

Space Program Operations Contract

SPACE SHUTTLE ORBITER OPERATIONAL LEVEL C FUNCTIONAL SUBSYSTEM SOFTWARE REQUIREMENTS GUIDANCE, NAVIGATION AND CONTROL PART D

REDUNDANCY MANAGEMENT

**Prepared by The Boeing Company
Space Exploration**

Under Subcontract 6000132079, PDRD P1433q

December 14, 2007

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FOREWORD

The primary avionics software system (PASS) requirements for the computer programs that execute in the Shuttle general-purpose computers (GPCs) are specified in the Computer Program Development Specifications (CPDSs) and the Functional Subsystem Software Requirements (FSSR) documents. The requirements are specified at three levels:

Level A CPDS – System-level constraints and capabilities

Level B CPDS – Functional requirements

Level C FSSR – Detailed-level requirements

The Level A CPDS specifies system-level constraints and capabilities that are not oriented toward any particular program end item. The Level B CPDS specifies system-level requirements for guidance, navigation, and control (GN&C) and detailed requirements for systems management (SM) and vehicle utility (VU). The Level C FSSR's specify the detailed requirements for GN&C and display/controls. The Level C reconfigurable requirements are specified in the systems management and payload documents. The Level A, Level B, and Level C requirements documents are listed in Section 2, Applicable Documents.

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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 14, 2007	This baseline release for effectivity OI-34 and subs includes:		
	<u>SCR</u>	<u>OI</u>	<u>Title</u>
	93017G	33	Baseline RSS99D0100 with Expanded Downlist
	93128B	33	GN&C Switch RM Changes for DR 122228
	93160B	32	Year End Roll Over (YERO) Reset
	93167A	33	Bearing Display Documentation Clean-up
	93175	32	Expand Effectivity of SCR 93160B

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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 software change requests (SCRs) to this document are indicated by a change bar in the outer margin of the changed page.

CHANGE REQUEST SUMMARY			
Paragraph	SCR No.	OI	SCR Title
N/A	93175	32	Expand Effectivity of SCR 93160B
1.3-1.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.1.4-1.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.1.4-2.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.3	93160B	32	Year End Roll Over (YERO) Reset
4.2.5-1.(T)	93160B	32	Year End Roll Over (YERO) Reset
	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.5-2.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.2.5-3.(T)	93160B	32	Year End Roll Over (YERO) Reset
4.3.5-1.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.3.5-2.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.4.1.3-1.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.4.1.3-2.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.4.2.3-1.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.4.2.3-2.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.5.4-1.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.5.4-2.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.6.3-1.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.6.3-2.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.7.1.3-1.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.7.1.3-2.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.7.2.3-1.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.7.2.3-2.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.7.3.3-1.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
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4.9.4-1.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.9.4-2.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.10.4-1.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist

CHANGE REQUEST SUMMARY			
Paragraph	SCR No.	OI	SCR Title
4.10.4-2.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.11.4-1.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.11.4-2.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.12.1.1	93128B	33	GN&C Switch RM Changes for DR 122228
4.12.1.4	93128B	33	GN&C Switch RM Changes for DR 122228
4.12.5-1.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
	93167A	33	Bearing Displays Documentation Clean-up
4.12.5-2.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.13.1.3-1.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.13.2.3-1.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.13.2.3-2.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.13.3.2-1.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.13.3.2-2.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.13.4.3-1.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.14.4-1.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist
4.14.4-2.(T)	93017G	33	Baseline RSS99D0100 with Expanded Downlist

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1.0 INTRODUCTION

1.1 PURPOSE

The purpose of the Redundancy Management Level C document is to specify detailed software requirements in support of the redundancy management Level B functional requirements.

1.2 SCOPE

This document contains the requirements, details, and formulations for those redundancy management (RM) functions that are operative during the orbital flight. The RM functions are those specified in the Guidance, Navigation, and Control (GN&C) Level B Functional Requirements document.

1.3 ORGANIZATION

This document is organized into the following sections:

- 1.0 Introduction
- 2.0 Applicable Documents
- 3.0 Overview
- 4.0 Detail Requirements

Section 1.0 defines the purpose, scope, and organization of this document. Section 2.0 lists the applicable documents. Section 3.0 provides an overview of the OFP software functions and discusses the contents of Section 4.0. Section 4.0 presents the detail level requirements for this document. 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.

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.
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

Table 1.3-1. Parameter Element Description

Title	Definition	Valid Entries
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:	<p>(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.</p> <p>** 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</p> <p>*** 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 9th 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).</p>	

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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
- STS 83-0013 Operational Flight Level C, Functional Subsystem Software Requirements; Guidance, Navigation, and Control, Part E, Inertial Measurement Unit Subsystem Operating Program

STS 83-0010-34
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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; Displays and Controls
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

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

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 of CPDS SS-P-0002-170, Volume 1, System Level Requirements, Software.

3.0 OVERVIEW

3.1 OPERATIONAL FLIGHT PROGRAM

The operational flight program (OFP) represents the total computer program that operates in the orbiter general-purpose flight computer subsystem. The requirements for each OFP are specified at three levels: system level (Level A), functional level (Level B), and detailed level (Level C). In addition, the Level B and Level C requirements are specified in separate documents for GN&C and system management (SM). This document specifies the RM part of the GN&C Level C OFP requirements.

3.2 GN&C SOFTWARE MAJOR FUNCTIONS

The orbiter general-purpose computer (GPC) provides for the following GN&C major software functions:

- Guidance (GUID)
- Navigation (NAV)
- Flight control (FC)
- Redundancy management (RM)
- Subsystem operating programs (SOP)
- Crew interface
- Sequencing

This document specifies the RM major function and its interface with other GN&C major functions.

3.3 RM FLIGHT PHASE APPLICABILITY

The basic function of the RM is to direct utilization of the GN&C system hardware and software during all orbiter flight phases. This document provides detailed RM software functional requirements for the following memory configurations (MC's):

- Memory Configuration 1: Ascent and return to launch site (RTLS)
- Memory Configuration 2: On-orbit
- Memory Configuration 3: Entry
- Memory Configuration 8: On-orbit checkout

The memory configurations are further described in terms of operational sequences and major modes in Table 3.3-1.

3.4 REDUNDANCY MANAGEMENT OVERVIEW (GENERAL)

The GN&C RM is designed to maximize the operational reliability of the GN&C system. This is accomplished by management of redundant data to minimize usage of incorrect or faulty data within the GN&C software application programs. Data from sensors, transducers, and switches are processed to minimize the probability of degrading system performance; i.e., maximizing safety and mission success probabilities.

RM consists of two major functions:

- Selection filter (SF)
- Fault detection, identification, and reconfiguration (FDIR)

A general RM functional block diagram shown in Figure 3.4–1 will be discussed here. The discussion contained in this section is not intended to apply universally to all subsystems, and exceptions will be noted in the appropriate detail requirements subsections.

In general, the GN&C is required to be tolerant of any two equipment failures.

Major interfaces exist between RM and the following major software functions:

- Crew interface
- Flight control
- Navigation
- Other application programs
- Subsystem operating programs (SOP's)
- Flight computer operating systems (FCOS).

One major feature of the RM system is the selection filter (SF). The SF provides a single data output source to user programs derived from redundant input data. Redundant data are input to the SF from SOP's, application programs (AP's), or hardware. The SF is controlled by an input from the FDIR (the selection filter command [SFC]), by digital communication status (commfaults) from FCOS, and by data lock-on status (for RF navigational aid equipment). For some subsystems, the SF also outputs a data good (DG) signal, which shall indicate RM's immediate assessment of the usability ("goodness") of the selected data by user programs.

The other major feature of RM is the FDIR. The FDIR performs three functions:

- Detection of equipment failures (fault detection [FD])
- Identification of faulty LRU's (fault identification [FI])

- Reconfiguration of the SF (fault reconfiguration [FR])

The inputs to the FDIR are the same as those to the SF (redundant data, commfaults, and lock-on) plus select/deselect commands from the crew and BITE status from some LRU's. The redundant set of input data with which FDIR performs FD and FI is established by the crew select/deselect signals in combination with commfaults, lock-on signals, and identified faults. In addition, crew commands in conjunction with identified faults, shall effect the SF configuration/reconfiguration via the SF command.

FDIR shall examine the data in the redundant set for out-of-tolerance conditions. An equipment failure shall have been detected whenever "N" predetermined number of consecutive out-of-tolerance conditions are detected. After a fault has been detected, FI shall attempt to identify the faulty LRU by various tests. BITE shall be used by FI when only two LRU's are in the redundant set for those subsystems indicated in Table 4.0-2. If an LRU has more than one parameter, the remaining good parameter(s) from a failed LRU shall not be used for subsequent FDIR. Detected faults and identified failed LRU's shall be sent to the crew via the fault status outputs. Subsystems for which providing a crew annunciation would not be meaningful are exempt from this requirement. The specific requirements for each subsystem's annunciation requirements are given in the applicable detailed requirements for that subsystem. The FDIR shall never fail out all units of a redundant set.

Table 3.4-1 summarizes the SF and FDIR requirements for each LRU by memory configuration and operational sequence. Detailed major mode breakdown requirements are provided in Tables 4.0-1 and 4.1-1.

The consecutive number of out-of-tolerance conditions necessary to declare a failure varies, depending on the system and experience. There are other values associated with fault identification that will vary as a function of the mission and experience. These values, which may vary from mission to mission, are listed in the I-load document.

3.5 IMPLEMENTATION CONSTRAINTS

The redundancy management subsystem design is protected from the effects of many transient-type errors. Accordingly, the software design shall not negate this capability by causing a program halt, permanent discontinuance of RM processing, or loss of protected data as a result of program check or error interrupts.

Check or error interrupts shall be prevented by software safeguards, or standard fixup and error returns shall be provided which are appropriate in the RM function as described in Level A CPDS Section 4.6.4.

3.6 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.

3.7 SYMBOL DESCRIPTION

Special parameter tables in this document contain data-type symbols as given in Table 3.7-1.

Table 3.3-1. Memory Configuration, Operation Sequences, and Major Modes			
MC	Operation Sequence	Major Mode No.	Major Mode Name
MC1	OPS-1: Ascent operations	101	Terminal count
		102	First stage
		103	Second stage
		104	OMS 1 insertion
		105	OMS 2 insertion
		106	Insertion coast
	OPS-6: RTLS operations	601	RTLS second stage
		602	RTLS entry
		603	RTLS TAEM
MC2	OPS-2: Orbit operations	201	Orbit coast
		202	Maneuver execute (orbit coast)
MC8	OPS-8: On-orbit checkout	801	On-orbit checkout
MC3	OPS-3: Entry operations	301	Predeorbit coast
		302	Deorbit execute
		303	Pre-entry monitor
		304	Entry
		305	TAEM

Table 3.4-1. RM Summary Requirements								
LRU/Parameter	Memory Configuration (MC) 1				MC 2/8		MC 3	
	Ascent (OPS 1)		RTLS (OPS 6)		On-Orbit C/O (OPS 8) On-Orbit (OPS 2)		Entry (OPS 3)	
	SF	FDIR/RM	SF	FDIR/RM	SF	FDIR/RM	SF	FDIR/RM
• Orbiter rate gyros	X	X	X	X			X	X
• Accelerometer assys	X	X	X	X			X	X
• Elevon F/B			1	1			X	X
• Speed brake F/B			1	1			X	X
• Rudder F/B			1	1			X	X
• Body flap F/B	1	X	X	X			X	X
• RHC's (left and right, and aft)	X	X	X	X	X	X	X	X
• SBTC (left and right)	1		X	1			1	1
• RPTA			1	1			1	X
• MSBLS			1	1			1	1
• IMU	1	1	X	X	X	X	X	X
• Switches ²	X	X	X	X	X	X	X	X
• Air data			1	1			1	X
• Body flap command	NA	1	NA	X	NA		NA	1
• RCS	NA	X	NA	X	NA	X	NA	X
• OMS	NA	1	NA		NA	1	NA	1
• TACAN			1	1			1	1
• Hyd system pressure (1,2,3)	X	X	X	X			X	X
• Radar altimeter	1	NA	1	NA		NA	1	NA
• Elevon ΔP F/B	1	1						
• SRB rate gyros	1	1						
• SRB chamber pressure	1	NA		NA		NA		NA
• LG WOW RM			1	1			1	1
• ORB RGA SMRDs	X	X	X	X			X	X

1 Refer to Table 4.0-1 (FDIR/RM) or 4.1-1 (SF) for major mode requirements. These LRU parameter functions are not processed over the entire memory configuration.
2 Refer to Section 4.12 for additional unique requirements.

Table 3.7-1. Type Symbol Description	
Symbol	Description
B	Boolean
D	Discrete
I	Integer
S	Floating point scalar
FX*	Fixed point
V	Floating Point vector
M	Floating point matrix
DP	Double precision

*Data of this type may require special processing such that signs, lock-on, and BITE status bits are extracted for RM consideration and other user requirements

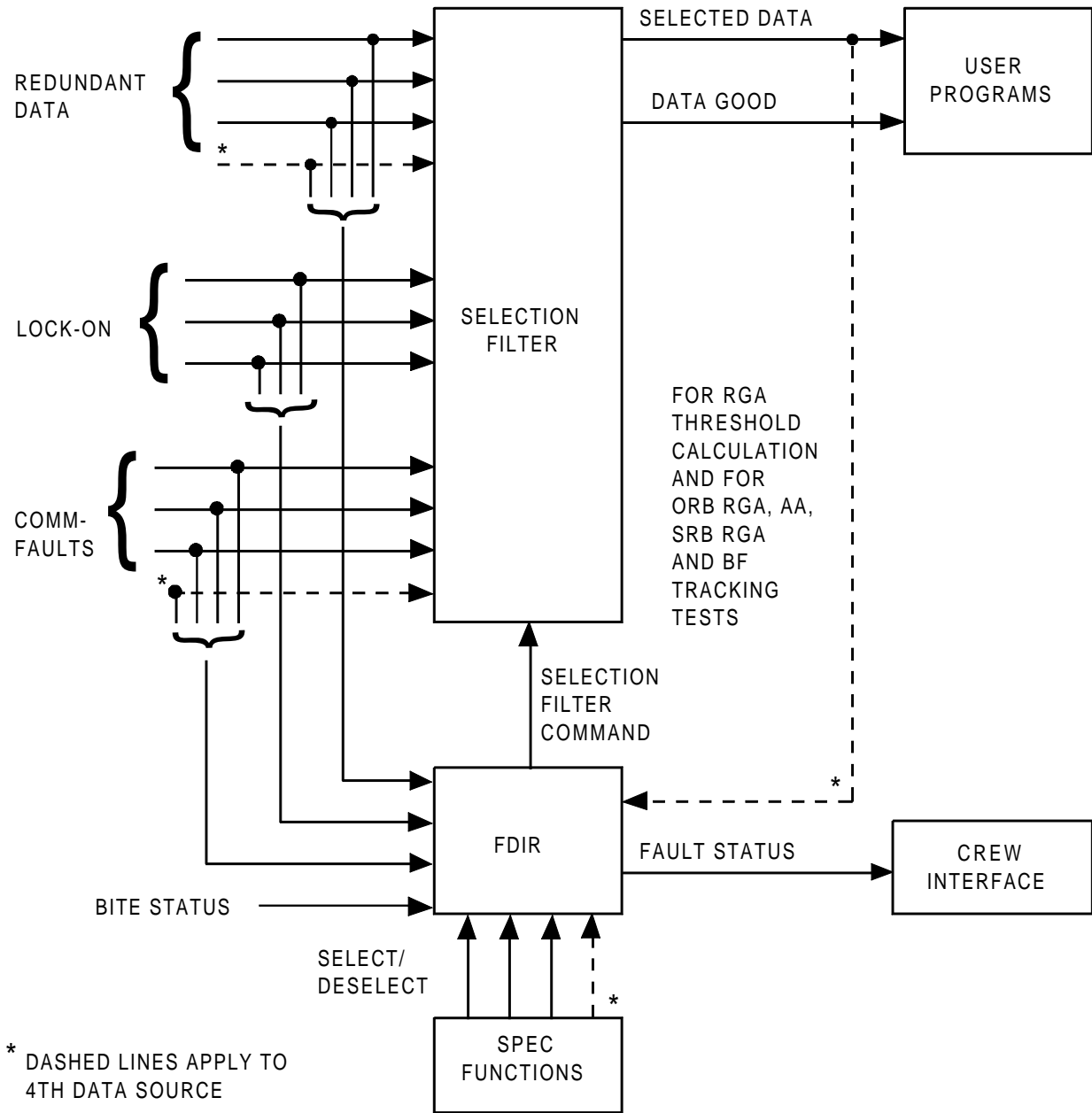


FIGURE 3.4-1. General Redundancy Management Block Diagram (Not Applicable to All Sensors)

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4.0 REDUNDANCY MANAGEMENT (RM) DETAILED REQUIREMENTS

Redundancy management performs two basic functions: selecting single datum from multiple data sources and detecting and isolating erroneous datum in a data set and then reconfiguring the data set.

