater than 2. The $q = 10$ line is the altitude vs velocity line which, if the vehicle state is below this line, q will be greater than 10 PSF. These lines are ET separation constraints and while they are not mission dependent they are I-Loaded lines.
- (3) The scale across the top is delta range (ΔR). ΔR is defined as glide range potential based on mission-dependent energy state minus present range to the landing site, in nautical miles. Present ΔR is indicated by a moving, large, double overbright down pointing triangle which will not flash if offscale. A tic mark is placed on the scale where powered pitch down (PD) nominally occurs at \sim MECO – 20 secs, and a second tic is placed where PD occurs for the 3 engine RTLS case. A tic mark (CO) is also placed where MECO occurs. A four character field “FINE” shall be displayed to indicate when guidance is in fine countdown (\sim PD – 6 sec).
- (4) “ET SEP INH” shall be displayed, double overbright, in the upper XXXXXXXXXXXX position if the ET AUTO SEP INHIBIT CREW ALERT discrete (V90X8259X) is set by the ET SEP sequencer. “ET SEP MAN” shall be displayed, double overbright, in the lower XXXXXXXXXXXX position if the SEL ET SEP MNL ENABLE discrete (V90X7556X) is set by GN&C Switch RM.
- (5) The following digital readouts shall be displayed:

PRPLT XX - Percent propellant remaining in the ET (%).

TMECO XX:XX - Predicted time of MECO from PW RTLS GUID (4.4) or PW CONT GUID (4.5) in minutes and seconds from lift off. This data field shall be blanked whenever a contingency abort is initiated except for a Contingency Abort Mode 5.

THROT XXX - Percent commanded throttle level (%) to the engines (K_CMD) (V90U1948C) from PW RTLS GUID (4.4), PW CONT GUID (4.5), or SBTC SOP (4.55).

TGO XX:XX - Time to go to MECO in minutes and seconds. This data field shall be blanked whenever a contingency abort is initiated except for a Contingency Abort Mode 5.

- (6) The value of the guidance status parameter (GUID XXXX) provides an indication of the status of the guidance solution prior to powered pitcharound. The value of GUID XXXX is a mnemonic or a 3 digit integer.
 - a. "GUID INIT" will be displayed until RTLS guidance initialization is complete.
 - b. When guidance has converged and the vehicle is progressing to the powered pitcharound point, GUID XXXX displays the percent deviation of the predicted final mass from the RTLS mass target. As the pitcharound point is approached, this numeric value will decrement to zero. The numeric shall be left justified in the XXXX field, for example "GUID 23".
 - c. If guidance is unconverged or if powered pitcharound has been delayed because of an attitude violation, GUID INHB will be displayed to indicate that powered pitcharound is inhibited.
 - d. At the beginning of powered pitcharound, "GUID PPA" will be displayed and the field will be frozen.
- (7) The following information and crew item entry controls shall be provided to support the automated contingency abort processing which is a function of the main engine(s) failure scenario.
 - a. The type of contingency abort (XXXX ABORT) shall be displayed as a character string. The type of abort is determined by the guidance principal functions and displayed as "CONT" or "RTLS" to the left of background nomenclature word "ABORT".
 - b. For the three-engine-out contingency abort mode (3EO), a character field shall display a color word describing the contingency abort mode region. The color word shall be displayed cyclically, but there shall be two different ways of determining how the 3EO color word will be displayed.

The first way shall be when the ENA_CONT_3EO_GUID flag (an I-Load) is set ON. This flag enables Contingency 3EO Guidance which calculates a region index (CONT_3EO_REGION) which shall determine the appropriate color to display for automatic contingency 3EO maneuvers. Based on this index, the color to be displayed shall be one of the following:

(BLANK), BLUE, GREEN, ORANGE, YELLOW, or RED

The displayed 3EO color word shall be independent of the type of contingency abort (XXXX ABORT) described in (7a) above.

When ENA_CONT_3EO_GUID = ON, the function of Contingency 3EO guidance shall normally only be to compute the current value of the 3EO region index. If three SSME's fail requiring a contingency abort (CONT_3EO_START = ON), the 3EO color word field (3EO XXXXXX) shall be displayed double overbright to indicate the automatic maneuver is actually being performed. When CONT_3EO_START = ON, the 2EO color word field (2EO XXXXXX), see (7c) and (7d) below) shall become static. The intensity of the 2EO color word field shall also become static.

The second way of displaying the 3EO color word shall be when the ENA_CONT_3EO_GUID flag is set to OFF. This will only occur if it has been determined pre-flight to disable the automatic 3EO maneuver logic. In this case, the crew will have to perform manual 3EO procedures. These procedures are different than the automatic maneuvers and the index that determines the 3EO color word is also different for this case. If ENA_CONT_3EO_GUID = OFF, the 3EO color field shall be based on the CONT_3EO_MODE index computed by Powered Contingency Guidance and the type of contingency abort (SMODE) described in (7a) above. The displayed color word shall be one of the following:

<u>Type Abort</u>	<u>Color Word Character String to be Displayed</u>
CONT	(BLANK), BLUE, or GREEN
RTLS	(BLANK), BLUE, YELLOW, ORANGE, or GREEN

When ENA_CONT_3EO_GUID = OFF, the 3EO color word shall be displayed at normal intensity.

- c. For the two-engine-out contingency abort mode (2EO), a character field shall display a color word describing the contingency abort mode region. The color word to be displayed cyclically is a function of the type of abort and shall be based on the combination of the current values for SMODE and CONT_2EO_MODE to display one of the following:

<u>Type Abort</u>	<u>Color Word Character String to be Displayed</u>
CONT	(BLANK), BLUE, or GREEN
RTLS	(BLANK), BLUE, YELLOW, ORANGE, GREEN, or RED

- d. Item 2 (ARM) allows the crew to toggle the abort "ARM" on or off for the contingency abort processing based on the two-engine-out contingency abort mode displayed. In certain RTLS cases powered contingency guidance can automatically set item 2. Arming the selected abort mode shall be indicated by displaying an asterisk to the right of item 2 and by setting the two-engine-out contingency abort mode region color word (2EO XXXXXX) field double overbright. When item 2 execution results in setting the "ARM" to off the two-engine-out contingency abort mode region color word (2EO XXXXXX) shall be displayed at normal intensity and the asterisk next to item 2 blanked.

If item 2 is executed when the CONT_2EO_MODE is equal to zero (2EO color word is BLANK), the input shall be rejected and an "ILLEGAL ENTRY" CRT message output.

- e. Item 4 (ABORT) allows the crew to invoke the automated contingency abort as indicated by the two-engine-out contingency mode region color word which is displayed double overbright when armed via item 2. An asterisk shall appear to the right of item 4 when it is successfully executed by the crew, otherwise it shall remain blank.

For the item 4 EXEC to be legal, item 2 must have been executed and CONT_2EO_ARM must have been set on. If item 4 EXEC is performed and CONT_2EO_ARM = OFF, an "ILLEGAL ENTRY" message shall be displayed and the input rejected as an operator error.

If item 4 EXEC is performed and CONT_2EO_ARM = ON, then CONT_2EO_START shall be set on and CONT_SERC shall be set to on. Also PRPLT_DUMP_ARM and PRPLT_DUMP_START shall both be set on, and PRPLT_DUMP_STOP shall be set off. In addition the ORBITER_DUMP_ENA shall be set on and the ORBITER_DUMP_INH shall be set off. An asterisk shall be displayed next to item 4 indicating the abort mode has been invoked. The two-engine-out contingency abort mode region color word character string shall become static and remain double overbright.

The three-engine-out contingency abort mode region color word character string shall continue to update cyclically when CONT_2EO_START is set to ON and ENA_CONT_3EO_GUID = ON. The three-engine-out contingency abort mode region color word character string shall become static when CONT_2EO_START is set to ON and ENA_CONT_3EO_GUID = OFF.

A two-engine-out contingency abort maneuver shall be initiated automatically by PW CONT GUID (4.5) if a second SSME is confirmed failed and the two-engine-out mode color word is "ORANGE", or if the two-engine-out mode color word is "YELLOW" and the horizontal downrange velocity is low enough, as determined by PW CONT GUID (4.5). In addition, a single-engine RTLS completion contingency abort mode (RTLS RED) shall be initiated automatically by PW CONT GUID (4.5) if 2 SSME's are confirmed failed and the two-engine-out mode color word is "RED". Automatic initiation of these modes shall be indicated by the two-engine-out contingency abort mode region color word character string being displayed double overbright and static and an asterisk shall be displayed next to item 2 and item 4. When automatic initiation occurs and ENA_CONT_3EO_GUID = ON, the three-engine-out contingency abort mode region color word character string shall continue to update cyclically. When automatic initiation occurs and ENA_CONT_3EO_GUID = OFF, the three-engine-out contingency abort mode region color word character string shall become static.

Once item 4 and item 2 have been correctly executed (either manual or auto), any further attempt to execute items 2 or 4 shall result in an "ILLEGAL ENTRY" message and the input shall be rejected as an operator error.

- (8) Item 5 (YAW STEER) shall provide status of the Yaw Steering configuration by displaying the character string "ENA" or "INH" to the right of the item number. This item allows the crew to toggle the yaw steering configuration. This item shall be updated cyclically based on CONT_YAW_ENA changes. Each execution of item 5 shall cause the discrete CONT_YAW_ENA to toggle on or off to enable/inhibit the yaw steering capability.

Once item 4 and item 2 have been correctly executed (either manual or auto), any further attempt to execute item 5 shall result in an "ILLEGAL ENTRY" message and the input shall be rejected as an operator error.

- (9) Item 6 (SERC) provides the capability to toggle the "SINGLE ENGINE ROLL CONTROL" configuration. An asterisk shall be displayed after the item number based on CONT_SERC = ON. If CONT_SERC = OFF, the asterisk shall be blanked. Each execution of the item 6 control shall cause the discrete CONT_SERC to toggle on or off. The Ascent DAP can set CONT_SERC = ON, one time only, if sensed acceleration drops below a threshold value. For this case, the asterisk shall be displayed next to item 6 (SERC) and the toggle function shall be valid.

The character string "ON" shall be displayed double overbright to the right of "SERC" when the discrete ENA_RCS_CNTL = ON. Otherwise the character string shall be blanked.

- (10) The inertial velocity in feet per second at the time the first main engine failure is confirmed shall be displayed. Both the nomenclature character string and data field shall remain blank until one or more of the three main engine fail shutdown discretely is set on by SSME OPS at which time the V_INERTIAL_MAG is snapshot for display and TLM as the FIRST_EO_VI. The character string "1ST EO VI" and FIRST_EO_VI value shall be displayed continuously until transition to MM 602. If the FIRST_EO_VI value is already set prior to MM 601, the character string "1ST EO VI" and FIRST_EO_VI value shall be displayed continuously throughout MM 601.
- (11) The inertial velocity in feet per second at the time the second main engine failure is confirmed shall be displayed below the first EO velocity. Both the double overbright nomenclature character string and inertial velocity in feet per second after a second main engine failure is confirmed shall remain blank until the second SSME failure is recognized by ASC_RECON via SSME failure shutdown discretely or the automatic second SSME failure recognition logic. At which time, the V_INERTIAL_MAG is snapshot for display and TLM as the SECOND_EO_VI. The character string "2ND EO VI" and SECOND_EO_VI value shall be displayed continuously in double overbright until transition to MM 602. If the SECOND_EO_VI value is already set prior to MM 601, the character string "2ND EO VI" and SECOND_EO_VI value shall be displayed continuously in double overbright throughout MM 601.
- (12) The only functional item entries on this display are 2, 4, 5, and 6. Execution of any other item number shall result in an operator error and output the "ILLEGAL ENTRY" CRT messages.

4.2.40.2 RTLS TRAJ 2 (PFS) Keyboard Processing Addendum

- A. Item 2 shall be a toggle function. Each execution of item 2 shall toggle the CONT_2EO_ARM (V93X6680X) discrete and send it to PW CONT GUID (4.5), TLM, and CRT (6.54)

Upon execution of item 2 when CONT_2EO_MODE(V90J2077C) = 0 (ZERO) then an "ILLEGAL ENTRY" message shall be displayed and the input shall be rejected as an operator error.

Upon execution of item 4 when CONT_2EO_ARM(V93X6680X) = OFF then an “ILLEGAL ENTRY” message shall be displayed and the input shall be rejected as an operator error.

Upon execution of item 4 when CONT_2EO_ARM(V93X6680X) = ON the following functions shall be performed:

IF CONT_2EO_ARM(V93X6680X) = ON

THEN SET CONT_2EO_START(V93X6681X) = ON

Destinations for the CONT_2EO_ARM(V93X6680X) are PW CONT GUID (4.5), TLM, and CRT (6.54). Destinations for the CONT_2EO_START(V93X6681X) are GRTLS DAP (4.227), PW CONT GUID (4.5), MSC, TLM, HORIZ SIT DISP (6.21), HORIZ SIT SPEC FUNCTION (5.7), A/E ATT PROC (4.226) and CRT (6.54).

AND SET CONT_SERC(V93X6682X) = ON

Destinations are ASC DAP (4.176), ABT CNTL SEQ (4.192), TLM, MSC, CRT (6.54) and GC STEER (4.175).

AND SET PRPLT_DUMP_ARM(V93X5350X) = ON

SET PRPLT_DUMP_START(V93X5351X) = ON

SET PRPLT_DUMP_STOP(V93X5352X) = OFF

Destinations for all three are OVERRIDE SPEC FUNCTION (5.21) and OVERRIDE DISPLAY (6.47).

AND SET ORBITER_DUMP_ENA(V93X6980X) = ON

SET ORBITER_DUMP_INH(V93X6981X) = OFF

Destinations for ORBITER_DUMP_ENA(V93X6980X) are ABT CNTL SEQ (4.192) and OVERRIDE SPEC FUNCTION (5.21).

Destination for ORBITER_DUMP_INH(V93X6981X) is ABT CNTL SEQ (4.192).

IF CONT_2EO_START(V93X6681X) = ON

THEN execution of items 2 and 4 shall become illegal and if executed an “ILLEGAL ENTRY” message shall be displayed and the input shall be rejected as an operator error.

- B. Item 5 shall be a toggle function. Each execution of item 5 shall cause the discrete CONT_YAW_ENA(V93X6600X) to toggle on or off to enable/inhibit the yaw steering capability.

IF CONT_2EO_START(V93X6681X) = ON

THEN execution of item 5 shall become illegal and if executed an “ILLEGAL ENTRY” message shall be displayed and the input shall be rejected as an operator error.

Destinations for CONT_YAW_ENA(V93X6600X) are PW CONT GUID (4.5), TLM, and CRT (6.54).

- C. Item 6 shall be a toggle function. Each execution of item 6 shall cause the discrete CONT_SERC(V93X6682X) to toggle on or off to control the single engine roll control capability.

Destinations for CONT_SERC(V93X6682X) are ASC DAP (4.176), ABT CNTL SEQ (4.192), TLM, MSC, CRT (6.54) and GC STEER (4.175).

4.2.40.3 RTLS TRAJ 2 PFS CRT Display Processing Addendum

All necessary processing for dynamic symbols on this display are defined in the Section B.4.160 (XXXXXX TRAJ DIP) of this FSSR.

- A. Time of MECO. Time of MECO in seconds input from PW RTLS GUID (4.4) or PW CONT GUID (4.5) shall be converted and displayed in minutes and seconds from liftoff.

IF S_BLANK_TMECO(V90X7001X) = ON

Then the time of MECO (TMECO) data field shall be blanked.

Source for S_BLANK_TMECO(V90X7001X) is PW CONT GUID (4.5).

- B. ET SEP Inhibit and Manual Flags. When the ET AUTO SEP INHIBIT CREW ALERT discrete (V90X8259X) is set ON by the ET SEP sequencer, “ET SEP INH” will be displayed double overbright. When the SEL ET SEP MNL ENABLE discrete (V90X7556X) is set ON by GN&C SWITCH RM, “ET SEP MAN” will be displayed double overbright.
- C. Vehicle Current Position. Display the “up-pointing triangle” (symbol, 7F) double overbright at the location specified by dynamic data.
- D. Vehicle Predicted Position. Display a circle with a radius of 5 AUs double overbright at the location specified by dynamic data for both the 30 and 60 second predictors.
- E. ΔR Scale. Display the “down-pointing triangle” (symbol, 06) double overbright specified by a variable X position and a constant Y position.
- F. Contingency Abort Type Character String. The character string to be displayed shall be determined as follows:

<u>Value of SMODE</u>	<u>Character String to be Displayed</u>
1	CONT
5	RTLS

Source for SMODE(V94J3779C) is PW RTLS GUID (4.4). The character string shall be initialized to “CONT”.

- G. 3EO Abort Region Color Word Character String. The MSID for ENA_CONT_3EO_GUID is V97U8599C. The MSID for CONT_3EO_START is V90X0909X.

When ENA_CONT_3EO_GUID = ON, the logic is as follows:

CONT_3EO_REGION (V90J0108C)	Character String To Be Displayed
-1	BLUE
102	BLUE
1	GREEN
2	ORANGE
3	YELLOW
4	RED
0	(BLANK)

If CONT_3EO_START = OFF, the 3EO contingency abort color word character string shall be displayed at normal intensity and continue to be updated cyclically.

If CONT_3EO_START = ON, the 3EO contingency abort color word character string shall be displayed double overbright and continue to be updated cyclically. When CONT_3EO_START = ON, the 2EO color word field shall become static. The intensity of the 2EO color word field shall also become static.

Source for CONT_3EO_REGION and CONT_3EO_START is CONT 3EO GUID (4.6).

When ENA_CONT_3EO_GUID = OFF, the logic is as follows:

Value of SMODE (V94J3779C)	Value of CONT_3EO_MODE (V90J2088C)	Character String To Be Displayed
1	1	BLUE
1	2	GREEN
1	0	(BLANK)
5	1	BLUE
5	2	YELLOW
5	3	ORANGE
5	4	GREEN
5	0	(BLANK)

When ENA_CONT_3EO_GUID = OFF, the 3EO contingency abort color word character string shall be displayed at normal intensity and continue to be updated cyclically.

Source for SMODE(V94J3779C) is PW RTLS GUID (4.4). Source for CONT_3EO_MODE(V90J2088C) is PW CONT GUID (4.5).

When ENA_CONT_3EO_GUID = OFF, the following shall apply:

If CONT_2EO_ARM(V93X6680X) = ON
AND CONT_2EO_START(V93X6681X) = ON
THEN the 3EO contingency abort region color word character string shall become static, i.e., no longer cyclically updated.

Sources for CONT_2EO_ARM(V93X6680X) and CONT_2EO_START(V93X6681X) are PW CONT GUID (4.5) and KEYBOARD (6.54).

H. 2EO Contingency Abort Region Color Word Character String and Item 2 (ARM) and Item 4 (ABORT) Indicators.

The character string to be displayed shall be displayed at normal intensity and determined from the combination logic in the following table:

Value of SMODE (V94J3779C)	Value of CONT_2EO_MODE (V90J2077C)	Character String To Be Displayed
1	0	(BLANK)
1	1	BLUE
1	2	GREEN
5	0	(BLANK)
5	1	BLUE
5	2	YELLOW
5	3	ORANGE
5	4	GREEN
5	5	RED

Source for SMODE(V94J3779C) is PW RTLS GUID (4.4). Source for CONT_2EO_MODE(V90J2077C) is PW CONT GUID (4.5).

- IF CONT_2EO_ARM(V93X6680X) = ON
 THEN the 2EO contingency abort mode region color word character string shall be displayed double overbright.
 AND an Asterisk shall be displayed next to item 2.
- IF CONT_2EO_ARM(V93X6680X) = ON
 AND CONT_2EO_START(V93X6681X) = ON
 THEN the 2EO contingency abort region color word character string shall become static, i.e., no longer cyclically updated, and shall remain double overbright.
 AND an Asterisk shall be displayed next to item 4.
- IF CONT_2EO_ARM(V93X6680X) = OFF
 THEN the 2EO contingency abort mode region color word character string shall be displayed at normal intensity.
 AND the Asterisk shall be blanked next to item 2.

Sources for CONT_2EO_ARM(V93X6680X) and CONT_2EO_START(V93X6681X) are PW CONT GUID (4.5) and KEYBOARD (6.52, 6.53, or 6.54).

I. SERC Status.

IF ENA_RCS_CNTL(V90X1739X) = ON
 THEN the status character string "ON" shall be displayed double overbright, otherwise this field shall be blanked.

J. First Inertial Velocity Nomenclature Character String and Data.

IF (ME1_FAIL_SHUTDOWN(V95X1207X) = ON
OR ME2_FAIL_SHUTDOWN(V95X1208X) = ON
OR ME3_FAIL_SHUTDOWN(V95X1209X) = ON)
THEN display the nomenclature character string "1ST EO VI"

AND SET FIRST_EO_VI(V90L0480C) = V_INERTIAL_MAG(V95L0510C)
(one time snapshot) for display and TLM if not already set; otherwise, display
FIRST_EO_VI.

The nomenclature character string and FIRST_EO_VI value shall continue to be displayed until transition to MM 602.

ELSE blank the nomenclature character string field and inertial velocity data field

Source for ME1_FAIL_SHUTDOWN(V95X1207X), ME2_FAIL_SHUTDOWN(V95X1208X) and ME3_FAIL_SHUTDOWN(V95X1209X) is SSME OPS (4.165).

Source for V_INERTIAL_MAG(V95L0510C) is RTLS UPP (4.20).

K. Second Inertial Velocity Nomenclature Character String and Data.

IF (AUTO_2ND_OUT (V90X1744X) OR (SSME_FAILS (V90J1763C) > 3 AND
SSME_FAILS (V90J1763C) < 7))

THEN display the nomenclature character string "2ND EO VI" at double overbright intensity.
AND SET SECOND_EO_VI (V90L3820C) = V_INERTIAL_MAG(V95L0510C)
(one time snapshot) for display (at double overbright intensity) and TLM if not already
set; otherwise, display SECOND_EO_VI (at double overbright intensity).

The nomenclature character string and SECOND_EO_VI value shall continue to be displayed in double overbright until transition to MM 602.

ELSE blank the nomenclature character string field and inertial velocity data field

Source for SSME_FAILS(V90J1763C) and AUTO_2ND_OUT(V90X1744X) is ASC DAP (4.176).

Source for V_INERTIAL_MAG(V95L0510C) is RTLS UPP (4.20).

L. FINE Countdown Indicator. The character string "FINE" shall be displayed when S_FCD (V90X2086X) = ON.

Sources for S_FCD(V90X2086X) are PW RTLS GUID (4.4) and PW CONT GUID (4.5).

M. Time to go to MECO (TGO). TIME TO GO TO ENGINE CUTOFF RTLS (V90W1921C) is computed by subtracting CLOCKTIME(V91W5000C) minus T_GMTLO(V90W4380C) from TMET_MECO(V90W1970C) as follows:

TIME TO GO TO ENGINE CUTOFF RTLS = TMET_MECO – (CLOCKTIME -
T_GMTLO)

Source for CLOCKTIME(V91W5000C) and T_GMTLO(V90W4380C) is FCOS. Sources for TMET_MECO(V90W1970C) are PW RTLS GUID (4.4) and PW CONT GUID (4.5).

IF S_BLANK_TMECO(V90X7001X) = ON

Then the time to go to MECO (TGO) data field shall be blanked.

Source for S_BLANK_TMECO(V90X7001X) is PW CONT GUID (4.5).

- N. Throttle Setting. The source for K_CMD (V90U1948C) is PW RTLS GUID (4.4), PW CONT GUID (4.5), or SBTC SOP (4.55).

4.2.40.4 RTLS TRAJ 2 Figure/Table References

Figure 4.2.40-1 RTLS TRAJ 2 Display (PFS) Generic

Table 4.2.40-1 Keyboard Processing Table

Table 4.2.40-2 CRT Display Processing Table

Table 4.2.40-3 CRT Display Processing Background Requirements, Design Dependent

Table 4.2.40-4 Mission Design Background Constants N/A

Table 4.2.40-5 Input Functional Parameters

Table 4.2.40-6 Output Functional Parameters

Table 4.2.40-7 I-Loads

Table 4.2.40-8 K-Loads

Table 4.2.40-9 Constants

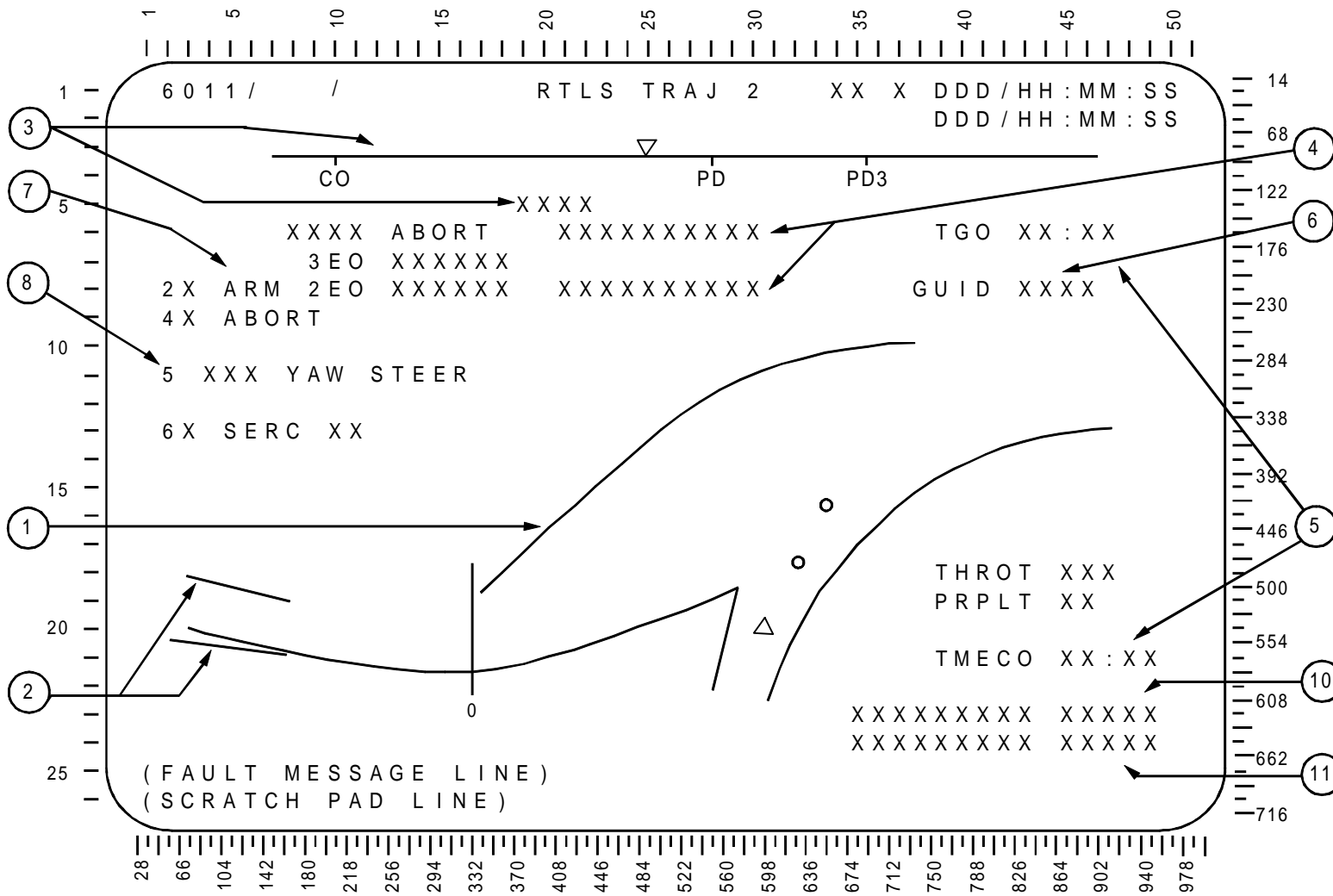


FIGURE 4.2.40-1 RTLS TRAJ 2 Display (PFS) Generic

Table 4.2.40-1. RTLS TRAJ 2 (PFS) KEYBOARD PROCESSING													
Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D I K E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T	
							MIN	MAX					
001	2X ARM	V93X6680X	0.0	CTRL			2		A	ADDENDUM	CONTINGENCY 2-ENG OUT ARM FLAG		
002	4X ABORT	V93X6681X	0.0	CTRL			4		A	ADDENDUM	CONTINGENCY 2-ENG OUT START FLAG		
003	5 XXX YAW STEER	V93X6600X	0.0	CTRL			5		B	ADDENDUM	CONTINGENCY YAW ENABLE FLAG		
004	6X SERC	V93X6682X	0.0	CTRL			6		C	ADDENDUM	CONT SINGLE ENG ROLL CNTL FLAG		

Table 4.2.40-2. RTLS TRAJ 2 (PFS) CRT DISPLAY PROCESSING																									
Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T U S	B L A N K	S I Z E	I N T E N S	F L A S H	R A T E	S I G N	L E A D E R	B R A N C H	D W N L S T	Add Ref	Source	Nomenclature	C R T		
			X	Y		CHAR	BILEVEL																	TYPE	
							1	0																	
001	(OPS)	V93X0040X	2	1		5.0															UI	OPS FUNCTION PAGE	X		
002	(SPEC)	V93X0042X	7	1		4.0																UI	SPEC FUNCTION PAGE	X	
003	(DISP)	V93X0044X	11	1		4.0																UI	DISPLAY FUNCTION PAGE	X	
004	(UL)	V92X5032X	34	1		2.0	UL							X								UI	UPLINK ACTIVITY IND	X	
005	(GPC)	V93X0048X	36	1		2.0																UI	GPC DRIVER	X	
006	(MT)	V91W1990C	39	1		12.0																A	FCOS	MISSION ELAPSED TIME	X
007	(CRT TIMER)	V91W1987C	39	2		12.0																A	FCOS	DISPLAY CRT TIMER,GNC	X
008	TMECO XX:XX	V90W1970C	45	21		5.0				X												A	ADDENDUM	PREDICTED SSME C/O TIME IN MET	X
009	GUIDXXXX (CHAR STRG)	V94J1366C	43	8		4.0																B	XXXXXX TRAJ DIP	RTLS GUID STATUS-CHAR STRING	
010	GUIDXXXX (DEC VAL)	V94G1367C	43	8		4.0																B	XXXXXX TRAJ DIP	RTLS GUID STATUS-DECIMAL VAL	
011	PRPLT XX	V94U1325C	44	19		3.0																A	XXXXXX TRAJ DIP	ET PROPELLANT REMAINING	X
012	XXXXXXXXXX (ET SEP INH)	V90X8259X	21	6		10.0	ET SEP INH						X									B	ET SEP SEQ	ET AUTO SEP INHIBIT CREW ALERT	
013	XXXXXXXXXX (ET SEP MAN)	V90X7556X	21	8		10.0	ET SEP MAN						X									B	GN&C SW RM	SEL ET SEP MNL ENABLE	

Table 4.2.40-2. RTLS TRAJ 2 (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		ITEM NO	Format			UNITS	STATUS	BLANK	SIZE	INTELS	FLASH	RATE	SIGN	LEADER	BRANCH	DOWNLIST	Add Ref	Source	Nomenclature	CRT	
			X	Y		CHAR	BILEVEL																	TYPE
							1	0																
014	THROT XXX	V90U1948C	44	18		4.0			DEC	PCT										N	ADDENDUM	COMMANDED SSME THROTTLE SETTING		
015	TGO XX:XX	V90W1921C	43	6		5.0			CHAR	MS										M	ADDENDUM	TIME TO GO TO ENGINE CUTOFF RTLS		
016	(CUR VEH X POS)	V94U1322C							DEC			X	X							C	XXXXXX TRAJ DIP	ALT/VEL X COORD	X	
017	(CUR VEH Y POS)	V94U1323C							DEC			X	X							C	XXXXXX TRAJ DIP	ALT/VEL Y COORD	X	
018	(PRED VEH X1 POS)	V94U1321C							DEC				X							D	XXXXXX TRAJ DIP	ALT VEL PRED X POS 1	X	
019	(PRED VEH Y1 POS)	V94H1326C							DEC				X							D	XXXXXX TRAJ DIP	ALT/VEL PRED Y POS 1	X	
020	(X POS OF DELTA R)	V94U1324C							DEC			X	X		F					E	XXXXXX TRAJ DIP	X COORD OF DELTA RANGE	X	
021	(PRED VEH X2 POS)	V94J1335C							DEC				X							D	XXXXXX TRAJ DIP	ALT/VEL PRED X POS 2	X	
022	(PRED VEH Y2 POS)	V94J1336C							DEC				X							D	XXXXXX TRAJ DIP	ALT/VEL PRED Y POS 2	X	
023	FINE	V90X2086X	19	5		4.0	FINE		BLVL											L	ADDENDUM	FINE COUNTDOWN IND	X	
024	XXXX ABORT	V94J3779C	8	6		4.0			CHAR						A					F	ADDENDUM	GUIDANCE MODE INDICATOR		
025	3 EO XXXXXX	ADDENDUM	13	7		6.0			CHAR		X	X		A						G	ADDENDUM	3 ENG OUT ABORT COLOR CHAR STRING		
026	2 EO XXXXXX	ADDENDUM	13	8		6.0			CHAR		X	X		A						H	ADDENDUM	2 ENG OUT ABORT COLOR CHAR STRING		
027	2X ARM	V93X6680X	3	8		1.0	*		BLVL		X			A				X	H	ADDENDUM	CONTINGENCY 2-ENG OUT ARM FLAG			
028	4X ABORT	V93X6681X	3	9		1.0	*		BLVL		X			A				X	H	ADDENDUM	CONTINGENCY 2-ENG OUT START FLAG			
029	5 XXX YAW STEER	V93X6600X	4	11		3.0	ENA	INH	BLVL					A				X	X	KYBD	ADDENDUM	CONTINGENCY YAW ENABLE FLAG		
030	6X SERC	V93X6682X	3	13		1.0	*		BLVL		X			A				X	X	KYBD, ASC	ADDENDUM	CONT SINGLE ENG ROLL CNL FLAG		
031	SERC XX	V90X1739X	10	13		2.0	ON		BLVL		X	X		A				X	I	ASC DAP	ADDENDUM	ENABLE RCS CONTROL DISCRETE		
032	XXXXXXXXXX (1ST EO VI)	ADDENDUM	35	23		9.0			CHAR		X			A					J	ADDENDUM	ADDENDUM	FIRST EO VI NOMENCLATURE CHAR STRING		
033	XXXXX (FIRST EO VI)	V90L0480C	44	23		6.0			DEC	FPS	X			A				X	J	ADDENDUM	ADDENDUM	FIRST ENG OUT INERTIAL VELOCITY		
034	XXXXXXXXXX (2ND EO VI)	ADDENDUM	35	24		9.0			CHAR		X	X		A					K	ADDENDUM	ADDENDUM	SECOND EO VI NOMENCLATURE CHAR STRING		
035	XXXXX (SECOND EO VI)	V90L3820C	44	24		6.0			DEC	FPS	X	X		A				X	K	ADDENDUM	ADDENDUM	SECOND ENG OUT INERTIAL VELOCITY		
036	(MSG LINE)	V93X0050X	1	25		44.0			CHAR					G						UI	ADDENDUM	MESSAGE LINE	X	
037	(BUFFER MSG)	V93X0054X	45	25		4.0			CHAR					G						UI	ADDENDUM	BUFFER MESSAGE INDICATOR	X	
038	(SPL)	V93X0056X	2	26		49.0			CHAR					G						UI	ADDENDUM	SCRATCH PAD LINE	X	

Table 4.2.40-3. RTLS TRAJ 2 CRT DISPLAY PROCESSING BACKGROUND REQUIREMENTS, DESIGN DEPENDENT				
VECTORS				
VECTOR ID	ORIGIN		TERMINAL	
	X(AU)	Y(AU)	X(AU)	Y(AU)
ΔR scale	136/-376	95/271	936/424	95/271
CHARACTER STRINGS				
CHARACTER STRING ID	ORIGIN			
	X(AU)		Y(AU)	
ΔR scale symbols	CO CO tick mark vertical symbol (symbol 18)		227/-285 236/-276	118/248 104/262
Design dependent location of dynamic symbol: Down-pointing triangle (symbol 06) on ΔR scale centered @ $Y = 86/280$				
NOTES				
1. X, Y position values of design dependent data preceding the “/” are AU coordinates with respect to the origin being at the upper left corner of the CRT. X, Y position values following the “/” are the equivalent AU coordinates with the origin at the center of the CRT.				
2. Vector AU coordinates for the ΔR scale specify the endpoints of the scale.				

TABLE 4.2.40-5. INPUT FUNCTIONAL PARAMETERS FOR RTLS TRAJ 2 DISPLAY (PFS) (G6.54)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
AUTO_2ND_OUT	V90X1744X	AUTO RECOG OF 2ND ENG OUT FLAG	ASC DAP		BD		93017G	*
CLOCK/CLOCKTIME	V91W5000C	CLOCK-COMPUTER(GMT)	FCOS	S			93160B	*
CONT_2EO_ARM	V93X6680XA	CONTINGENCY 2-ENG OUT ARM FLAG	XXXXXX TRAJ 1 DISP		BD		93017G	*
CONT_2EO_ARM	V93X6680XB	CONTINGENCY 2-ENG OUT ARM FLAG	PW CONT GUID		BD		93017G	*
CONT_2EO_ARM	V93X6680XC	CONTINGENCY 2-ENG OUT ARM FLAG	XXXXXX TRAJ 2 DISP		BD		93017G	*
CONT_2EO_ARM	V93X6680XD	CONTINGENCY 2-ENG OUT ARM FLAG	RTLS TRAJ 2 DISP		BD		93017G	*
CONT_2EO_MODE	V90J2077C	CONTINGENCY 2-ENG OUT MODE INDEX	PW CONT GUID		HXS		93017G	*
CONT_2EO_START	V93X6681XA	CONTINGENCY 2-ENG OUT START FLAG	XXXXXX TRAJ 1 DISP		BD		93017G	*
CONT_2EO_START	V93X6681XB	CONTINGENCY 2-ENG OUT START FLAG	PW CONT GUID		BD		93090E	
CONT_2EO_START	V93X6681XC	CONTINGENCY 2-ENG OUT START FLAG	XXXXXX TRAJ 2 DISP		BD		93017G	*
CONT_2EO_START	V93X6681XD	CONTINGENCY 2-ENG OUT START FLAG	RTLS TRAJ 2 DISP		BD		93017G	*
CONT_3EO_MODE	V90J2088C	CONTINGENCY 3-ENG OUT MODE INDEX	PW CONT GUID		HXS		93017G	*
CONT_3EO_REGION	V90J0108C	CONTINGENCY 3 E/O REGION INDEX	CONT 3E/O GUID				93017G	*
CONT_3EO_START	V90X0909X	CONTINGENCY 3 E/O START FLAG	CONT 3E/O GUID		BD		93017G	*
CONT_SERC	V93X6682X	CONT SINGLE ENG ROLL CNTL FLAG	XXXXXX TRAJ 1 DISP		BD		93017G	*
CONT_SERC	V93X6682XA	CONT SINGLE ENG ROLL CNTL FLAG	ASC DAP		BD		93017G	*
CONT_SERC	V93X6682XB	CONT SINGLE ENG ROLL CNTL FLAG	XXXXXX TRAJ 2 DISP		BD		93017G	*
CONT_SERC	V93X6682XC	CONT SINGLE ENG ROLL CNTL FLAG	RTLS TRAJ 2 DISP		BD		93017G	*
CONT_YAW_ENA	V93X6600X	CONTINGENCY YAW ENABLE FLAG	XXXXXX TRAJ 1 DISP		BD		93017G	*
CONT_YAW_ENA	V93X6600XA	CONTINGENCY YAW ENABLE FLAG	XXXXXX TRAJ 2 DISP		BD		93017G	*
CONT_YAW_ENA	V93X6600XB	CONTINGENCY YAW ENABLE FLAG	RTLS TRAJ 2 DISP		BD		93017G	*
ENA_RCS_CNTL	V90X1739X	ENABLE RCS CONTROL DISCRETE	ASC DAP		BD		93017G	*
FIRST_EO_VI	V90L0480C	FIRST ENG OUT INERTIAL VELOCITY	XXXXXX TRAJ 1 DISP	FT/S	SPL		93017G	*
FIRST_EO_VI	V90L0480CA	FIRST ENG OUT INERTIAL VELOCITY	XXXXXX TRAJ 2 DISP	FT/S	SPL		93017G	*
GUID_XXXX_CHAR	V94J1366C	RTLS GUID STATUS-CHAR STRING	XXXXXX TRAJ DIP				93012D	
GUID_XXXX_DEC	V94G1367C	RTLS GUID STATUS-DECIMAL VAL	XXXXXX TRAJ DIP				93012D	
K_CMD	V90U1948CC	COMMANDED SSME THROTTLE SETTING	PW RTLS GUID	PCT			93017G	*
K_CMD	V90U1948CE	COMMANDED SSME THROTTLE SETTING	SBTC SOP	PCT			93012D	
K_CMD	V90U1948CF	COMMANDED SSME THROTTLE SETTING	PW CONT GUID	PCT			93017G	*
ME1_FAIL_SHUTDOWN	V95X1207X	MPS E1 FAIL FLAG	SSME OPS		BD		93017G	*
ME2_FAIL_SHUTDOWN	V95X1208X	MPS E2 FAIL FLAG	SSME OPS		BD		93017G	*
ME3_FAIL_SHUTDOWN	V95X1209X	MPS E3 FAIL FLAG	SSME OPS		BD		93017G	*
PRPLT	V94U1325C	ET PROPELLANT REMAINING	XXXXXX TRAJ DIP	PCT	VAR		93012D	
R2_D_R_X	V94U1324C	X COORD OF DELTA RANGE	XXXXXX TRAJ DIP	AU	VAR		93012D	
R2_PRED_X	V94U1321C	ALT/VEL PRED X POS 1	XXXXXX TRAJ DIP	AU	VAR		93012D	
R2_PRED_X2	V94J1335C	ALT/VEL PRED X POS 2	XXXXXX TRAJ DIP	AU	VAR		93012D	

TABLE 4.2.40-5. INPUT FUNCTIONAL PARAMETERS FOR RTLS TRAJ 2 DISPLAY (PFS) (G6.54)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
R2_PRED_Y	V94H1326C	ALT/VEL PRED Y POS 1	XXXXXX TRAJ DIP	AU	VAR		93012D	
R2_PRED_Y2	V94J1336C	ALT/VEL PRED Y POS 2	XXXXXX TRAJ DIP	AU	VAR		93012D	
R2_STATE_X	V94U1322C	ALT/VEL X COORD	XXXXXX TRAJ DIP	AU	VAR		93012D	
R2_STATE_Y	V94U1323C	ALT/VEL Y COORD	XXXXXX TRAJ DIP	AU	VAR		93012D	
SECOND_EO_VI	V90L3820C	SECOND ENG OUT INERTIAL VELOCITY	XXXXXX TRAJ 1 DISP	FT/S	SPL		93017G	*
SECOND_EO_VI	V90L3820CA	SECOND ENG OUT INERTIAL VELOCITY	XXXXXX TRAJ 2 DISP	FT/S	SPL		93017G	*
SMODE	V94J3779CB	GUIDANCE MODE INDICATOR	PW RTLS GUID		HXS		93012D	
SSME_FAILS	V90J1763C	SSME FAILURE STATUS FLAG	ASC DAP		HXS		93017G	*
S_BLANK_TMECO	V90X7001X	BLANK TMECO FIELD FLAG	PW CONT GUID		BD		93012D	
S_FCD	V90X2086XA	FINE COUNTDOWN IND	PW RTLS GUID		BD		93012D	
S_FCD	V90X2086XB	FINE COUNTDOWN IND	PW CONT GUID		BD		93012D	
TMET_MECO	V90W1970CB	PREDICTED SSME C/O TIME IN MET	PW RTLS GUID	S			93017G	*
TMET_MECO	V90W1970CC	PREDICTED SSME C/O TIME IN MET	PW CONT GUID	S			93017G	*
T_GMTLO	V90W4380C	TIME OF LIFTOFF IN GMT	FCOS	S			93012D	
V_INERTIAL_MAG	V95L0510CB	MAG OF VEHICLE INERTIAL VELOCITY	RTLS UPP	FT/S			93090E	
	V90X7556X	SEL ET SEP MNL ENABLE	GN&C SW RM		BD		93017G	*
	V90X8259X	ET AUTO SEP INHIBIT CREW ALERT	ET SEP SEQ		BD		93017G	*
	V94X4862X	ILL ENTRY MSG(RTLS TRAJ 2 DISP)	UI				93012D	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.40-6. OUTPUT FUNCTIONAL PARAMETERS FROM RTLS TRAJ 2 DISPLAY (PFS) (G6.54)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
CONT_2EO_ARM	V93X6680XD	CONTINGENCY 2-ENG OUT ARM FLAG	DL FMT 21/1 PW CONT GUID RTLS TRAJ 2 DISP		BD		93017G	*
CONT_2EO_START	V93X6681XD	CONTINGENCY 2-ENG OUT START FLAG	A/E ATT PROC ASC BRG DISP ASC BRG SPEC DL FMT 21/1 GRTLS DAP HORIZ SIT DISP HORIZ SIT SPEC MSC PW CONT GUID RTLS TRAJ 2 DISP		BD		93017G	*
CONT_SERC	V93X6682XC	CONT SINGLE ENG ROLL CNTL FLAG	ABT CNTL SEQ ASC DAP DL FMT 21/1 G/C STEER MSC RTLS TRAJ 2 DISP		BD		93017G	*
CONT_YAW_ENA	V93X6600XB	CONTINGENCY YAW ENABLE FLAG	DL FMT 21/1 PW CONT GUID RTLS TRAJ 2 DISP		BD		93017G	*
FIRST_EO_VI	V90L0480CB	FIRST ENG OUT INERTIAL VELOCITY	DL FMT 21/1	FT/S	SPL		93017G	*
ORBITER_DUMP_ENA	V93X6980XF	ORBITER DUMP ENABLE	ABT CNTL SEQ OVERRIDE SPEC				93012D	
ORBITER_DUMP_INH	V93X6981XD	ORBITER DUMP INHIBIT	ABT CNTL SEQ				93012D	
PRPLT_DUMP_ARM	V93X5350XE	ORB PRPLNT DUMP ARM CMD	OVERRIDE DISP OVERRIDE SPEC				93012D	
PRPLT_DUMP_START	V93X5351XE	ORB PRPLNT DUMP START CMD	OVERRIDE DISP OVERRIDE SPEC				93012D	
PRPLT_DUMP_STOP	V93X5352XE	ORB PRPLNT DUMP STOP CMD	OVERRIDE DISP OVERRIDE SPEC				93012D	
SECOND_EO_VI	V90L3820CB	SECOND ENG OUT INERTIAL VELOCITY	DL FMT 21/1	FT/S	SPL		93017G	*
	V99M1855P	CONT MNVR DISCRETES	DL FMT 21/1				93017G	*

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
(HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec

TABLE 4.2.40-7. RTLS TRAJ 2 DISPLAY (PFS) (G6.54) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
ENA_CONT_3EO_GUID	V97U8599C	ND	D		D	P	G3.3 G6.52 G6.53 G6.54	00	A3E	93012D	
QBARHI_LINE(1,1)	V97U8138C	AU	F	S	D	P	G6.54	00	DAK	93012D	
QBARHI_LINE(1,2)	V97U8139C	AU	F	S	D	P	G6.54	00	DAK	93012D	
QBARHI_LINE(1,3)	V97U8140C	AU	F	S	D	P	G6.54	00	DAK	93012D	
QBARHI_LINE(1,4)	V97U8141C	AU	F	S	D	P	G6.54	00	DAK	93012D	
QBARLO_LINE(1,1)	V97U8134C	AU	F	S	D	P	G6.54	00	DAK	93012D	
QBARLO_LINE(1,2)	V97U8135C	AU	F	S	D	P	G6.54	00	DAK	93012D	
QBARLO_LINE(1,3)	V97U8136C	AU	F	S	D	P	G6.54	00	DAK	93012D	
QBARLO_LINE(1,4)	V97U8137C	AU	F	S	D	P	G6.54	00	DAK	93012D	
R1_CHAR_STRING(01,1)	V97U8047C	ND	CH		M	P	G6.54	00	DFR	93012D	
R1_CHAR_STRING(01,2)	V97U8048C	AU	F	S	M	P	G6.54	00	DAE	93012D	
R1_CHAR_STRING(01,3)	V97U8049C	AU	F	S	M	P	G6.54	00	DFR	93012D	
R1_CHAR_STRING(02,2)	V97U8051C	AU	F	S	M	P	G6.54	00	DAE	93012D	
R1_CHAR_STRING(02,3)	V97U8052C	AU	F	S	M	P	G6.54	00	DFR	93012D	
R1_CHAR_STRING(03,1)	V97U8053C	ND	CH		M	P	G6.54	00	DFR	93012D	
R1_CHAR_STRING(03,2)	V97U8054C	AU	F	S	M	P	G6.54	00	DFR	93012D	
R1_CHAR_STRING(03,3)	V97U8055C	AU	F	S	M	P	G6.54	00	DFR	93012D	
R1_CHAR_STRING(04,1)	V97U8056C	ND	CH		M	P	G6.54	00	DFR	93012D	
R1_CHAR_STRING(04,2)	V97U8057C	AU	F	S	M	P	G6.54	00	DFR	93012D	
R1_CHAR_STRING(04,3)	V97U8058C	AU	F	S	M	P	G6.54	00	DFR	93012D	
R1_CHAR_STRING(05,1)	V97U8059C	ND	CH		M	P	G6.54	00	DFR	93012D	
R1_CHAR_STRING(05,2)	V97U8060C	AU	F	S	M	P	G6.54	00	DAE	93012D	
R1_CHAR_STRING(05,3)	V97U8061C	AU	F	S	M	P	G6.54	00	DFR	93012D	
R1_CHAR_STRING(07,1)	V97U8936C	ND	CH		M	C	G6.54	00	DFR	93012D	
R1_CHAR_STRING(07,2)	V97U8937C	AU	I	S	M	C	G6.54	00	DAL	93012D	
R1_CHAR_STRING(07,3)	V97U8938C	AU	I	S	M	C	G6.54	00	DFR	93012D	
R1_CHAR_STRING(6,1)	V97U8383C	ND	SY		M	P	G6.54	00	DFR	93012D	
R1_CHAR_STRING(6,2)	V97U8385C	AU	F	S	M	P	G6.54	00	DAE	93012D	
R1_CHAR_STRING(6,3)	V97U8386C	AU	F	S	M	P	G6.54	00	DFR	93012D	
R1_SOLID_LINE(01,1)	V97U8074C	AU	F	S	M	P	G6.54	00	DAP	93012D	
R1_SOLID_LINE(01,2)	V97U8075C	AU	F	S	M	P	G6.54	00	DAP	93012D	
R1_SOLID_LINE(01,3)	V97U8076C	AU	F	S	M	P	G6.54	00	DAP	93012D	
R1_SOLID_LINE(01,4)	V97U8077C	AU	F	S	M	P	G6.54	00	DAP	93012D	
R1_SOLID_LINE(02,1)	V97U8078C	AU	F	S	M	P	G6.54	00	DAP	93012D	
R1_SOLID_LINE(02,2)	V97U8079C	AU	F	S	M	P	G6.54	00	DAP	93012D	
R1_SOLID_LINE(02,3)	V97U8080C	AU	F	S	M	P	G6.54	00	DAP	93012D	
R1_SOLID_LINE(02,4)	V97U8081C	AU	F	S	M	P	G6.54	00	DAP	93012D	
R1_SOLID_LINE(03,1)	V97U8082C	AU	F	S	M	P	G6.54	00	DAP	93012D	
R1_SOLID_LINE(03,2)	V97U8083C	AU	F	S	M	P	G6.54	00	DAP	93012D	
R1_SOLID_LINE(03,3)	V97U8084C	AU	F	S	M	P	G6.54	00	DAP	93012D	
R1_SOLID_LINE(03,4)	V97U8085C	AU	F	S	M	P	G6.54	00	DAP	93012D	
R1_SOLID_LINE(04,1)	V97U8086C	AU	F	S	M	P	G6.54	00	DFR	93012D	
R1_SOLID_LINE(04,2)	V97U8087C	AU	F	S	M	P	G6.54	00	DFR	93012D	
R1_SOLID_LINE(04,3)	V97U8088C	AU	F	S	M	P	G6.54	00	DFR	93012D	

TABLE 4.2.40-7. RTLS TRAJ 2 DISPLAY (PFS) (G6.54) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
R1_SOLID_LINE(04,4)	V97U8089C	AU	F	S	M	P	G6.54	00	DFR	93012D	
R1_SOLID_LINE(05,1)	V97U8090C	AU	F	S	M	P	G6.54	00	DFR	93012D	
R1_SOLID_LINE(05,2)	V97U8091C	AU	F	S	M	P	G6.54	00	DFR	93012D	
R1_SOLID_LINE(05,3)	V97U8092C	AU	F	S	M	P	G6.54	00	DFR	93012D	
R1_SOLID_LINE(05,4)	V97U8093C	AU	F	S	M	P	G6.54	00	DFR	93012D	
R1_SOLID_LINE(06,1)	V97U8094C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(06,2)	V97U8095C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(06,3)	V97U8096C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(06,4)	V97U8097C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(07,1)	V97U8098C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(07,2)	V97U8099C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(07,3)	V97U8100C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(07,4)	V97U8101C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(08,1)	V97U8102C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(08,2)	V97U8103C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(08,3)	V97U8104C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(08,4)	V97U8105C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(09,1)	V97U8106C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(09,2)	V97U8107C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(09,3)	V97U8108C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(09,4)	V97U8109C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(10,1)	V97U8110C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(10,2)	V97U8111C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(10,3)	V97U8112C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(10,4)	V97U8113C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(11,1)	V97U8114C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(11,2)	V97U8115C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(11,3)	V97U8116C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(11,4)	V97U8117C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(12,1)	V97U8118C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(12,2)	V97U8119C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(12,3)	V97U8120C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(12,4)	V97U8121C	AU	F	S	M	P	G6.54	00	DAK	93012D	
R1_SOLID_LINE(13,1)	V97U8122C	AU	F	S	M	P	G6.54	00	DAL	93012D	
R1_SOLID_LINE(13,2)	V97U8123C	AU	F	S	M	P	G6.54	00	DAL	93012D	
R1_SOLID_LINE(13,3)	V97U8124C	AU	F	S	M	P	G6.54	00	DAL	93012D	
R1_SOLID_LINE(13,4)	V97U8125C	AU	F	S	M	P	G6.54	00	DAL	93012D	
R1_SOLID_LINE(14,1)	V97U8126C	AU	F	S	M	P	G6.54	00	DAL	93012D	
R1_SOLID_LINE(14,2)	V97U8127C	AU	F	S	M	P	G6.54	00	DAL	93012D	
R1_SOLID_LINE(14,3)	V97U8128C	AU	F	S	M	P	G6.54	00	DAL	93012D	
R1_SOLID_LINE(14,4)	V97U8129C	AU	F	S	M	P	G6.54	00	DAL	93012D	
R1_SOLID_LINE(15,1)	V97U8130C	AU	F	S	M	P	G6.54	00	DAL	93012D	
R1_SOLID_LINE(15,2)	V97U8131C	AU	F	S	M	P	G6.54	00	DAL	93012D	
R1_SOLID_LINE(15,3)	V97U8132C	AU	F	S	M	P	G6.54	00	DAL	93012D	
R1_SOLID_LINE(15,4)	V97U8133C	AU	F	S	M	P	G6.54	00	DAL	93012D	
R1_SOLID_LINE(16,1)	V97U8991C	AU	I	S	M	C	G6.54	00	DAL	93012D	
R1_SOLID_LINE(16,2)	V97U8992C	AU	I	S	M	C	G6.54	00	DAL	93012D	

TABLE 4.2.40-7. RTLS TRAJ 2 DISPLAY (PFS) (G6.54) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
R1_SOLID_LINE(16,3)	V97U8993C	AU	I	S	M	C	G6.54	00	DAL	93012D	
R1_SOLID_LINE(16,4)	V97U8994C	AU	I	S	M	C	G6.54	00	DAL	93012D	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.40-8. RTLS TRAJ 2 DISPLAY (PFS) (G6.54) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.40-9. RTLS TRAJ 2 DISPLAY (PFS) (G6.54) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.41 ASCENT BEARING (PFS)

TITLE: ASCENT BEARING

TYPE: SPEC/054

AVAILABILITY: OPS 1,6 PFS

4.2.41.1 Purpose, Operation and Organization.

The Ascent Bearing display provides the crew with data to support horizontal situation assessment of the Shuttle during the Ascent phase. Central plot area of the Ascent Bearing display shows one of two sets of longitude vs. geodetic latitude map plots. Each set is composed of a main plot and a plot inset window. The first set for a high inclination flight, Figure 4.2.41-1, maps the launch range with an inset window further down-range. The second set for a high inclination flight, Figure 4.2.41-2, maps the North American Atlantic coast further down-range, with an inset window map for transoceanic aborts. The first set for a low inclination flight, Figure 4.2.41-3, maps the launch range with an inset window further down-range across the Atlantic Ocean. The second set for a low inclination flight, Figure 4.2.41-4, maps the Atlantic Ocean further down-range, with an inset window map for transoceanic aborts. Map sets automatically transition based on Shuttle symbol position across the first map.