4.0.1 Selection Filter

The selection filter (SF) operates in several modes which are determined by the number of usable entities in the data set. In general, if there are four usable entities, a mid value select with standby signal, interchangeable mid value select, or quad mid value select is used. If there are three usable entities, a mid value select mode is used. If two entities are usable, they are averaged. If one entity is usable, the selection filter operates in a pass mode. Detailed requirements for those data sets that can be processed to single datum by these SF modes are given in paragraph 4.1.

4.0.2 Fault Detection, Identification, and Reconfiguration

Fault detection, identification, and reconfiguration (FDIR) requirements will be specified as though the FDIR consists of three distinct submodules:

- Fault detection (FD)
- Fault identification (FI)
- Fault reconfiguration (FR)

The FD module compares redundant input data to determine whether an out-of-tolerance condition exists. The FI module determines whether a failure has occurred and attempts to identify the LRU that has failed. The reconfiguration module causes the SF to be moded in response to crew commands and identified failures. There is no requirement for a one-to-one software relationship to these submodules nor is there a requirement that there be any submodules. It is required that the FD process precede FI and that FI precede the reconfiguration process embedded within that particular FDIR module. Figure 4.0-1 is a block diagram of the general FDIR requirements and the general FDIR interfaces.

Although similar in failure analysis techniques, the subject LRU's have distinctions. The unique requirements resulting from these distinctions are given in the following paragraphs:

Title	Paragraph
ORB RGA	4.4.1
AA	4.4.2
MSBLS	4.6
ELVN PFB	4.7.1
RUD PFB	4.7.2
SB PFB	4.7.3
BF PFB	4.7.4
RHC	4.8.1
SBTC	4.8.2
RPTA	4.8.3
GN&C SWITCH RM	4.12.1.4
ELVN Δ PFB	4.13.1
SRB RGA	4.13.2
LG WOW RM	4.13.3
HYD SYS	4.13.4

Table 4.0–1 specifies the major modes applicable for each functional module. The LRU’s with special RM requirements are included in this table for ease of reference.

Table 4.0–2 references all FDIR/RM parameters for the entire OFT mission. This table lists the required processing rates for each parameter and identifies all parameter–specific characteristics. Again, the LRU’s with special RM requirements have been included in this table for ease of reference. The results of the FDIR function shall be available to the associated SF at the FDIR rate and the results shall be retained for SF usage on a demand basis.

The redundancy level of input signals for a parameter is the maximum number of redundant signals that can be available for that parameter. It is fixed and is specified in Table 4.0–2. However, the availability of redundant signals for FDIR functions is affected by crew selection commands, commfault status, lock–on status, failure status (multiparameter LRU restrictions), and quad redundancy restrictions.

1. Crew select/deselect commands:

For a redundant signal to be available, its associated LRU must be selected. Because selection is on an LRU basis, mapping will be required from the LRU to all of its associated parameters. Parameters, for which the crew has no select/deselect command authority, shall be considered as always selected. Crew selection command authority is not available in all memory configurations. After command authority ceases to exist, the selection status shall be configured as it was in the most recent memory configuration in which this command authority existed. In OPS–1, all parameters shall be initially selected. LRU’s deselected by the crew shall not be available for RM functions.

2. Commfault status:

On any given cycle, signal availability is dependent upon a valid input/output transaction as determined by FCOS. Note in Table 4.0-2 that some parameters have no provisions for commfaults. These parameters shall be considered to have been validly updated at all times. The FDIR function shall not declare failures based on commfaults. The FCOS function will declare such failures if a commfault condition exists for a period of time.

3. Lock-on status:

RF navigational aid equipment provides a status signal that indicates if the LRU is validly updating its output signals (i.e., "locked-on"). For any particular redundant data signal to be considered available for the FDIR function, the signal's associated lock-on signal must indicate "lock-on." Signals not locked-on shall not be failed by FDIR since either state of lock-on is a normal operating state for the LRU. Those parameters in Table 4.0-2 for which no lock-on status is indicated shall be considered to be always "locked-on."

4. Failure status:

For a signal to be available for FDIR, it shall not have been failed by FDIR nor associated with a failed LRU (as determined by fault identification, Section 4.0.2). That is, if one or more parameters of an LRU are failed by FDIR, then all parameters from that LRU shall not be available for RM purposes. This requirement applies to all single parameter LRU's as well as the following multi-parameter LRU's: MSBLS, RHC, ORB RGA, SRB, RGA, AA, IMU, and ADTA. Exempted from this requirement are the THC and TACAN. For these two LRU's, failure of a parameter shall not affect the availability of the other parameters of that LRU (refer to Sections 4.12 and 4.5, respectively, for specifics).

5. Quad redundancy restrictions:

As indicated in Table 4.0-2, certain parameters have a fourth level of input data redundancy. Availability of the fourth signal to FDIR shall generally be determined on the same basis as the availability of other redundant signals. However, the fourth signal shall be nonavailable to FDIR until one, or more, of the first three redundant signals becomes nonavailable. This requirement also means that if the fourth signal is in use by the FDIR and all of the first three signals become available at a subsequent time, the fourth signal shall become nonavailable at that time. When multi-parameter LRU's are quad redundant, use of any one parameter from an LRU shall require use of all parameters from that LRU in FDIR. Quad redundancy restrictions do not apply to orbiter RGA, AA, body flap position feedback (BFPFB), and SRB RGA's.

4.0.2.1 Fault Detection (FD).

FD is the determination of whether an out-of-tolerance condition exists. It shall be performed whenever two or more parameters are available for FDIR, except for ELVN PFB, RUD PFB, SB PFB, BF PFB, orbiter RGA, SRB RGA, and AA. Faults are determined by comparing the difference among the pairs of available input signals (i.e., tracking tests) for a given parameter to a limit. FDIR for ELVN PFB, RUD PFB, SB PFB, BF PFB, orbiter RGA, SRB RGA, and AA shall be terminated below the four level, e.g., when one unit is not usable. In the event of simultaneous failures in which the failures are on differing axis and LRU's, the orbiter RGA, SRB RGA, and AA FDIR will terminate after detection of the first failed parameter. Faults for the orbiter RGA, SRB RGA, AA, and body flap position feedback at the four level are determined by comparing the difference between the selected signal and each available input signal to a limit for a given parameter. Limits may be mission-dependent (i.e., I-load) and are listed in the I-load document (JSC-19350). Not all limits are constant. The special limit computations are specified in the applicable paragraphs. A state of miscomparison will exist whenever the absolute value of a pairwise difference or the selected signal to signal difference exceeds its limit. Each miscomparison and the identity of the LRU's associated with each miscomparison shall be made known to the FI function. It is a requirement that no overflow condition be permitted in fault detection, especially when differencing fixed point data.

There shall be no FD tests performed on any fourth redundant signal unless it is available to FDIR as described above.

4.0.2.2 Fault Identification (FI).

FI performs two distinct functions: one is the determination of whether a failure has occurred and the other is the identification of the failed LRU.

FI shall monitor the miscomparison indications from FD and shall declare existence of a failure whenever a predetermined number, N, of consecutive miscomparisons are detected. At the two level, a miscomparison is equivalent to the out-of-tolerance condition detected by FD. At the three level a miscomparison is considered to exist when there are two simultaneous, pairwise out-of-tolerance conditions. At the four level for orbiter RGA, SRB RGA, AA and BF PFB, FI shall monitor the fault indications from FD and shall declare existence of a failure whenever N consecutive miscomparisons against the selected signal are detected. For pairwise comparisons, it is required that the same two pairs be used to determine consecutive miscomparisons. The limit to the number of consecutive miscomparisons is given in either the specific I-Load or K-Load Table for the parameter/LRU in question.

Whenever there is a good comparison (i.e., a miscomparison does not exist) and the number of consecutive miscomparisons is less than N, the N-counter shall be reset. N-counters shall be neither reset nor incremented if any of associated signals from the LRU have not been validly updated (i.e., due to commfault or lock-on). Whenever the number of consecutive miscomparisons equals or exceeds the value of N, a failure shall be considered to exist, and all associated failure indications to the GAX, telemetry, and SF command logic shall be set. Some subsystems are not required to provide failure indications to GAX. For specific annunciation requirements refer to the applicable detailed requirements for that subsystem. LRU-specific failure indications (i.e., identified failures) shall be allowed to be reset only by crew reselection of the affected LRU(s). Disagree failure indications shall be reset whenever a third LRU

becomes available to resolve the disagreement (either by reselection, lock-on, or absence of commfault) or whenever the disagreement is automatically resolved by FDIR (BITE) or by crew deselect.

After FI determines that a failure has occurred, it shall announce the failure and either identify the failed LRU or announce that a failure has occurred and FI is unable to identify the failed LRU. When the failure is declared due to two or three pairs of out-of-tolerance indications, FI shall identify the LRU that is common to these pairs as the failed LRU. Where the selected signal is the comparison reference, the failed LRU is that LRU which miscompares versus the reference in excess of the limit (trip level) for N successive cycles. Action to be taken in the subsequent cycle depends upon whether there are three or two LRU's remaining in the redundant set. If three LRU's remain, failure determination and identification shall be as described previously. If two LRU's remain, FI shall undertake the two-level routine described below.

When a failure is determined to exist at the two-level, FI shall attempt to discriminate the failed LRU with BITE if BITE is used for that particular parameter. Table 4.0-2 shows the LRU's with BITE. For BITE to isolate the failure, it is necessary that one, and only one, of the two LRU's in question has failed their built-in-test. If BITE can discriminate, FI will identify the failed parameter and LRU. Otherwise, FI will announce that a disagreement exists and shall identify the LRU's so involved in the dilemma. These dilemma indications need be on an LRU-only basis. On subsequent cycles, FI shall continue to try to isolate the failure through BITE.

4.0.2.3 Reconfiguration (FR).

The SF command from the reconfiguration logic modifies the SF mode in that it dictates which LRU's may be used by the SF (refer to paragraph 4.1 for details of SF moding). The SF command shall respond directly to crew select/deselect commands and to identified failure indications. Select/deselect commands shall be issued on an LRU basis. The SF command shall not allow the use of parameters from an LRU which has been selected if any one (or more) parameter from the LRU has been identified as failed. The LRU's for which this requirement applies were described previously under the failure status requirements.

4.0.2.4 Interface Requirements.

Refer to the applicable paragraphs for detailed interface requirements.

4.0.2.5 Processing Requirements.

Processing requirements are specified in Table 4.0-2.

4.0.2.6 Initialization Requirements.

All failure flags and failure counters shall be initialized in OPS 1 to the unfailed state. In all other operational sequences, the failure status shall be the same as the status that last existed in the preceding OPS. In operational sequences where crew candidate select is not available, the select/deselect status shall be configured as it was in the most recent phase in which such capability was available. In OPS-1, all parameters shall be initially selected.

4.0.3 Additional Requirements

Certain Line Replaceable Units (LRU's) have unique SF and FDIR requirements which are best stated in separate RM Level B PF name/paragraphs. These LRU's and their Level C section/paragraphs are as follows:

CPDS (LVLB) Software RM (PF) No.	LRU (Hardware)	Level C FSSR Section/Paragraph
G4.72	IMU	4.2
G4.73	ADTA	4.3
G4.77	TACAN	4.5
G4.91	RCS	4.9
G4.92	OMS	4.10
G4.95	BF CMD	4.11
G4.180	GN&C switches	4.12
G4.243	LG WOW	4.13
G4.257	ORB RGA SMRD	4.14

However, for ease of reference, Tables 4.1-1, 4.1-2, 4.1-3, 4.1-4, and 4.0-1 and -2 contain data pertinent to all principal functions. There is no requirement to design software modules on a one-to-one basis with the principal functions. Flags are defined as a means of depicting detail requirements and are not in any way intended to constrain software design by implying a one-to-one correspondence between these flags and the flags and/or indicators actually utilized in the software implementation.

4.0.4 Traceability

Table 4.0-3 shows the traceability of the software paragraphs in this FSSR with respect to the corresponding Sections of the Level B CPDS' documentation. In addition, Table 4.0-4 shows the traceability of the PASS GN&C principal functions located in this FSSR with respect to the applicable BFS paragraphs in the Level C PRD specifications. These tables are provided for information only.

4.0.5 Documented Requirements Precedence

Requirements precedence in this document shall be as follows:

1. If there is a conflict between the data in the function subtables and the standard principal function tables, the principal function tables shall have precedence.
2. If there is a conflict between the data in the flow diagrams and the written requirements, the written requirements shall have precedence.

Table 4.0-1. FDIR/RM Major Mode Applicability						
Functional Module	Major Mode					
	1 1 1 1 1 1	2	2	8	3 3 3 3 3	6 6 6
	0 0 0 0 0 0	0	0	0	0 0 0 0 0	0 0 0
	1 2 3 4 5 6	1	2	1	1 2 3 4 5	1 2 3
Orbiter RGA FDIR	X X X X X X				X X X X X	X X X
AA FDIR	X X X X X X				X X X X X	X X X
SRB RGA FDIR	X X					
Elevon fbk FDIR					X X X X X	X X
Elevon Δ P fbk FDIR	X					
Speed brake fbk FDIR					X X X X X	2 X X
Rudder fbk FDIR					X X X X X	X X
Body flap fbk FDIR	X X X X X X				X X X X X	X X X
RHC cmd FDIR	X X X X X X	X	X	X	X X X X X	X X X
Speed brake cmd FDIR					X X	X X
RPTA FDIR					X X X X X	X X
MSBLS FDIR					X	X
IMU RM	1 X X X X X	X	X	X	X X X X X	X X X
Switch RM	X X X X X X	X	X	X	X X X X X	X X X
Air data RM					X X	X X
Hydraulic system FDIR	X X X X X X				X X X X X	X X X
Body flap command RM	X X X X X				X X	X X X
RCS RM	X X X X X X	X	X	X	X X X X X	X X X
OMS RM						
Engine FDI	X X X X		X		X X	X X
Actuator FDI	X X X		X		X X X X	
TACAN RM					X X	X X
LANDING GEAR					X	X
WOW RM						
ORB RGA SMRD RM	X X X X X X				X X X X X	X X X

Notes: 1. In MM101, beginning at platform reference update.
2. In MM601, beginning at MECO Confirmed