The Ascent Bearing display shows digital readouts of the selected site index and indexes of two alternate sites associated with the selected site. Selected site runway name and primary runway name of the two alternate sites are also displayed. An item entry (Item 41) to change the selected site index like that on the Horizontal Situation display is present on this display. Alternate site indexes are I-Loaded, but are changeable via item entries (Items 1 and 2) on the display. The Ascent Bearing display also shows digital readouts of Shuttle heading error (delta azimuth) with respect to the selected site and each of the alternate sites.

Item 41, the selected site index, and selected runway name are the only data supported in MM 105 and MM 106 on this display.

For SPEC 054, the Ascent Bearing display transitions automatically to the Entry Bearing display on the MM 601 to MM 602 transition. However, there is no other automatic transition of SPEC 054 displays. For instance, on a TAL abort with the transition from OPS 1 to OPS 3, the Ascent Bearing display will be replaced by the OPS display. The Entry Bearing display is then accessed by executing SPEC 054 PRO.

The main plot shows current Shuttle position and 30 and 60 second predictors. Also depicted is a theoretical ballistic instantaneous impact point (IIP), should all main engines fail at the current time. If the IIP is determined to have moved out of the main plot, it is displayed in the plot inset window.

The Ascent Bearing display utilizes color capabilities provided by MEDS. The "default green" color referenced below is that used by MEDS on other displays for normal intensity text, data, etc. "Default yellow" is the color used by MEDS on other displays for overbright / double overbright intensity.

- (1) The central plot area shows one of two sets of longitude vs. geodetic latitude map plots. Each set is composed of a main plot and a plot inset window. The first set maps the launch range with an inset window further down-range. The second set maps further down-range, with an inset window map for transoceanic aborts. For both high and low inclination flights, the North American Atlantic coastline around the launch range is depicted in light gray in the main plot of the first map set. For a high inclination flight, more of the North American Atlantic coastline down-range is displayed in light gray in the inset window of the first map set and main plot of the second map set. Segments of the European and North African Atlantic coastlines are shown in light gray in the inset window of the second map set for both high and low inclination flights. Each map plot shows landing sites within its plot region and their three-character site labels in default green from the landing site table.
- (2) Current position of the Shuttle is portrayed by a Shuttle planform symbol in default green in the main plots. The Shuttle symbol is not displayed in the inset windows. Transition to the second map set occurs when the Shuttle symbol's longitude and latitude enters the main plot region of the second map set (the two main plots overlap). During Ascent flight major modes, 30 second and 60 second predictors are shown as unfilled circles in default green in the main plots. Each of the Shuttle and predictor symbols parks and remains displayed if it reaches the edge of the plot region.

In MM 102, 103 and 104, the Shuttle planform symbol rotates positive clockwise to represent yaw steering. "Null" orientation of the symbol is the angle between up and the tangent to the target insertion line at the Shuttle's current longitude. Added to that angle is an amount equal to the Shuttle's out-of-plane yaw angle (yaw body Euler angle with respect to the LVIY coordinate frame). The latter angle is the same as that displayed for heading on the Horizontal Situation Indicator (HSI).

In MM 601, the Shuttle planform symbol rotates positive clockwise from a null orientation of up to represent vehicle heading with respect to magnetic north (i.e., yaw body Euler angle with respect to the topodetic coordinate frame minus the correction angle from true north to magnetic north). Vehicle heading with respect to magnetic north is also the heading angle displayed on the HSI in MM 601.

During MM 101, the Shuttle planform symbol is oriented up.

- (3) Shuttle vehicle inertial heading (with respect to north) is represented by an arrow in default green which rotates clockwise about the tail. Tail of the arrow is located at the center of the Shuttle planform symbol. The vehicle inertial heading arrow is not displayed in MM 101.
- (4) Shown in the central plot area as a white cross is an instantaneous impact point (IIP), should all main engines fail at the current time. If the IIP is determined to have moved out of the main plot, it is displayed in the plot inset window. It is displayed in MM 103, 104 and 601 for both map sets.
- (5) Groundtrack of the target insertion plane is shown as a solid, five-segment line in default yellow in both the main plot and inset window. Five segments are used in each of the main plot and inset window. The target insertion line is displayed in MM 101 through MM 104 for both map sets. It is updated cyclically, reflecting adjustment at SRB ignition for nodal regression

- and any abort selection later. If the target insertion plane is defined as an inertial plane, the line "marches" across the display screen as the Ascent phase progresses.
- (6) Groundtracks of the planes representing launch azimuth at open and close of the launch window are shown as dashed, five segment lines in default green in the main plots of both map sets. Launch window lines are shown for high inclination flights only. The launch window open line is the bottom line, while the launch window close line is the top line. The lines are computed at the transition to MM 101.
 - (7) If a TAL abort has been declared, a solid circular arc in default yellow is displayed around the selected (TAL) landing site in the inset window of the second map set. Radius of the circular arc represents the maximum TAL crossrange for the site, an I-Loaded value. The TAL crossrange circle is intended to give the crew improved situational awareness regarding achieving the landing site for a TAL abort.
 - (8) Item 41 provides the capability to specify a landing area, or site, by entering an index value from 1 - 45. Item 41 on the Ascent Bearing display functions identically to Item 41 on the Horizontal Situation Display (HSD). The selected landing site index is displayed in default green next to Item 41 under the "SITE" label. The I-Loaded RTLS site is displayed initially in MM 101 before Item 41 entries are made, as on the HSD. Next to the landing site index under the "ID" label is shown a character string in default green identifying the selected runway. This identifier changes when a new landing area is designated, or a different primary or secondary runway selection is made with Items 3 and 4 on the HSD. The vehicle's heading error with respect to the selected runway (delta azimuth) is shown in degrees in default green next to the runway character identifier.
 - (9) Item 1 provides the capability to specify a first alternate landing site by entering an index value from 0 - 45. An entry of zero signifies no first alternate site is designated. Next to Item 1 under the "SITE" label the first alternate site index is displayed in default green. The I-Loaded first alternate site index associated with the RTLS site is displayed initially in MM 101 before Item 41 or Item 1 entries are made. The first alternate site index changes when a valid Item 1 entry is made, or when a new landing site has been selected with Item 41 on this display or the HSD. In the latter case, the I-Loaded first alternate site index associated with the newly selected landing site is displayed.

A character string identifying the primary runway of the first alternate site is displayed in default green next to the site index under the "ID" label. This identifier changes when a new landing area is designated, or a different site index is entered via Item 1. There is no capability to designate the secondary runway of an alternate site. The character string is blanked if the first alternate site index is zero.

The vehicle's heading error with respect to the primary runway of the first alternate site (delta azimuth) is shown in degrees in default green next to the runway character identifier. This field is blanked if the first alternate site index is zero.

- (10) Item 2 provides the capability to specify a second alternate landing site by entering an index value from 0 - 45. An entry of zero signifies no second alternate site is designated. Next to Item 2 under the "SITE" label the second alternate site index is displayed in default green. The

I-Loaded second alternate site index associated with the RTLS site is displayed initially in MM 101 before item 41 or Item 1 entries are made. The second alternate site index changes when a valid Item 2 entry is made, or when a new landing site has been selected with Item 41 on this display or the HSD. In the latter case, the I-Loaded second alternate site index associated with the newly selected landing site is displayed.

A character string identifying the primary runway of the second alternate site is displayed in default green next to the site index under "ID" label. This identifier changes when a new landing area is designated, or a different site index is entered via Item 2. There is no capability to designate the secondary runway of an alternate site. The character string is blanked if the second alternate site index is zero.

The vehicle's heading error with respect to the primary runway of the second alternate site (delta azimuth) is shown in degrees in default green next to the runway character identifier. This field is blanked if the second alternate site index is zero.

- (11) Magnitude of the inertial velocity of the vehicle is displayed to the right of the "VI" label. Inertial velocity magnitude is displayed in MM 102, 103, 104, and 601. The field is blanked in MM 101, 105, and 106.

4.2.41.2 Ascent Bearing (PFS) Keyboard Processing Addendum

A. SITE XX.

1. Whenever Item 41 is executed, the parameter NEW_AREA shall be set to 1.
2. Whenever Item 41 is executed, the parameter AREA_SEL shall be set to the valid value entered.
3. Entry of an index value outside the range 1 - 45 shall cause the value to be rejected and an illegal entry message to be displayed.
4. If a TAL abort has not been declared (TAL_ABORT_DECLARED = OFF), and a contingency abort has not been declared (CONT_2EO_START = OFF and CONT_3EO_START = OFF), and the entered index value is not designated as an RTLS site (TARGET_INDEX(entered index value) is greater than or equal to zero), a 'TARGET ERR RTLS' error message shall be generated.
5. If a TAL abort has not been declared (TAL_ABORT_DECLARED = OFF), and a contingency abort has not been declared (CONT_2EO_START = OFF and CONT_3EO_START = OFF), and an RTLS abort has not been declared (RTLS_ABORT_DECLARED = OFF), and the entered index value is not designated as an RTLS site (TARGET_INDEX(entered index value) is greater than or equal to zero), the value shall be rejected.
6. If a TAL abort has been declared (TAL_ABORT_DECLARED = ON), and the entered index value is not designated as a TAL site (TARGET_INDEX(entered index value) is less than or equal to zero), a 'TARGET ERR TAL' error message shall be generated.

- B. SITE XX OVHD/STRT IND Status: If Item 41 is executed, TOGHAC shall be set to OFF and OVHD/STRT IND shall be set to 1 (OVHD).

- C. SITE 1 XX.
 - 1. Whenever Item 1 is entered, the parameter ALT_SITE_INDEX(1) shall be set to the valid value entered.
 - 2. Entry of an index value outside the range 0 - 45 shall cause the value to be rejected and an illegal entry message to be displayed.
 - 3. Execution of Item 1 in MM 105 (MM_CODE = 105) or MM 106 (MM_CODE = 106) shall cause the value to be rejected and an illegal entry message to be displayed.

- D. SITE 2 XX.
 - 1. Whenever Item 2 is entered, the parameter ALT_SITE_INDEX(2) shall be set to the valid value entered.
 - 2. Entry of an index value outside the range 0 - 45 shall cause the value to be rejected and an illegal entry message to be displayed.
 - 3. Execution of Item 2 in MM 105 (MM_CODE = 105) or MM 106 (MM_CODE = 106) shall cause the value to be rejected and an illegal entry message to be displayed.

4.2.41.3 Ascent Bearing (PFS) CRT Display Processing Addendum

All necessary processing for dynamic symbols on this display is defined in Section B.5.26 (Ascent Bearing Specialist Function) of Volume 3 of this FSSR.

- A. Delta Azimuths.
 - 1. The Ascent Bearing Display shall convert DELAZ_SEL, DELAZ_ALT(1), and DELAZ_ALT(2) from radians to degrees for display.
 - 2. The Item 1 delta azimuth field shall be blanked if ALT_SITE_INDEX(1) = 0.
 - 3. The Item 2 delta azimuth field shall be blanked if ALT_SITE_INDEX(2) = 0.
 - 4. Delta azimuth fields shall be blanked in MM 101 (MM_CODE = 101) and in MM 102 (MM_CODE = 102) until REL_VEL_MAG > 200 fps.
 - 5. Delta azimuth fields shall be blanked in MM 105 (MM_CODE = 105) and in MM 106 (MM_CODE = 106).

- B. Vehicle Current Position.
 - 1. A Shuttle planform symbol (alternate character set symbol 18) shall be displayed at the X and Y location specified by AB_STATE_X and AB_STATE_Y, respectively, in addressable unit (AU) coordinates, with the origin at the center of the screen.
 - 2. Display location shall be initialized to X = -512 AUs, Y = -400 AUs (off screen).
 - 3. The Shuttle symbol shall be blanked in MM 105 (MM_CODE = 105) and in MM 106 (MM_CODE = 106).

- C. Vehicle Steering Orientation. The Shuttle symbol shall be oriented by an angle equal to AB_DISP_ANG_S degrees positive clockwise, with the symbol pointing up at zero degrees.

- D. Vehicle Predicted Positions.
 - 1. A circle of radius 5 AUs shall be displayed for the 30 second predictor at the X and Y location specified by AB_PRED_30_X and AB_PRED_30_Y, respectively, in AU coordinates, with the origin at the center of the screen.

2. A circle of radius 5 AUs shall be displayed for the 60 second predictor at the X and Y location specified by AB_PRED_60_X and AB_PRED_60_Y, respectively, in AU coordinates, with the origin at the center of the screen.
 3. Predictor symbols shall be blanked in MM 101 (MM_CODE = 101), in MM 105 (MM_CODE = 105), and in MM 106 (MM_CODE = 106).
 4. Display locations shall be initialized to X = -512 AUs, Y = -400 AUs (off screen).
- E. Instantaneous Impact Point (IIP) Position.
1. The IIP symbol shall be displayed as a large cross (alternate character set symbol 16) in color 29 when AB_IIP_PLOT_IND = 1 (main plot) and as a small cross (alternate character set symbol 17) in color 33 when AB_IIP_PLOT_IND = 2 (inset window).
 2. The IIP symbol shall be displayed at the X and Y location specified by AB_IIP_X and AB_IIP_Y, respectively, in AU coordinates, with the origin at the center of the screen.
 3. The IIP symbol shall be blanked if (MM 101 (MM_CODE = 101) or MM 102 (MM_CODE = 102) or BLANK_IIP = ON).
 4. Display location shall be initialized to X = -512 AUs, Y = -400 AUs (off screen).
 5. The IIP symbol shall be blanked in MM 105 (MM_CODE = 105) and in MM 106 (MM_CODE = 106).
- F. Vehicle Inertial Heading Arrow.
1. Shuttle inertial heading shall be depicted by an arrow symbol (alternate character set symbol 1C) rotated by an angle equal to AB_HDG_ARROW_ANG_S degrees positive clockwise about the tail of the arrow, with the arrow pointing up at zero degrees.
 2. The vehicle inertial heading arrow shall be blanked in MM 101 (MM_CODE = 101), in MM 105 (MM_CODE = 105), and in MM 106 (MM_CODE = 106).
 3. Tail of the arrow shall be located at the Shuttle planform symbol X and Y location specified by AB_STATE_X and AB_STATE_Y, respectively.
- G. Target Insertion Line (Main Display).
1. The target insertion line shall be displayed on the main plot as a five segment, continuous, piecewise linear solid line whose X and Y coordinate start point, segment break points, and end point are given by TGT_INS_LINE_MN_X(1-6) and TGT_INS_LINE_MN_Y(1-6), respectively, in AU coordinates, with the origin at the center of the screen.
 2. The target insertion line on the main display plot shall be blanked when BLANK_TGT_INS_LN_MN = ON.
 3. The target insertion line on the main display plot shall be blanked in MM 105 (MM_CODE = 105) and in MM 106 (MM_CODE = 106).
- H. Target Insertion Line (Inset Window).
1. The target insertion line shall be displayed in the inset window as a five segment, continuous, piecewise linear solid line whose X and Y coordinate start point, segment break points, and end point are given by TGT_INS_LINE_IS_X(1-6) and TGT_INS_LINE_IS_Y(1-6), respectively, in AU coordinates, with the origin at the center of the screen.
 2. The target insertion line in the inset window shall be blanked when BLANK_TGT_INS_LN_IS = ON.
 3. The target insertion line in the inset window shall be blanked in MM 105 (MM_CODE = 105) and in MM 106 (MM_CODE = 106).

- I. Launch Window Open Line.
1. The launch window open line shall be displayed on the main display plot as a five segment, continuous, piecewise linear dashed line whose X and Y coordinate start point segment break points, and end point are given by LCH_WINDOW_OPEN_X(1-6) and LCH_WINDOW_OPEN_Y(1-6), respectively, in AU coordinates, with the origin at the center of the screen.
 2. The launch window open line on the main display plot shall be blanked when BLANK_LCH_WINDOW_OPEN = ON.
 3. The launch window open line on the main display plot shall be blanked in MM 105 (MM_CODE = 105) and in MM 106 (MM_CODE = 106).
- J. Launch Window Close Line.
1. The launch window close line shall be displayed on the main display plot as a five segment, continuous, piecewise linear dashed line whose X and Y coordinate start point, segment break points, and end point are given by LCH_WINDOW_CLOSE_X(1-6) and LCH_WINDOW_CLOSE_Y(1-6), respectively, in AU coordinates, with the origin at the center of the screen.
 2. The launch window close line on the main display plot shall be blanked when BLANK_LCH_WINDOW_CLOSE = ON.
 3. The launch window close line on the main display plot shall be blanked in MM 105 (MM_CODE = 105) and in MM 106 (MM_CODE = 106).
- K. Landing Site Positions.
1. Each of up to 20 landing sites shall be displayed as a shaded circle (alternate character set symbol 14) in color 40 when the corresponding array element LDG_SITE_XYPOS_CHAR(I,4) = OFF (main plot) and in color 43 when LDG_SITE_XYPOS_CHAR(I,4) = ON (inset window), where I = 1 to 20.
 2. Each landing site symbol shall be displayed at the X and Y location specified by the corresponding array elements LDG_SITE_XYPOS_CHAR(I,1) and LDG_SITE_XYPOS_CHAR(I,2), respectively, where I = 1 to 20, in AU coordinates, with the origin at the center of the screen.
 3. Each landing site symbol shall be blanked if its corresponding array element BLANK_LDG_SITE(I) = ON, where I = 1 to 20.
 4. Each landing site symbol shall be blanked in MM 105 (MM_CODE = 105) and in MM 106 (MM_CODE = 106).
- L. Landing Site Character Strings.
1. Each of up to 20 landing sites shall be identified by the three-character string specified in the corresponding array element LDG_SITE_XYPOS_CHAR(I,3), where I = 1 to 20.
 2. Each of up to 20 landing site character strings shall be displayed in color 40 when the corresponding array element LDG_SITE_XYPOS_CHAR(I,4) = OFF (main plot) and in color 43 when LDG_SITE_XYPOS_CHAR(I,4) = ON (inset window), where I = 1 to 20.
 3. Each landing site character string shall be blanked if its corresponding array element BLANK_LDG_SITE(I) = ON, where I = 1 to 20.
 4. Each landing site character string shall be blanked in MM 105 (MM_CODE = 105) and in MM 106 (MM_CODE = 106).

Note: See "Shuttle GPC/Integrated Display Processor Interface Control Document", ICD-3-0070-01, for the specification of Format Control Words (FCWs) sent to the MDU containing X and Y display locations and labels for landing sites. Placement of each character string adjacent to its landing site to afford proximity while avoiding overlapping other landing sites and character strings is determined in the MEDS Integrated Display Processor (IDP). Reference the MEDS IDP Software Requirements Specification (SRS), MG070100A1012E2, for requirements.

M. TAL Crossrange Circle.

1. The Ascent Bearing Display shall display a circle of radius TAL_CRNG_RADIUS in AUs, with the X and Y location of the center of the circle specified by TAL_CRNG_CTR_X and TAL_CRNG_CTR_Y, respectively, in AU coordinates, with the origin at the center of the screen.
2. The circle shall be blanked if BLANK_TAL_CRNG_CIRCLE = ON.
3. The circle shall be blanked in MM 105 (MM_CODE = 105) and in MM 106 (MM_CODE = 106).

N. Site Indexes and IDs.

1. The "ID" field corresponding to Item 1 shall be blanked if ALT_SITE_INDEX(1) = 0.
2. The "ID" field corresponding to Item 2 shall be blanked if ALT_SITE_INDEX(2) = 0.
3. The site index and "ID" fields corresponding to Item 1 and 2 shall be blanked in MM 105 (MM_CODE = 105) and in MM 106 (MM_CODE = 106).

- O. Inertial Velocity Magnitude. The "VI" field shall be blanked in MM 101 (MM_CODE = 101), MM 105 (MM_CODE = 105), and MM 106 (MM_CODE = 106).

4.2.41.4 Ascent Bearing Figure/Table References

Figure 4.2.41-1	Ascent Bearing Display (PFS) (High Inclination Map Set 1)
Figure 4.2.41-2	Ascent Bearing Display (PFS) (High Inclination Map Set 2)
Figure 4.2.41-3	Ascent Bearing Display (PFS) (Low Inclination Map Set 1)
Figure 4.2.41-4	Ascent Bearing Display (PFS) (Low Inclination Map Set 2)
Table 4.2.41-1	Keyboard Processing Table
Table 4.2.41-2	CRT Display Processing Table
Table 4.2.41-3	CRT Display Processing Background Requirements, Design Dependent
Table 4.2.41-4	Mission Design Background Constants N/A
Table 4.2.41-5	Input Functional Parameters

Table 4.2.41-6 Output Functional Parameters

Table 4.2.41-7 I-Loads

Table 4.2.41-8 K-Loads

Table 4.2.41-9 Constants

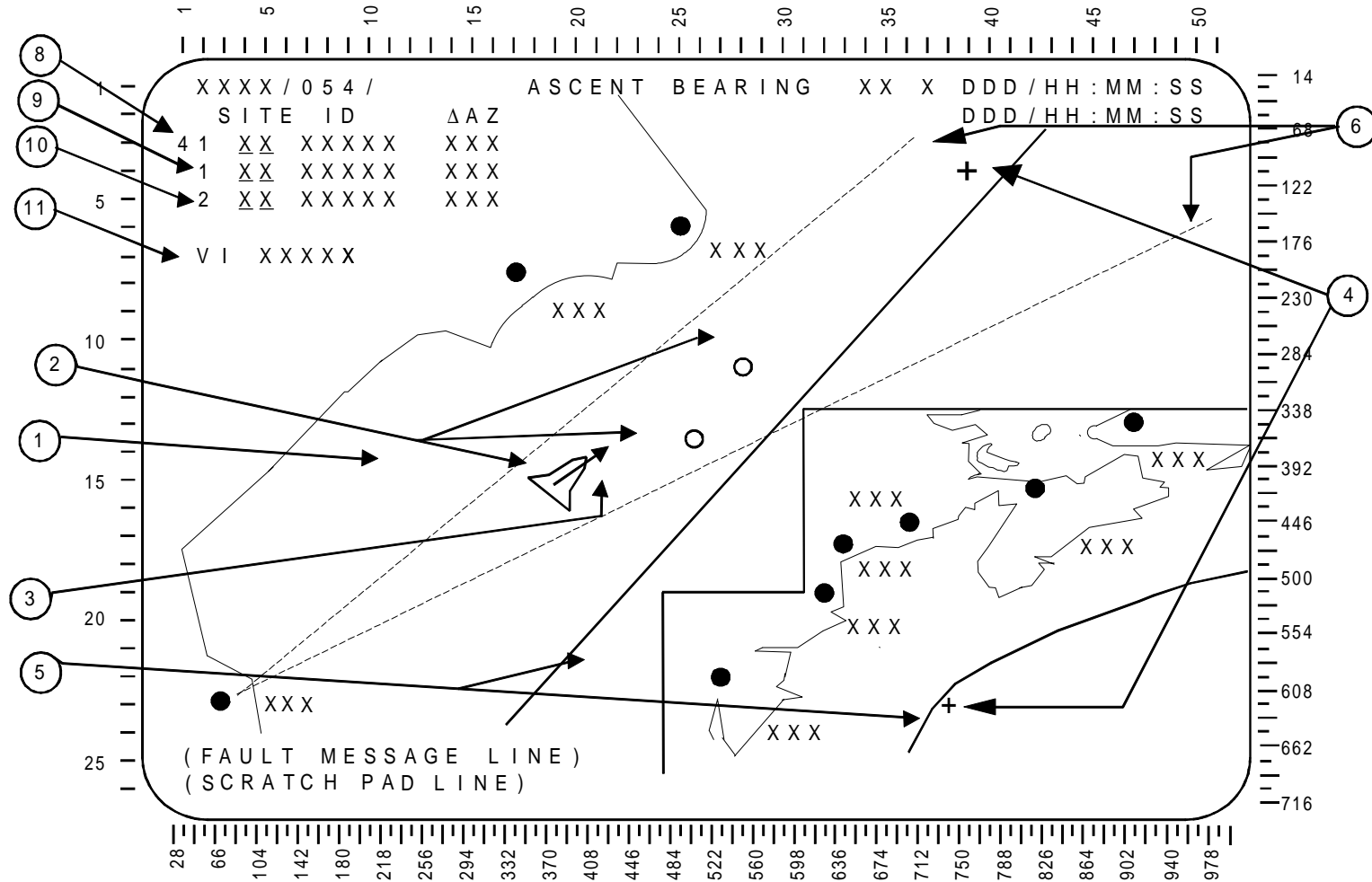


FIGURE 4.2.41-1. Ascent Bearing Display (PFS) (High Inclination Map Set 1)