Table 4.0-2. FDIR/RM Parameter Reference and Processing Requirements								
Parameter	Redundancy Level	Has Crew Candidate Select?	Has Commfault?	Has LockOn?	Has BITE?	Is BITE Used?	Processing Rate (Hz)	Notes
Orbiter pitch rate	4	Yes	Yes	No	Yes	No	1.04	4
Orbiter roll rate	4	Yes	Yes	No	Yes	No	1.04	4
Orbiter yaw rate	4	Yes	Yes	No	Yes	No	1.04	4
ORB RGA 1 SMRD	3	No	Yes	No	No	No	*	5
ORB RGA 2 SMRD	3	No	Yes	No	No	No	*	5
ORB RGA 3 SMRD	3	No	Yes	No	No	No	*	5
ORB RGA 4 SMRD	3	No	Yes	No	No	No	*	5
AA normal accel	4	Yes	Yes	No	Yes	No	0.52	4
AA lateral accel	4	Yes	Yes	No	Yes	No	0.52	4
ROB elevon feedback	4	Yes	Yes	No	No	No	1.04	4
LOB elevon feedback	4	Yes	Yes	No	No	No	1.04	4
RIB elevon feedback	4	Yes	Yes	No	No	No	1.04	4
LIB elevon feedback	4	Yes	Yes	No	No	No	1.04	4
Speed brake feedback	4	Yes	Yes	No	No	No	1.04	4
Rudder feedback	4	Yes	Yes	No	No	No	1.04	4
Body flap feedback	4	Yes	Yes	No	No	No	1.04	4
Right RHC pitch cmd	3	Yes	Yes	No	No	No	1.04/3.125	1
Right RHC roll cmd	3	Yes	Yes	No	No	No	1.04/3.125	1
Right RHC yaw cmd	3	Yes	Yes	No	No	No	1.04/3.125	1
Left RHC pitch cmd	3	Yes	Yes	No	No	No	1.04/3.125	1
Left RHC roll cmd	3	Yes	Yes	No	No	No	1.04/3.125	1
Left RHC yaw cmd	3	Yes	Yes	No	No	No	1.04/3.125	1
Right speed brake cmd (SBTC)	3	Yes	Yes	No	No	No	1.04/3.125	1
Left speed brake cmd (SBTC)	3	Yes	Yes	No	No	No	1.04/3.125	1
Right RPTA cmd	3	Yes	Yes	No	No	-	1.04	
Left RPTA cmd	3	Yes	Yes	No	No	-	1.04	
MSBLS range	3	Yes	Yes	Yes	Yes	Yes	0.25	
MSBLS azimuth	3	Yes	Yes	Yes	Yes	Yes	0.25	
MSBLS elevation	3	Yes	Yes	Yes	Yes	Yes	0.25	
IMU attitude	3	Yes	Yes	No	Yes	Yes	FD-1/16 FI 1.04 or 1/16	2,3
IMU velocity	3	Yes	Yes	No	Yes	Yes	1/16	2
Switches	4/3/2/1	Yes	Yes	No	No	-	*	2
Right ADTA PS	2	Yes	Yes	No	Yes	No	See para 4.3	2
Right ADTA PAC	2	Yes	Yes	No	Yes	No	See para 4.3	2
Right ADTA PAU	2	Yes	Yes	No	Yes	No	See para 4.3	2

Table 4.0-2. FDIR/RM Parameter Reference and Processing Requirements								
Parameter	Redundancy Level	Has Crew Candidate Select?	Has Commfault?	Has LockOn?	Has BITE?	Is BITE Used?	Processing Rate (Hz)	Notes
Right ADTA PAL	2	Yes	Yes	No	Yes	No	See para 4.3	2
Left ADTA PS	2	Yes	Yes	No	Yes	No	See para 4.3	2
Left ADTA PAC	2	Yes	Yes	No	Yes	No	See para 4.3	2
Left ADTA PAU	2	Yes	Yes	No	Yes	No	See para 4.3	2
Left ADTA PAL	2	Yes	Yes	No	Yes	No	See para 4.3	2
Center ADTA PS	2	No	No	No	Yes	No	See para 4.3	2
Center ADTA PAC	2	No	No	No	Yes	No	See para 4.3	2
Center ADTA PAU	2	No	No	No	Yes	No	See para 4.3	2
Center ADTA PAL	2			No	Yes	No	See para 4.3	2
Body Flap cmd	–	Yes	No	No	No	–	3.125	2
RCS	–	Yes	Yes	No	No	–	(multiple)	2
OMS	–	Yes	Yes	No	No	–		2
TACAN	3	Yes	Yes	Yes	Yes	Yes	See para 4.5	2
Aft RHC pitch cmd	3	Yes	Yes	No	No	–	1.04/3.125	1
Aft RHC roll cmd	3	Yes	Yes	No	No	–	1.04/3.125	1
Aft RHC yaw cmd	3	Yes	Yes	No	No	–	1.04/3.125	1
Elevon Δ P fdbk	4	Yes	Yes	No	No	–	1.04	
SRB pitch rate	4	No	Yes	No	Yes	No	0.52	4
SRB yaw rate	4	No	Yes	No	Yes	No	0.52	4
Hydraulic sys No. 1	3	No	Yes	No	No	–	1.04	
Hydraulic sys No. 2	3	No	Yes	No	No	–	1.04	
Hydraulic sys No. 3	3	No	Yes	No	No	–	1.04	
Left Main Gear NOWOW	3	No	Yes	No	No	–	6.25	2
Right Main Gear NOWOW	3	No	Yes	No	No	–	6.25	2
Nose Landing Gear NOWOW	2	No	Yes	No	No	–	6.25	2

*Except for THC translation switch inputs in OPS 2 and 8, process FDIR at SF rate. Process FDIR for THC translation switch inputs in OPS 2 and 8 at 6.25 Hz.

Notes:

1. Three-level processing rate/two-level processing rate. The rate change can take up to .96 seconds.
2. These functions require special processing applicable subsections.
3. The FI rate for attitude is conditional on the attitude data good flag at the 2 and 1 levels and on the OPS.
4. FDIR shall be terminated if any of the four LRU'S are not usable.
5. FDIR shall be terminated if any of the three discretes are not available.

Table 4.0-3. Level B to Level C Traceability		
Level B PF No.	Level B PF Name (Acronym)	Level C FSSR Section No.
4.76	Accelerometer Assembly (AA) FDIR (AA FDIR)	4.4.2
4.73	Air Data Transducer Assembly (ADTA) RM (ADTA RM)	4.3
4.95	Body Flap (BF) Command RM (BF CMD RM)	4.11
4.84	Body Flap Position Feedback (BF PFB) FDIR (BF PFB FDIR)	4.7.4
4.81	Elevon Position Feedback (ELVN PFB) FDIR (ELVN PFB FDIR)	4.7.1
4.241	Elevon Primary Delta Pressure Feedback (ELVN Δ PFB) FDIR (ELVN DELTA P FDIR)	4.13.1
4.180	GN&C Switch RM (GN&C SW RM)	4.12
4.249	Hydraulic System Pressure FDIR (HYD SYS FDIR)	4.13.4
4.72	Inertial Measurement Unit (IMU) RM (IMU RM)	4.2
4.243	Landing Gear Weight on Wheels (WOW) RM (LG WOW RM)	4.13.3
4.78	Microwave Scan Beam Landing System (MSBLS) Tranceivers FDIR (MSBLS FDIR)	4.6
4.92	Orbital Maneuvering System (OMS) Actuator/Engine RM (OMS RM)	4.10
4.74	Orbiter Rate Gyro Assembly (ORB RGA) FDIR (ORB RG FDIR)	4.4.1
4.257	ORBITER RGA Spin Motor Rotation Detector (SMRD)RM (ORB RGA SMRD RM)	4.14
4.91	Reaction Control System (RCS) RM (RCS RM)	4.9
4.87	Rotational Hand Controller (RHC) FDIR (RHC FDIR)	4.8.1
4.89	Rudder Pedal Transducer Assembly (RPTA) FDIR (RPTA FDIR)	4.8.3
4.82	Rudder Position Feedback (RUD PFB) FDIR (RUD PFB FDIR)	4.7.2
4.71	Selection Filter (SF) (SF)	4.1
4.242	Solid Rocket Booster (SRB) Rate Gyro Assembly (RGA) FDIR (SRB RG FDIR)	4.13.2
4.83	Speed Brake Position Feedback (SB PFB) FDIR (SB PFB FDIR)	4.7.3
4.88	Speed Brake Thrust Controller (SBTC) FDIR (SBTC FDIR)	4.8.2
4.77	Tactical Air Navigation (TACAN) RM (TACAN RM)	4.5

Table 4.0-4. Redundancy Management FSSR/PRD Correlation					
Principal Function	FSSR Paragraph	FSSR Title	BFS PRD	PRD Paragraph	BFS Title
G4.71	4.1	Selection Filtering	MG038106	3.2.6.10	SEL_FILTER
G4.72	4.2	Inertial Measurement Unit RM Requirements	MG038106	3.2.5.1	Inertial Measurement Unit HIP
G4.73	4.3	ADTA RM Processing	MG038106	3.2.5.2.1	Air Data Transducer Assembly Hardware Interface Program (ADTA_HIP)
G4.74	4.4.1	Orbiter RGA FDIR	N/A	N/A	N/A
G4.76	4.4.2	AA FDIR	N/A	N/A	N/A
G4.77	4.5	TACAN RM	MG038106	3.2.5.2.3	TACAN Hardware Interface Processor (TACAN HIP)
G4.78	4.6	MSBLS FDIR	N/A	N/A	N/A
G4.81	4.7.1	ELVN PFB FDIR	N/A	N/A	N/A
G4.82	4.7.2	RUD PFB FDIR	N/A	N/A	N/A
G4.83	4.7.3	SB PFB FDIR	N/A	N/A	N/A
G4.84	4.7.4	BF PFB FDIR	N/A	N/A	N/A
G4.87	4.8.1	RHC FDIR	N/A	N/A	N/A
G4.88	4.8.2	SBTC FDIR	N/A	N/A	N/A
G4.89	4.8.3	RPTA FDIR	N/A	N/A	N/A
G4.91	4.9	RCS RM Processing	MG038106	3.2.5.5.8	Reaction Control System Pressure Monitoring HIP (RCS_PRESS_MON_HIP)
			MG038106	3.2.5.5.10	(RCS_JET_READ_HIP)
G4.92	4.10	OMS RM	MG038106	3.2.5.5.7	Orbital Maneuvering System Actuator (FDI HIP)
G4.95	4.11	BF CMD RM	N/A	N/A	N/A
G4.180	4.12	GN&C Switch RM	MG038106	3.2.5.6.1	GN&C Switch Processing HIP (GN&C_SW_HIP)
G4.241	4.13.1	Elevon Delta PFB FDIR	N/A	N/A	N/A
G4.242	4.13.2	SRB RGA FDIR	N/A	N/A	N/A
G4.243	4.13.3	Landing Gear WOW RM	N/A	N/A	N/A
G4.249	4.13.4	Hydraulic System FDIR	N/A	N/A	N/A
G4.257	4.14	ORB RGA SMRD RM	N/A	N/A	N/A

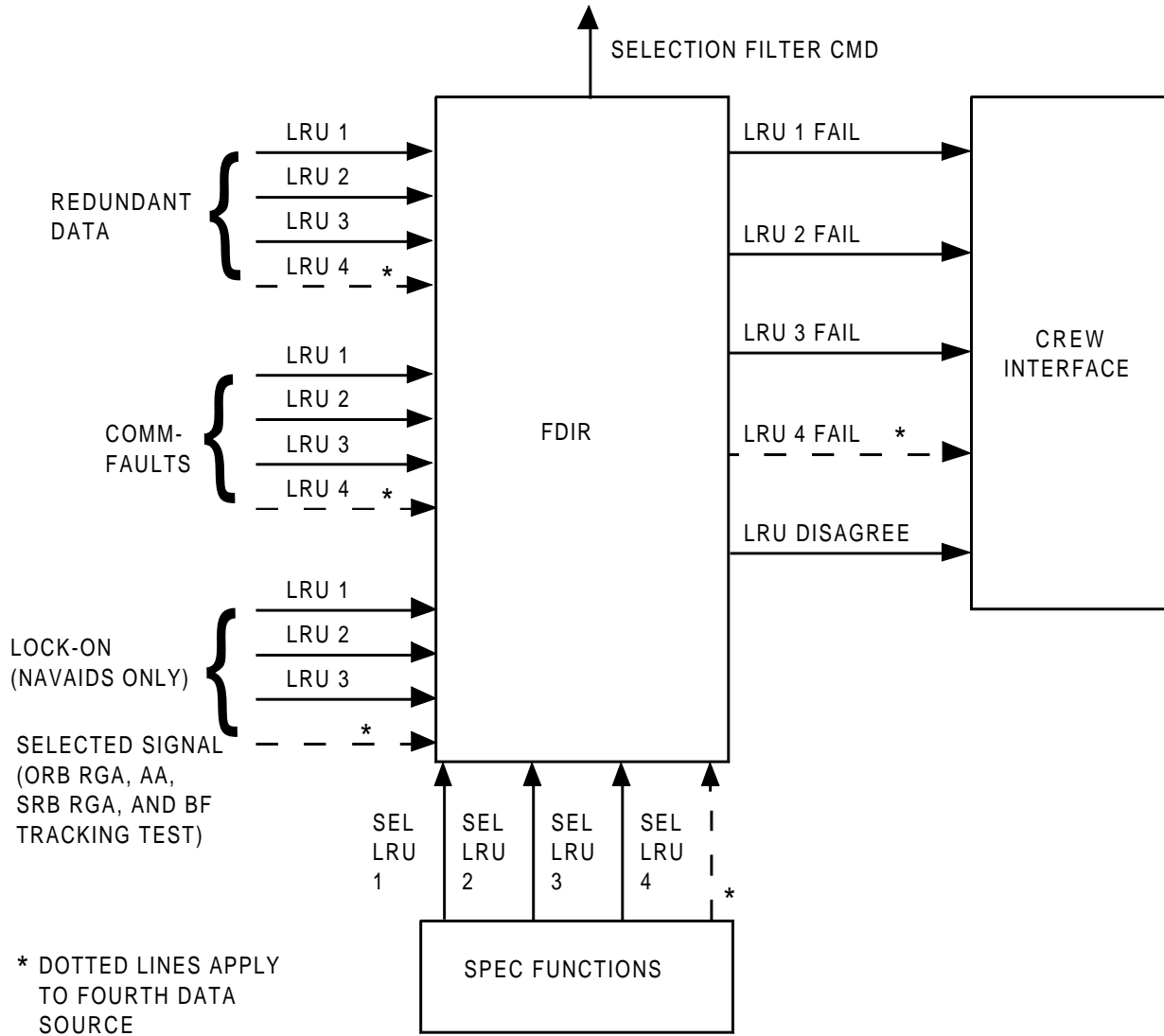


FIGURE 4.0-1. FDIR Interface (General)

4.1 SELECTION FILTER (SF) (PF 4.71)

The SF is the means of reducing multiple, redundant input data to a single output datum. It is a goal to have a single type of selection filter (with alternate processing requirements, depending on data type) mechanized.

The SF functional module shall be available to subsystem operating programs (SOP's) and application programs (AP's) at the user rate. The SF major mode requirements are specified in Table 4.1-1. Table 4.1-2 lists the required selection filters, the total number of parameters, selection filter commands and their source and destination, and the typical user processing rate for each filter. Note that it is optional to provide a separate SF command for each parameter, but that all SF commands for a subsystem must be moded concurrently in the applicable FDIR module.

The SF functional module shall not be used on mixed data sets; i.e., all inputs to the SF must be updated prior to the SF process to ensure that correct SF processing results. Mixed data sets result from failure to update data blocks properly. Update blocks shall be used whenever necessary in RM to preserve homogeneity between RM data sets so that nondivergence can be ensured between GPC's.

4.1.1 Functional Requirements

There shall be six different selection filter modes depending on the usable level of input redundancy and the specific LRU data sets being addressed.

The interchangeable midvalue select (IMVS) filter mode shall provide signal selection from four valid input signals and shall provide protection from any single failure and from dual null failures. Dual null failure protection is provided in two ways: (1) it ensures the selection of non-null signal whenever the true input is greater than a null threshold level (I-load) and (2) it minimizes switching between the null and true values when the true input cycles in and out of the null threshold level. IMVS shall be used for the orbiter RGA's, the SRB RGA's and the AA's.

The quad midvalue select (QMVS) shall provide protection against dual null failures by causing selection of one of the two median signals, the specific selection being based on the magnitude of the difference between these two signals. Whenever the difference is greater than an I-loaded value, the signal with the larger magnitude shall be selected; otherwise either signal may be selected. Note that this implies that a failed-to-null signal can be selected, but only when the difference between the good signals and the null signal is less than the I-load values.

The midvalue select (MVS) filter mode shall be used when three valid input signals are available. The selected output signal will be between the other remaining two signals.

The averaging (AVE) mode shall be used when only two remaining valid signals are available. The averaging mode computes an output signal which is the arithmetical average of the two valid input signals.

The pass (PASS) mode shall be used when only one remaining valid signal is available. The selected signal output is equal to the one remaining valid input signal.

The no-available-sensor (NAS) mode shall be used when no valid input signal is available. The selected signal output remains unchanged from the previous valid output value. (This action results from the fact

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that SF output COMPOOL location is fixed until updated. Failure to output a new value leaves the old value in the COMPOOL location.)

The usable inputs to the selection filter shall establish the SF mode and shall be determined each time and prior to the execution of the data selection process.

Input parameter (datum value) numbers shall be associated with LRU identification numbers as follows (except for the special cases noted):

1. Input Parameter 1 from LRU 1.
2. Input Parameter 2 from LRU 2.
3. Input Parameter 3 from LRU 3.
4. Input Parameter 4 from LRU 4.

An alternate LRU/input parameter numbering scheme is acceptable provided that it meets the intent of the total specified requirements and is self-consistent.

The usability of an input parameter in the selection filter shall be as specified in Table 4.1-3. The usability of input parameters shall then determine the SF mode, as shown in Table 4.1-4.

The usable level of input redundancy is established by a combination of inputs to the SF. The maximum number of usable inputs is established by the SF command from the FDIR. The SF command provides a flag associated with each input datum value, which allows or disallows the use of that datum value in the selection filter process. Input data values disallowed from use by the SF command shall not be used to determine the SF output datum value. Input data values allowed for use by the SF command may be used to determine the SF output datum value, depending on the state of other parameter-associated flags available to the SF from the parameter input source. The input parameter shall be used if the associated communication fault (commfault) and the associated lock-on (if applicable) flags are set valid and shall not be used if either flag is set invalid. Lock-on flags are applicable for the following parameters:

1. MSBLS range.
2. MSBLS azimuth.
3. MSBLS elevation.
4. Radar altimeter height.
5. TACAN bearing.
6. TACAN range.

For these parameters, the DG flag indicated on Table 4.1-4 shall be set valid for the MVS mode. The flag for the AVE mode shall be set invalid if

$$| \text{Input Data } i - \text{Input Data } j | > K_k$$

where

$$i, j = 2, 3; 1, 3; 1, 2$$

K_k = data limit for Parameter k

The limit K_k shall be as given in paragraph 4.1.4 for the applicable parameters. For the pass mode, the DG flag shall be set valid. For the NAS mode, the DG flag shall be set invalid.

Figure 4.1-1 is a suggested logic flow diagram for the SF. In this mechanization, the two-level tracking test is integrated with the selection process. The MVS routine logic is shown in Figure 4.1-2 and the AVE routine logic and tracking-test logic are shown in Figure 4.1-3. The QMVS routine logic is shown in Figure 4.1-4. The IMVS routine logic is shown in Figure 4.1-5.

There are three commands to the SF in the flow diagrams: FDIR(i), LOCK-ON(i), and COMMFAULT(i). The (i) notation specifies the selection filter index number with one index per SF. The commands are four-level flags of the following form:

$$\text{FDIR}(i) = I_i, J_i, K_i, L_i$$

where

$I_i = 1$ if the Ith parameter to the ith SF is allowed by the FDIR

$I_i = 0$ if the Ith parameter to the ith SF is inhibited by the FDIR

Same for J_i , K_i , and L_i

$$\text{COMMFAULT}(i) = \text{CFI}_i, \text{CFJ}_i, \text{CFK}_i, \text{CFL}_i$$

where

$\text{CFI}_i = 1$ if the Ith parameter to the ith selection filter was updated by the GPC

$\text{CFI}_i = 0$ if not

Same for CFJ_i , CFK_i , and CFL_i

$$\text{LOCK-ON}(i) = \text{LOI}_i, \text{LOJ}_i, \text{LOK}_i, 0$$

where

$\text{LOI}_i = 1$ if the Ith parameter to the ith selection filter has valid lock-on as determined by the associated SOP

$\text{LOI}_i = 0$ otherwise

Same for LOJ_i and LOK_i .

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Note that an LOL_i is zero, since no RF NAVAID has a fourth input parameter. Also note that the LOK_i is always zero for the radar altimeter, since only two inputs are present.

Two entries to the selection filter are defined: Entry 2 for RF NAVAID's and Entry 1 for all others.

Several commands (two or three) are logically ANDed to form the status flag that modes the SF. The status flag is defined as

$$\text{Status} = \text{Flag I, Flag J, Flag K, Flag L}$$

where, for Entry 1

$$\text{Flag R} = \text{R}_i \text{ AND CFRI}; \text{ R} = \text{I, J, K, L}$$

for Entry 2

$$\text{Flag R} = \text{R}_i \text{ AND CFRI AND LORI}; \text{ R} = \text{I, J, K, L}$$

The DG flag for the *i*th output parameter is initialized by setting a TEMP flag to 1. If an AVE mode is entered for *I_i* and *J_i*, *I_i* and *K_i*, or *J_i* and *K_i*, TEMP will be zeroed if the associated limit test is exceeded. TEMP will also be zeroed by the NAS mode. The DG *i* flag is set according to the value of TEMP.

4.1.2 Processing Requirements

SF processing schedules are user-dependent and are given in Table 4.1-1. In ascent, the active selection filters for which there is no FDIR shall be moded only by commfaults, lock-on signals, and SFC, but not by FDIR. All other active selection filters in ascent shall be moded by FDIR as well as by commfaults, lock-on signals, and SFC. Table 3.4-1 indicates the memory configuration applicability of the various selection filters and FDI routines. Tables 4.0-1 and 4.1-1 show the major mode applicability.

4.1.2.1 Body Flap Position Feedback Selection Filter Processing.

The selection filter for the body flap command SOP and the body flap position feedback shall be processed before the DAP outside the transport delay critical processing, i.e., in the same minor cycle.

4.1.2.2 Rotational Hand Controller Selection Filter Processing.

The RHC selection filter shall be processed as follows:

On-demand: MM 101, 102, 103 until Event 33B (SSME ZERO THRUST) and MM 601

Continuously: MM 103 after event 33B (SSME ZERO THRUST), and all other major modes.

4.1.3 Initialization Requirements

For the first pass following entry into the OPS 1 and OPS 3 flight regimes, the IMVS flag X shall be set to 0 (see Figure 4.1-5) for each LRU set in the IMVS category.

4.1.4 Parameter Tables for SF

The IDD inputs and outputs are listed in Tables 4.1.4-1 and 4.1.4-2 respectively. Values for the I-loads are contained in the I-load requirements document (JSC-19350); however, I-load definitions applicable to this principal function are listed in Table 4.1.4-3. K-loads are listed in Table 4.1.4-4. There are no constants requirements for SF.

Table 4.1-1. SF Major Mode Applicability*																	
LRU	Major Mode																
	1	1	1	1	1	1	2	2	8	3	3	3	3	3	6	6	6
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1	2	3	4	5	6	1	2	1	1	2	3	4	5	1	2	3
Orbiter RGA	X	X	X	X	X	X				X	X	X	X	X	X	X	X
Orbiter RGA SMRD	X	X	X	X	X	X				X	X	X	X	X	X	X	X
AA	X	X	X	X	X	X				X	X	X	X	X	X	X	X
SRB RGA	X	X															
Elevon fbk										X	X	X	X	X		X	X
Elevon Δ P fbk		X															
Speed brake fbk										X	X	X	X	X	2	X	X
Rudder fbk										X	X	X	X	X		X	X
Body flap fbk	X	X	X	X						X	X	X	X	X	X	X	X
RHC cmd	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Speed brake cmd		X	X										X	X	X	X	X
RPTA													X	X		X	X
MSBLS														X			X
IMU	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GNC switch	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Air data													X	X		X	X
Hydraulic system	X	X	X	X	X	X				X	X	X	X	X	X	X	X
TACAN													X	X		X	X
Radar altimeter				X										X	X		X
Landing Gear WOW RM														X			X
SRB chamber pressure	X	X															

*In general, the selection filter for an LRU runs whenever the LRU SOP is running.
Notes: 1. In MM101, beginning at platform reference update.
2. In MM601, beginning at MECO Confirmed

Table 4.1-2. Parameters Requiring Selection Filters and Typical Processing Rates (1)					
Selection Filter	No. of Inputs	SF Command	SF Processing Rate (Hz)	SF Input Data Source	SF Output Data Destination
RGA roll rate	4	RGA	25	RGA SOP	FC AP, ST SOP
RGA pitch rate	4	RGA	25	RGA SOP	FC AP, ST SOP
RGA yaw rate	4	RGA	25	RGA SOP	FC AP, ST SOP
ORB RGA 1 SMRD(2)	3	ORB RGA SMRD	25	RGAO 1	SF, ORB RG FDIR, CNTLS DISP, GAX, TLM
ORB RGA 2 SMRD(2)	3	ORB RGA SMRD	25	RGAO 2	SF, ORB RG FDIR, CNTLS DISP, GAX, TLM
ORB RGA 3 SMRD(2)	3	ORB RGA SMRD	25	RGAO 3	SF, ORB RG FDIR, CNTLS DISP, GAX, TLM
ORB RGA 4 SMRD(2)	3	ORB RGA SMRD	25	RGAO 4	SF, ORB RG FDIR, CNTLS DISP, GAX, TLM
AA normal accel	4	AA	25	AA SOP	FC AP
AA lateral accel	4	AA	25	AA SOP	FC AP
ROB elevon feedback	4	ROB el fdbk	25	ASA	ELVN PFB SOP
LOB elevon feedback	4	LOB el fdbk	25	ASA	ELVN PFB SOP
RIB elevon feedback	4	RIB el fdbk	25	ASA	ELVN PFB SOP
LIB elevon feedback	4	LIB el fdbk	25	ASA	ELVN PFB SOP
Speed brake feedback	4	Sp bk fdbk	6.25	ASA	SPBK PFB SOP
Rudder feedback	4	Rudder fdbk	1.04	ASA	RUD PFB SOP
Body flap feedback	4	BF fdbk	6.25	ASA	BF PFB SOP
Right RHC pitch command	3	Right RHC	25	Controller	2AX RHC SOP 3AX RHC SOP ORB 3AX RHC SOP
Right RHC roll command	3	Right RHC	25	Controller	2AX RHC SOP 3AX RHC SOP ORB 3AX RHC SOP
Right RHC yaw command	3	Right RHC	12.5	Controller	3AX RHC SOP ORB 3AX RHC SOP
Left RHC pitch command	3	Left RHC	25	Controller	2AX RHC SOP 3AX RHC SOP ORB 3AX RHC SOP
Left RHC roll command	3	Left RHC	25	Controller	2AX RHC SOP 3AX RHC SOP ORB 3AX RHC SOP
Left RHC yaw command	3	Left RHC	12.5	Controller	3AX RHC SOP ORB 3AX RHC SOP
Right speed brake command	3	Right SBTC	6.25	Controller	SBTC SOP

Table 4.1-2. Parameters Requiring Selection Filters and Typical Processing Rates (1)					
Selection Filter	No. of Inputs	SF Command	SF Processing Rate (Hz)	SF Input Data Source	SF Output Data Destination
Left speed brake command	3	Left SBTC	6.25	Controller	SBTC SOP
Right RPTA command	3	Right RPTA	6.25	Controller	RPTA SOP
Left RPTA command	3	Left RPTA	6.25	Controller	RPTA SOP
Aft RHC pitch command	3	Aft RHC	12.5	Controller	Orb 3AX RHC SOP
Aft RHC roll command	3	Aft RHC	12.5	Controller	Orb 3AX RHC SOP
Aft RHC yaw command	3	Aft RHC	12.5	Controller	Orb 3AX RHC SOP
TACAN range	3	(2)	1.04	TACAN SOP	NAV
TACAN bearing	3	(2)	1.04	TACAN SOP	NAV
MSBLS range	3	MSBLS	3.125	MSBLS SOP	MSBLS SOP
MSBLS azimuth	3	MSBLS	3.125	MSBLS SOP	MSBLS SOP
MSBLS elevation	3	MSBLS	3.125	MSBLS SOP	MSBLS SOP
Radar altimeter height	2	NA(3)	6.25	RALT SOP	NAV, GPS SOP
Right ADTA PS	2	Right ADTA	1.04	ADTA	ADTA SOP
Right ADTA PAC	2	Right ADTA	1.04	ADTA	ADTA SOP
Right ADTA PAU	2	Right ADTA	1.04	ADTA	ADTA SOP
Right ADTA PAL	2	Right ADTA	1.04	ADTA	ADTA SOP
Left ADTA PS	2	Left ADTA	1.04	ADTA	ADTA SOP
Left ADTA PAC	2	Left ADTA	1.04	ADTA	ADTA SOP
Left ADTA PAU	2	Left ADTA	1.04	ADTA	ADTA SOP
Left ADTA PAL	2	Left ADTA	1.04	ADTA	ADTA SOP
Center ADTA PS	2	Center ADTA	1.04	ADTA SOP	ADTA SOP
Center ADTA PAC	2	Center ADTA	1.04	ADTA SOP	ADTA SOP
Center ADTA PAU	2	Center ADTA	1.04	ADTA SOP	ADTA SOP
Center ADTA PAL	2	Center ADTA	1.04	ADTA SOP	ADTA SOP
IMU velocity	3	IMU_SFC	(4)	IMU SOP	(Multiple)
IMU attitude	3	SEL_IMU_ID	(5)	IMU SOP	(Multiple)
Left SRB chamber pressure	3	NA	12.5	SRB MON FCS	ASC•DAP, SRB SEP SEQ
Right SRB chamber pressure	3	NA	12.5	SRB MON FCS	ASC•DAP, SRB SEP SEQ
LIB elevon PRI delta pressure	4	LIB el PRI Δ P	12.5	ASA	P F/B SOP
LOB elevon PRI delta pressure	4	LOB el PRI Δ P	12.5	ASA	P F/B SOP
RIB elevon PRI delta pressure	4	RIB el PRI Δ P	12.5	ASA	P F/B SOP
ROB elevon PRI delta pressure	4	ROB el PRI Δ P	12.5	ASA	P F/B SOP

Table 4.1-2. Parameters Requiring Selection Filters and Typical Processing Rates (1)					
Selection Filter	No. of Inputs	SF Command	SF Processing Rate (Hz)	SF Input Data Source	SF Output Data Destination
SRB pitch rate(2)	4	SRB RGA	25	SRB RG SOP	ASC DAP, SRB RGA FDIR, A/E ATT PROC, TLM
SRB yaw rate(2)	4	SRB RGA	25	SRB RG SOP	ASC, DAP, SRB RGA FDIR, A/E ATT PROC, TLM
GN&C switch	4/3/2	(multiple)	Multiple (see para. 4.12)	Hardware switches	(multiple)
Hyd system 1 pressure	3	Hyd Sys 1	25(6)	Press. transducer	Hyd sys SOP
Hyd system 2 pressure	3	Hyd Sys 2	25(6)	Press. transducer	Hyd sys SOP
Hyd system 3 pressure	3	Hyd Sys 3	25(6)	Press. transducer	Hyd sys SOP
Nose wheel position	3	SEL_NW_POSN	25	SPSA	NW POSN SOP
Left Main Gear NOWOW	3	LMGNOWOW	6.25	Anti-Skid Box/ Prox Sens Elect	Landing SOP, TLM
Right Main Gear NOWOW	3	RMGNOWOW	6.25	Anti-Skid Box/ Prox Sens Elect	Landing SOP, TLM
Nose Landing Gear NOWOW(2)	2	N/A	6.25	Prox Sens Elect	Landing SOP
<p>(1) The listed rates were typical of user requirements existing at the time of publication and may change as user requirements dictate. They are used here for information only.</p> <p>(2) Special processing is required.</p> <p>(3) There is no FDIR associated with the Radar Altimeter.</p> <p>(4) 6.25 Hz in Major Modes 103 (before event 32), 601, 602, 603, 304, and 305 and at 1.04 Hz in 103 (after event 32) and all other Major Modes.</p> <p>(5) 6.25 Hz in Major Modes 201 and 202 and during OPS-8 (on-orbit C/O). In all other Major Modes at 1.04 Hz.</p> <p>(6) 6.25 Hz in Major Modes 104, 105, 106, 301, 302, and 303.</p>					
Note: Rates represent highest value unless otherwise specified.					