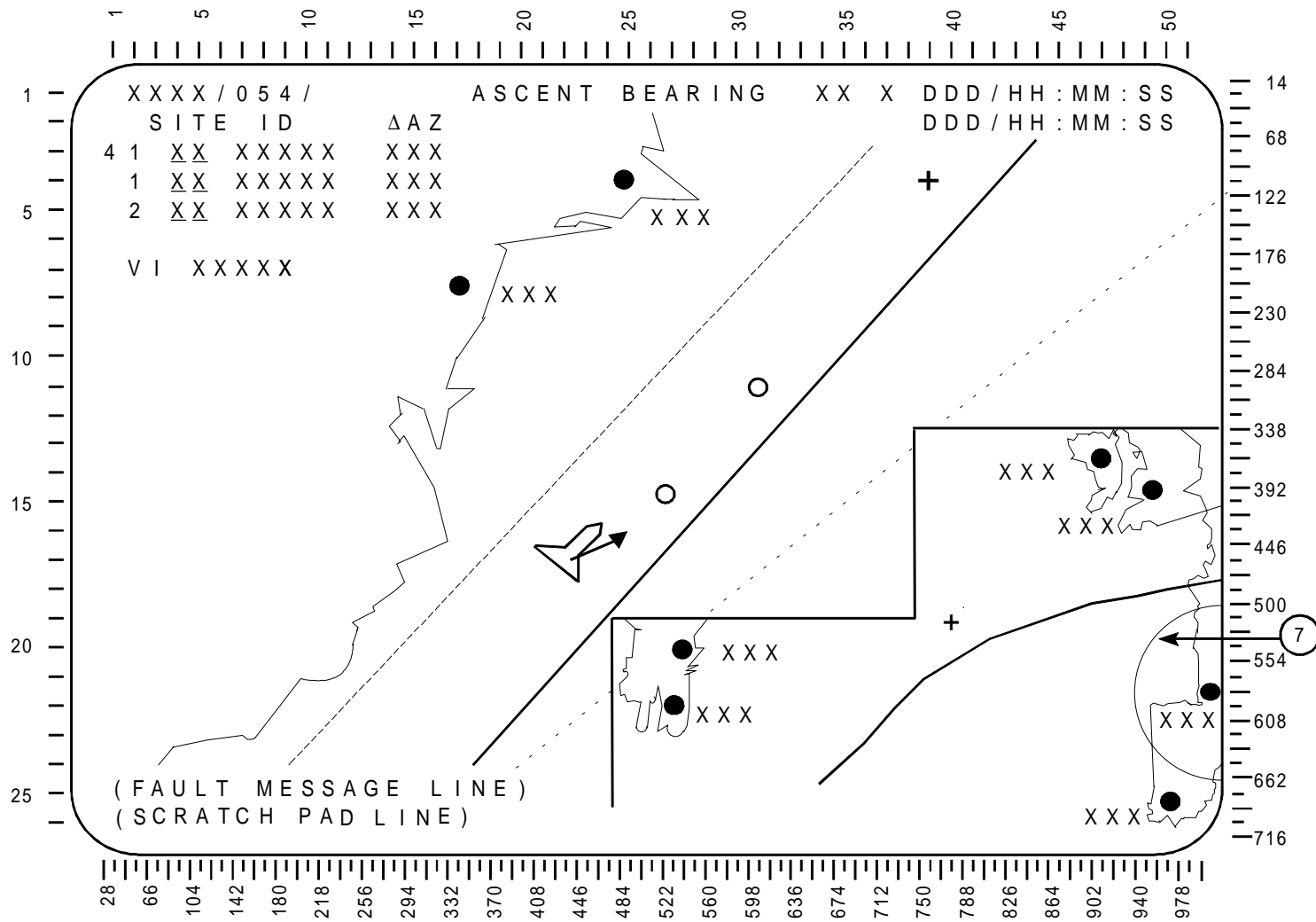


FIGURE 4.2.41-2. Ascent Bearing Display (PFS) (High Inclination Map Set 2)

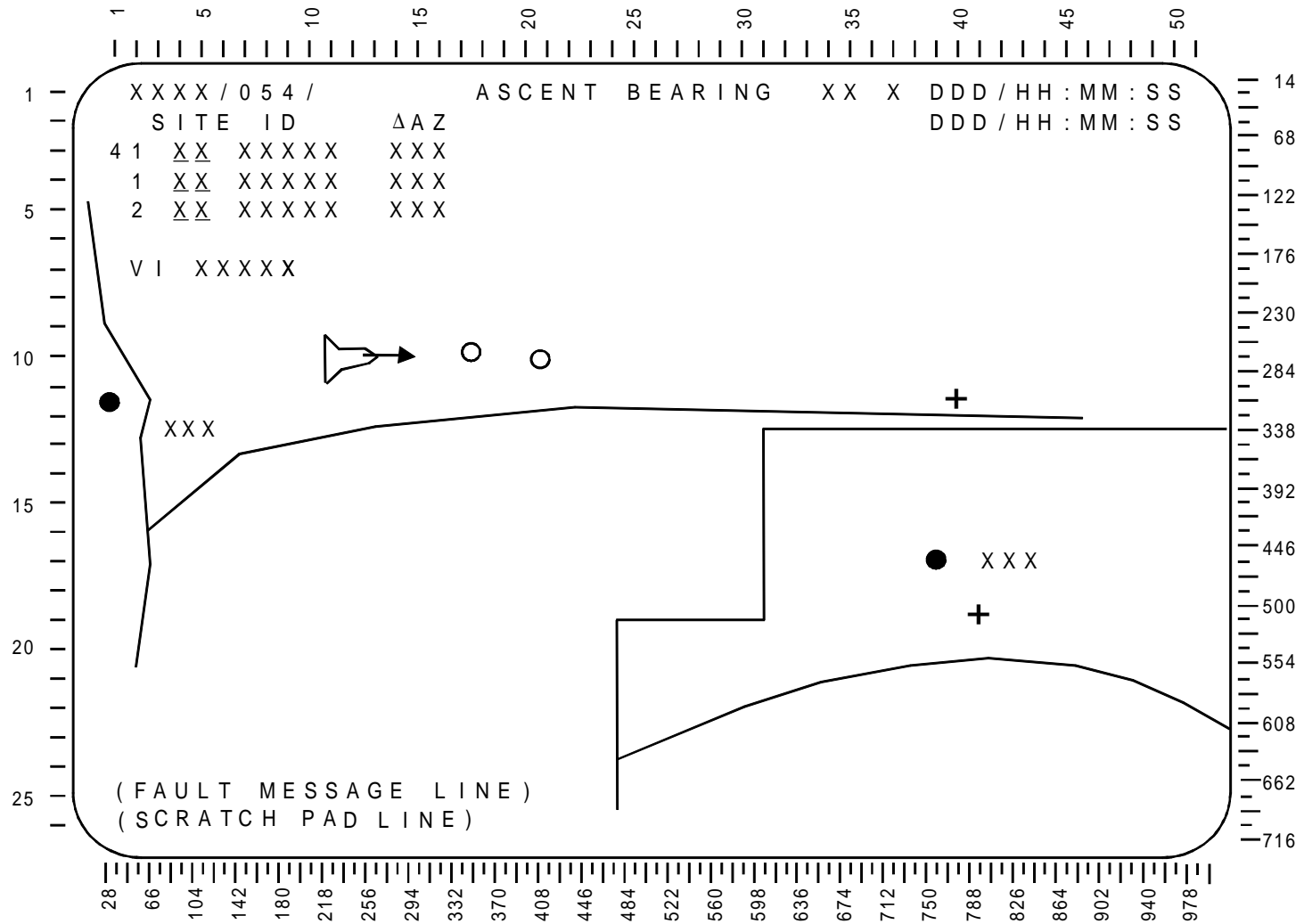


FIGURE 4.2.41-3. Ascent Bearing Display (PFS) (Low Inclination Map Set 1)

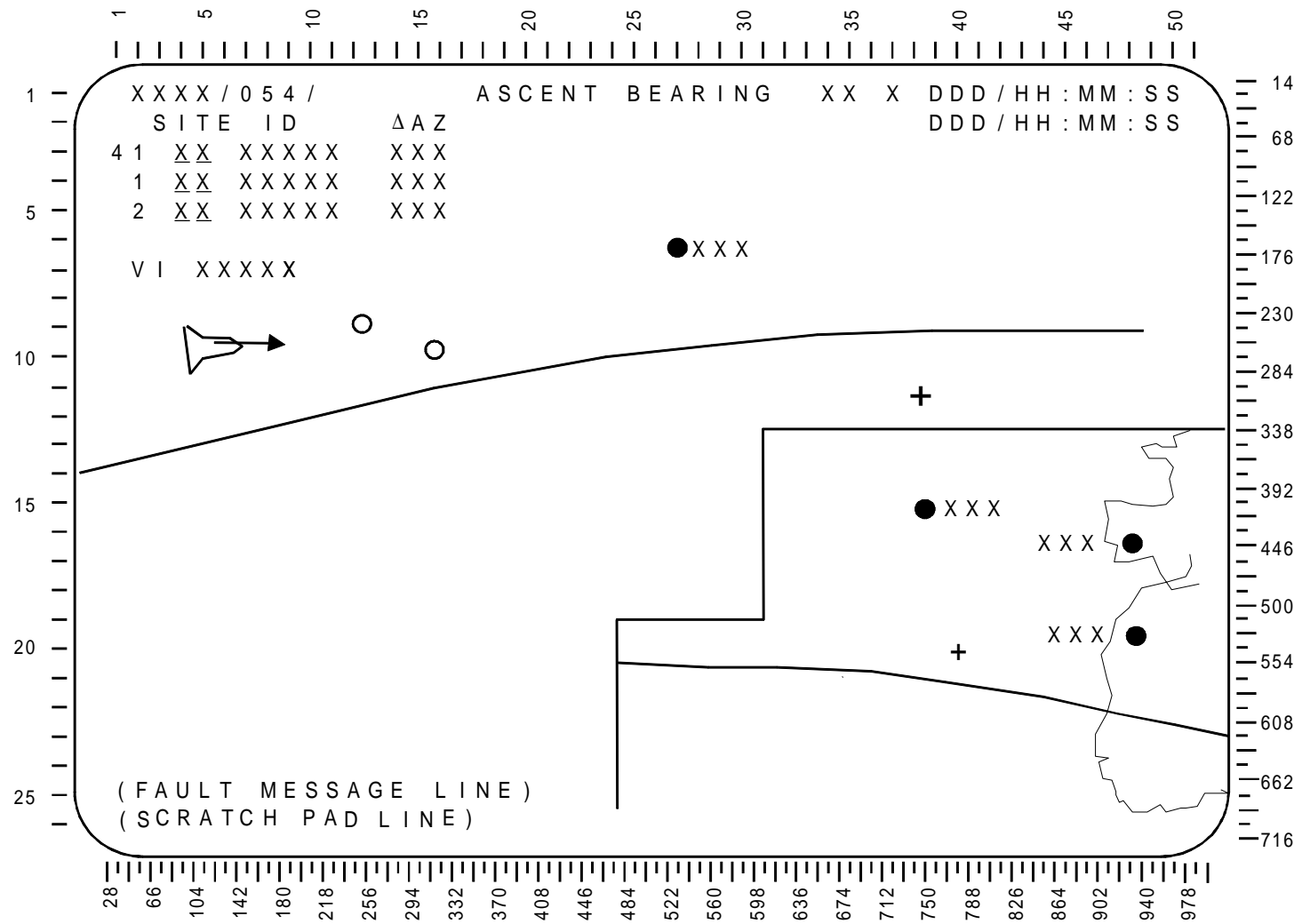


FIGURE 4.2.41-4. Ascent Bearing Display (PFS) (Low Inclination Map Set 2)

Table 4.2.41-1. ASCENT BEARING (PFS) KEYBOARD PROCESSING													
Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T	
							MIN	MAX					
001	41 XX	V93J4396C	3.0	DEC		X	41	1	45	A,B	ASC SITE LOOKUP	NEW LANDING AREA SELECT CMD	
002	1 XX	V94U5524C	3.0	DEC			1	0	45	C	ASC BRG DISP, ASC BRG SPEC	ALTERNATE SITE 1 INDEX	
003	2 XX	V94U5525C	3.0	DEC			2	0	45	D	ASC BRG DISP, ASC BRG SPEC	ALTERNATE SITE 2 INDEX	

Table 4.2.41-2. ASCENT BEARING (PFS) CRT DISPLAY PROCESSING																					
Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format	U N I T S	S T A T E S	B A T T E R Y	S I Z E	C O L O R	F L A T T E N E D	R E S O L U T I O N	L I N E S	B I T S	D I S P L A Y	Add Ref	Source	Nomenclature	C R T	
			X	Y																	CHAR	BILEVEL	TYPE
001	(OPS)	V93X0040X	2	1		5.0												UI		OPS FUNCTION PAGE	
002	(SPEC)	V93X0042X	7	1		4.0												UI		SPEC FUNCTION PAGE	
003	(DISP)	V93X0044X	10	1		4.0												UI		DISPLAY FUNCTION PAGE	

Table 4.2.41-2. ASCENT BEARING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T E S	B L A Z E R	S I Z E R	C O L O R	F L A S H	R A T E	S I G N A L	L E N G T H	B R I D G E	D I S T A N C E	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							I	O																
004	(UL)	V92X5032X	34	1		2.0	UL		BLVL						X	G					UI	UPLINK ACTIVITY IND		
005	(GPC)	V93X0048X	36	1		2.0										E					UI	GPC DRIVER		
006	(MT)	V91W1990C	39	1		12.0		CHAR	DHMS						A						FCOS	MISSION ELAPSED TIME		
007	(CRT TIMER)	V91W1987C	39	2		12.0		CHAR	DHMS						A						FCOS	DISPLAY CRT TIMER, GNC		
008	41 SITE XX	V93J4392C	3	3	41	3.0		DEC				40		B							ASC BRG DISP, HORIZ SIT DISP, ASC SITE LOOKUP	SELECTED AREA		
009	41 ID XXXXX	V94U5528C	7	3		5.0		CHAR				40		B							ASC SITE LOOKUP	RUNWAY NAME SELECTED LANDING SITE		
010	41 ΔAZ	V94H5519C	13	3		4.0		DEC	DEG	X		40		B					A		ASC BRG SPEC	SELECTED SITE DELTA AZIMUTH		
011	1 SITE XX	V94U5524C	3	4	1	3.0		DEC		X		40		B					N		ASC BRG DISP, ASC SITE LOOKUP	ALTERNATE SITE 1 INDEX		
012	1 ID XXXXX	V94U5522C	7	4		5.0		CHAR		X		40		B					N		ASC BRG SPEC	ALTERNATE SITE 1 PRI RUNWAY NAME		
013	1 ΔAZ	V94H5517C	13	4		4.0		DEC	DEG	X		40		B					A		ASC BRG SPEC	ALTER SITE 1 DELTA AZIMUTH		
014	2 SITE XX	V94U5525C	3	5	2	3.0		DEC		X		40		B					N		ASC BRG DISP, ASC SITE LOOKUP	ALTERNATE SITE 2 INDEX		
015	2 ID XXXXX	V94U5523C	7	5		5.0		CHAR		X		40		B					N		ASC BRG SPEC	ALTERNATE SITE 2 PRI RUNWAY NAME		

Table 4.2.41-2. ASCENT BEARING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T I S T I C S	B I L I N A L	S I Z E	C O L O R	F L A T	R A T I O	S L A T	L I N E	B I R D	D	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL																	TYPE
							I	O																
016	2 ΔAZ	V94H5518C	13	5		4.0			DEC	DEG		X	40		B					A	ASC BRG SPEC	ALTER SITE 2 DELTA AZIMUTH		
017	(CURR VEH X POS)	V94H5579C							DEC			X	40		B					B	ASC BRG SPEC	ASC BRG LAT/LON CURR X POS		
018	(CURR VEH Y POS)	V94H5580C							DEC			X	40		B					B	ASC BRG SPEC	ASC BRG LAT/LON CURR Y POS		
019	(VEH ROT ANG)	V94U5624C							DEC	DEG			40		B					C	ASC BRG SPEC	ASC BRG VEH SYMBOL ROTATION ANGLE		
020	(PRED VEH X POS 30)	V94H5575C							DEC			X	40		B					D	ASC BRG SPEC	ASC BRG LAT/LON PRED X POS 30		
021	(PRED VEH Y POS 30)	V94H5576C							DEC			X	40		B					D	ASC BRG SPEC	ASC BRG LAT/LON PRED Y POS 30		
022	(PRED VEH X POS 60)	V94H5577C							DEC			X	40		B					D	ASC BRG SPEC	ASC BRG LAT/LON PRED X POS 60		
023	(PRED VEH Y POS 60)	V94H5578C							DEC			X	40		B					D	ASC BRG SPEC	ASC BRG LAT/LON PRED Y POS 60		
024	(IIP VEH X POS)	V94H5573C							DEC			X	29/ 33		B					E	ASC BRG SPEC	ASC BRG LAT/LON IIP X POS		
025	(IIP VEH Y POS)	V94H5574C							DEC			X	29/ 33		B					E	ASC BRG SPEC	ASC BRG LAT/LON IIP Y POS		

Table 4.2.41-2. ASCENT BEARING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U	S	B	S	C	F	R	S	L	B	D	Add Ref	Source	Nomenclature	C R T		
			X	Y		CHAR	BILEVEL		TYPE	DEG															
							I	O																	
026	(HDG ARROW ROT ANGLE)	V94U5625C						DEC	DEG		X		40		B					F	ASC BRG SPEC	ASC BRG HEADING ARROW ROT ANGLE			
027	(TGT INS LINE MN X POS 1)	V94H5361C						DEC			X		7		B					G	ASC BRG SPEC	ASC BRG LAT/LON TGT INS MN X POS 1			
028	(TGT INS LINE MN Y POS 1)	V94H5367C						DEC			X		7		B					G	ASC BRG SPEC	ASC BRG LAT/LON TGT INS MN Y POS 1			
029	(TGT INS LINE MN X POS 2)	V94H5362C						DEC			X		7		B					G	ASC BRG SPEC	ASC BRG LAT/LON TGT INS MN X POS 2			
030	(TGT INS LINE MN Y POS 2)	V94H5368C						DEC			X		7		B					G	ASC BRG SPEC	ASC BRG LAT/LON TGT INS MN Y POS 2			
031	(TGT INS LINE MN X POS 3)	V94H5363C						DEC			X		7		B					G	ASC BRG SPEC	ASC BRG LAT/LON TGT INS MN X POS 3			
032	(TGT INS LINE MN Y POS 3)	V94H5369C						DEC			X		7		B					G	ASC BRG SPEC	ASC BRG LAT/LON TGT INS MN Y POS 3			
033	(TGT INS LINE MN X POS 4)	V94H5364C						DEC			X		7		B					G	ASC BRG SPEC	ASC BRG LAT/LON TGT INS MN X POS 4			
034	(TGT INS LINE MN Y POS 4)	V94H5370C						DEC			X		7		B					G	ASC BRG SPEC	ASC BRG LAT/LON TGT INS MN Y POS 4			
035	(TGT INS LINE MN X POS 5)	V94H5365C						DEC			X		7		B					G	ASC BRG SPEC	ASC BRG LAT/LON TGT INS MN X POS 5			

Table 4.2.41-2. ASCENT BEARING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U	S	B	S	C	F	R	S	L	B	D	Add Ref	Source	Nomenclature	C R T			
			X	Y		CHAR	BILEVEL		TYPE	N	T	A	A	Z	L	A	T	G	A					A	N	L
							I	O																		
036	(TGT INS LINE MN Y POS 5)	V94H5371C									X		7		B					G	ASC BRG SPEC	ASC BRG LAT/LON TGT INS MN Y POS 5				
037	(TGT INS LINE MN X POS 6)	V94H5366C									X		7		B					G	ASC BRG SPEC	ASC BRG LAT/LON TGT INS MN X POS 6				
038	(TGT INS LINE MN Y POS 6)	V94H5372C									X		7		B					G	ASC BRG SPEC	ASC BRG LAT/LON TGT INS MN Y POS 6				
039	(TGT INS LINE IS X POS 1)	V94H5373C									X		56		B					H	ASC BRG SPEC	ASC BRG LAT/LON TGT INS IS X POS 1				
040	(TGT INS LINE IS Y POS 1)	V94H5379C									X		56		B					H	ASC BRG SPEC	ASC BRG LAT/LON TGT INS IS Y POS 1				
041	(TGT INS LINE IS X POS 2)	V94H5374C									X		56		B					H	ASC BRG SPEC	ASC BRG LAT/LON TGT INS IS X POS 2				
042	(TGT INS LINE IS Y POS 2)	V94H5380C									X		56		B					H	ASC BRG SPEC	ASC BRG LAT/LON TGT INS IS Y POS 2				
043	(TGT INS LINE IS X POS 3)	V94H5375C									X		56		B					H	ASC BRG SPEC	ASC BRG LAT/LON TGT INS IS X POS 3				
044	(TGT INS LINE IS Y POS 3)	V94H5381C									X		56		B					H	ASC BRG SPEC	ASC BRG LAT/LON TGT INS IS Y POS 3				
045	(TGT INS LINE IS X POS 4)	V94H5376C									X		56		B					H	ASC BRG SPEC	ASC BRG LAT/LON TGT INS IS X POS 4				

Table 4.2.41-2. ASCENT BEARING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T I O N	B A Z I L A R H	S O L A T G E N	L A A N E C R	D W N L S	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL												TYPE
							I	O											
046	(TGT INS LINE IS Y POS 4)	V94H5382C									X	56	B		H	ASC BRG SPEC	ASC BRG LAT/LON TGT INS IS Y POS 4		
047	(TGT INS LINE IS X POS 5)	V94H5377C									X	56	B		H	ASC BRG SPEC	ASC BRG LAT/LON TGT INS IS X POS 5		
048	(TGT INS LINE IS Y POS 5)	V94H5383C									X	56	B		H	ASC BRG SPEC	ASC BRG LAT/LON TGT INS IS Y POS 5		
049	(TGT INS LINE IS X POS 6)	V94H5378C									X	56	B		H	ASC BRG SPEC	ASC BRG LAT/LON TGT INS IS X POS 6		
050	(TGT INS LINE IS Y POS 6)	V94H5384C									X	56	B		H	ASC BRG SPEC	ASC BRG LAT/LON TGT INS IS Y POS 6		
051	(LCH WINDOW OPEN X POS 1)	V94H5465C									X	40	B		I	ASC BRG SPEC	ASC BRG LAT/LON LCH OP X POS 1		
052	(LCH WINDOW OPEN Y POS 1)	V94H5471C									X	40	B		I	ASC BRG SPEC	ASC BRG LAT/LON LCH OP Y POS 1		
053	(LCH WINDOW OPEN X POS 2)	V94H5466C									X	40	B		I	ASC BRG SPEC	ASC BRG LAT/LON LCH OP X POS 2		
054	(LCH WINDOW OPEN Y POS 2)	V94H5472C									X	40	B		I	ASC BRG SPEC	ASC BRG LAT/LON LCH OP Y POS 2		
055	(LCH WINDOW OPEN X POS 3)	V94H5467C									X	40	B		I	ASC BRG SPEC	ASC BRG LAT/LON LCH OP X POS 3		

Table 4.2.41-2. ASCENT BEARING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U	S	B	S	C	F	R	S	L	B	D	Add Ref	Source	Nomenclature	C R T		
			X	Y		CHAR	BILEVEL		TYPE	N	T	A	Z	L	A	T	G	A	A					N	L
							I	O																		S	U	K	R	H	E	N	D	R	H	T
056	(LCH WINDOW OPEN Y POS 3)	V94H5473C									X		40		B					I	ASC BRG SPEC	ASC BRG LAT/LON LCH OP Y POS 3			
057	(LCH WINDOW OPEN X POS 4)	V94H5468C									X		40		B					I	ASC BRG SPEC	ASC BRG LAT/LON LCH OP X POS 4			
058	(LCH WINDOW OPEN Y POS 4)	V94H5474C									X		40		B					I	ASC BRG SPEC	ASC BRG LAT/LON LCH OP Y POS 4			
059	(LCH WINDOW OPEN X POS 5)	V94H5469C									X		40		B					I	ASC BRG SPEC	ASC BRG LAT/LON LCH OP X POS 5			
060	(LCH WINDOW OPEN Y POS 5)	V94H5475C									X		40		B					I	ASC BRG SPEC	ASC BRG LAT/LON LCH OP Y POS 5			
061	(LCH WINDOW OPEN X POS 6)	V94H5470C									X		40		B					I	ASC BRG SPEC	ASC BRG LAT/LON LCH OP X POS 6			
062	(LCH WINDOW OPEN Y POS 6)	V94H5476C									X		40		B					I	ASC BRG SPEC	ASC BRG LAT/LON LCH OP Y POS 6			
063	(LCH WINDOW CLOSE X POS 1)	V94H5477C									X		40		B					J	ASC BRG SPEC	ASC BRG LAT/LON LCH CL X POS 1			
064	(LCH WINDOW CLOSE Y POS 1)	V94H5483C									X		40		B					J	ASC BRG SPEC	ASC BRG LAT/LON LCH CL Y POS 1			
065	(LCH WINDOW CLOSE X POS 2)	V94H5478C									X		40		B					J	ASC BRG SPEC	ASC BRG LAT/LON LCH CL X POS 2			

Table 4.2.41-2. ASCENT BEARING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U	S	B	S	C	F	R	S	L	B	D	Add Ref	Source	Nomenclature	C R T		
			X	Y		CHAR	BILEVEL		TYPE	N	T	A	A	Z	L	A	T	G	A					A	N
							I	O																		R	H	E	N	D	N	L	R	H	T
066	(LCH WINDOW CLOSE Y POS 2)	V94H5484C									X		40		B					J	ASC BRG SPEC	ASC BRG LAT/LON LCH CL Y POS 2			
067	(LCH WINDOW CLOSE X POS 3)	V94H5479C									X		40		B					J	ASC BRG SPEC	ASC BRG LAT/LON LCH CL X POS 3			
068	(LCH WINDOW CLOSE Y POS 3)	V94H5485C									X		40		B					J	ASC BRG SPEC	ASC BRG LAT/LON LCH CL Y POS 3			
069	(LCH WINDOW CLOSE X POS 4)	V94H5480C									X		40		B					J	ASC BRG SPEC	ASC BRG LAT/LON LCH CL X POS 4			
070	(LCH WINDOW CLOSE Y POS 4)	V94H5486C									X		40		B					J	ASC BRG SPEC	ASC BRG LAT/LON LCH CL Y POS 4			
071	(LCH WINDOW CLOSE X POS 5)	V94H5481C									X		40		B					J	ASC BRG SPEC	ASC BRG LAT/LON LCH CL X POS 5			
072	(LCH WINDOW CLOSE Y POS 5)	V94H5487C									X		40		B					J	ASC BRG SPEC	ASC BRG LAT/LON LCH CL Y POS 5			
073	(LCH WINDOW CLOSE X POS 6)	V94H5482C									X		40		B					J	ASC BRG SPEC	ASC BRG LAT/LON LCH CL X POS 6			
074	(LCH WINDOW CLOSE Y POS 6)	V94H5488C									X		40		B					J	ASC BRG SPEC	ASC BRG LAT/LON LCH CL Y POS 6			
075	(LDG SITE 1 X POS)	V94H5489C									X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE X POS 1			

Table 4.2.41-2. ASCENT BEARING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U	S	B	S	C	F	R	S	L	B	D	Add Ref	Source	Nomenclature	C R T			
			X	Y		CHAR	BILEVEL		TYPE	N	T	A	A	Z	L	A	T	G	A					A	N	L
							I	O																		
076	(LDG SITE 1 Y POS)	V94H5490C									X		40/43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE Y POS 1				
077	(LDG SITE 1 CHAR)	V94U5385C						CHAR			X		40/43		E					L	ASC BRG SPEC	ASC BRG LDG SITE CHAR STRING 1				
078	(LDG SITE 2 X POS)	V94H5491C									X		40/43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE X POS 2				
079	(LDG SITE 2 Y POS)	V94H5492C									X		40/43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE Y POS 2				
080	(LDG SITE 2 CHAR)	V94U5386C						CHAR			X		40/43		E					L	ASC BRG SPEC	ASC BRG LDG SITE CHAR STRING 2				
081	(LDG SITE 3 X POS)	V94H5493C									X		40/43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE X POS 3				
082	(LDG SITE 3 Y POS)	V94H5494C									X		40/43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE Y POS 3				
083	(LDG SITE 3 CHAR)	V94U5387C						CHAR			X		40/43		E					L	ASC BRG SPEC	ASC BRG LDG SITE CHAR STRING 3				
084	(LDG SITE 4 X POS)	V94H5495C									X		40/43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE X POS 4				
085	(LDG SITE 4 Y POS)	V94H5496C									X		40/43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE Y POS 4				