Table 4.1-3. Usable Input Parameter Determination			
SF Command Flag	COMMFAULT Flag	Lock-On Flag	Input Parameter Usability
Disallow	Invalid	Invalid	Do not use
Disallow	Invalid	Valid	Do not use
Disallow	Valid	Invalid	Do not use
Disallow	Valid	Valid	Do not use
Allow	Invalid	Invalid	Do not use
Allow	Invalid	Valid	Do not use
Allow	Valid	Invalid	Do not use
Allow	Valid	Valid	Use
Disallow	Invalid	N/A	Do not use
Disallow	Valid	N/A	Do not use
Allow	Invalid	N/A	Do not use
Allow	Valid	N/A	Use
Disallow	N/A	N/A	Do not use
Allow	N/A	N/A	Use

Table 4.1-4. Selection Filter Modes						
Usability Status				SF Mode	Output Data	DG Flag
Input 1	Input 2	Input 3	Input 4			
DNU	DNU	DNU	DNU	NAS	No update of output	Invalid
DNU	DNU	DNU	U	PASS	Input Data 4	Valid
DNU	DNU	U	DNU	PASS	Input Data 3	Valid
DNU	U	DNU	DNU	PASS	Input Data 2	Valid
U	DNU	DNU	DNU	PASS	Input Data 1	Valid
DNU	DNU	U	U	AVE	(Input Data 3 + Input Data 4)/2	(1)
DNU	U	DNU	U	AVE	(Input Data 2 + Input Data 4)/2	(1)
U	DNU	DNU	U	AVE	(Input Data 1 + Input Data 4)/2	(1)
DNU	U	U	NA	AVE	(Input Data 2 + Input Data 3)/2	(2)
U	DNU	U	NA	AVE	(Input Data 1 + Input Data 3)/2	(3)
U	U	DNU	NA	AVE	(Input Data 1 + Input Data 2)/2	(4)
DNU	U	U	U	MVS	Midvalue of Input Data 2, 3, and 4	Valid
U	DNU	U	U	MVS	Midvalue of Input Data 1, 3, and 4	Valid
U	U	DNU	U	MVS	Midvalue of Input Data 1, 2, and 4	Valid
U	U	U	X	MVS	Midvalue of Input Data 1, 2, and 3	Valid
U	U	U	U	QMVS	2nd or 3rd highest of Input Data 1, 2, 3, and 4 (see Figure 4.1-4)	Valid(5)
U	U	U	U	IMVS	Midvalue of Input Data Set A or B (See Figure 4.1-5)	Valid(6)

DNU = Do not use (See Table 4.1-3).
U = Use (See Table 4.1-3).
X = DNU or U

DG flag is only required for applicable parameters.

See notes on following page.

Notes:

- (1) The DG flag is not applicable to this SF mode.
- (2) Set invalid if $|\text{Input Data 2} - \text{Input Data 3}|$ exceeds the tracking limit; otherwise set valid.
- (3) Set invalid if $|\text{Input Data 1} - \text{Input Data 3}|$ exceeds the tracking limit; otherwise set valid.
- (4) Set invalid if $|\text{Input Data 1} - \text{Input Data 2}|$ exceeds the tracking limit; otherwise set valid.
- (5) QMVS applicable to BF PFB.
- (6) IMVS applicable to SRB RGA's, Orbiter RGA's, and AA's.

The selection filter shall provide transient protection via a data good flag that will allow data users to take appropriate action whenever nonnormal data are output.

The data good (DG) flags shall be set (if applicable) prior to completion of the SF processing each time the processing occurs. The selection filter shall provide a data good (DG) flag associated with the output datum values for each of the following parameters:

1. MSBLS range
2. MSBLS azimuth
3. MSBLS elevation
4. Radar altimeter height
5. Right RHC pitch command
6. Right RHC roll command
7. Right RHC yaw command
8. Left RHC pitch command
9. Left RHC roll command
10. Left RHC yaw command
11. Right speed brake command
12. Left speed brake command
13. Right RPTA
14. Left RPTA
15. Aft RHC pitch command
16. Aft RHC roll command
17. Aft RHC yaw command
18. Hydraulic system 1 pressure
19. Hydraulic system 2 pressure
20. Hydraulic system 3 pressure

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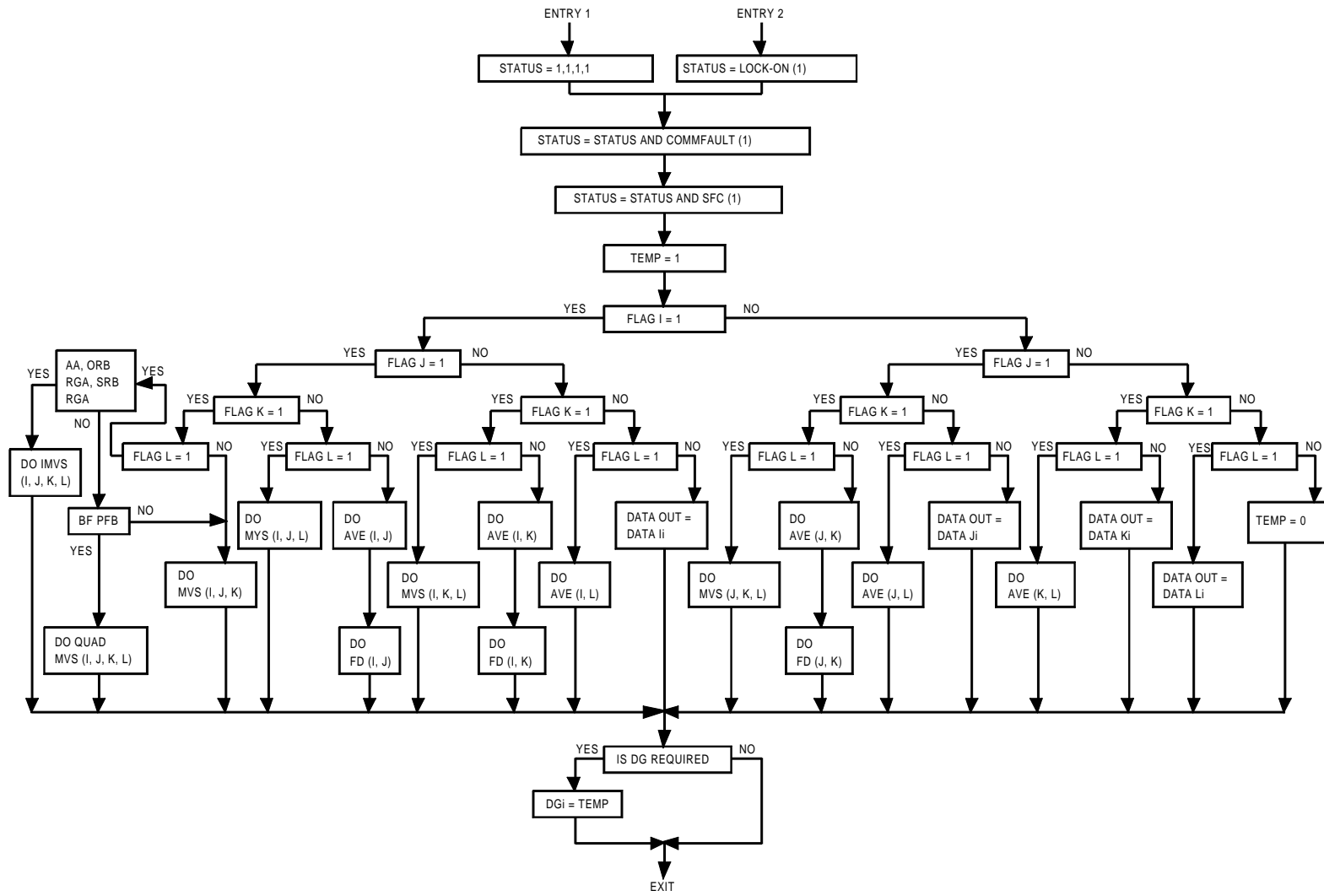