Table 4.2.41-2. ASCENT BEARING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U	S	B	S	C	F	R	S	L	B	D	Add Ref	Source	Nomenclature	C R T		
			X	Y		CHAR	BILEVEL		TYPE	N	T	A	A	Z	L	A	T	G	A					A	N
							I	O																	
086	(LDG SITE 4 CHAR)	V94U5388C									X		40/ 43		E					L	ASC BRG SPEC	ASC BRG LDG SITE CHAR STRING 4			
087	(LDG SITE 5 X POS)	V94H5497C									X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE X POS 5			
088	(LDG SITE 5 Y POS)	V94H5498C									X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE Y POS 5			
089	(LDG SITE 5 CHAR)	V94U5389C									X		40/ 43		E					L	ASC BRG SPEC	ASC BRG LDG SITE CHAR STRING 5			
090	(LDG SITE 6 X POS)	V94H5499C									X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE X POS 6			
091	(LDG SITE 6 Y POS)	V94H5500C									X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE Y POS 6			
092	(LDG SITE 6 CHAR)	V94U5390C									X		40/ 43		E					L	ASC BRG SPEC	ASC BRG LDG SITE CHAR STRING 6			
093	(LDG SITE 7 X POS)	V94H5501C									X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE X POS 7			
094	(LDG SITE 7 Y POS)	V94H5502C									X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE Y POS 7			
095	(LDG SITE 7 CHAR)	V94U5391C									X		40/ 43		E					L	ASC BRG SPEC	ASC BRG LDG SITE CHAR STRING 7			

Table 4.2.41-2. ASCENT BEARING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U	S	B	S	C	F	R	S	L	B	D	Add Ref	Source	Nomenclature	C R T			
			X	Y		CHAR	BILEVEL		TYPE	N	T	A	A	Z	L	A	T	G	A					A	N	L
							I	O																			S	U	K	R	H	E	N	D	N	L	R	H	T
096	(LDG SITE 8 X POS)	V94H5503C									X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE X POS 8				
097	(LDG SITE 8 Y POS)	V94H5504C									X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE Y POS 8				
098	(LDG SITE 8 CHAR)	V94U5392C						CHAR			X		40/ 43		E					L	ASC BRG SPEC	ASC BRG LDG SITE CHAR STRING 8				
099	(LDG SITE 9 X POS)	V94H5505C									X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE X POS 9				
100	(LDG SITE 9 Y POS)	V94H5506C									X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE Y POS 9				
101	(LDG SITE 9 CHAR)	V94U5393C						CHAR			X		40/ 43		E					L	ASC BRG SPEC	ASC BRG LDG SITE CHAR STRING 9				
102	(LDG SITE 10 X POS)	V94H5507C									X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE X POS 10				
103	(LDG SITE 10 Y POS)	V94H5508C									X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE Y POS 10				
104	(LDG SITE 10 CHAR)	V94U5394C						CHAR			X		40/ 43		E					L	ASC BRG SPEC	ASC BRG LDG SITE CHAR STRING 10				
105	(LDG SITE 11 X POS)	V94H5509C									X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE X POS 11				

Table 4.2.41-2. ASCENT BEARING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U	S	B	S	C	F	R	S	L	B	D	Add Ref	Source	Nomenclature	C R T			
			X	Y		CHAR	BILEVEL		TYPE	N	T	A	A	Z	L	A	T	G	A					A	N	L
							I	O																			S	U	K	E	R	H	R	H	T
106	(LDG SITE 11 Y POS)	V94H5584C						DEC			X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE Y POS 11				
107	(LDG SITE 11 CHAR)	V94U5395C						CHAR			X		40/ 43		E					L	ASC BRG SPEC	ASC BRG LDG SITE CHAR STRING 11				
108	(LDG SITE 12 X POS)	V94H5585C						DEC			X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE X POS 12				
109	(LDG SITE 12 Y POS)	V94H5586C						DEC			X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE Y POS 12				
110	(LDG SITE 12 CHAR)	V94U5396C						CHAR			X		40/ 43		E					L	ASC BRG SPEC	ASC BRG LDG SITE CHAR STRING 12				
111	(LDG SITE 13 X POS)	V94H5587C						DEC			X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE X POS 13				
112	(LDG SITE 13 Y POS)	V94H5588C						DEC			X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE Y POS 13				
113	(LDG SITE 13 CHAR)	V94U5397C						CHAR			X		40/ 43		E					L	ASC BRG SPEC	ASC BRG LDG SITE CHAR STRING 13				
114	(LDG SITE 14 X POS)	V94H5589C						DEC			X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE X POS 14				
115	(LDG SITE 14 Y POS)	V94H5590C						DEC			X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE Y POS 14				

Table 4.2.41-2. ASCENT BEARING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U	S	B	S	C	F	R	S	L	B	D	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	I	O	TYPE	N	A	A	Z	L	A	T	G	A	A					N
										S	U	K		R	H									
116	(LDG SITE 14 CHAR)	V94U5398C							CHAR			X		40/ 43		E					L	ASC BRG SPEC	ASC BRG LDG SITE CHAR STRING 14	
117	(LDG SITE 15 X POS)	V94H5591C							DEC			X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE X POS 15	
118	(LDG SITE 15 Y POS)	V94H5592C							DEC			X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE Y POS 15	
119	(LDG SITE 15 CHAR)	V94U5399C							CHAR			X		40/ 43		E					L	ASC BRG SPEC	ASC BRG LDG SITE CHAR STRING 15	
120	(LDG SITE 16 X POS)	V94H5593C							DEC			X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE X POS 16	
121	(LDG SITE 16 Y POS)	V94H5594C							DEC			X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE Y POS 16	
122	(LDG SITE 16 CHAR)	V94U5543C							CHAR			X		40/ 43		E					L	ASC BRG SPEC	ASC BRG LDG SITE CHAR STRING 16	
123	(LDG SITE 17 X POS)	V94H5595C							DEC			X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE X POS 17	
124	(LDG SITE 17 Y POS)	V94H5596C							DEC			X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE Y POS 17	
125	(LDG SITE 17 CHAR)	V94U5544C							CHAR			X		40/ 43		E					L	ASC BRG SPEC	ASC BRG LDG SITE CHAR STRING 17	

Table 4.2.41-2. ASCENT BEARING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U	S	B	S	C	F	R	S	L	B	D	Add Ref	Source	Nomenclature	C R T			
			X	Y		CHAR	BILEVEL		TYPE	N	T	A	A	Z	L	A	T	G	A					A	N	L
							I	O																			S	U	K	E	R	H	E	C	S	R	H	T
126	(LDG SITE 18 X POS)	V94H5597C									X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE X POS 18				
127	(LDG SITE 18 Y POS)	V94H5598C									X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE Y POS 18				
128	(LDG SITE 18 CHAR)	V94U5545C						CHAR			X		40/ 43		E					L	ASC BRG SPEC	ASC BRG LDG SITE CHAR STRING 18				
129	(LDG SITE 19 X POS)	V94H5599C									X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE X POS 19				
130	(LDG SITE 19 Y POS)	V94H5600C									X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE Y POS 19				
131	(LDG SITE 19 CHAR)	V94U5546C						CHAR			X		40/ 43		E					L	ASC BRG SPEC	ASC BRG LDG SITE CHAR STRING 19				
132	(LDG SITE 20 X POS)	V94H5604C									X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE X POS 20				
133	(LDG SITE 20 Y POS)	V94H5605C									X		40/ 43		E					K	ASC BRG SPEC	ASC BRG LAT/LON LDG SITE Y POS 20				
134	(LDG SITE 20 CHAR)	V94U5547C						CHAR			X		40/ 43		E					L	ASC BRG SPEC	ASC BRG LDG SITE CHAR STRING 20				
135	(TAL CRNG CIRCLE CTR X POS)	V94H5553C									X				B					M	ASC BRG SPEC	TAL CRNG CIRCLE CTR X POS				

Table 4.2.41-2. ASCENT BEARING (PFS) CRT DISPLAY PROCESSING																			
Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format			U N I T S	S T A T I O N	B A Z I L A R H	S I L A T G A N D E R H T	C F R S L B D	A I E R W	Add Ref	Source	Nomenclature	C R T	
			X	Y		CHAR	BILEVEL I 0	TYPE											
136	(TAL CRNG CIRCLE CTR Y POS)	V94H5554C									X				B		M	ASC BRG SPEC	TAL CRNG CIRCLE CTR Y POS
137	(TAL CRNG CIRCLE RADIUS)	V94H5555C									X	56			B		M	ASC BRG SPEC	TAL CRNG CIRCLE RADIUS
138	VI XXXXX	V95L0510C	4	7		6.0					X	40			B		O	ASC UPP, RTLS UPP	MAG OF VEHICLE INERTIAL VELOCITY
139	(MSG LINE)	V93X0050X	1	25		44.0									G			UI	MESSAGE LINE
140	(BUFFER MSG)	V93X0054X	45	25		4.0									G			UI	BUFFER MESSAGE INDICATOR
141	(SPL)	V93X0056X	2	26		49.0									G			UI	SCRATCH PAD LINE

Table 4.2.41-3. ASCENT BEARING CRT DISPLAY PROCESSING BACKGROUND REQUIREMENTS, DESIGN DEPENDENT
MAPS
1. The Ascent Bearing display shall display the Ascent Bearing Display Background (081 Hex) Virtual Display.
2. The Ascent Bearing display shall display the Bearing Display High Inc Main Map 1 (201 Hex) and Bearing Display High Inc Inset Map 1 (203 Hex) Virtual Displays if the inclination indicator AB_INCL_IND = 1 and the map set indicator AB_DISP_IND = 1.

Table 4.2.41-3. ASCENT BEARING CRT DISPLAY PROCESSING BACKGROUND REQUIREMENTS, DESIGN DEPENDENT

3. The Ascent Bearing display shall display the Bearing Display High Inc Main Map 2 (202 Hex) and Bearing Display High Inc Inset Map 2 (204 Hex) Virtual Displays if the inclination indicator AB_INCL_IND = 1 and the map set indicator AB_DISP_IND = 2.
4. The Ascent Bearing display shall display the Bearing Display Low Inc Main Map 1 (205 Hex) and Bearing Display Low Inc Inset Map 1 (207 Hex) Virtual Displays if the inclination indicator AB_INCL_IND = 2 and the map set indicator AB_DISP_IND = 1.
5. The Ascent Bearing display shall display the Bearing Display Low Inc Main Map 2 (206 Hex) and Bearing Display Low Inc Inset Map 2 (208 Hex) Virtual Displays if the inclination indicator AB_INCL_IND = 2 and the map set indicator AB_DISP_IND = 2.

NOTES

1. Ascent Bearing display coastline map latitude and longitude points for the two map sets of both main display and inset window are specified in the MEDS IDP Software Requirements Specification (SRS), MG070100A1012E2.
2. Color and thickness of the coastline map lines are specified in the MEDS IDP Software Requirements Specification (SRS), MG070100A1012E2.
3. Virtual Display numbers are specified in the General Purpose Computer (GPC) / Integrated Display Processor (IDP) ICD, ICD-3-0070-01.

TABLE 4.2.41-5. INPUT FUNCTIONAL PARAMETERS FOR ASCENT BEARING DISPLAY (PFS) (G6.55)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
AB_DISP_ANG_S	V94U5624C	ASC BRG VEH SYMBOL ROTATION ANGLE	ASC BRG SPEC	DEG	SPL		93090E	
AB_DISP_IND	V94X5630X	ASC BRG MAP SET INDICATOR	ASC BRG SPEC	ND	HXS		93090E	
AB_HDG_ARROW_ANG_S	V94U5625C	ASC BRG HEADING ARROW ROT ANGLE	ASC BRG SPEC	DEG	SPL		93090E	
AB_IIP_PLOT_IND	V94X5572X	ASC BRG IIP PLOT INDEX	ASC BRG SPEC	ND	HXS		93090E	
AB_IIP_X	V94H5573C	ASC BRG LAT/LON IIP X POS	ASC BRG SPEC	AU	VAR		93090E	
AB_IIP_Y	V94H5574C	ASC BRG LAT/LON IIP Y POS	ASC BRG SPEC	AU	VAR		93090E	
AB_INCL_IND	V94X6407X	ASC BRG INCLINATION INDICATOR	ASC BRG SPEC	ND	HXS		93090E	
AB_PRED_30_X	V94H5575C	ASC BRG LAT/LON PRED X POS 30	ASC BRG SPEC	AU	VAR		93090E	
AB_PRED_30_Y	V94H5576C	ASC BRG LAT/LON PRED Y POS 30	ASC BRG SPEC	AU	VAR		93090E	
AB_PRED_60_X	V94H5577C	ASC BRG LAT/LON PRED X POS 60	ASC BRG SPEC	AU	VAR		93090E	
AB_PRED_60_Y	V94H5578C	ASC BRG LAT/LON PRED Y POS 60	ASC BRG SPEC	AU	VAR		93090E	
AB_STATE_X	V94H5579C	ASC BRG LAT/LON CURR X POS	ASC BRG SPEC	AU	VAR		93090E	
AB_STATE_Y	V94H5580C	ASC BRG LAT/LON CURR Y POS	ASC BRG SPEC	AU	VAR		93090E	
ALT_RW_NAME(1)	V94U5522C	ALTERNATE SITE 1 PRI RUNWAY NAME	ASC BRG SPEC	ND	VAR		93090E	
ALT_RW_NAME(2)	V94U5523C	ALTERNATE SITE 2 PRI RUNWAY NAME	ASC BRG SPEC	ND	VAR		93090E	
ALT_SITE_INDEX(1)	V94U5524C	ALTERNATE SITE 1 INDEX	ASC BRG DISP	ND	HXS		93167A	*
ALT_SITE_INDEX(1)	V94U5524CB	ALTERNATE SITE 1 INDEX	ASC SITE LOOKUP	ND	HXS		93167A	*
ALT_SITE_INDEX(2)	V94U5525C	ALTERNATE SITE 2 INDEX	ASC BRG DISP	ND	HXS		93167A	*
ALT_SITE_INDEX(2)	V94U5525CB	ALTERNATE SITE 2 INDEX	ASC SITE LOOKUP	ND	HXS		93167A	*
AREA_SEL	V93J4392C	SELECTED AREA	HORIZ SIT DISP				93090E	
AREA_SEL	V93J4392CB	SELECTED AREA	ASC SITE LOOKUP				93017G	*
AREA_SEL	V93J4392CC	SELECTED AREA	ASC BRG DISP				93090E	
BLANK_IIP	V94X5534X	IIP SYMBOL BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LCH_WINDOW_CLOSE	V94X5536X	LAUNCH WINDOW CLOSE BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LCH_WINDOW_OPEN	V94X5535X	LAUNCH WINDOW OPEN BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LDG_SITE(1)	V94X5693X	LANDING SITE 1 BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LDG_SITE(10)	V94X5702X	LANDING SITE 10 BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LDG_SITE(11)	V94X5703X	LANDING SITE 11 BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LDG_SITE(12)	V94X5704X	LANDING SITE 12 BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LDG_SITE(13)	V94X5705X	LANDING SITE 13 BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LDG_SITE(14)	V94X5706X	LANDING SITE 14 BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LDG_SITE(15)	V94X5707X	LANDING SITE 15 BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LDG_SITE(16)	V94X5708X	LANDING SITE 16 BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LDG_SITE(17)	V94X5709X	LANDING SITE 17 BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LDG_SITE(18)	V94X5710X	LANDING SITE 18 BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LDG_SITE(19)	V94X5711X	LANDING SITE 19 BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	

TABLE 4.2.41-5. INPUT FUNCTIONAL PARAMETERS FOR ASCENT BEARING DISPLAY (PFS) (G6.55)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
BLANK_LDG_SITE(2)	V94X5694X	LANDING SITE 2 BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LDG_SITE(20)	V94X5712X	LANDING SITE 20 BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LDG_SITE(3)	V94X5695X	LANDING SITE 3 BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LDG_SITE(4)	V94X5696X	LANDING SITE 4 BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LDG_SITE(5)	V94X5697X	LANDING SITE 5 BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LDG_SITE(6)	V94X5698X	LANDING SITE 6 BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LDG_SITE(7)	V94X5699X	LANDING SITE 7 BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LDG_SITE(8)	V94X5700X	LANDING SITE 8 BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_LDG_SITE(9)	V94X5701X	LANDING SITE 9 BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_TAL_CRNG_CIRCLE	V94X6682X	TAL CRNG CIRCLE BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_TGT_INS_LN_IS	V94X5538X	TGT INS LINE INSET BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
BLANK_TGT_INS_LN_MN	V94X5537X	TGT INS LINE MAIN BLANKING FLAG	ASC BRG SPEC	ND	BD		93090E	
CONT_2EO_START	V93X6681XA	CONTINGENCY 2-ENG OUT START FLAG	XXXXXX TRAJ 1 DISP		BD		93017G	*
CONT_2EO_START	V93X6681XB	CONTINGENCY 2-ENG OUT START FLAG	PW CONT GUID		BD		93090E	
CONT_2EO_START	V93X6681XC	CONTINGENCY 2-ENG OUT START FLAG	XXXXXX TRAJ 2 DISP		BD		93017G	*
CONT_2EO_START	V93X6681XD	CONTINGENCY 2-ENG OUT START FLAG	RTLS TRAJ 2 DISP		BD		93017G	*
CONT_3EO_START	V90X0909X	CONTINGENCY 3 E/O START FLAG	CONT 3E/O GUID		BD		93017G	*
DELAZ_ALT(1)	V94H5517C	ALTER SITE 1 DELTA AZIMUTH	ASC BRG SPEC	RAD	SPL		93090E	
DELAZ_ALT(2)	V94H5518C	ALTER SITE 2 DELTA AZIMUTH	ASC BRG SPEC	RAD	SPL		93090E	
DELAZ_SEL	V94H5519C	SELECTED SITE DELTA AZIMUTH	ASC BRG SPEC	RAD	SPL		93090E	
LCH_WINDOW_CLOSE_X(1)	V94H5477C	ASC BRG LAT/LON LCH CL X POS 1	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_CLOSE_X(2)	V94H5478C	ASC BRG LAT/LON LCH CL X POS 2	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_CLOSE_X(3)	V94H5479C	ASC BRG LAT/LON LCH CL X POS 3	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_CLOSE_X(4)	V94H5480C	ASC BRG LAT/LON LCH CL X POS 4	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_CLOSE_X(5)	V94H5481C	ASC BRG LAT/LON LCH CL X POS 5	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_CLOSE_X(6)	V94H5482C	ASC BRG LAT/LON LCH CL X POS 6	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_CLOSE_Y(1)	V94H5483C	ASC BRG LAT/LON LCH CL Y POS 1	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_CLOSE_Y(2)	V94H5484C	ASC BRG LAT/LON LCH CL Y POS 2	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_CLOSE_Y(3)	V94H5485C	ASC BRG LAT/LON LCH CL Y POS 3	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_CLOSE_Y(4)	V94H5486C	ASC BRG LAT/LON LCH CL Y POS 4	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_CLOSE_Y(5)	V94H5487C	ASC BRG LAT/LON LCH CL Y POS 5	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_CLOSE_Y(6)	V94H5488C	ASC BRG LAT/LON LCH CL Y POS 6	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_OPEN_X(1)	V94H5465C	ASC BRG LAT/LON LCH OP X POS 1	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_OPEN_X(2)	V94H5466C	ASC BRG LAT/LON LCH OP X POS 2	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_OPEN_X(3)	V94H5467C	ASC BRG LAT/LON LCH OP X POS 3	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_OPEN_X(4)	V94H5468C	ASC BRG LAT/LON LCH OP X POS 4	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_OPEN_X(5)	V94H5469C	ASC BRG LAT/LON LCH OP X POS 5	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_OPEN_X(6)	V94H5470C	ASC BRG LAT/LON LCH OP X POS 6	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_OPEN_Y(1)	V94H5471C	ASC BRG LAT/LON LCH OP Y POS 1	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_OPEN_Y(2)	V94H5472C	ASC BRG LAT/LON LCH OP Y POS 2	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_OPEN_Y(3)	V94H5473C	ASC BRG LAT/LON LCH OP Y POS 3	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_OPEN_Y(4)	V94H5474C	ASC BRG LAT/LON LCH OP Y POS 4	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_OPEN_Y(5)	V94H5475C	ASC BRG LAT/LON LCH OP Y POS 5	ASC BRG SPEC	AU	VAR		93090E	
LCH_WINDOW_OPEN_Y(6)	V94H5476C	ASC BRG LAT/LON LCH OP Y POS 6	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(1,1)	V94H5489C	ASC BRG LAT/LON LDG SITE X POS 1	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(1,2)	V94H5490C	ASC BRG LAT/LON LDG SITE Y POS 1	ASC BRG SPEC	AU	VAR		93090E	

TABLE 4.2.41-5. INPUT FUNCTIONAL PARAMETERS FOR ASCENT BEARING DISPLAY (PFS) (G6.55)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
LDG_SITE_XYPOS_CHAR(1,3)	V94U5385C	ASC BRG LDG SITE CHAR STRING 1	ASC BRG SPEC	ND	VAR		93090E	
LDG_SITE_XYPOS_CHAR(1,4)	V94X5405X	ASC BRG LDG SITE PLOT IND 1	ASC BRG SPEC	ND	BD		93090E	
LDG_SITE_XYPOS_CHAR(10,1)	V94H5507C	ASC BRG LAT/LON LDG SITE X POS 10	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(10,2)	V94H5508C	ASC BRG LAT/LON LDG SITE Y POS 10	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(10,3)	V94U5394C	ASC BRG LDG SITE CHAR STRING 10	ASC BRG SPEC	ND	VAR		93090E	
LDG_SITE_XYPOS_CHAR(10,4)	V94X5414X	ASC BRG LDG SITE PLOT IND 10	ASC BRG SPEC	ND	BD		93090E	
LDG_SITE_XYPOS_CHAR(11,1)	V94H5509C	ASC BRG LAT/LON LDG SITE X POS 11	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(11,2)	V94H5584C	ASC BRG LAT/LON LDG SITE Y POS 11	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(11,3)	V94U5395C	ASC BRG LDG SITE CHAR STRING 11	ASC BRG SPEC	ND	VAR		93090E	
LDG_SITE_XYPOS_CHAR(11,4)	V94X5415X	ASC BRG LDG SITE PLOT IND 11	ASC BRG SPEC	ND	BD		93090E	
LDG_SITE_XYPOS_CHAR(12,1)	V94H5585C	ASC BRG LAT/LON LDG SITE X POS 12	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(12,2)	V94H5586C	ASC BRG LAT/LON LDG SITE Y POS 12	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(12,3)	V94U5396C	ASC BRG LDG SITE CHAR STRING 12	ASC BRG SPEC	ND	VAR		93090E	
LDG_SITE_XYPOS_CHAR(12,4)	V94X5416X	ASC BRG LDG SITE PLOT IND 12	ASC BRG SPEC	ND	BD		93090E	
LDG_SITE_XYPOS_CHAR(13,1)	V94H5587C	ASC BRG LAT/LON LDG SITE X POS 13	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(13,2)	V94H5588C	ASC BRG LAT/LON LDG SITE Y POS 13	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(13,3)	V94U5397C	ASC BRG LDG SITE CHAR STRING 13	ASC BRG SPEC	ND	VAR		93090E	
LDG_SITE_XYPOS_CHAR(13,4)	V94X5417X	ASC BRG LDG SITE PLOT IND 13	ASC BRG SPEC	ND	BD		93090E	
LDG_SITE_XYPOS_CHAR(14,1)	V94H5589C	ASC BRG LAT/LON LDG SITE X POS 14	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(14,2)	V94H5590C	ASC BRG LAT/LON LDG SITE Y POS 14	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(14,3)	V94U5398C	ASC BRG LDG SITE CHAR STRING 14	ASC BRG SPEC	ND	VAR		93090E	
LDG_SITE_XYPOS_CHAR(14,4)	V94X5418X	ASC BRG LDG SITE PLOT IND 14	ASC BRG SPEC	ND	BD		93090E	
LDG_SITE_XYPOS_CHAR(15,1)	V94H5591C	ASC BRG LAT/LON LDG SITE X POS 15	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(15,2)	V94H5592C	ASC BRG LAT/LON LDG SITE Y POS 15	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(15,3)	V94U5399C	ASC BRG LDG SITE CHAR STRING 15	ASC BRG SPEC	ND	VAR		93090E	
LDG_SITE_XYPOS_CHAR(15,4)	V94X5419X	ASC BRG LDG SITE PLOT IND 15	ASC BRG SPEC	ND	BD		93090E	
LDG_SITE_XYPOS_CHAR(16,1)	V94H5593C	ASC BRG LAT/LON LDG SITE X POS 16	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(16,2)	V94H5594C	ASC BRG LAT/LON LDG SITE Y POS 16	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(16,3)	V94U5543C	ASC BRG LDG SITE CHAR STRING 16	ASC BRG SPEC	ND	VAR		93090E	
LDG_SITE_XYPOS_CHAR(16,4)	V94X5512X	ASC BRG LDG SITE PLOT IND 16	ASC BRG SPEC	ND	BD		93090E	
LDG_SITE_XYPOS_CHAR(17,1)	V94H5595C	ASC BRG LAT/LON LDG SITE X POS 17	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(17,2)	V94H5596C	ASC BRG LAT/LON LDG SITE Y POS 17	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(17,3)	V94U5544C	ASC BRG LDG SITE CHAR STRING 17	ASC BRG SPEC	ND	VAR		93090E	
LDG_SITE_XYPOS_CHAR(17,4)	V94X5513X	ASC BRG LDG SITE PLOT IND 17	ASC BRG SPEC	ND	BD		93090E	
LDG_SITE_XYPOS_CHAR(18,1)	V94H5597C	ASC BRG LAT/LON LDG SITE X POS 18	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(18,2)	V94H5598C	ASC BRG LAT/LON LDG SITE Y POS 18	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(18,3)	V94U5545C	ASC BRG LDG SITE CHAR STRING 18	ASC BRG SPEC	ND	VAR		93090E	
LDG_SITE_XYPOS_CHAR(18,4)	V94X5514X	ASC BRG LDG SITE PLOT IND 18	ASC BRG SPEC	ND	BD		93090E	
LDG_SITE_XYPOS_CHAR(19,1)	V94H5599C	ASC BRG LAT/LON LDG SITE X POS 19	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(19,2)	V94H5600C	ASC BRG LAT/LON LDG SITE Y POS 19	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(19,3)	V94U5546C	ASC BRG LDG SITE CHAR STRING 19	ASC BRG SPEC	ND	VAR		93090E	
LDG_SITE_XYPOS_CHAR(19,4)	V94X5515X	ASC BRG LDG SITE PLOT IND 19	ASC BRG SPEC	ND	BD		93090E	
LDG_SITE_XYPOS_CHAR(2,1)	V94H5491C	ASC BRG LAT/LON LDG SITE X POS 2	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(2,2)	V94H5492C	ASC BRG LAT/LON LDG SITE Y POS 2	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(2,3)	V94U5386C	ASC BRG LDG SITE CHAR STRING 2	ASC BRG SPEC	ND	VAR		93090E	
LDG_SITE_XYPOS_CHAR(2,4)	V94X5406X	ASC BRG LDG SITE PLOT IND 2	ASC BRG SPEC	ND	BD		93090E	

TABLE 4.2.41-5. INPUT FUNCTIONAL PARAMETERS FOR ASCENT BEARING DISPLAY (PFS) (G6.55)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
LDG_SITE_XYPOS_CHAR(20,1)	V94H5604C	ASC BRG LAT/LON LDG SITE X POS 20	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(20,2)	V94H5605C	ASC BRG LAT/LON LDG SITE Y POS 20	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(20,3)	V94U5547C	ASC BRG LDG SITE CHAR STRING 20	ASC BRG SPEC	ND	VAR		93090E	
LDG_SITE_XYPOS_CHAR(20,4)	V94X5516X	ASC BRG LDG SITE PLOT IND 20	ASC BRG SPEC	ND	BD		93090E	
LDG_SITE_XYPOS_CHAR(3,1)	V94H5493C	ASC BRG LAT/LON LDG SITE X POS 3	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(3,2)	V94H5494C	ASC BRG LAT/LON LDG SITE Y POS 3	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(3,3)	V94U5387C	ASC BRG LDG SITE CHAR STRING 3	ASC BRG SPEC	ND	VAR		93090E	
LDG_SITE_XYPOS_CHAR(3,4)	V94X5407X	ASC BRG LDG SITE PLOT IND 3	ASC BRG SPEC	ND	BD		93090E	
LDG_SITE_XYPOS_CHAR(4,1)	V94H5495C	ASC BRG LAT/LON LDG SITE X POS 4	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(4,2)	V94H5496C	ASC BRG LAT/LON LDG SITE Y POS 4	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(4,3)	V94U5388C	ASC BRG LDG SITE CHAR STRING 4	ASC BRG SPEC	ND	VAR		93090E	
LDG_SITE_XYPOS_CHAR(4,4)	V94X5408X	ASC BRG LDG SITE PLOT IND 4	ASC BRG SPEC	ND	BD		93090E	
LDG_SITE_XYPOS_CHAR(5,1)	V94H5497C	ASC BRG LAT/LON LDG SITE X POS 5	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(5,2)	V94H5498C	ASC BRG LAT/LON LDG SITE Y POS 5	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(5,3)	V94U5389C	ASC BRG LDG SITE CHAR STRING 5	ASC BRG SPEC	ND	VAR		93090E	
LDG_SITE_XYPOS_CHAR(5,4)	V94X5409X	ASC BRG LDG SITE PLOT IND 5	ASC BRG SPEC	ND	BD		93090E	
LDG_SITE_XYPOS_CHAR(6,1)	V94H5499C	ASC BRG LAT/LON LDG SITE X POS 6	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(6,2)	V94H5500C	ASC BRG LAT/LON LDG SITE Y POS 6	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(6,3)	V94U5390C	ASC BRG LDG SITE CHAR STRING 6	ASC BRG SPEC	ND	VAR		93090E	
LDG_SITE_XYPOS_CHAR(6,4)	V94X5410X	ASC BRG LDG SITE PLOT IND 6	ASC BRG SPEC	ND	BD		93090E	
LDG_SITE_XYPOS_CHAR(7,1)	V94H5501C	ASC BRG LAT/LON LDG SITE X POS 7	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(7,2)	V94H5502C	ASC BRG LAT/LON LDG SITE Y POS 7	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(7,3)	V94U5391C	ASC BRG LDG SITE CHAR STRING 7	ASC BRG SPEC	ND	VAR		93090E	
LDG_SITE_XYPOS_CHAR(7,4)	V94X5411X	ASC BRG LDG SITE PLOT IND 7	ASC BRG SPEC	ND	BD		93090E	
LDG_SITE_XYPOS_CHAR(8,1)	V94H5503C	ASC BRG LAT/LON LDG SITE X POS 8	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(8,2)	V94H5504C	ASC BRG LAT/LON LDG SITE Y POS 8	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(8,3)	V94U5392C	ASC BRG LDG SITE CHAR STRING 8	ASC BRG SPEC	ND	VAR		93090E	
LDG_SITE_XYPOS_CHAR(8,4)	V94X5412X	ASC BRG LDG SITE PLOT IND 8	ASC BRG SPEC	ND	BD		93090E	
LDG_SITE_XYPOS_CHAR(9,1)	V94H5505C	ASC BRG LAT/LON LDG SITE X POS 9	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(9,2)	V94H5506C	ASC BRG LAT/LON LDG SITE Y POS 9	ASC BRG SPEC	AU	VAR		93090E	
LDG_SITE_XYPOS_CHAR(9,3)	V94U5393C	ASC BRG LDG SITE CHAR STRING 9	ASC BRG SPEC	ND	VAR		93090E	
LDG_SITE_XYPOS_CHAR(9,4)	V94X5413X	ASC BRG LDG SITE PLOT IND 9	ASC BRG SPEC	ND	BD		93090E	
MM_CODE	V90Q8001C	MAJOR MODE CODE	UI		HXS		93017G	*
REL_VEL_MAG	V95L0151CA	GND REL VEL MAGNITUDE IN M50 SYS	RTLS UPP	FT/S	SPL		93017G	*
REL_VEL_MAG	V95L0151CE	GND REL VEL MAGNITUDE IN M50 SYS	ASC UPP	FT/S			93017G	*
RTLS_ABORT_DECLARED	V90X8637XA	RTLS ABORT DECLARED	MSC		BD		93167A	*
RTLS_ABORT_DECLARED	V90X8637XB	RTLS ABORT DECLARED	ET SEP SEQ		BD		93167A	*
RTLS_ABORT_DECLARED	V90X8637XC	RTLS ABORT DECLARED	CONT 3E/O GUID		BD		93167A	*
RW_NAME_SEL	V94U5528C	RUNWAY NAME SELECTED LANDING SITE	ASC SITE LOOKUP	ND	VAR		93090E	
TAL_ABORT_DECLARED	V90X8658X	TAL ABORT DECLARED	MSC				93090E	
TAL_CRNG_CTR_X	V94H5553C	TAL CRNG CIRCLE X POS	ASC BRG SPEC	AU	VAR		93090E	
TAL_CRNG_CTR_Y	V94H5554C	TAL CRNG CIRCLE Y POS	ASC BRG SPEC	AU	VAR		93090E	
TAL_CRNG_RADIUS	V94H5555C	TAL CRNG CIRCLE RADIUS	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_IS_X(1)	V94H5373C	ASC BRG LAT/LON TGT INS IS X POS 1	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_IS_X(2)	V94H5374C	ASC BRG LAT/LON TGT INS IS X POS 2	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_IS_X(3)	V94H5375C	ASC BRG LAT/LON TGT INS IS X POS 3	ASC BRG SPEC	AU	VAR		93090E	

TABLE 4.2.41-5. INPUT FUNCTIONAL PARAMETERS FOR ASCENT BEARING DISPLAY (PFS) (G6.55)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
TGT_INS_LINE_IS_X(4)	V94H5376C	ASC BRG LAT/LON TGT INS IS X POS 4	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_IS_X(5)	V94H5377C	ASC BRG LAT/LON TGT INS IS X POS 5	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_IS_X(6)	V94H5378C	ASC BRG LAT/LON TGT INS IS X POS 6	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_IS_Y(1)	V94H5379C	ASC BRG LAT/LON TGT INS IS Y POS 1	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_IS_Y(2)	V94H5380C	ASC BRG LAT/LON TGT INS IS Y POS 2	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_IS_Y(3)	V94H5381C	ASC BRG LAT/LON TGT INS IS Y POS 3	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_IS_Y(4)	V94H5382C	ASC BRG LAT/LON TGT INS IS Y POS 4	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_IS_Y(5)	V94H5383C	ASC BRG LAT/LON TGT INS IS Y POS 5	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_IS_Y(6)	V94H5384C	ASC BRG LAT/LON TGT INS IS Y POS 6	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_MN_X(1)	V94H5361C	ASC BRG LAT/LON TGT INS MN X POS 1	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_MN_X(2)	V94H5362C	ASC BRG LAT/LON TGT INS MN X POS 2	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_MN_X(3)	V94H5363C	ASC BRG LAT/LON TGT INS MN X POS 3	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_MN_X(4)	V94H5364C	ASC BRG LAT/LON TGT INS MN X POS 4	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_MN_X(5)	V94H5365C	ASC BRG LAT/LON TGT INS MN X POS 5	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_MN_X(6)	V94H5366C	ASC BRG LAT/LON TGT INS MN X POS 6	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_MN_Y(1)	V94H5367C	ASC BRG LAT/LON TGT INS MN Y POS 1	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_MN_Y(2)	V94H5368C	ASC BRG LAT/LON TGT INS MN Y POS 2	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_MN_Y(3)	V94H5369C	ASC BRG LAT/LON TGT INS MN Y POS 3	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_MN_Y(4)	V94H5370C	ASC BRG LAT/LON TGT INS MN Y POS 4	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_MN_Y(5)	V94H5371C	ASC BRG LAT/LON TGT INS MN Y POS 5	ASC BRG SPEC	AU	VAR		93090E	
TGT_INS_LINE_MN_Y(6)	V94H5372C	ASC BRG LAT/LON TGT INS MN Y POS 6	ASC BRG SPEC	AU	VAR		93090E	
V_INERTIAL_MAG	V95L0510CA	MAG OF VEHICLE INERTIAL VELOCITY	ASC UPP	FT/S			93090E	
V_INERTIAL_MAG	V95L0510CB	MAG OF VEHICLE INERTIAL VELOCITY	RTLS UPP	FT/S			93090E	
	V94X6368X	ILL ENTRY MSG (ASC BRG DISP)	UI				93090E	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.41-6. OUTPUT FUNCTIONAL PARAMETERS FROM ASCENT BEARING DISPLAY (PFS) (G6.55)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ALT_SITE_INDEX(1)	V94U5524C	ALTERNATE SITE 1 INDEX	ASC BRG DISP ASC BRG SPEC ENT BRG DISP ENT BRG SPEC ENT SITE LOOKUP	ND	HXS		93167A	*
ALT_SITE_INDEX(2)	V94U5525C	ALTERNATE SITE 2 INDEX	ASC BRG DISP ASC BRG SPEC ENT BRG DISP ENT BRG SPEC ENT SITE LOOKUP	ND	HXS		93167A	*
AREA_SEL	V93J4392CC	SELECTED AREA	ASC BRG DISP ASC BRG SPEC ASC SITE LOOKUP HORIZ SIT DISP				93090E	
NEW_AREA	V93J4396CA	NEW LANDING AREA SELECT CMD	ASC SITE LOOKUP		HXS		93090E	
OVHD	V95X0154XE	OVHD/STRT IND	HORIZ SIT DISP TLM	EVENT	BD		93204D	*
TOGHAC	V93X4477XA	R/L CONE CHG CMD	RTLS UPP TLM		BD		93204D	*

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
 (HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec

TABLE 4.2.41-7. ASCENT BEARING DISPLAY (PFS) (G6.55) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
TARGET_INDEX(1)	V99U8901C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(10)	V98U8276C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(11)	V98U8567C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(12)	V98U8568C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(13)	V98U8569C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(14)	V98U8570C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(15)	V98U8571C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(16)	V98U8572C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(17)	V98U8573C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(18)	V98U8574C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(19)	V98U8575C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	

TABLE 4.2.41-7. ASCENT BEARING DISPLAY (PFS) (G6.55) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
TARGET_INDEX(2)	V99U8913C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(20)	V98U8576C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(21)	V98U8577C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(22)	V98U8578C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(23)	V98U8579C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(24)	V98U8580C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(25)	V98U8581C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(26)	V97U9927C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(27)	V97U9928C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(28)	V97U9929C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(29)	V97U9930C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	

TABLE 4.2.41-7. ASCENT BEARING DISPLAY (PFS) (G6.55) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
TARGET_INDEX(3)	V99U8925C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(30)	V97U9931C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(31)	V97U9932C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(32)	V97U9933C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(33)	V97U9934C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(34)	V97U9935C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(35)	V97U9936C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(36)	V97U9937C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(37)	V97U9938C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(38)	V97U9939C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(39)	V97U9940C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	

TABLE 4.2.41-7. ASCENT BEARING DISPLAY (PFS) (G6.55) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
TARGET_INDEX(4)	V99U8937C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(40)	V97U9941C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(41)	V97U9942C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(42)	V97U9943C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(43)	V97U9944C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(44)	V97U9945C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(45)	V97U9946C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(5)	V99U8949C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(6)	V98U8272C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(7)	V98U8273C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	
TARGET_INDEX(8)	V98U8274C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	

TABLE 4.2.41-7. ASCENT BEARING DISPLAY (PFS) (G6.55) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
TARGET_INDEX(9)	V98U8275C	ND	I	S	M	C	G4.2 G4.4 G5.7 G6.55	00	AID	93090E	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.41-8. ASCENT BEARING DISPLAY (PFS) (G6.55) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.41-9. ASCENT BEARING DISPLAY (PFS) (G6.55) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

4.2.42 ENTRY BEARING (PFS)

TITLE: ENTRY BEARING

TYPE: SPEC/054

AVAILABILITY: OPS 3,6, PFS

4.2.42.1 Purpose, Operation and Organization

The Entry Bearing display provides the crew with data to support horizontal situation assessment of the Shuttle during the Entry phase. Central plot area of the Entry Bearing display is a plot of range vs. delta azimuth (heading error to Way Point 1 (WP1)) with respect to the Shuttle orbiter of the selected landing site and the two alternate sites associated with the selected site. The plot is a "polar" plot with range as the distance variable and delta azimuth with respect to the orbiter as the angle variable. Current vehicle heading is "up". Therefore, the zero delta azimuth axis is "up", with positive delta azimuth in the clockwise direction. The plot is continuously rescaled based on range to the selected site. Fixed range rings enter and leave the plot as vehicle range decreases.

Energy over weight (E/W) scales are presented for the selected site and each of the alternate sites in MM 602 and 603. E/W scale for the selected site is identical to that on the Vertical Situation 1/2 displays. Shown above each of the E/W scales is its associated three-character site name, as well as digital readouts of Shuttle heading error (delta azimuth) to WP1 with respect to the site.

The Entry Bearing display shows digital readouts of the selected site index and indexes of the two alternate sites. Selected site runway name and primary runway name of the two alternate sites are also displayed. An item entry (Item 41) to change the selected site like that on the Horizontal Situation display is also present on this display. Alternate sites are I-Loaded, but are changeable via item entries (Item 1 and 2) on the display.

Item 41, the selected site index, and selected runway name are the only data supported in MM 301 through MM 303 on this display.

For SPEC 054, the Ascent Bearing Display transitions automatically to the Entry Bearing Display on the MM 601 to MM 602 transition. However, there is no other automatic transition of SPEC 054 displays. For instance, on a TAL abort with the transition from OPS 1 to OPS 3, the Ascent Bearing Display will be replaced by the OPS display. The Entry Bearing Display is then accessed by executing SPEC 054 PRO.

Figure 4.2.42-1 shows the Entry Bearing Display format in MM 602 and 603. Display format in MM 304 and 305 is shown in Figure 4.2.42-2.

The Entry Bearing display utilizes color capabilities provided by MEDS.

- (1) Central plot area of the Entry Bearing display is a plot of range vs. delta azimuth (heading error to Way Point 1) with respect to the Shuttle orbiter. The plot is a "polar" plot with range as the distance variable and delta azimuth with respect to the orbiter as the angle variable.

Current vehicle heading is "up". Therefore, the zero delta azimuth axis is "up", with positive delta azimuth in the clockwise direction.

Position of the vehicle is represented on the plot by a Shuttle symbol in default green, located at a fixed screen location. Threshold of the selected landing site runway is a fixed screen radius from the Shuttle symbol, lying at a point on an imaginary circle equal to delta azimuth with respect to the orbiter. Hence, the plot is continuously rescaled based on range to the selected runway threshold. The fixed screen radius to the selected runway is approximately 77% of the distance to the top of the plot region when delta azimuth is zero. The selected runway is shown in the plot region if delta azimuth is in the approximate range of -38 to 53 degrees; otherwise, it is outside of the plot region and not displayed.

The shuttle symbol rotates positive clockwise an amount equal to the roll angle of the vehicle. When the roll angle is zero, the Shuttle symbol is oriented with tail pointing up and wings level.

- (2) The selected runway is depicted as a line of fixed length in yellow, pointing in the direction of the runway azimuth relative to the vehicle heading. The three-character site identifier for the selected runway is shown in yellow above the runway line. A line is drawn, the "delaz" line, in yellow between the Shuttle symbol and the selected runway threshold. In MM 304, two sets of "roll reversal" lines are drawn in green. These lines point in the direction of plus and minus the two maximum absolute heading errors with respect to the orbiter's current heading (up). The inner roll reversal lines are shown as dashed lines. The outer roll reversal lines are shown as slightly shorter solid lines.

The delaz line indicates the direction of the selected runway with respect to the vehicle's current heading. Furthermore, within the framework of the roll reversal lines, the delaz line provides insight into when a roll reversal is expected to occur.

- (3) The first alternate site is shown as a filled circle in white, if present in the plot region. Its three-character site identifier is displayed in white above the circle. The second alternate site is shown as a filled diamond in cyan, if present in the plot region. Its three-character site identifier is displayed in cyan above the diamond. Each of the alternate sites is shown in the plot region if delta azimuth is in the approximate range of -38 to 53 degrees; otherwise, it is outside of the plot region and not displayed. These colors are used to display the respective alternate site symbols on the Entry Trajectory 1-5 displays in MM 304.
- (4) The instantaneous impact point (IIP), an impact point given the current state of the Shuttle, is displayed as a white cross. As a non-guided impact point, its "heading" coincides with that of the Shuttle. Therefore, the IIP symbol is located along the imaginary line from the Shuttle symbol up to the top of the plot region. The IIP symbols parks and remains displayed if it reaches the edge of the plot region.
- (5) Range rings, representing fixed distances from the selected runway threshold, enter and leave the plot as vehicle range decreases and the plot is continuously rescaled. Range rings are drawn as dashed circular arcs in green. A nautical mile label in green next to each ring specifies the distance it represents from the selected runway threshold.

There are a total of nine range rings, each of which first appears when a prescribed altitude or range condition is met. Each ring moves across the screen until it cannot be displayed or a maximum screen distance is exceeded.

- (6) In MM 602 and 603, an E/W scale for the selected landing runway is shown in yellow nearest the left border of display. This scale functions identically to the E/W scale shown on the Vertical Situation 1 and 2 displays. Current vehicle energy state, nominal energy state, and guidance energy limits are dynamically displayed. The scale is scaled as a function of the S-TURN and MEP values, with those locations fixed on the scale. Current energy state symbol is a right pointing triangle. This symbol flashes if current energy is greater than S-TURN energy or less than MEP energy. Nominal energy state and energy limits are tick marked. The OTT downmode energy state is displayed with a right pointing solid arrow. When range to the runway is less than an I-Loaded limit, the display of OTT downmode energy symbol is blanked. All fixed and dynamic symbols are displayed in yellow.
- (7) In MM 602 and 603, E/W scales for each of alternate sites 1 and 2 are shown in green to the right of the selected site E/W scale. The alternate site 1 E/W scale is next to the selected site E/W scale. The alternate site 2 E/W scale is to the right of the alternate site 1 E/W scale. Current vehicle energy state, nominal energy state, and guidance energy limits with respect to each alternate site are dynamically displayed on its respective scale. Each scale is scaled as a function of its S-TURN and MEP values, with those locations fixed on the scale. Current energy state symbol is a right pointing triangle. This symbol does not flash on the alternate site E/W scales. Nominal energy state and the energy limits are tick marked. The OTT downmode energy state is displayed with a right pointing solid arrow. When the range to the runway is less than an I-Loaded limit, the display of OTT downmode energy symbol is blanked. All fixed and dynamic symbols are displayed in green.
- (8) Displayed above each E/W scale is its associated three-character site identifier and heading error of the Shuttle with respect to WP1 for the selected landing runway and each of the alternate sites. Each site identifier is shown across from the "SITE" label above its respective E/W scale. Similarly, each value of heading error is shown in degrees across from the " Δ Az" label above its respective E/W scale. For the selected runway, site identifier and heading error value are displayed in yellow to match its color for the site label and runway line on the plot. To match their respective colors of site labels on the plot, site identifier and heading error value are displayed in white for alternate site 1 and cyan for alternate site 2.
- (9) Item 41 provides the capability to specify a landing area, or site, by entering an index value from 1 - 45. Item 41 on the Entry Bearing display functions identically to Item 41 on the Horizontal Situation Display (HSD). The selected landing site index is displayed in green next to Item 41 under the "SITE" label. Next to the landing site index under the "ID" label is shown in green a character string identifying the selected runway. This identifier changes when a new landing area is designated, or a different primary or secondary runway selection is made with Items 3 and 4 on the HSD.
- (10) Item 1 provides the capability to specify a first alternate landing site (alternate site 1) by entering an index value from 0 - 45. A value of zero signifies no first alternate site is designated. Displayed next to Item 1 under the "SITE" label is the first alternate site index in green. The first alternate site index changes when a valid Item 1 entry is made, or when a new

landing site has been selected with Item 41 on this display or the HSD. In the latter case, the I-Loaded first alternate site index (which may be zero) associated with the newly selected landing site is displayed.

A character string identifying the primary runway of the first alternate site is displayed in green next to the site index under the "ID" label. This identifier changes when a new landing area is designated, or a different site index is entered via Item 1. There is no capability to designate the secondary runway of an alternate site. The character string is blanked if the first alternate site index is zero.

- (11) Item 2 provides the capability to specify a second alternate landing site (alternate site 2) by entering an index value from 0 - 45. A value of zero signifies no second alternate site is designated. Displayed next to Item 2 under the "SITE" label is the second alternate site index in green. The second alternate site index changes when a valid Item 2 entry is made, or when a new landing site has been selected with Item 41 on this display or the HSD. In the latter case, the I-Loaded second alternate site index (which may be zero) associated with the newly selected landing site is displayed.

A character string identifying the primary runway of the second alternate site is displayed in green next to the site index under the "ID" label. This identifier changes when a new landing area is designated, or a different site index is entered via Item 2. There is no capability to designate the secondary runway of an alternate site. The character string is blanked if the second alternate site index is zero.

4.2.42.2 Entry Bearing (PFS) Keyboard Processing Addendum

A. SITE XX.

1. Whenever Item 41 is executed, the parameter NEW_AREA shall be set to 1.
2. Whenever Item 41 is executed, the parameter AREA_SEL shall be set to the valid value entered.
3. Entry of an index value outside the range 1 - 45 shall cause the value to be rejected and an illegal entry message to be displayed.

B. SITE 1XX.

1. Whenever Item 1 is entered, the parameter ALT_SITE_INDEX(1) shall be set to the valid value entered.
2. Entry of an index value outside the range 0 - 45 shall cause the value to be rejected and an illegal entry message to be displayed.
3. Execution of Item 1 in MM 301 - MM 303 (MM_CODE = 301, 302, or 303) shall cause the value to be rejected and an illegal entry message to be displayed.

C. SITE 2XX.

1. Whenever Item 2 is entered, the parameter ALT_SITE_INDEX(2) shall be set to the valid value entered.
2. Entry of an index value outside the range 0 - 45 shall cause the value to be rejected and an illegal entry message to be displayed.
3. Execution of Item 2 in MM 301 - MM 303 (MM_CODE = 301, 302, or 303) shall cause the value to be rejected and an illegal entry message to be displayed.

4.2.42.3 Entry Bearing (PFS) CRT Display Processing Addendum

All necessary processing for dynamic symbols on this display are defined in Section B.5.27 (Entry Bearing Specialist Function) of Volume 3 of this FSSR.

A. Site Indexes and IDs.

1. The "ID" field corresponding to Item 1 shall be blanked if ALT_SITE_INDEX(1) = 0 or EB_RNG_DELAZ_PROC = OFF.
2. The "ID" field corresponding to Item 2 shall be blanked if ALT_SITE_INDEX(2) = 0 or EB_RNG_DELAZ_PROC = OFF.
3. The site indexes and "ID" fields corresponding to Items 1 and 2 shall be blanked in MM 301 - MM 303 (MM_CODE = 301, 302, or 303).

B. Energy Over Weight (EOW) Scale Site IDs.

1. The Entry Bearing Display shall display the first three characters of RW_NAME_SEL in the left field adjacent to "SITE", the first three characters of ALT_RW_NAME(1) in the middle field, and the first three characters of ALT_RW_NAME(2) in the right field.
2. The middle "SITE" field shall be blanked if ALT_SITE_INDEX(1) = 0 or EB_RNG_DELAZ_PROC = OFF.
3. The right "SITE" field shall be blanked if ALT_SITE_INDEX(2) = 0 or EB_RNG_DELAZ_PROC = OFF.
4. All "SITE" fields shall be blanked in MM 301 - MM 303 (MM_CODE = 301, 302, or 303).

C. Delta Azimuths.

1. The Entry Bearing Display shall convert DELAZ_SEL, DELAZ_ALT(1), and DELAZ_ALT(2) from radians to degrees for display.
2. The left delta azimuth field shall be blanked if EB_RNG_DELAZ_PROC = OFF.
3. The middle delta azimuth field shall be blanked if ALT_SITE_INDEX(1) = 0 or EB_RNG_DELAZ_PROC = OFF.
4. The right delta azimuth field shall be blanked if ALT_SITE_INDEX(2) = 0 or EB_RNG_DELAZ_PROC = OFF.
5. All delta azimuth fields shall be blanked in MM 301 - MM 303 (MM_CODE = 301, 302, or 303).

D. Selected Runway Position.

1. The selected runway shall be drawn as a straight line starting at the X and Y runway threshold location specified by EB_POS_RW_X and EB_POS_RW_Y, respectively, and ending at the X and Y runway endpoint location specified by EB_POS_RW_ENDPT_X and EB_POS_RW_ENDPT_Y, respectively, in addressable unit (AU) coordinates, with the origin at the center of the screen.
2. The first three characters of RW_NAME_SEL shall be displayed centered above the runway threshold if EB_POS_RW_Y \geq EB_POS_RW_ENDPT_Y, and centered above the runway endpoint if EB_POS_RW_ENDPT_Y $>$ EB_POS_RW_Y.
3. The selected runway line and character string shall be blanked if EB_BLANK_SEL_SITE = ON or EB_RNG_DELAZ_PROC = OFF.

4. The selected runway line and character string shall be blanked in MM 301 – MM 303 (MM_CODE = 301, 302, or 303).

E. Alternate Site 1 Position.

1. A filled circle (alternate character set symbol 14) shall be displayed as Alternate Site 1 at the X and Y location specified by EB_POS_ALT_X(1) and EB_POS_ALT_Y(1), respectively, in addressable unit (AU) coordinates, with the origin at the center of the screen.

2. The first three characters of ALT_RW_NAME(1) shall be displayed centered above the symbol location.

3. Alternate Site 1 symbol and character string shall be blanked if EB_BLANK_ALT_SITE(1) = ON or EB_RNG_DELAZ_PROC = OFF.

4. Alternate Site 1 symbol and character string shall be blanked in MM 301 - MM 303 (MM_CODE = 301, 302, or 303).

F. Alternate Site 2 Position.

1. A filled diamond (alternate character set symbol 15) shall be displayed as Alternate Site 2 at the X and Y location specified by EB_POS_ALT_X(2) and EB_POS_ALT_Y(2), respectively, in addressable unit (AU) coordinates, with the origin at the center of the screen.

2. The first three characters of ALT_RW_NAME(2) shall be displayed centered above the symbol location.

3. Alternate Site 2 symbol and character string shall be blanked if EB_BLANK_ALT_SITE(2) = ON or EB_RNG_DELAZ_PROC = OFF.

4. Alternate Site 2 symbol and character string shall be blanked in MM 301 - MM 303 (MM_CODE = 301, 302, or 303).

G. Delaz Line.

1. The Entry Bearing Display shall draw a line between the X and Y location near the Shuttle symbol specified by EB_DELAZ_LINE_STRT_X and EB_DELAZ_LINE_STRT_Y, respectively, and the X and Y location near the selected runway threshold specified by EB_DELAZ_LINE_ENDPT_X and EB_DELAZ_LINE_ENDPT_Y, respectively.

2. If the selected runway threshold location is not within the plot region (EB_BLANK_SEL_SITE = ON), the delaz line shall be drawn in the direction of the selected runway threshold location and terminate at the plot region boundary.

3. The delaz line shall be blanked if EB_RNG_DELAZ_PROC = OFF.

4. The delaz line shall be blanked in MM 301 - MM 303 (MM_CODE = 301, 302, or 303).

Notes: (1) The delaz line runs between the Shuttle symbol and the selected runway threshold. The specified start and end points provide for "gaps" between the delaz line and the Shuttle symbol and the selected runway line, respectively, so there is no overlap. (2) The selected runway location may be inside or outside of the plot region.

H. Roll Reversal Lines.

1. The Entry Bearing Display shall draw a dashed line between the X and Y location near the Shuttle symbol specified by EB_POS_RR_LINE1_L_STRT_X and EB_POS_RR_LINE1_L_STRT_Y, respectively, and the X and Y left reversal line endpoint location specified by EB_POS_RR_LINE1_L_X and EB_POS_RR_LINE1_L_Y, respectively.