FIGURE 4.1-1. General SF Flow Diagram

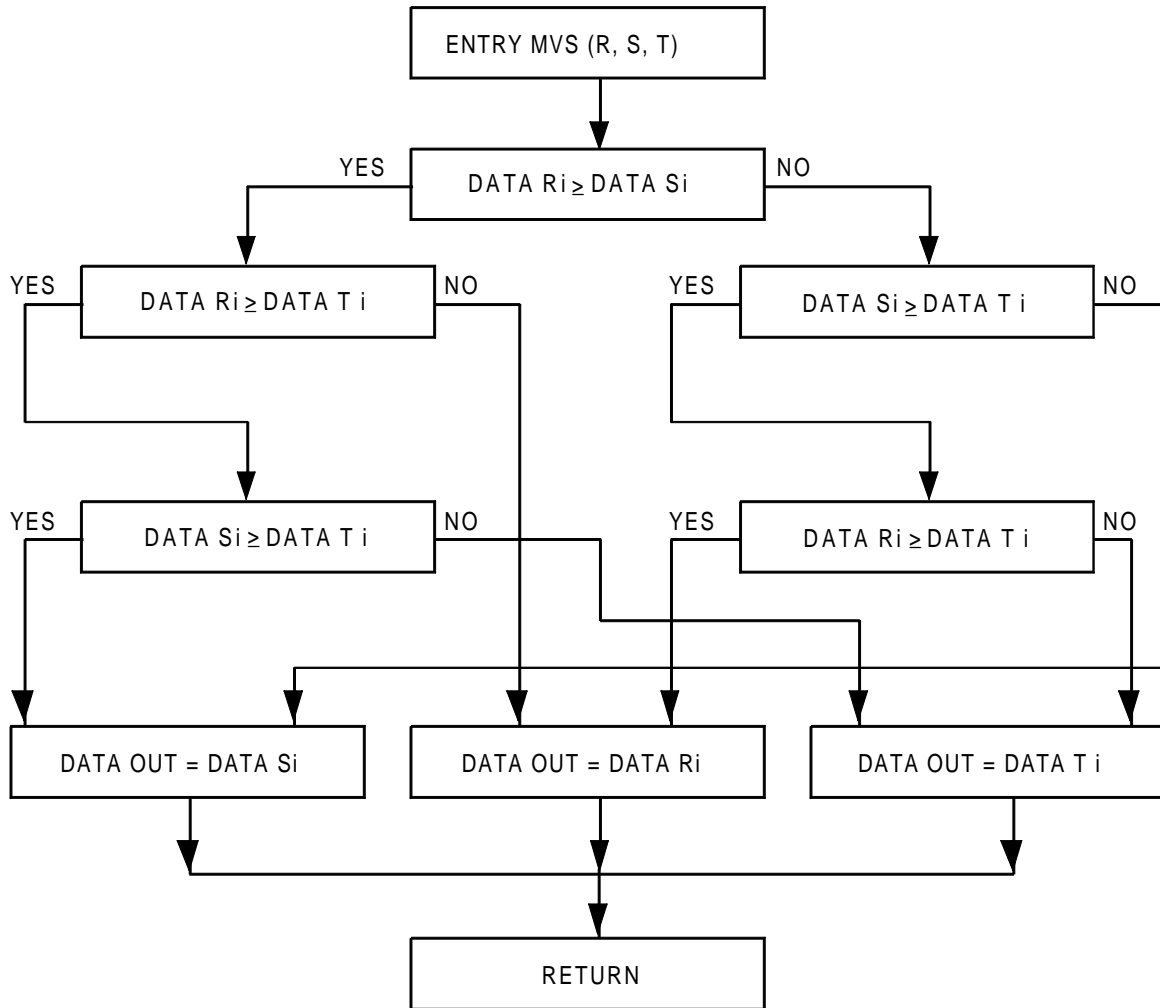


FIGURE 4.1-2. MVS Routine Flow Diagram

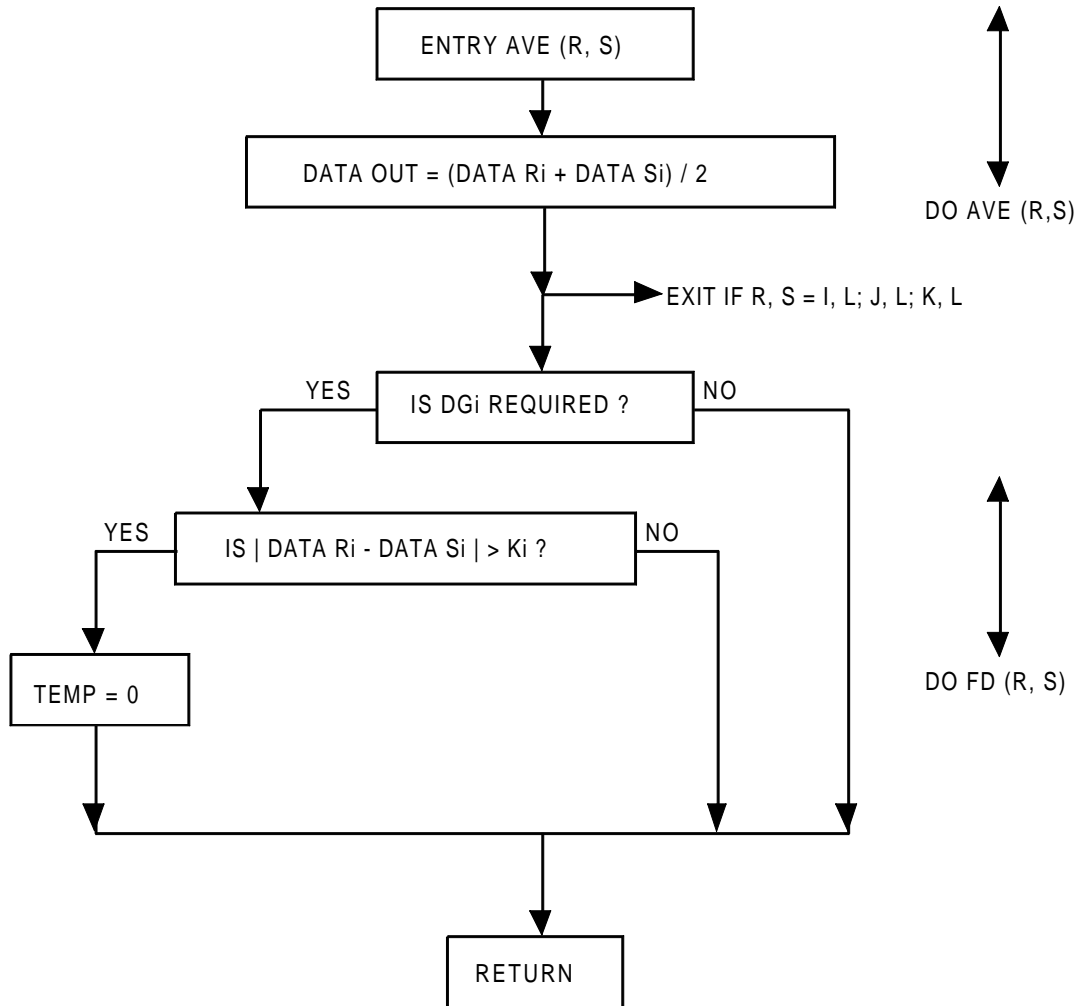


FIGURE 4.1-3. AVE and Tracking Test Flow Diagram

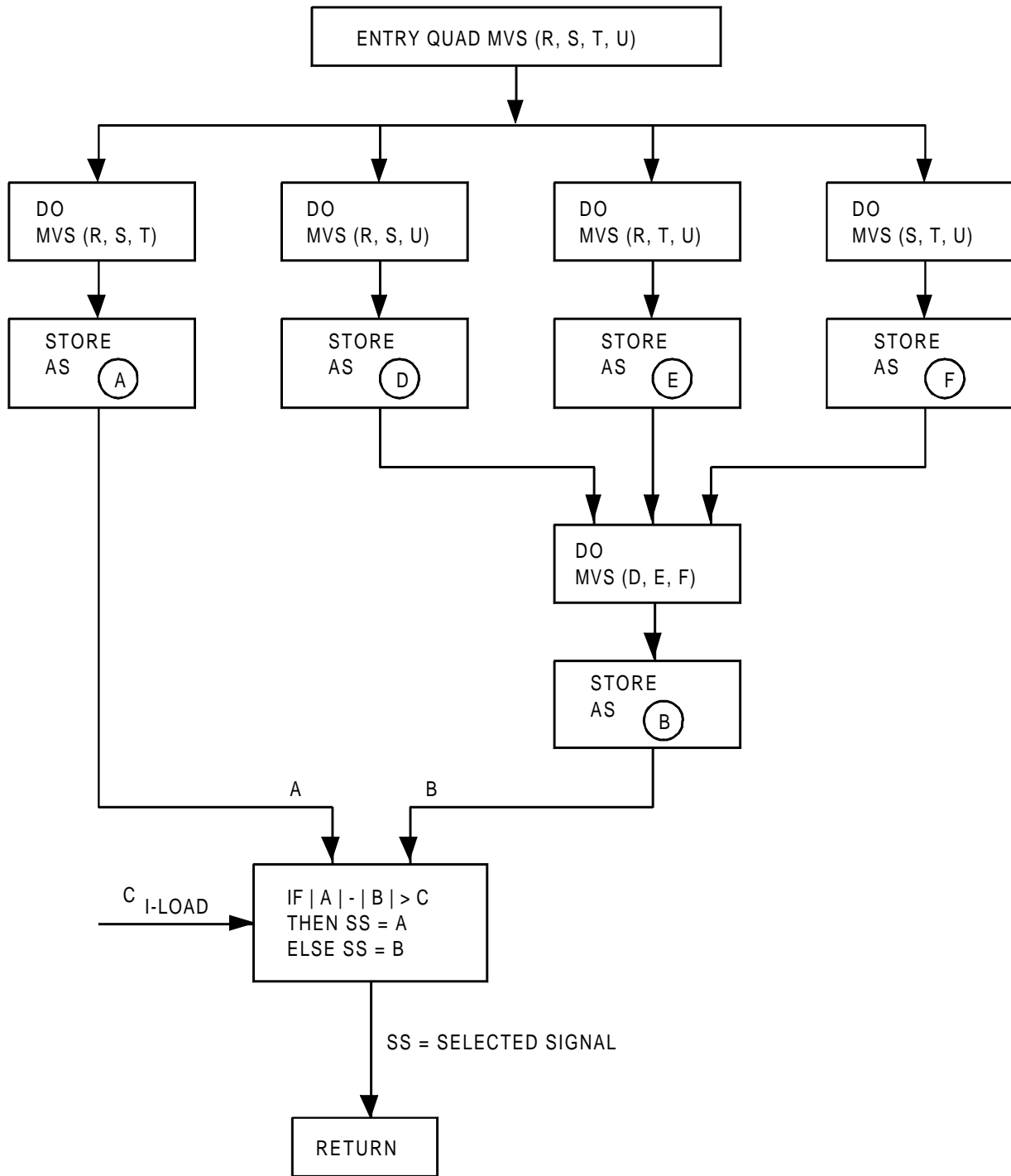


FIGURE 4.1-4. Quad MVS Flow Diagram

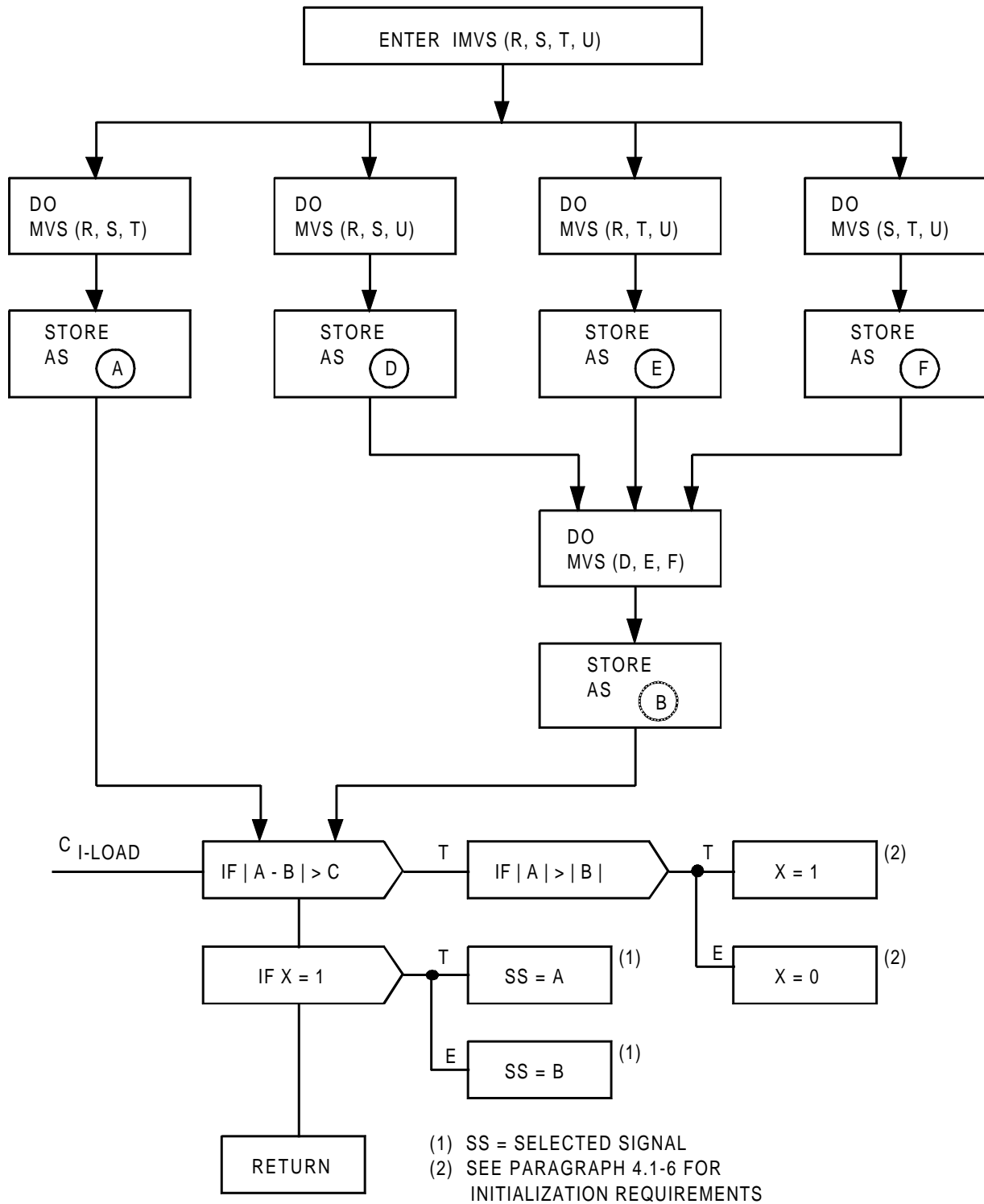


FIGURE 4.1-5. Interchangeable MVS Flow Diagram

TABLE 4.1.4-1. INPUT FUNCTIONAL PARAMETERS FOR SELECTION FILTERING (G4.71)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
AA_LAT_CF(1)	V91X3650X	AA 1 LATERAL ACCEL COMMFault	FCOS				79556D	
AA_LAT_CF(2)	V91X3660X	AA 2 LATERAL ACCEL COMMFault	FCOS				79556D	
AA_LAT_CF(3)	V91X3670X	AA 3 LATERAL ACCEL COMMFault	FCOS				79556D	
AA_LAT_CF(4)	V91X3680X	AA 4 LATERAL ACCEL COMMFault	FCOS				79556D	
AA_NOR_CF(1)	V91X3651X	AA 1 NORMAL ACCEL COMMFault	FCOS				79556D	
AA_NOR_CF(2)	V91X3661X	AA 2 NORMAL ACCEL COMMFault	FCOS				79556D	
AA_NOR_CF(3)	V91X3671X	AA 3 NORMAL ACCEL COMMFault	FCOS				79556D	
AA_NOR_CF(4)	V91X3681X	AA 4 NORMAL ACCEL COMMFault	FCOS				79556D	
BF_FBK_CF(1)	V91X7900X	BODY FLAP FDBK 1 COMMFault	FCOS		BD		79556D	
BF_FBK_CF(2)	V91X7901X	BODY FLAP FDBK 2 COMMFault	FCOS		BD		79556D	
BF_FBK_CF(3)	V91X7902X	BODY FLAP FDBK 3 COMMFault	FCOS		BD		79556D	
BF_FBK_CF(4)	V91X7904X	BODY FLAP FDBK 4 COMMFault	FCOS		BD		79556D	
CPC4(1)	V90P8981C	COMPENSATED LH SRM CHMBR PRESS A	SRB MON FCN	PSIA				
CPC4(2)	V90P8982C	COMPENSATED LH SRM CHMBR PRESS B	SRB MON FCN	PSIA				
CPC4(3)	V90P8983C	COMPENSATED LH SRM CHMBR PRESS C	SRB MON FCN	PSIA				
CPC5(1)	V90P8986C	COMPENSATED RH SRM CHMBR PRESS A	SRB MON FCN	PSIA				
CPC5(2)	V90P8987C	COMPENSATED RH SRM CHMBR PRESS B	SRB MON FCN	PSIA				
CPC5(3)	V90P8988C	COMPENSATED RH SRM CHMBR PRESS C	SRB MON FCN	PSIA				
DACC(1)	V72K1155C	LH RHC ROLL CMD-A	RHC 1	VDC	AMB		93017G	*
DACC(2)	V72K1170C	LH RHC ROLL CMD-B	RHC 1	VDC	AMB		93017G	*
DACC(3)	V72K1185C	LH RHC ROLL CMD-C	RHC 1	VDC	AMB		93017G	*
DACP(1)	V72K1205C	RH RHC ROLL CMD-A	RHC 2	VDC	AMB		93017G	*
DACP(2)	V72K1220C	RH RHC ROLL CMD-B	RHC 2	VDC	AMB		93017G	*
DACP(3)	V72K1235C	RH RHC ROLL CMD-C	RHC 2	VDC	AMB		93017G	*
DBFM(1)	V57H0065C	BODY FLAP POSN FDBK-1	ASA 1	VDC	AMB		93017G	*
DBFM(2)	V57H0066C	BODY FLAP POSN FDBK-2	ASA 2	VDC	AMB		93017G	*
DBFM(3)	V57H0067C	BODY FLAP POSN FDBK-3	ASA 3	VDC	AMB		93017G	*
DBFM(4)	V57H0068C	BODY FLAP POSN FDBK-4	ASA 4	VDC	AMB		93017G	*
DECC(1)	V72K1156C	LH RHC PITCH CMD-A	RHC 1	VDC	AMB		93017G	*
DECC(2)	V72K1171C	LH RHC PITCH CMD-B	RHC 1	VDC	AMB		93017G	*
DECC(3)	V72K1186C	LH RHC PITCH CMD-C	RHC 1	VDC	AMB		93017G	*
DECP(1)	V72K1206C	RH RHC PITCH CMD-A	RHC 2	VDC	AMB		93017G	*
DECP(2)	V72K1221C	RH RHC PITCH CMD-B	RHC 2	VDC	AMB		93017G	*
DECP(3)	V72K1236C	RH RHC PITCH CMD-C	RHC 2	VDC	AMB		93017G	*
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	*

TABLE 4.1.4-1. INPUT FUNCTIONAL PARAMETERS FOR SELECTION FILTERING (G4.71)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
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	*
DRCC(1)	V72K1530C	LEFT RUDDER PEDAL CMD-A	RPTA 1	VDC	AMB		93017G	*
DRCC(2)	V72K1531C	LEFT RUDDER PEDAL CMD-B	RPTA 1	VDC	AMB		93017G	*
DRCC(3)	V72K1532C	LEFT RUDDER PEDAL CMD-C	RPTA 1	VDC	AMB		93017G	*
DRCP(1)	V72K1540C	RIGHT RUDDER PEDAL CMD-A	RPTA 2	VDC	AMB		93017G	*
DRCP(2)	V72K1541C	RIGHT RUDDER PEDAL CMD-B	RPTA 2	VDC	AMB		93017G	*
DRCP(3)	V72K1542C	RIGHT RUDDER PEDAL CMD C	RPTA 2	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	*
DSBCC(1)	V72K1575C	LH SBTC CMD-A	SBTC 1	VDC	AMB		93017G	*
DSBCC(2)	V72K1578C	LH SBTC CMD-B	SBTC 1	VDC	AMB		93017G	*
DSBCC(3)	V72K1581C	LH SBTC CMD-C	SBTC 1	VDC	AMB		93017G	*
DSBCP(1)	V72K1585C	RH SBTC CMD-A	SBTC 2	VDC	AMB		93017G	*
DSBCP(2)	V72K1588C	RH SBTC CMD-B	SBTC 2	VDC	AMB		93017G	*
DSBCP(3)	V72K1591C	RH SBTC CMD-C	SBTC 2	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	*
HSPM(1,1)	V58P0114C	HYDR SYS 1 SUPPLY PRESS A	HYDR SYS 1	VDC	AMU		93017G	*
HSPM(1,2)	V58P0115C	HYDR SYS 1 SUPPLY PRESS B	HYDR SYS 1	VDC	AMU			
HSPM(1,3)	V58P0116C	HYDR SYS 1 SUPPLY PRESS C	HYDR SYS 1	VDC	AMU		93017G	*
HSPM(2,1)	V58P0214C	HYDR SYS 2 SUPPLY PRESS A	HYDR SYS 2	VDC	AMU		93017G	*
HSPM(2,2)	V58P0215C	HYDR SYS 2 SUPPLY PRESS B	HYDR SYS 2	VDC	AMU			
HSPM(2,3)	V58P0216C	HYDR SYS 2 SUPPLY PRESS C	HYDR SYS 2	VDC	AMU		93017G	*
HSPM(3,1)	V58P0314C	HYDR SYS 3 SUPPLY PRESS A	HYDR SYS 3	VDC	AMU		93017G	*
HSPM(3,2)	V58P0315C	HYDR SYS 3 SUPPLY PRESS B	HYDR SYS 3	VDC	AMU			
HSPM(3,3)	V58P0316C	HYDR SYS 3 SUPPLY PRESS C	HYDR SYS 3	VDC	AMU			
LC(1)	V95A4101C	COMPENSATED LAT ACCELN 1	AA SOP	G	SPL		93017G	*
LC(2)	V95A4102C	COMPENSATED LAT ACCELN 2	AA SOP	G	SPL		93017G	*
LC(3)	V95A4103C	COMPENSATED LAT ACCELN 3	AA SOP	G	SPL		93017G	*
LC(4)	V95A4104C	COMPENSATED LAT ACCELN 4	AA SOP	G	SPL		93017G	*
LIB_FBK_CF(1)	V91X7000X	LIB ELEVON FDBK 1 COMMFault	FCOS		BD		79556D	
LIB_FBK_CF(2)	V91X7001X	LIB ELEVON FDBK 2 COMMFault	FCOS		BD		79556D	
LIB_FBK_CF(3)	V91X7002X	LIB ELEVON FDBK 3 COMMFault	FCOS		BD		79556D	
LIB_FBK_CF(4)	V91X7003X	LIB ELEVON FDBK 4 COMMFault	FCOS		BD		79556D	
LOB_FBK_CF(1)	V91X7050X	LOB ELEVON FDBK 1 COMMFault	FCOS		BD		79556D	
LOB_FBK_CF(2)	V91X7051X	LOB ELEVON FDBK 2 COMMFault	FCOS		BD		79556D	
LOB_FBK_CF(3)	V91X7052X	LOB ELEVON FDBK 3 COMMFault	FCOS		BD		79556D	
LOB_FBK_CF(4)	V91X7053X	LOB ELEVON FDBK 4 COMMFault	FCOS		BD		79556D	
LRHCP_CF(1)	V91X6525X	LH RHC PITCH CMD A COMMFault	FCOS					

TABLE 4.1.4-1. INPUT FUNCTIONAL PARAMETERS FOR SELECTION FILTERING (G4.71)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
LRHCP_CF (2)	V91X6526X	LH RHC PITCH CMD B COMMFAULT	FCOS					
LRHCP_CF (3)	V91X6527X	LH RHC PITCH CMD C COMMFAULT	FCOS					
LRHCR_CF (1)	V91X6500X	LH RHC ROLL CMD A COMMFAULT	FCOS					
LRHCR_CF (2)	V91X6501X	LH RHC ROLL CMD B COMMFAULT	FCOS					
LRHCR_CF (3)	V91X6502X	LH RHC ROLL CMD C COMMFAULT	FCOS					
LRHCY_CF (1)	V91X6540X	LH RHC YAW CMD A COMMFAULT	FCOS					
LRHCY_CF (2)	V91X6541X	LH RHC YAW CMD B COMMFAULT	FCOS					
LRHCY_CF (3)	V91X6542X	LH RHC YAW CMD C COMMFAULT	FCOS					
LRPTA_CF (1)	V91X6700X	LH RPTA CMD A COMMFAULT	FCOS		BD			
LRPTA_CF (2)	V91X6701X	LH RPTA CMD B COMMFAULT	FCOS		BD			
LRPTA_CF (3)	V91X6702X	LH RPTA CMD C COMMFAULT	FCOS		BD			
LSBTC_CF (1)	V91X6800X	LH SBTC CMD A COMMFAULT	FCOS		BD			
LSBTC_CF (2)	V91X6801X	LH SBTC CMD B COMMFAULT	FCOS		BD			
LSBTC_CF (3)	V91X6802X	LH SBTC CMD C COMMFAULT	FCOS		BD			
MSBAZIMDG (1)	V95X6124X	MSBLS 1 AZIMUTH LOCKED ON	MSBLS SOP				92297B	
MSBAZIMDG (2)	V95X6224X	MSBLS 2 AZIMUTH LOCKED ON	MSBLS SOP				92297B	
MSBAZIMDG (3)	V95X6324X	MSBLS 3 AZIMUTH LOCKED ON	MSBLS SOP				92297B	
MSBAZIMO (1)	V95H6122C	MSBLS 1 AZIMUTH OUT	MSBLS SOP	RAD			90278D	
MSBAZIMO (2)	V95H6222C	MSBLS 2 AZIMUTH OUT	MSBLS SOP	RAD			90278D	
MSBAZIMO (3)	V95H6322C	MSBLS 3 AZIMUTH OUT	MSBLS SOP	RAD			90278D	
MSBELEVDG (1)	V95X6144X	MSBLS 1 ELEVATION LOCKED ON	MSBLS SOP				92297B	
MSBELEVDG (2)	V95X6244X	MSBLS 2 ELEVATION LOCKED ON	MSBLS SOP				92297B	
MSBELEVDG (3)	V95X6344X	MSBLS 3 ELEVATION LOCKED ON	MSBLS SOP				92297B	
MSBELEVO (1)	V95H6142C	MSBLS 1 ELEVATION OUT	MSBLS SOP	RAD			90278D	
MSBELEVO (2)	V95H6242C	MSBLS 2 ELEVATION OUT	MSBLS SOP	RAD			90278D	
MSBELEVO (3)	V95H6342C	MSBLS 3 ELEVATION OUT	MSBLS SOP	RAD			90278D	
MSBLS_CF (1)	V91X3550X	MSBLS 1 COMMFAULT	FCOS					
MSBLS_CF (2)	V91X3560X	MSBLS 2 COMMFAULT	FCOS					
MSBLS_CF (3)	V91X3570X	MSBLS 3 COMMFAULT	FCOS					
MSBRANGDG (1)	V95X6104X	MSBLS 1 RANGE LOCKED ON	MSBLS SOP				92297B	
MSBRANGDG (2)	V95X6204X	MSBLS 2 RANGE LOCKED ON	MSBLS SOP				92297B	
MSBRANGDG (3)	V95X6304X	MSBLS 3 RANGE LOCKED ON	MSBLS SOP				92297B	
MSBRANGE (1)	V95H6102C	MSBLS 1 RANGE OUT	MSBLS SOP	FT			90278D	
MSBRANGE (2)	V95H6202C	MSBLS 2 RANGE OUT	MSBLS SOP	FT			90278D	
MSBRANGE (3)	V95H6302C	MSBLS 3 RANGE OUT	MSBLS SOP	FT			90278D	
NC (1)	V95A4151C	COMPENSATED NORM ACCELN 1	AA SOP	G	SPL		93017G	*
NC (2)	V95A4152C	COMPENSATED NORM ACCELN 2	AA SOP	G	SPL		93017G	*
NC (3)	V95A4153C	COMPENSATED NORM ACCELN 3	AA SOP	G	SPL		93017G	*
NC (4)	V95A4154C	COMPENSATED NORM ACCELN 4	AA SOP	G	SPL		93017G	*
NWP_A	V51V0550C	NOSE WHEEL POSITION A	SPSA	PCM	AMB		93017G	*
NWP_A_CF	V91X6314X	NOSE WHEEL POSITION A CF	FCOS				89890E	
NWP_B	V51V0551C	NOSE WHEEL POSITION B	SPSA	PCM	AMB		93017G	*
NWP_B_CF	V91X6315X	NOSE WHEEL POSITION B CF	FCOS				89890E	
NWP_C	V51V0552C	NOSE WHEEL POSITION C	SPSA	PCM	AMB		93017G	*
NWP_C_CF	V91X6316X	NOSE WHEEL POSITION C CF	FCOS				89890E	
PC (1)	V95R4001C	COMPENSATED ROLL RATE 1	ORB RG SOP	DEG/S	SPL		93017G	*

TABLE 4.1.4-1. INPUT FUNCTIONAL PARAMETERS FOR SELECTION FILTERING (G4.71)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
PC(2)	V95R4002C	COMPENSATED ROLL RATE 2	ORB RG SOP	DEG/S	SPL		93017G	*
PC(3)	V95R4003C	COMPENSATED ROLL RATE 3	ORB RG SOP	DEG/S	SPL		93017G	*
PC(4)	V95R4004C	COMPENSATED ROLL RATE 4	ORB RG SOP	DEG/S	SPL		93017G	*
QC(1)	V95R4031C	COMPENSATED PITCH RATE 1	ORB RG SOP	DEG/S	SPL		93017G	*
QC(2)	V95R4032C	COMPENSATED PITCH RATE 2	ORB RG SOP	DEG/S	SPL		93017G	*
QC(3)	V95R4033C	COMPENSATED PITCH RATE 3	ORB RG SOP	DEG/S	SPL		93017G	*
QC(4)	V95R4034C	COMPENSATED PITCH RATE 4	ORB RG SOP	DEG/S	SPL		93017G	*
RALT_CF(1)	V91X3600X	RADAR ALTIMETER 1 COMMFAULT	FCOS					
RALT_CF(2)	V91X3620X	RADAR ALTIMETER 2 COMMFAULT	FCOS					
RALT_DG(1)	V95X7110X	RADAR ALTIMETER NO 1 LOCKED ON	RA SOP					
RALT_DG(2)	V95X7210X	RADAR ALTIMETER NO 2 LOCKED ON	RA SOP					
RA_ALTO(1)	V95H7100C	RADAR ALTIMETER NO 1 ALTITUDE	RA SOP	FT				
RA_ALTO(2)	V95H7200C	RADAR ALTIMETER NO 2 ALTITUDE	RA SOP	FT				
RC(1)	V95R4061C	COMPENSATED YAW RATE 1	ORB RG SOP	DEG/S	SPL		93017G	*
RC(2)	V95R4062C	COMPENSATED YAW RATE 2	ORB RG SOP	DEG/S	SPL		93017G	*
RC(3)	V95R4063C	COMPENSATED YAW RATE 3	ORB RG SOP	DEG/S	SPL		93017G	*
RC(4)	V95R4064C	COMPENSATED YAW RATE 4	ORB RG SOP	DEG/S	SPL		93017G	*
RGA_PIT_CF(1)	V91X3701X	RGA 1 PITCH COMMFAULT	FCOS				79556D	
RGA_PIT_CF(2)	V91X3731X	RGA 2 PITCH COMMFAULT	FCOS				79556D	
RGA_PIT_CF(3)	V91X3761X	RGA 3 PITCH COMMFAULT	FCOS				79556D	
RGA_PIT_CF(4)	V91X3791X	RGA 4 PITCH COMMFAULT	FCOS				79556D	
RGA_ROLL_CF(1)	V91X3700X	RGA 1 ROLL COMMFAULT	FCOS				79556D	
RGA_ROLL_CF(2)	V91X3730X	RGA 2 ROLL COMMFAULT	FCOS				79556D	
RGA_ROLL_CF(3)	V91X3760X	RGA 3 ROLL COMMFAULT	FCOS				79556D	
RGA_ROLL_CF(4)	V91X3790X	RGA 4 ROLL COMMFAULT	FCOS				79556D	
RGA_YAW_CF(1)	V91X3702X	RGA 1 YAW COMMFAULT	FCOS				79556D	
RGA_YAW_CF(2)	V91X3732X	RGA 2 YAW COMMFAULT	FCOS				79556D	
RGA_YAW_CF(3)	V91X3762X	RGA 3 YAW COMMFAULT	FCOS				79556D	
RGA_YAW_CF(4)	V91X3792X	RGA 4 YAW COMMFAULT	FCOS				79556D	
RGQCF(1)	V91X2780X	SRGA 1 PITCH RATE CF	FCOS				79935H	
RGQCF(2)	V91X2792X	SRGA 2 PITCH RATE CF	FCOS				79935H	
RGQCF(3)	V91X2782X	SRGA 3 PITCH RATE CF	FCOS				79935H	
RGQCF(4)	V91X2794X	SRGA 4 PITCH RATE CF	FCOS				79935H	
RGRCF(1)	V91X2781X	SRGA 1 YAW RATE CF	FCOS				79935H	
RGRCF(2)	V91X2793X	SRGA 2 YAW RATE CF	FCOS				79935H	
RGRCF(3)	V91X2783X	SRGA 3 YAW RATE CF	FCOS				92847C	
RGRCF(4)	V91X2795X	SRGA 4 YAW RATE CF	FCOS				79935H	
RIB_FBK_CF(1)	V91X7100X	RIB ELEVON FDBK 1 COMMFAULT	FCOS		BD		79556D	
RIB_FBK_CF(2)	V91X7101X	RIB ELEVON FDBK 2 COMMFAULT	FCOS		BD		79556D	
RIB_FBK_CF(3)	V91X7102X	RIB ELEVON FDBK 3 COMMFAULT	FCOS		BD		79556D	
RIB_FBK_CF(4)	V91X7103X	RIB ELEVON FDBK 4 COMMFAULT	FCOS		BD		79556D	
ROB_FBK_CF(1)	V91X7150X	ROB ELEVON FDBK 1 COMMFAULT	FCOS		BD		79556D	
ROB_FBK_CF(2)	V91X7151X	ROB ELEVON FDBK 2 COMMFAULT	FCOS		BD		79556D	
ROB_FBK_CF(3)	V91X7152X	ROB ELEVON FDBK 3 COMMFAULT	FCOS		BD		79556D	
ROB_FBK_CF(4)	V91X7153X	ROB ELEVON FDBK 4 COMMFAULT	FCOS		BD		79556D	
RRHCP_CF(1)	V91X6575X	RH RHC PITCH CMD A COMMFAULT	FCOS					

TABLE 4.1.4-1. INPUT FUNCTIONAL PARAMETERS FOR SELECTION FILTERING (G4.71)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
RRHCP_CF(2)	V91X6576X	RH RHC PITCH CMD B COMMFault	FCOS					
RRHCP_CF(3)	V91X6577X	RH RHC PITCH CMD C COMMFault	FCOS					
RRHCR_CF(1)	V91X6550X	RH RHC ROLL CMD A COMMFault	FCOS					
RRHCR_CF(2)	V91X6551X	RH RHC ROLL CMD B COMMFault	FCOS					
RRHCR_CF(3)	V91X6552X	RH RHC ROLL CMD C COMMFault	FCOS					
RRHCY_CF(1)	V91X6590X	RH RHC YAW CMD A COMMFault	FCOS					
RRHCY_CF(2)	V91X6591X	RH RHC YAW CMD B COMMFault	FCOS					
RRHCY_CF(3)	V91X6592X	RH RHC YAW CMD C COMMFault	FCOS					
RRPTA_CF(1)	V91X6750X	RH RPTA CMD A COMMFault	FCOS		BD			
RRPTA_CF(2)	V91X6751X	RH RPTA CMD B COMMFault	FCOS		BD			
RRPTA_CF(3)	V91X6752X	RH RPTA CMD C COMMFault	FCOS		BD			
RSBTC_CF(1)	V91X6850X	RH SBTC CMD A COMMFault	FCOS		BD			
RSBTC_CF(2)	V91X6851X	RH SBTC CMD B COMMFault	FCOS		BD			
RSBTC_CF(3)	V91X6852X	RH SBTC CMD C COMMFault	FCOS		BD			
RUD_FBK_CF(1)	V91X3850X	RUDDER FDBK 1 COMMFault	FCOS		BD			
RUD_FBK_CF(2)	V91X3860X	RUDDER FDBK 2 COMMFault	FCOS		BD			
RUD_FBK_CF(3)	V91X3870X	RUDDER FDBK 3 COMMFault	FCOS		BD			
RUD_FBK_CF(4)	V91X3880X	RUDDER FDBK 4 COMMFault	FCOS		BD			
SB_FBK_CF(1)	V91X3800X	SPEEDBRAKE FDBK 1 COMMFault	FCOS		BD			
SB_FBK_CF(2)	V91X3810X	SPEEDBRAKE FDBK 2 COMMFault	FCOS		BD			
SB_FBK_CF(3)	V91X3820X	SPEEDBRAKE FDBK 3 COMMFault	FCOS		BD			
SB_FBK_CF(4)	V91X3830X	SPEEDBRAKE FDBK 4 COMMFault	FCOS		BD			
SRBQC(1)	V95R4260C	STRING 1 SRGA COMP PITCH RATE	SRB RG SOP	DEG/S			93017G	*
SRBQC(2)	V95R4262C	STRING 2 SRGA COMP PITCH RATE	SRB RG SOP	DEG/S			93017G	*
SRBQC(3)	V95R4270C	STRING 3 SRGA COMP PITCH RATE	SRB RG SOP	DEG/S			93017G	*
SRBQC(4)	V95R4272C	STRING 4 SRGA COMP PITCH RATE	SRB RG SOP	DEG/S			93017G	*
SRBRC(1)	V95R4261C	STRING 1 SRGA COMP YAW RATE	SRB RG SOP	DEG/S			93017G	*
SRBRC(2)	V95R4263C	STRING 2 SRGA COMP YAW RATE	SRB RG SOP	DEG/S			93017G	*
SRBRC(3)	V95R4271C	STRING 3 SRGA COMP YAW RATE	SRB RG SOP	DEG/S			93017G	*
SRBRC(4)	V95R4273C	STRING 4 SRGA COMP YAW RATE	SRB RG SOP	DEG/S			93017G	*
V58P0816C	L INBD ELEVON PRI DELTA PRESS 1	ASA 1	VDC		AMB		93017G	*
V58P0817C	L INBD ELEVON PRI DELTA PRESS 2	ASA 2	VDC		AMB		93017G	*
V58P0818C	L INBD ELEVON PRI DELTA PRESS 3	ASA 3	VDC		AMB		93017G	*
V58P0819C	L INBD ELEVON PRI DELTA PRESS 4	ASA 4	VDC		AMB		93017G	*
V58P0866C	L OUTBD ELEVON PRI DELTA PRESS 1	ASA 1	VDC		AMB		93017G	*
V58P0867C	L OUTBD ELEVON PRI DELTA PRESS 2	ASA 2	VDC		AMB		93017G	*
V58P0868C	L OUTBD ELEVON PRI DELTA PRESS 3	ASA 3	VDC		AMB		93017G	*
V58P0869C	L OUTBD ELEVON PRI DELTA PRESS 4	ASA 4	VDC		AMB		93017G	*
V58P0916C	R INBD ELEVON PRI DELTA PRESS 1	ASA 1	VDC		AMB		93017G	*
V58P0917C	R INBD ELEVON PRI DELTA PRESS 2	ASA 2	VDC		AMB		93017G	*
V58P0918C	R INBD ELEVON PRI DELTA PRESS 3	ASA 3	VDC		AMB		93017G	*
V58P0919C	R INBD ELEVON PRI DELTA PRESS 4	ASA 4	VDC		AMB		93017G	*
V58P0966C	R OUTBD ELEVON PRI DELTA PRESS 1	ASA 1	VDC		AMB		93017G	*
V58P0967C	R OUTBD ELEVON PRI DELTA PRESS 2	ASA 2	VDC		AMB		93017G	*
V58P0968C	R OUTBD ELEVON PRI DELTA PRESS 3	ASA 3	VDC		AMB		93017G	*
V58P0969C	R OUTBD ELEVON PRI DELTA PRESS 4	ASA 4	VDC		AMB		93017G	*