2. The entry Bearing Display shall draw a dashed line between the X and Y location near the Shuttle symbol specified by EB_POS_RR_LINE1_R_STRT_X and EB_POS_RR_LINE1_R_STRT_Y, respectively, and the X and Y right reversal line endpoint location specified by EB_POS_RR_LINE1_R_X and EB_POS_RR_LINE1_R_Y, respectively.
3. The Entry Bearing Display shall draw a solid line between the X and Y location near the Shuttle symbol specified by EB_POS_RR_LINE2_L_STRT_X and EB_POS_RR_LINE2_L_STRT_Y, respectively, and the X and Y left reversal line endpoint location specified by EB_POS_RR_LINE2_L_X and EB_POS_RR_LINE2_L_Y, respectively.
4. The Entry Bearing Display shall draw a solid line between the X and Y location near the Shuttle symbol specified by EB_POS_RR_LINE2_R_STRT_X and EB_POS_RR_LINE2_R_STRT_Y, respectively, and the X and Y right reversal line endpoint location specified by EB_POS_RR_LINE2_R_X and EB_POS_RR_LINE2_R_Y, respectively.
5. Both sets of left and right roll reversal lines shall be blanked if EB_RNG_DELAZ_PROC = OFF or MM_CODE \neq 304.

Note: Roll reversal lines originate at the Shuttle symbol. The specified start points provide for a "gap" between each roll reversal line and the Shuttle symbol, so there is no overlap.

- I. Shuttle Symbol Roll Angle. The Shuttle symbol shall rotate by an angle equal to PHI degrees positive clockwise, where zero is oriented with the symbol tail pointing up and wings level.
- J. Range Rings.
 1. Each of nine range ring arcs shall be displayed with origin at the selected site X and Y location given by EB_POS_RW_X and EB_POS_RW_Y, respectively, and radius equal to EB_RING_DISP_RADIUS(I) in AUs, if its corresponding display indicator EB_RING_DISP(I) = ON and EB_RNG_DELAZ_PROC = ON, for I = 1 to 9.
 2. Each range ring arc shall be blanked if its corresponding display indicator EB_RING_DISP(I) = OFF or EB_RNG_DELAZ_PROC = OFF, for I = 1 to 9.
 3. All range ring arcs shall be blanked in MM 301 - MM 303 (MM_CODE = 301, 302, or 303).

Note: Values of the selected site X and Y location given by EB_POS_RW_X and EB_POS_RW_Y may exceed their respective maximum / minimum screen locations of ± 512 and ± 365 AUs, with the origin at the center of the screen. These values are needed to determine positions of range ring arcs and labels when the selected site is off-screen.

- K. Range Ring Labels.
 1. Each of nine range ring labels indicating nautical miles from the selected landing site shall be displayed if its corresponding range ring arc is displayable (EB_RING_DISP(I) = ON, I = 1 to 9), with the label displayed as a right-justified character string using the value to the nearest nautical mile of its corresponding EB_RANGE_RING_RADIUS parameters specified in the table below.
 2. Each range ring label shall be blanked if its corresponding display indicator EB_RING_DISP(I) = OFF or EB_RNG_DELAZ_PROC = OFF, for I = 1 to 9.
 3. Each range ring label shall be placed according to the following order of precedence:

- a. Ring label shall be placed inside the ring if the selected landing site is within the plot region.
- b. Ring label shall be placed inside the ring to the right at the same vertical level as the selected landing site if the landing site is within the plot region and the ring arc does not intersect the right border of the plot region, i.e., the right arc of the ring is within the plot region.
- c. If the selected landing site is within the plot region and the ring arc intersects the right border of the plot region, i.e., part of the ring is outside the plot region on the right side, the ring label shall be placed inside the ring above the lower point of intersection with the right border.
- d. If the selected landing site is within the plot region and the ring arc intersects the left border of the plot region, the ring label shall be placed inside the ring above the lower point of intersection with the left border.
- e. If the selected landing site is within the plot region and the ring arc only intersects the bottom border of the plot region, the ring label shall be placed inside the ring above the rightmost point of intersection.
- f. If the selected landing site is outside the plot region, the ring label shall be placed outside the ring arc.
- g. If the selected landing site is outside the plot region, and the ring arc intersects the right border of the plot region, the ring label shall be placed above the lower point of intersection with the right border.
- h. If the selected landing site is outside the plot region, and the ring arc intersects the left border of the plot region, the ring label shall be placed above the lower point of intersection with the left border.
- i. If the selected landing site is outside the plot region, and the ring arc only intersects the bottom border of the plot region, the ring label shall be placed above the rightmost point of intersection.

Range Ring Index (I)	Range Ring Parameter
1	EB_RANGE_RING_RADIUS(1)
2	EB_RANGE_RING_RADIUS(2)
3	EB_RANGE_RING_RADIUS(3)
4	EB_RANGE_RING_RADIUS(4)
5	EB_RANGE_RING_RADIUS(5)
6	EB_RANGE_RING_RADIUS(6)
7	EB_RANGE_RING_RADIUS(7)
8	EB_RANGE_RING_RADIUS(8)
9	EB_RANGE_RING_RADIUS(9)

Range Ring Nautical Labels

4. All range ring labels shall be blanked in MM 301 - MM 303 (MM_CODE = 301, 302, or 303).
- L. Instantaneous Impact Point (IIP).
1. The IIP symbol shall be displayed as a cross (alternate character set symbol 16) at the X and Y location specified by EB_N_X and EB_POS_IIP_Y, respectively, in AU coordinates, with the origin at the center of the screen.
 2. The IIP symbol shall be blanked if EB_BLANK_IIP = ON or EB_RNG_DELAZ_PROC = OFF.
 3. The IIP symbol shall be blanked in MM 301 - MM 303 (MM_CODE = 301, 302, or 303).
- M. Selected Landing Site E/W Scale.
1. Shuttle current energy symbol shall be displayed as a right pointing triangle (symbol 0B) at the X and Y location specified by EB_SEL_ESYMCEN (Table 4.2.42-3) and SHUTTLE_ENER_Y, respectively, in addressable unit (AU) coordinates, with the origin at the center of the screen.
 2. Shuttle current energy symbol shall be flashed if SHUTTLE_ENER_FLAG = ON.
 3. Nominal energy tick mark shall be displayed as a minus sign (symbol 2D) at the X and Y location specified by EB_SEL_ENOMX (Table 4.2.42-3) and NOM_ENERGY_Y, respectively, in addressable unit (AU) coordinates, with the origin at the center of the screen.
 4. Lower energy tick mark shall be displayed as an underscore (symbol 7D) at the X and Y location specified by EB_SEL_ELIMX (Table 4.2.42-3) and ENER_LL_Y, respectively, in addressable unit (AU) coordinates, with the origin at the center of the screen.
 5. Upper energy tick mark shall be displayed as an underscore (symbol 7D) at the X and Y location specified by EB_SEL_ELIMX (Table 4.2.42-3) and ENER_UL_Y, respectively, in addressable unit (AU) coordinates, with the origin at the center of the screen.
 6. OTT downmode energy symbol shall be displayed as a right pointing arrow (symbol 1E) at the X and Y location specified by EB_SEL_EMOH (Table 4.2.42-3) and EMOH_ENER_Y, respectively, in addressable unit (AU) coordinates, with the origin at the center of the screen.
 7. All selected landing site E/W scale dynamic symbols and tick marks shall be blanked in MM 301 through MM 305 (MM_CODE = 301 or 302 or 303 or 304 or 305).
- Note: Dynamic symbols for the selected landing site E/W scale are blanked (set off-display) by the VERT SIT DIP under conditions specified in Section B.4.154 of the D&C FSSR 20 Volume 3.
- N. Alternate Site 1 E/W Scale.
1. Shuttle current energy symbol with respect to alternate site 1 shall be displayed as a right pointing triangle (symbol 0B) at the X and Y location specified by EB_A1_ESYMCEN (Table 4.2.42-3) and SHUTTLE_ENER_Y_ALT(1), respectively, in addressable unit (AU) coordinates, with the origin at the center of the screen.
 2. Nominal energy tick mark with respect to alternate site 1 shall be displayed as a minus sign (symbol 2D) at the X and Y location specified by EB_A1_ENOMX (Table 4.2.42-3) and NOM_ENERGY_Y_ALT(1), respectively, in addressable unit (AU) coordinates, with the origin at the center of the screen.

3. Lower energy tick mark with respect to alternate site 1 shall be displayed as an underscore (symbol 7D) at the X and Y location specified by EB_A1_ELIMX (Table 4.2.42-3) and ENER_LL_Y_ALT(1), respectively, in addressable unit (AU) coordinates, with the origin at the center of the screen.
4. Upper energy tick mark with respect to alternate site 1 shall be displayed as an underscore (symbol 7D) at the X and Y location specified by EB_A1_ELIMX (Table 4.2.42-3) and ENER_UL_Y_ALT(1), respectively, in addressable unit (AU) coordinates, with the origin at the center of the screen.
5. OTT downmode energy symbol with respect to alternate site 1 shall be displayed as a right pointing arrow (symbol 1E) at the X and Y location specified by EB_A1_EMOH (Table 4.2.42-3) and EMOH_ENER_Y_ALT(1), respectively, in addressable unit (AU) coordinates, with the origin at the center of the screen.
6. All alternate site 1 E/W scale dynamic symbols and tick marks shall be blanked in MM 301 through MM 305 (MM_CODE = 301 or 302 or 303 or 304 or 305).

Note: Dynamic symbols for the alternate site 1 E/W scale are blanked (set off-display) by the ENT BRG SPEC under conditions specified in Section B.5.27 of the D&C FSSR 20 Volume 3.

O. Alternate Site 2 E/W Scale.

1. Shuttle current energy symbol with respect to alternate site 2 shall be displayed as a right pointing triangle (symbol 0B) at the X and Y location specified by EB_A2_ESYMCEN (Table 4.2.42-3) and SHUTTLE_ENER_Y_ALT(2), respectively, in addressable unit (AU) coordinates, with the origin at the center of the screen.
2. Nominal energy tick mark with respect to alternate site 2 shall be displayed as a minus sign (symbol 2D) at the X and Y location specified by EB_A2_ENOMX (Table 4.2.42-3) and NOM_ENERGY_Y_ALT(2), respectively, in addressable unit (AU) coordinates, with the origin at the center of the screen.
3. Lower energy tick mark with respect to alternate site 2 shall be displayed as an underscore (symbol 7D) at the X and Y location specified by EB_A2_ELIMX (Table 4.2.42-3) and ENER_LL_Y_ALT(2), respectively, in addressable unit (AU) coordinates, with the origin at the center of the screen.
4. Upper energy tick mark with respect to alternate site 2 shall be displayed as an underscore (symbol 7D) at the X and Y location specified by EB_A2_ELIMX (Table 4.2.42-3) and ENER_UL_Y_ALT(2), respectively, in addressable unit (AU) coordinates, with the origin at the center of the screen.
5. OTT downmode energy symbol with respect to alternate site 2 shall be displayed as a right pointing arrow (symbol 1E) at the X and Y location specified by EB_A2_EMOH (Table 4.2.42-3) and EMOH_ENER_Y_ALT(2), respectively, in addressable unit (AU) coordinates, with the origin at the center of the screen.
6. All alternate site 2 E/W scale dynamic symbols and tick marks shall be blanked in MM 301 through MM 305 (MM_CODE = 301 or 302 or 303 or 304 or 305).

Note: Dynamic symbols for the alternate site 2 E/W scale are blanked (set off-display) by the ENT BRG SPEC under conditions specified in Section B.5.27 of the D&C FSSR 20 Volume 3.

4.2.42.4 Entry Bearing Figure/Table References

Figure 4.2.42-1	Entry Bearing Display (PFS) (MM 602 and 603)
Figure 4.2.42-2	Entry Bearing Display (PFS) (MM 304 and 305)
Table 4.2.42-1	Keyboard Processing Table
Table 4.2.42-2	CRT Display Processing Table
Table 4.2.42-3	CRT Display Processing Background Requirements, Design Dependent
Table 4.2.42-4	Mission Design Background Constants N/A
Table 4.2.42-5	Input Functional Parameters
Table 4.2.42-6	Output Functional Parameters
Table 4.2.42-7	I-Loads
Table 4.2.42-8	K-Loads
Table 4.2.42-9	Constants

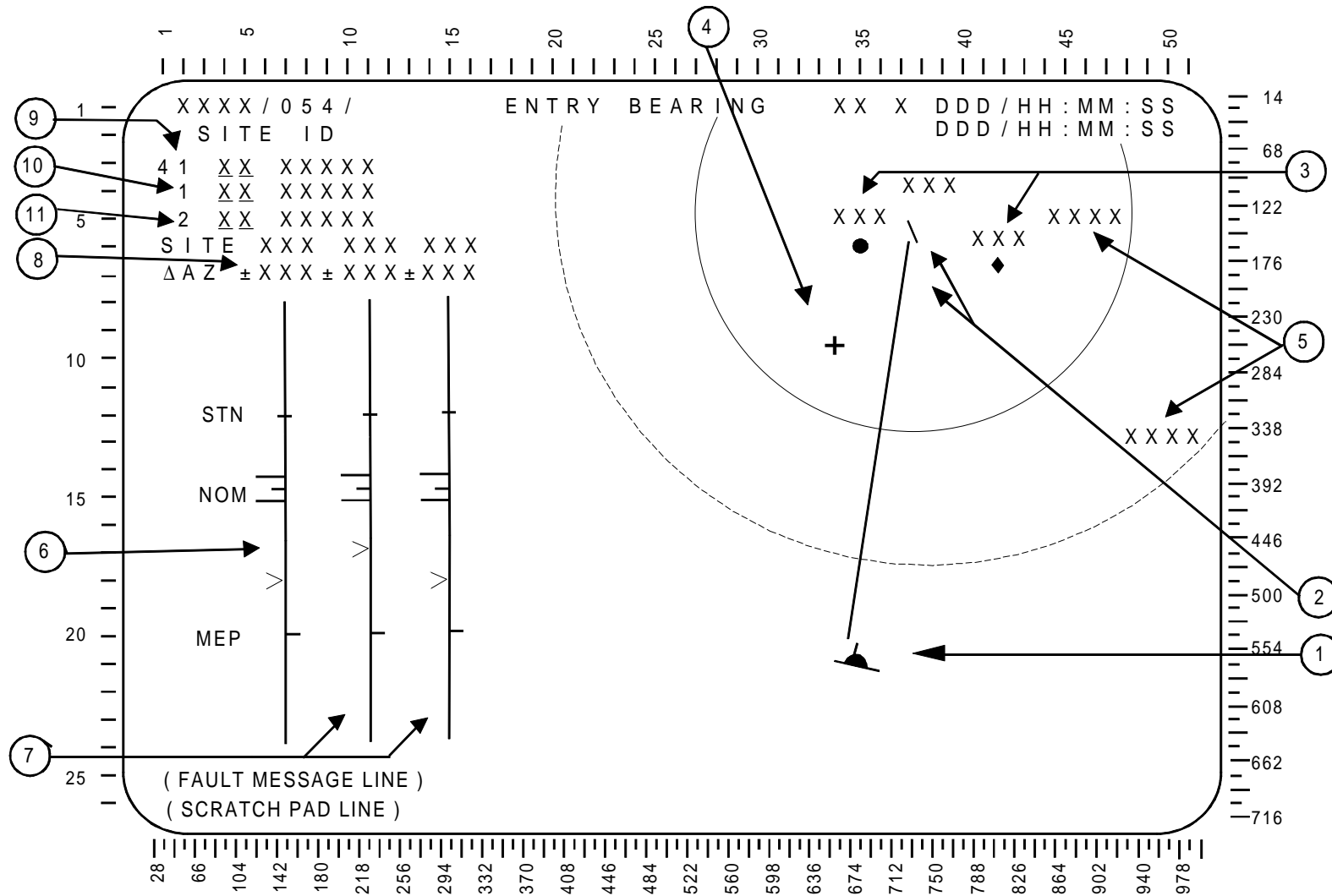


FIGURE 4.2.42-1. Entry Bearing Display (PFS) (MM 602 and 603)

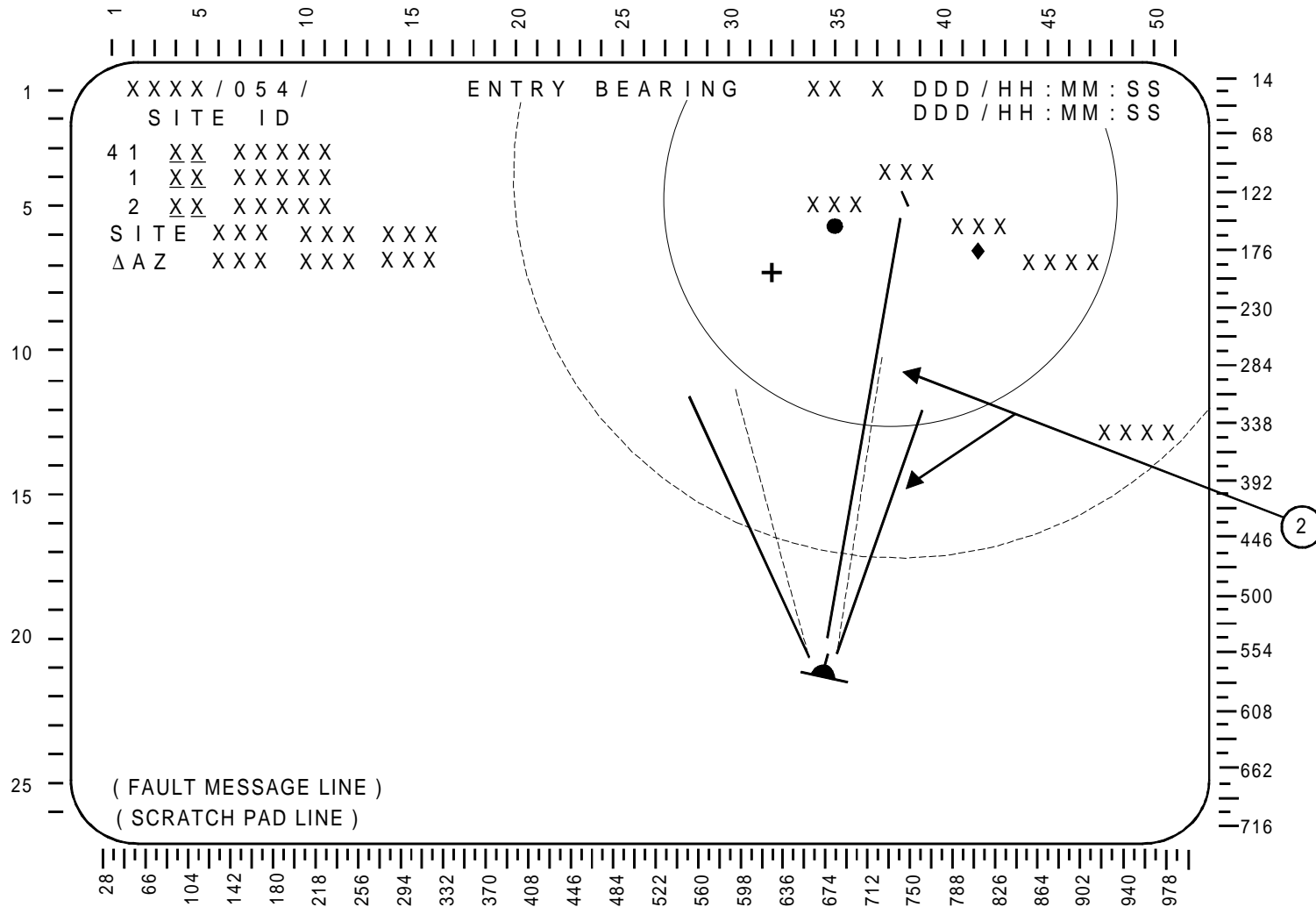


FIGURE 4.2.42-2.Entry Bearing Display (PFS) (MM 304 and 305)

Table 4.2.42-1. ENTRY BEARING (PFS) KEYBOARD PROCESSING													
Seq	CRT Signal Name	M/S ID	C H A R	T Y P E	U N I T S	D K	I T E M	Item No. Limits		Add Ref	Destination	Nomenclature	C R T
								MIN	MAX				
001	41 XX	V93J4396C	3.0	DEC		X	41	1	45	A	ENT SITE LOOKUP	NEW LANDING AREA SELECT CMD	
002	1 XX	V94U5524CA	3.0	DEC			1	0	45	B	ENT DIP, ENT BRG DISP, ENT BRG SPEC	ALTERNATE SITE 1 INDEX	
003	2 XX	V94U5525CA	3.0	DEC			2	0	45	C	ENT DIP, ENT BRG DISP, ENT BRG SPEC	ALTERNATE SITE 2 INDEX	

Table 4.2.42-2. ENTRY BEARING (PFS) CRT DISPLAY PROCESSING																							
Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format				U N I T S	S T A T U S	B A Z E	S E R I A L	C O L O R	F L O A T I N G	R E S O L U T I O N	L E T T E R S E T	B I T S	D I S P L A Y	Add Ref	Source	Nomenclature	C R T
			X	Y		BILEVEL																	
						CHAR	1	0	TYPE														
001	(OPS)	V93X0040X	2	1		5.0			CHAR											UI	OPS FUNCTION PAGE	X	

Table 4.2.42-2. ENTRY BEARING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format				U N I T S	S T A T U S	B L A Z E	S I Z E	C O L O R	F L A T T E N E D	R A T I O	S L O W	L E N G T H	B R I D G E	D I S T A N C E	Add Ref	Source	Nomenclature	C R T	
			X	Y		BILEVEL																			
						CHAR	1	0	TYPE																
002	(SPEC)	V93X0042X	7	1		4.0			CHAR													UI	SPEC FUNCTION PAGE	X	
003	(DISP)	V93X0044X	10	1		4.0			DEC														UI	DISPLAY FUNCTION PAGE	X
004	(UL)	V92X5032X	34	1		2.0	U L		BLVL					X	G								UI	UPLINK ACTIVITY IND	X
005	(GPC)	V93X0048X	36	1		2.0									E								UI	GPC DRIVER	X
006	(MT)	V91W1990C	39	1		12.0			CHAR	DHMS					A								FCOS	MISSION ELAPSED TIME	X
007	(CRT TIMER)	V91W1987C	39	2		12.0			CHAR	DHMS					A								FCOS	DISPLAY CRT TIMER, GNC	X
008	41 SITE XX	V93J4392C	3	3	41	3.0			DEC				19		B								ENT BRGDISP, ENT SITE LOOKUP, HORIZ SIT DISP	SELECTED AREA	
009	41 ID XXXXX	V94U5528C	7	3		5.0			CHAR				19		B								ENT SITE LOOKUP	RUNWAY NAME SELECTED LANDING SITE	
010	1 SITE XX	V94U5524C	3	4	1	3.0			DEC		X		19		B					A			ASC BRG DISP, ENT BRG DISP, ENT SITE LOOKUP	ALTERNATE SITE 1 INDEX	
011	1 ID XXXXX	V94U5522C	7	4		5.0			CHAR		X		19		B					A			ENT BRG SPEC	ALTERNATE SITE 1 PRI RUNWAY NAME	

Table 4.2.42-2. ENTRY BEARING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format				U N I T S	S T A T U S	B L A Z E	S I Z E	C O L O R	F L A S H	R A T E	S I G N	L E N G T H	B R I D G E	D I S T A N C E	Add Ref	Source	Nomenclature	C R T
			X	Y		BILEVEL																		
						CHAR	1	0	TYPE															
012	2 SITE XX	V94U5525C	3	5	2	3.0			DEC			X		19	B					A	ASC BRG DISP, ENT BRG DISP, ENT SITE LOOKUP	ALTERNATE SITE 2 INDEX		
013	2 ID XXXXX	V94U5523C	7	5		5.0			CHAR			X		19	B					A	ENT BRG SPEC	ALTERNATE SITE 2 PRI RUNWAY NAME		
014	(E/W SEL SITE XXX)	V94U5528C	6	6		3.0			CHAR			X		21	E					B	ENT SITE LOOKUP	RUNWAY NAME SELE CTED LANDING SITE		
015	(E/W ALT SITE 1 XXX)	V94U5522C	10	6		3.0			CHAR			X		31	E					B	ENT BRG SPEC	ALTERNATE SITE 1 PRI RUNWAY NAME		
016	(E/W ALT SITE 2 XXX)	V94U5523C	14	6		3.0			CHAR			X		48	E					B	ENT BRG SPEC	ALTERNATE SITE 2 PRI RUNWAY NAME		
017	(Δ AZ SEL SITE)	V94H5519C	5	7		4.0			DEC	DEG		X		21	A					C	ENT BRG SPEC	SELECTED SITE DELTA AZIMUTH		
018	(Δ AZ ALT SITE 1)	V94H5517C	9	7		4.0			DEC	DEG		X		31	A					C	ENT BRG SPEC	ALTER SITE 1 DELTA AZIMUTH		
019	(Δ AZ ALT SITE 2)	V94H5518C	13	7		4.0			DEC	DEG		X		48	A					C	ENT BRG SPEC	ALTER SITE 2 DELTA AZIMUTH		
020	(POS SEL RW THRSX)	V94U5568C							DEC			X		21	A					D	ENT BRG SPEC	ENT BRG SEL RW THRESH X POS		
021	(POS SEL RW	V94U5569C							DEC			X		21	A					D	ENT BRG	ENT BRG SEL RW THRESH Y POS		

Table 4.2.42-2. ENTRY BEARING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format				U N I T S	S T T U S	B A A Z N E	S C L O L A T O R H	F R O N T E N D	R E G I O N A L	S I T E C O D E	L A N D I N G	B E A R I N G	D I R E C T I O N	Add Ref	Source	Nomenclature	C R T
			X	Y		BILEVEL																	
						CHAR	1	0	TYPE														
	THRSH Y)																			SPEC			
022	(POS SEL RW ENDPT X)	V94U5566C										X		21		A				D	ENT BRG SPEC	ENT BRG SEL RW ENDPT X POS	
023	(POS SEL RW ENDPT Y)	V94U5567C										X		21		A				D	ENT BRG SPEC	ENT BRG SEL RW ENDPT Y POS	
024	(SEL RW SITE XXX)	V94U5528C				3.0						X		21		A				D	ENT SITE LOOKUP	RUNWAY NAME SELECTED LANDING SITE	
025	(POS ALT SITE 1 X)	V94U5562C										X		31		A				E	ENT BRG SPEC	ENT BRG ALT SITE 1 X POS	
026	(POS ALT SITE 1 Y)	V94U5564C										X		31		A				E	ENT BRG SPEC	ENT BRG ALT SITE 1 Y POS	
027	(ALT SITE 1 XXX)	V94U5522C				3.0						X		31		A				E	ENT BRG SPEC	ALTERNATE SITE 1 PRI RUNWAY NAME	
028	(POS ALT SITE 2 X)	V94U5563C										X		48		A				F	ENT BRG SPEC	ENT BRG ALT SITE 2 X POS	
029	(POS ALT SITE 2 Y)	V94U5565C										X		48		A				F	ENT BRG SPEC	ENT BRG ALT SITE 2 Y POS	
030	(ALT SITE 2 XXX)	V94U5523C				3.0						X		48		A				F	ENT BRG SPEC	ALTERNATE SITE 2 PRI RUNWAY NAME	
031	(DELAZ LINE START X)	V94H6642C										X		7		A				G	ENT BRG SPEC	ENT BRG DELAZ LINE START X POS	
032	(DELAZ LINE START Y)	V94H6643C										X		7		A				G	ENT BRG	ENT BRG DELAZ LINE START Y	

Table 4.2.42-2. ENTRY BEARING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format				U N I T S	S T A T S	B A N K	S I Z E	C O L O R	F L A T N E S S	R O T A T I O N	S L O W E R S T R I C T	L I N E S	B E A R I N G	D I S T A N C E	Add Ref	Source	Nomenclature	C R T			
			X	Y		BILEVEL																					
						CHAR	1	0	TYPE																		
	START Y)																					SPEC	POS				
033	(DELAZ LINE ENDPT X)	V94H6644C														X		7		A				G	ENT BRG SPEC	ENT BRG DELAZ LINE ENDPT X POS	
034	(DELAZ LINE ENDPT Y)	V94H6645C														X		7		A				G	ENT BRG SPEC	ENT BRG DELAZ LINE ENDPT Y POS	
035	(ROLL REVERSAL 1 LEFT START X)	V94H6646C														X		4		E				H	ENT BRG SPEC	ENT BRG RR LINE1 LEFT START X POS	
036	(ROLL REVERSAL 1 LEFT START Y)	V94H6647C														X		4		E				H	ENT BRG SPEC	ENT BRG RR LINE1 LEFT START Y POS	
037	(ROLL REVERSAL 1 LEFT ENDPT X)	V94H6686C														X		4		E				H	ENT BRG SPEC	ENT BRG RR LINE1 LEFT ENDPT X POS	
038	(ROLL REVERSAL 1 LEFT ENDPT Y)	V94H6687C														X		4		E				H	ENT BRG SPEC	ENT BRG RR LINE1 LEFT ENDPT Y POS	
039	(ROLL REVERSAL 1 RIGHT START X)	V94H6648C														X		4		E				H	ENT BRG SPEC	ENT BRG RR LINE1 RIGHT START X POS	
040	(ROLL REVERSAL 1	V94H6649C														X		4		E				H	ENT BRG SPEC	ENT BRG RR LINE1 RIGHT START Y POS	

Table 4.2.42-2. ENTRY BEARING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format				U N I T S	S T A T U S	B L A Z E	S C A L E	C O L O R	F O N T	R E S O L U T I O N	L I N E S	B E A R I N G	D I R E C T I O N	Add Ref	Source	Nomenclature	C R T
			X	Y		BILEVEL																	
						CHAR	1	0	TYPE														
	RIGHT START Y)																						
041	(ROLL REVERSAL 1 RIGHT ENDPT X)	V94H6688C																		H	ENT BRG SPEC	ENT BRG RR LINE1 RIGHT ENDPT X POS	
042	(ROLL REVERSAL 1 RIGHT ENDPT Y)	V94H6689C																		H	ENT BRG SPEC	ENT BRG RR LINE1 RIGHT ENDPT Y POS	
043	(ROLL REVERSAL 2 LEFT START X)	V94H6408C																		H	ENT BRG SPEC	ENT BRG RR LINE2 LEFT START X POS	
044	(ROLL REVERSAL 2 LEFT START Y)	V94H6409C																		H	ENT BRG SPEC	ENT BRG RR LINE2 LEFT START Y POS	
045	(ROLL REVERSAL 2 LEFT ENDPT X)	V94H6410C																		H	ENT BRG SPEC	ENT BRG RR LINE2 LEFT ENDPT X POS	
046	(ROLL REVERSAL 2 LEFT ENDPT Y)	V94H6411C																		H	ENT BRG SPEC	ENT BRG RR LINE2 LEFT ENDPT Y POS	
047	(ROLL	V94H6412C																		H	ENT BRG	ENT BRG RR LINE2 RIGHT START	

Table 4.2.42-2. ENTRY BEARING (PFS) CRT DISPLAY PROCESSING																								
Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format				U N I T S	S T A T U S	B A S E	S I Z E	C O L O R	F L A T N E S S	R A T I O	S C A L E	L I N E	B R I D G E	D W A R T	Add Ref	Source	Nomenclature	C R T
			X	Y		BILEVEL																		
						CHAR	1	0	TYPE															
	LABEL)																				DISP			
066	(RANGE RING 6 LABEL)	V94H6726C				4.0						X		4		A					K	ENT BRG DISP	RANGE RING 6 RADIUS	
067	(RANGE RING 7 LABEL)	V94H6727C				4.0						X		4		A					K	ENT BRG DISP	RANGE RING 7 RADIUS	
068	(RANGE RING 8 LABEL)	V94H6728C				4.0						X		4		A					K	ENT BRG DISP	RANGE RING 8 RADIUS	
069	(RANGE RING 9 LABEL)	V94H6729C				4.0						X		4		A					K	ENT BRG DISP	RANGE RING 9 RADIUS	
070	(IIP VEH Y POS)	V94H6640C										X		31		A					L	ENT BRG SPEC	ENT BRG IIP Y POS	
071	(CUR ENERGY POS)	V94H1308C			*							X	X	21	X	A					M	VERT SIT DIP	Y-COORD OF CURRENT ENERGY SYMBOL	X
072	(NOM ENERGY Y POS)	V94H1307C			*							X	X	21		A					M	VERT SIT DIP	Y-COORD OF NOMINAL ENERGY SYMBOL	X
073	(MAX ENER LIM Y POS)	V94H1309C			*							X	X	21		A					M	VERT SIT DIP	Y-COORD OF UPPER ENERGY LIMIT	X
074	(MIN ENER LIM Y POS)	V94H1310C			*							X	X	21		A					M	VERT SIT DIP	Y-COORD OF LOWER ENERGY LIMIT	X
075	(EMOH Y POS)	V94U1313C										X		21		A					M	VERT SIT DIP	Y-COORD OF OTT DOWNMODE ENERGY SYM	X
076	(CUR ENER ALT	V94U6516C										X	X	19		A					N	ENT BRG	Y-COORD ALT SITE 1 CURR ENER	

Table 4.2.42-2. ENTRY BEARING (PFS) CRT DISPLAY PROCESSING

Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format				U N I T S	S T A T U S	B L A Z E	S I Z E	C O L O R	F O N T	R E S O L U T I O N	L E N G T H	B I T S	D E T A I L	Add Ref	Source	Nomenclature	C R T	
			X	Y		BILEVEL																		
						CHAR	1	0	TYPE															
	SITE 1 Y POS)																				SPEC	SYM		
077	(NOM ENER ALT SITE 1 Y POS)	V94U6514C																			N	ENT BRG SPEC	Y-COORD ALT SITE 1 NOM ENER SYM	
078	(MAX ENER LIM ALT SITE 1 Y POS)	V94U6509C																			N	ENT BRG SPEC	Y-COORD ALT SITE 1 UPR ENER LMT	
079	(MIN ENER LIM ALT SITE 1 Y POS)	V94U6507C																			N	ENT BRG SPEC	Y-COORD ALT SITE 1 LWR ENER LMT	
080	(EMOH ALT SITE 1 Y POS)	V94U6505C																			N	ENT BRG SPEC	Y-COORD ALT SITE 1 OTT DNMD EN SYM	
081	(CUR ENER ALT SITE 2 Y POS)	V94U6517C																			O	ENT BRG SPEC	Y-COORD ALT SITE 2 CURR ENER SYM	
082	(NOM ENER ALT SITE 2 Y POS)	V94U6515C																			O	ENT BRG SPEC	Y-COORD ALT SITE 2 NOM ENER SYM	
083	(MAX ENER LIM ALT SITE 2 Y POS)	V94U6513C																			O	ENT BRG SPEC	Y-COORD ALT SITE 2 UPR ENER LMT	
084	(MIN ENER LIM ALT SITE 2 Y POS)	V94U6508C																			O	ENT BRG SPEC	Y-COORD ALT SITE 2 LWR ENER LMT	

Table 4.2.42-2. ENTRY BEARING (PFS) CRT DISPLAY PROCESSING																						
Seq	CRT Signal Name	M/S ID	Coord		I T E M N O	Format				U N I T S	S T A T I S T I C S	B L A Z E R H	S C A L E	C O L O R	R E F	S L O T S	L A N D M A R K S	D I S T A N C E	Add Ref	Source	Nomenclature	C R T
			BILEVEL																			
			CHAR	1		0	TYPE															
085	(EMOH ALT SITE 2 Y POS)	V94U6506C							DEC		X		19	A					O	ENT BRG SPEC	Y-COORD ALT SITE 2 OTT DNMD EN SYM	
086	(MSG LINE)	V93X0050X	1	25		44.0			CHAR					G						UI	MESSAGE LINE	
087	(BUFFER MSG)	V93X0054X	45	25		4.0			CHAR					G						UI	BUFFER INDICATOR	X
088	(SPL)	V93X0056X	2	26		49.0			CHAR					G						UI	SCRATCH PAD LINE	X

Table 4.2.42-3. ENTRY BEARING CRT DISPLAY PROCESSING BACKGROUND REQUIREMENTS, DESIGN DEPENDENT					
VECTORS (LINE SEGMENTS)					
VECTOR ID	COLOR	ORIGIN		TERMINAL	
		X(AU)	Y(AU)	X(AU)	Y(AU)
Selected Landing Site E/W Scale	21	151/-361	658/-292	151/-361	219/147
Alternate Site 1 E/W Scale	19	227/-285	658/-292	227/-285	219/147
Alternate Site 2 E/W Scale	19	303/-209	658/-292	303/-209	219/147
CHARACTER STRINGS					
CHARACTER STRING	COLOR	X(AU/AU/COL))		Y(AU/AU/ROW)	
STN	19	56/-456/2		324/42/12	
NOM	19	56/-456/2		405/-39/15	

Table 4.2.42-3. ENTRY BEARING CRT DISPLAY PROCESSING BACKGROUND REQUIREMENTS, DESIGN DEPENDENT			
MEP	19	56/-456/2	540/-174/20
FIXED SYMBOLS			
SYMBOL	COLOR	X(AU)	Y(AU)
Selected Landing Site E/W Scale			
STN Tick Mark (minus sign, symbol 2D)	21	151/-361	328/38
MEP Tick Mark (minus sign, symbol 2D)	21	151/-361	548/-182
Alternate Site 1 E/W Scale			
STN Tick Mark (minus sign, symbol 2D)	19	227/-285	328/38
MEP Tick Mark (minus sign, symbol 2D)	19	227/-285	548/-182
Alternate Site 2 E/W Scale			
STN Tick Mark (minus sign, symbol 2D)	19	303/-209	328/38
MEP Tick Mark (minus sign, symbol 2D)	19	303/-209	548/-182
Shuttle Symbol			
Shuttle Symbol (alternate character set symbol 19)	40	EB_N_X	EB_N_Y
DESIGN DEPENDENT LOCATIONS OF DYNAMIC SYMBOLS			
SYMBOL	X COORD NAME	X(AU)	
Right pointing triangle	EB_SEL_ESYMCEN	145/-367	
Minus sign	EB_SEL_ENOMX	143/-369	
Underscores	EB_SEL_ELIMX	139/-373	
Right pointing arrow	EB_SEL_EMOH	145/-367	
Right pointing triangle	EB_A1_ESYMCEN	221/-291	

Table 4.2.42-3. ENTRY BEARING CRT DISPLAY PROCESSING BACKGROUND REQUIREMENTS, DESIGN DEPENDENT		
Minus sign	EB_A1_ENOMX	219/-293
Underscores	EB_A1_ELIMX	215/-297
Right pointing arrow	EB_A1_EMOH	221/-291
Right pointing triangle	EB_A2_ESYMCEN	297/-215
Minus sign	EB_A2_ENOMX	295/-217
Underscores	EB_A2_ELIMX	291/-221
Right pointing arrow	EB_A2_EMOH	297/-215
BLANKING REQUIREMENT: Each of the E/W scale vectors (line segments), character strings, and fixed symbols for each E/W scale shall be blanked in MM 301 through MM 305 (MM_CODE = 301 or 302 or 303 or 304 or 305).		
VIRTUAL DISPLAY REQUIREMENT: The Entry Bearing Display shall display the Entry Bearing Display Background Virtual Display (082 Hex).		
NOTES		
<ol style="list-style-type: none"> 1. X position values in the X(AU) columns and Y position values in the Y(AU) columns preceding the first "/" are in AU coordinates with respect to the origin at the upper left corner of the CRT. X, Y position values following the first "/" are the equivalent AU coordinates with the origin at the center of the CRT. For character strings, the X and Y position values following the second "/" are column and row, respectively, for small characters (26 rows by 51 columns). 2. Dynamic symbols are fixed in the X position specified by the design dependent data in the table with variable Y position. 3. X, Y position values for the Shuttle profile symbol are defined by the constants EB_N_X and EB_N_Y, respectively, specified in Table 4.2.42-9 in AU coordinates with the origin at the center of the CRT. 4. Values in the COLOR column specify the MEDS color pallet entry to use. The MEDS color pallet is defined in the MEDS IDP Software 		

TABLE 4.2.42-5. INPUT FUNCTIONAL PARAMETERS FOR ENTRY BEARING DISPLAY (G6.56)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
(CRT_TIME)	V91W1987C	DISPLAY CRT TIMER,GNC	FCOS		SPL		93090E	
(DISP)	V93X0044X	DISPLAY FUNCTION PAGE	UI		BD		93090E	
(GPC)	V93X0048X	GPC DRIVER	UI		BD		93090E	
(LINE)	V93X0050X	MESSAGE LINE	UI		BD		93090E	
(MSG)	V93X0054X	BUFFER MESSAGE INDICATOR	UI		BD		93090E	
(MT)	V91W1990C	DISPLAY MSN TIME	FCOS	S	VAR		93090E	
(OPS)	V93X0040X	OPS FUNCTION PAGE	UI		BD		93090E	
(SPEC)	V93X0042X	SPEC FUNCTION PAGE	UI		BD		93090E	
(SPL)	V93X0056X	SCRATCH PAD LINE	UI		BD		93090E	
(UL)	V92X5032X	UPLINK ACTIVITY IND	UI		BD		93090E	
ALT_RW_NAME(1)	V94U5522CA	ALTERNATE SITE 1 PRI RUNWAY NAME	ENT BRG SPEC	ND	VAR		93090E	
ALT_RW_NAME(2)	V94U5523CA	ALTERNATE SITE 2 PRI RUNWAY NAME	ENT BRG SPEC	ND	VAR		93090E	
ALT_SITE_INDEX(1)	V94U5524C	ALTERNATE SITE 1 INDEX	ASC BRG DISP	ND	HXS		93167A	*
ALT_SITE_INDEX(1)	V94U5524CA	ALTERNATE SITE 1 INDEX	ENT BRG DISP	ND	HXS		93090E	
ALT_SITE_INDEX(1)	V94U5524CB	ALTERNATE SITE 1 INDEX	ASC SITE LOOKUP	ND	HXS		93167A	*
ALT_SITE_INDEX(1)	V94U5524CC	ALTERNATE SITE 1 INDEX	ENT SITE LOOKUP	ND	HXS		93090E	
ALT_SITE_INDEX(2)	V94U5525C	ALTERNATE SITE 2 INDEX	ASC BRG DISP	ND	HXS		93167A	*
ALT_SITE_INDEX(2)	V94U5525CA	ALTERNATE SITE 2 INDEX	ENT BRG DISP	ND	HXS		93090E	
ALT_SITE_INDEX(2)	V94U5525CB	ALTERNATE SITE 2 INDEX	ASC SITE LOOKUP	ND	HXS		93167A	*
ALT_SITE_INDEX(2)	V94U5525CC	ALTERNATE SITE 2 INDEX	ENT SITE LOOKUP	ND	HXS		93090E	
AREA_SEL	V93J4392C	SELECTED AREA	HORIZ SIT DISP				93090E	
AREA_SEL	V93J4392CA	SELECTED AREA	ENT SITE LOOKUP				93090E	
AREA_SEL	V93J4392CD	SELECTED AREA	ENT BRG DISP				93090E	
DELAZ_ALT(1)	V94H5517CA	ALTER SITE 1 DELTA AZIMUTH	ENT BRG SPEC	RAD	SPL		93090E	
DELAZ_ALT(2)	V94H5518CA	ALTER SITE 2 DELTA AZIMUTH	ENT BRG SPEC	RAD	SPL		93090E	
DELAZ_SEL	V94H5519CA	SELECTED SITE DELTA AZIMUTH	ENT BRG SPEC	RAD	SPL		93090E	
EB_BLANK_ALT_SITE(1)	V94U6523C	ENT BRG ALT SITE 1 BLANKING FLAG	ENT BRG SPEC	ND	BD		93090E	
EB_BLANK_ALT_SITE(2)	V94U6524C	ENT BRG ALT SITE 2 BLANKING FLAG	ENT BRG SPEC	ND	BD		93090E	
EB_BLANK_IIP	V94X6641X	ENT BRG IIP BLANKING FLAG	ENT BRG SPEC	ND	BD		93090E	
EB_BLANK_SEL_SITE	V94U6519C	ENT BRG SEL SITE BLANKING FLAG	ENT BRG SPEC	ND	BD		93090E	
EB_DELAZ_LINE_ENDPT_X	V94H6644C	ENT BRG DELAZ LINE ENDPT X POS	ENT BRG SPEC	AU	VAR		93090E	
EB_DELAZ_LINE_ENDPT_Y	V94H6645C	ENT BRG DELAZ LINE ENDPT Y POS	ENT BRG SPEC	AU	VAR		93090E	
EB_DELAZ_LINE_STRT_X	V94H6642C	ENT BRG DELAZ LINE START X POS	ENT BRG SPEC	AU	VAR		93090E	
EB_DELAZ_LINE_STRT_Y	V94H6643C	ENT BRG DELAZ LINE STRT Y POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_ALT_X(1)	V94U5562C	ENT BRG ALT SITE 1 X POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_ALT_X(2)	V94U5563C	ENT BRG ALT SITE 2 X POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_ALT_Y(1)	V94U5564C	ENT BRG ALT SITE 1 Y POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_ALT_Y(2)	V94U5565C	ENT BRG ALT SITE 2 Y POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_IIP_Y	V94H6640C	ENT BRG IIP Y POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_RR_LINE1_L_STRT_X	V94H6646C	ENT BRG RR LINE1 LEFT START X POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_RR_LINE1_L_STRT_Y	V94H6647C	ENT BRG RR LINE1 LEFT START Y POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_RR_LINE1_L_X	V94H6686C	ENT BRG RR LINE1 LEFT ENDPT X POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_RR_LINE1_L_Y	V94H6687C	ENT BRG RR LINE1 LEFT ENDPT Y POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_RR_LINE1_R_STRT_X	V94H6648C	ENT BRG RR LINE1 RIGHT START X POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_RR_LINE1_R_STRT_Y	V94H6649C	ENT BRG RR LINE1 RIGHT START Y POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_RR_LINE1_R_X	V94H6688C	ENT BRG RR LINE1 RIGHT ENDPT X POS	ENT BRG SPEC	AU	VAR		93090E	

TABLE 4.2.42-5. INPUT FUNCTIONAL PARAMETERS FOR ENTRY BEARING DISPLAY (G6.56)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
EB_POS_RR_LINE1_R_Y	V94H6689C	ENT BRG RR LINE1 RIGHT ENDPT Y POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_RR_LINE2_L_STRT_X	V94H6408C	ENT BRG RR LINE2 LEFT START X POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_RR_LINE2_L_STRT_Y	V94H6409C	ENT BRG RR LINE2 LEFT START Y POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_RR_LINE2_L_X	V94H6410C	ENT BRG RR LINE2 LEFT ENDPT X POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_RR_LINE2_L_Y	V94H6411C	ENT BRG RR LINE2 LEFT ENDPT Y POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_RR_LINE2_R_STRT_X	V94H6412C	ENT BRG RR LINE2 RIGHT START X POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_RR_LINE2_R_STRT_Y	V94H6413C	ENT BRG RR LINE2 RIGHT START Y POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_RR_LINE2_R_X	V94H6414C	ENT BRG RR LINE2 RIGHT ENDPT X POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_RR_LINE2_R_Y	V94H6415C	ENT BRG RR LINE2 RIGHT ENDPT Y POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_RW_ENDPT_X	V94U5566C	ENT BRG SEL RW ENDPT X POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_RW_ENDPT_Y	V94U5567C	ENT BRG SEL RW ENDPT Y POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_RW_X	V94U5568C	ENT BRG SEL RW THRESH X POS	ENT BRG SPEC	AU	VAR		93090E	
EB_POS_RW_Y	V94U5569C	ENT BRG SEL RW THRESH Y POS	ENT BRG SPEC	AU	VAR		93090E	
EB_RING_DISP(1)	V94U6690C	RANGE RING 1 DISPLAY INDICATOR	ENT BRG SPEC	ND	BD		93090E	
EB_RING_DISP(2)	V94U6691C	RANGE RING 2 DISPLAY INDICATOR	ENT BRG SPEC	ND	BD		93090E	
EB_RING_DISP(3)	V94U6692C	RANGE RING 3 DISPLAY INDICATOR	ENT BRG SPEC	ND	BD		93090E	
EB_RING_DISP(4)	V94U6693C	RANGE RING 4 DISPLAY INDICATOR	ENT BRG SPEC	ND	BD		93090E	
EB_RING_DISP(5)	V94U6694C	RANGE RING 5 DISPLAY INDICATOR	ENT BRG SPEC	ND	BD		93090E	
EB_RING_DISP(6)	V94U6695C	RANGE RING 6 DISPLAY INDICATOR	ENT BRG SPEC	ND	BD		93090E	
EB_RING_DISP(7)	V94U6696C	RANGE RING 7 DISPLAY INDICATOR	ENT BRG SPEC	ND	BD		93090E	
EB_RING_DISP(8)	V94U6697C	RANGE RING 8 DISPLAY INDICATOR	ENT BRG SPEC	ND	BD		93090E	
EB_RING_DISP(9)	V94U6698C	RANGE RING 9 DISPLAY INDICATOR	ENT BRG SPEC	ND	BD		93090E	
EB_RING_DISP_RADIUS(1)	V94U6699C	RANGE RING 1 DISPLAY RADIUS	ENT BRG SPEC	AU	VAR		93090E	
EB_RING_DISP_RADIUS(2)	V94U6670C	RANGE RING 2 DISPLAY RADIUS	ENT BRG SPEC	AU	VAR		93090E	
EB_RING_DISP_RADIUS(3)	V94U6671C	RANGE RING 3 DISPLAY RADIUS	ENT BRG SPEC	AU	VAR		93090E	
EB_RING_DISP_RADIUS(4)	V94U6672C	RANGE RING 4 DISPLAY RADIUS	ENT BRG SPEC	AU	VAR		93090E	
EB_RING_DISP_RADIUS(5)	V94U6673C	RANGE RING 5 DISPLAY RADIUS	ENT BRG SPEC	AU	VAR		93090E	
EB_RING_DISP_RADIUS(6)	V94U6674C	RANGE RING 6 DISPLAY RADIUS	ENT BRG SPEC	AU	VAR		93090E	
EB_RING_DISP_RADIUS(7)	V94U6675C	RANGE RING 7 DISPLAY RADIUS	ENT BRG SPEC	AU	VAR		93090E	
EB_RING_DISP_RADIUS(8)	V94U6676C	RANGE RING 8 DISPLAY RADIUS	ENT BRG SPEC	AU	VAR		93090E	
EB_RING_DISP_RADIUS(9)	V94U6677C	RANGE RING 9 DISPLAY RADIUS	ENT BRG SPEC	AU	VAR		93090E	
EB_RNG_DELAZ_PROC	V94X6683X	ENT BRG RNG DELAZ PROC FLAG	ENT BRG SPEC	ND	BD		93090E	
EMOH_ENER_Y	V94U1313C	Y-COORD OF OTT DOWNMODE ENERGY SYM	VERT SIT DIP	AU	VAR		93090E	
EMOH_ENER_Y_ALT(1)	V94U6505C	Y COORD ALT SITE 1 OTT DNMD EN SYM	ENT BRG SPEC	AU	VAR		93090E	
EMOH_ENER_Y_ALT(2)	V94U6506C	Y COORD ALT SITE 2 OTT DNMD EN SYM	ENT BRG SPEC	AU	VAR		93090E	
ENER_LL_Y	V94H1310C	Y-COORD OF LOWER ENERGY LIMIT	VERT SIT DIP	AU	VAR		93090E	
ENER_LL_Y_ALT(1)	V94U6507C	Y COORD ALT SITE 1 LWR ENER LMT	ENT BRG SPEC	AU	VAR		93090E	
ENER_LL_Y_ALT(2)	V94U6508C	Y COORD ALT SITE 2 LWR ENER LMT	ENT BRG SPEC	AU	VAR		93090E	
ENER_UL_Y	V94H1309C	Y-COORD OF UPPER ENERGY LIMIT	VERT SIT DIP	AU	VAR		93090E	
ENER_UL_Y_ALT(1)	V94U6509C	Y COORD ALT SITE 1 UPR ENER LMT	ENT BRG SPEC	AU	VAR		93090E	
ENER_UL_Y_ALT(2)	V94U6513C	Y COORD ALT SITE 2 UPR ENER LMT	ENT BRG SPEC	AU	VAR		93090E	
NOM_ENERGY_Y	V94H1307C	Y-COORD OF NOMINAL ENERGY SYMBOL	VERT SIT DIP	AU	VAR		93090E	
NOM_ENERGY_Y_ALT(1)	V94U6514C	Y COORD ALT SITE 1 NOM ENER SYM	ENT BRG SPEC	AU	VAR		93090E	
NOM_ENERGY_Y_ALT(2)	V94U6515C	Y COORD ALT SITE 2 NOM ENER SYM	ENT BRG SPEC	AU	VAR		93090E	
PHI/PHI_TOPO	V90H2202C	BODY ROLL ATTITUDE EULER ANGLE	A/E ATT PROC	DEG	SPL		93017G	*
RW_NAME_SEL	V94U5528CA	RUNWAY NAME SELECTED LANDING SITE	ENT SITE LOOKUP	ND	VAR		93090E	

TABLE 4.2.42-5. INPUT FUNCTIONAL PARAMETERS FOR ENTRY BEARING DISPLAY (G6.56)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
SHUTTLE_ENER_FLAG	V94X1311X	SHUTTLE ENERGY FLASH FLAG	VERT SIT DIP				93090E	
SHUTTLE_ENER_Y	V94H1308C	Y-COORD OF CURRENT ENERGY SYMBOL	VERT SIT DIP	AU	VAR		93090E	
SHUTTLE_ENER_Y_ALT(1)	V94U6516C	Y COORD ALT SITE 1 CURR ENER SYM	ENT BRG SPEC	AU	VAR		93090E	
SHUTTLE_ENER_Y_ALT(2)	V94U6517C	Y COORD ALT SITE 2 CURR ENER SYM	ENT BRG SPEC	AU	VAR		93090E	
	V94X6369X	ILL ENTRY MSG (ENT BRG DISP)	UI				93090E	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

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TABLE 4.2.42-6. OUTPUT FUNCTIONAL PARAMETERS FROM ENTRY BEARING DISPLAY (G6.56)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ALT_SITE_INDEX(1)	V94U5524CA	ALTERNATE SITE 1 INDEX	ENT BRG DISP ENT BRG SPEC ENT DIP	ND	HXS		93090E	
ALT_SITE_INDEX(2)	V94U5525CA	ALTERNATE SITE 2 INDEX	ENT BRG DISP ENT BRG SPEC ENT DIP	ND	HXS		93090E	
AREA_SEL	V93J4392CD	SELECTED AREA	ENT BRG DISP ENT BRG SPEC ENT SITE LOOKUP HORIZ SIT DISP				93090E	
NEW_AREA	V93J4396CB	NEW LANDING AREA SELECT CMD	ENT SITE LOOKUP		HXS		93090E	

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

**Rate Codes: (HDR Only) 1 = 1 sample/sec 2 = 5 samples/sec 3 = 12.5 samples/sec 4 = 25 samples/sec 5 = 100 samples/sec
(HDR and LDR) A = 1 sample/sec B = 5 samples/sec C = 12.5 samples/sec D = 25 samples/sec E = 100 samples/sec**

TABLE 4.2.42-7. ENTRY BEARING DISPLAY (G6.56) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.42-8. ENTRY BEARING DISPLAY (G6.56) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
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NO REQUIREMENTS

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

TABLE 4.2.42-9. ENTRY BEARING DISPLAY (G6.56) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
EB_N_X ENT BRG ORBITER X POS	V94H6360C	00	135.0	AU	F	S	P	G5.27 G6.56	93167A	*
EB_N_Y ENT BRG ORBITER Y POS	V94H6361C	00	-242.0	AU	F	S	P	G5.27 G6.56	93167A	*

NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.