TABLE 4.1.4-1. INPUT FUNCTIONAL PARAMETERS FOR SELECTION FILTERING (G4.71)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V72K1157C	LH RHC YAW CMD-A	RHC 1	VDC	AMB		93017G	*
	V72K1172C	LH RHC YAW CMD-B	RHC 1	VDC	AMB		93017G	*
	V72K1187C	LH RHC YAW CMD-C	RHC 1	VDC	AMB		93017G	*
	V72K1207C	RH RHC YAW CMD-A	RHC 2	VDC	AMB		93017G	*
	V72K1222C	RH RHC YAW CMD-B	RHC 2	VDC	AMB		93017G	*
	V72K1237C	RH RHC YAW CMD-C	RHC 2	VDC	AMB		93017G	*
	V72K1245C	AFT RHC ROLL CMD-A	RHC AFT	VDC	AMB		93017G	*
	V72K1246C	AFT RHC PITCH CMD-A	RHC AFT	VDC	AMB		93017G	*
	V72K1247C	AFT RHC YAW CMD-A	RHC AFT	VDC	AMB		93017G	*
	V72K1255C	AFT RHC ROLL CMD-B	RHC AFT	VDC	AMB		93017G	*
	V72K1256C	AFT RHC PITCH CMD-B	RHC AFT	VDC	AMB		93017G	*
	V72K1257C	AFT RHC YAW CMD-B	RHC AFT	VDC	AMB		93017G	*
	V72K1265C	AFT RHC ROLL CMD-C	RHC AFT	VDC	AMB		93017G	*
	V72K1266C	AFT RHC PITCH CMD-C	RHC AFT	VDC	AMB		93017G	*
	V72K1267C	AFT RHC YAW CMD-C	RHC AFT	VDC	AMB		93017G	*
	V90J6786C	LIB ELEVON DELTA PRESSURE COMMAND	ELVN DELTA P FDIR					
	V90J6787C	LOB ELEVON DELTA PRESSURE COMMAND	ELVN DELTA P FDIR					
	V90J6788C	RIB ELEVON DELTA PRESSURE COMMAND	ELVN DELTA P FDIR					
	V90J6789C	ROB ELEVON DELTA PRESSURE COMMAND	ELVN DELTA P FDIR					
	V90R6752C	SRGA COMMAND	SRB RG FDIR				79935H	
	V90U4400C	LEFT RPTA CMD SF COMMAND	RPTA FDIR					
	V90U4500C	RIGHT RPTA CMD SF COMMAND	RPTA FDIR					
	V90U5660CA	ORB RGA SF COMMAND	ORB RG FDIR				90477E	
	V90U5660CB	ORB RGA SF COMMAND	ORB RGA SMRD RM				90477E	
	V90U5960C	AA SF COMMAND	AA FDIR					
	V90U6000C	LEFT RHC CMD SF COMMAND	RHC FDIR					
	V90U6100C	RIGHT RHC CMD SF COMMAND	RHC FDIR					
	V90U6413C	BODY FLAP FDBK SF COMMAND	BF PFB FDIR					
	V90U6713C	SPEEDBRAKE FDBK SF COMMAND	SB PFB FDIR					
	V90U6833C	LEFT SPEEDBRAKE CMD SF COMMAND	SBTC FDIR					
	V90U6933C	RIGHT SPEEDBRAKE CMD SF COMMAND	SBTC FDIR					
	V90U7013C	RUDDER FDBK SF COMMAND	RUD PFB FDIR					
	V90U7515C	LIB ELEVON FDBK SF CMD	ELVN PFB FDIR					
	V90U7535C	LOB ELEVON FDBK SF CMD	ELVN PFB FDIR					
	V90U7565C	RIB ELEVON FDBK SF CMD	ELVN PFB FDIR					
	V90U7585C	ROB ELEVON FDBK SF CMD	ELVN PFB FDIR					
	V90X3000X	MSBLS SELECTION FILTER COMMAND	MSBLS FDIR					
	V90X6311X	AFT RHC SELECTION FILTER CMD	RHC FDIR					
	V90X6354X	HYD SYS 1 SF COMMAND	HYD SYS FDIR					
	V90X6355X	HYD SYS 2 SF COMMAND	HYD SYS FDIR					
	V90X6356X	HYD SYS 3 SF COMMAND	HYD SYS FDIR					
	V91X6370X	LIB ELEVON PRI DELTA P 1 CF	FCOS					
	V91X6371X	LIB ELEVON PRI DELTA P 2 CF	FCOS					
	V91X6372X	LIB ELEVON PRI DELTA P 3 CF	FCOS					
	V91X6373X	LIB ELEVON PRI DELTA P 4 CF	FCOS					
	V91X6380X	LOB ELEVON PRI DELTA P 1 CF	FCOS					

TABLE 4.1.4-1. INPUT FUNCTIONAL PARAMETERS FOR SELECTION FILTERING (G4.71)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V91X6381X	LOB ELEVON PRI DELTA P 2 CF	FCOS					
	V91X6382X	LOB ELEVON PRI DELTA P 3 CF	FCOS					
	V91X6383X	LOB ELEVON PRI DELTA P 4 CF	FCOS					
	V91X6390X	RIB ELEVON PRI DELTA P 1 CF	FCOS					
	V91X6391X	RIB ELEVON PRI DELTA P 2 CF	FCOS					
	V91X6392X	RIB ELEVON PRI DELTA P 3 CF	FCOS					
	V91X6393X	RIB ELEVON PRI DELTA P 4 CF	FCOS					
	V91X6400X	ROB ELEVON PRI DELTA P 1 CF	FCOS					
	V91X6401X	ROB ELEVON PRI DELTA P 2 CF	FCOS					
	V91X6402X	ROB ELEVON PRI DELTA P 3 CF	FCOS					
	V91X6403X	ROB ELEVON PRI DELTA P 4 CF	FCOS					
	V91X7772X	AFT RHC YAW CMD-A COMMFAULT	FCOS					
	V91X7778X	AFT RHC PITCH CMD-B COMMFAULT	FCOS					
	V91X7780X	AFT RHC YAW CMD-B COMMFAULT	FCOS					
	V91X7782X	AFT RHC PITCH CMD-A COMMFAULT	FCOS					
	V91X7783X	AFT RHC ROLL CMD-B COMMFAULT	FCOS					
	V91X7784X	AFT RHC PITCH CMD-C COMMFAULT	FCOS					
	V91X7788X	AFT RHC ROLL CMD-C COMMFAULT	FCOS					
	V91X7791X	AFT RHC YAW CMD-C COMMFAULT	FCOS					
	V91X7792X	AFT RHC ROLL CMD-A COMMFAULT	FCOS					
	V91X7810X	LH PRESS SRM CHAMBER 1 COMMFAULT	FCOS					
	V91X7811X	LH PRESS SRM CHAMBER 2 COMMFAULT	FCOS					
	V91X7812X	LH PRESS SRM CHAMBER 3 COMMFAULT	FCOS					
	V91X7813X	RH PRESS SRM CHAMBER 1 COMMFAULT	FCOS					
	V91X7814X	RH PRESS SRM CHAMBER 2 COMMFAULT	FCOS					
	V91X7815X	RH PRESS SRM CHAMBER 3 COMMFAULT	FCOS					
	V91X8029X	HYD SYS 1 PRESS A COMMFAULT	FCOS					
	V91X8030X	HYD SYS 1 PRESS B COMMFAULT	FCOS					
	V91X8031X	HYD SYS 1 PRESS C COMMFAULT	FCOS					
	V91X8032X	HYD SYS 2 PRESS A COMMFAULT	FCOS					
	V91X8033X	HYD SYS 2 PRESS B COMMFAULT	FCOS					
	V91X8034X	HYD SYS 2 PRESS C COMMFAULT	FCOS					
	V91X8035X	HYD SYS 3 PRESS A COMMFAULT	FCOS					
	V91X8036X	HYD SYS 3 PRESS B COMMFAULT	FCOS					
	V91X8037X	HYD SYS 3 PRESS C COMMFAULT	FCOS					
	V93X4431X	RA 1 DES CMD	SENSOR SELF TEST DISP				BD	
	V93X4433X	RA 2 DES CMD	SENSOR SELF TEST DISP				BD	

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

TABLE 4.1.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM SELECTION FILTERING (G4.71)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
DG_RADALT	V90X4003X	RALT HEIGHT DATA GOOD	A/L UPP DL FMT 23/1 GPS SOP HUD PROC RTLS UPP TAEM UPP		BD		93017G	*
DSBTCC	V90H6801C	SELECTED LEFT SPEEDBRAKE CMD	DL FMT 21/1 DL FMT 23/A SBTC SOP	VDC	SPL		93017G	*
DSBTCP	V90H6901C	SELECTED RIGHT SPEEDBRAKE CMD	DL FMT 21/1 DL FMT 23/A SBTC SOP	VDC	SPL		93017G	*
L_PIT_DG	V90X6033X	LEFT RHC PITCH DATA GOOD	2-AX RHC SOP 3-AX RHC SOP DL FMT 23/1 ORB 3-AX RHC SOP		BD		93017G	*
MLSAZ_DATA_GOOD	V90X3003X	MSBLS AZIMUTH DATA GOOD	A/RTLS NAV SEQ D/L NAV SEQ DL FMT 23/1 HUD PROC MSC PRELAND NAV RTLS NAV		BD		93017G	*
MLSEL_DATA_GOOD	V90X3033X	MSBLS ELEVATION DATA GOOD	DL FMT 23/1 PRELAND NAV RTLS NAV		BD		93017G	*
MLSRANGE_DATA_GOOD	V90X3063X	MSBLS RANGE DATA GOOD	A/RTLS NAV SEQ D/L NAV SEQ DL FMT 23/1 HUD PROC MSC PRELAND NAV RTLS NAV		BD		93017G	*

TABLE 4.1.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM SELECTION FILTERING (G4.71)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
NY	V90A5361C	SELECTED AA LATERAL ACCEL	AA FDIR AEROJET DAP ASC DAP DL FMT 21/B DL FMT 23/B ENTRY TRAJ1 ENTRY TRAJ2 ENTRY TRAJ3 ENTRY TRAJ4 ENTRY TRAJ5 GRTLS DAP PTI VERT SIT1 DISP VERT SIT2 DISP	G	SPL		93017G	*
NZ	V90A5381C	SELECTED AA NORMAL ACCEL	AA FDIR ABT CNTL SEQ AEROJET DAP AMI PROC ASC DAP DL FMT 21/B DL FMT 23/B E/L EV AN PROC GRTLS DAP GRTLS TAEM GUID HORIZ SIT SPEC	G	SPL		93017G	*
PC4	V90P2535C	SELECTED LEFT PRESS SRB CHAMBER	ASC DAP SRB SEP SEQ	PSIA			89494A	
PC5	V90P2536C	SELECTED RIGHT PRESS SRB CHAMBER	ASC DAP SRB SEP SEQ	PSIA			89494A	
P_ORB	V90R5301CA	SELECTED RGA ROLL RATE	A/E ATT PROC AEROJET DAP ASC ADI PROC ASC DAP CONT 3E/O GUID DL FMT 21/B DL FMT 23/B E/L ADI PROC ET SEP SEQ G/C STEER GN&C/SM-PL IF GRTLS DAP ORB RG FDIR PTI SRB SEP SEQ STAR TRCK SOP TRANS DAP	DEG/S			93017G	*

TABLE 4.1.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM SELECTION FILTERING (G4.71)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
Q_AZMLS	V90H3002C	SELECTED MSBLS AZIMUTH-RAW	DL FMT 23/1 MSBLS SOP	DEG	SPL		93017G	*
Q_ELMLS	V90H3032C	SELECTED MSBLS ELEVATION-RAW	DL FMT 23/1 MSBLS SOP	DEG	SPL		93017G	*
Q_ORB/Q	V90R5321CA	SELECTED RGA PITCH RATE	A/E ATT PROC A/L UPP AEROJET DAP ASC ADI PROC ASC DAP CONT 3E/O GUID DL FMT 21/B DL FMT 23/B E/L ADI PROC ENT BRG SPEC ET SEP SEQ G/C STEER GN&C/SM-PL IF GRTLS DAP GRTLS TAEM GUID ORB RG FDIR PTI PW CONT GUID RTLS UPP SRB SEP SEQ STAR TRCK SOP TAEM GUID TAEM UPP TRANS DAP	DEG/S			93017G	*
Q_RADALT	V90H4002C	SELECTED RALT HEIGHT-RAW	A/L UPP DL FMT 23/2 GPS SOP HUD PROC RTLS UPP TAEM UPP	FT	SPL		93017G	*
Q_RANGE	V90H3062C	SELECTED MSBLS RANGE-RAW	DL FMT 23/1 MSBLS SOP	NM	SPL		93017G	*
Q_SRB	V90R2511C	SRGA SEL PITCH RATE	A/E ATT PROC ASC DAP DL FMT 21/2 SRB RG FDIR	DEG/S			93017G	*

TABLE 4.1.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM SELECTION FILTERING (G4.71)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
R_ORB	V90R5341CA	SELECTED RGA YAW RATE	A/E ATT PROC AEROJET DAP ASC ADI PROC ASC DAP CONT 3E/O GUID DL FMT 21/B DL FMT 23/B E/L ADI PROC ET SEP SEQ G/C STEER GN&C/SM-PL IF GRTLS DAP ORB RG FDIR PTI SRB SEP SEQ STAR TRCK SOP TRANS DAP	DEG/S			93017G	*
R_PIT_DG	V90X6133X	RIGHT RHC PITCH DATA GOOD	2-AX RHC SOP 3-AX RHC SOP DL FMT 23/1 ORB 3-AX RHC SOP		BD		93017G	*
R_SRB	V90R2512C	SRGA SEL YAW RATE	A/E ATT PROC ASC DAP DL FMT 21/2 SRB RG FDIR	DEG/S			93017G	*
SEL_NW_POSN	V51H0650C	SELECT NOSE WHEEL POSITION	FWD RCS DSC	VDC	AMB			
SEL_NW_POSN	V90H2550C	SELECT NOSE WHEEL POSITION	DL FMT 21/1 DL FMT 23/2 NW POSN SOP	VDC	HXS		93017G	*
	V90H2519C	SELECTED RIGHT RHC YAW CMD	3-AX RHC SOP DL FMT 21/1 DL FMT 22/A DL FMT 23/A DL FMT 32/A ORB 3-AX RHC SOP	VDC	SPL		93017G	*
	V90H2520C	SELECTED LEFT RHC YAW CMD	3-AX RHC SOP DL FMT 21/1 DL FMT 22/A DL FMT 23/A DL FMT 32/A ORB 3-AX RHC SOP	VDC	SPL		93017G	*
	V90H2538C	SELECTED AFT RHC PITCH CMD	DL FMT 22/A DL FMT 32/A ORB 3-AX RHC SOP	VDC	SPL		93017G	*

TABLE 4.1.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM SELECTION FILTERING (G4.71)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90H2542C	SELECTED AFT RHC ROLL CMD	DL FMT 22/A DL FMT 32/A	VDC	SPL		93017G	*
	V90H2545C	SELECTED AFT RHC YAW CMD	ORB 3-AX RHC SOP DL FMT 22/A DL FMT 32/A	VDC	SPL		93017G	*
	V90H4402C	SELECTED LEFT RPTA CMD	ORB 3-AX RHC SOP DL FMT 21/A DL FMT 23/2 RPTA SOP	VDC	SPL		93017G	*
	V90H4502C	SELECTED RIGHT RPTA CMD	DL FMT 21/A DL FMT 23/A RPTA SOP	VDC	SPL		93017G	*
	V90H6001C	SELECTED LEFT RHC ROLL CMD	2-AX RHC SOP 3-AX RHC SOP DL FMT 21/1 DL FMT 22/A DL FMT 23/B DL FMT 32/A	VDC	SPL		93017G	*
	V90H6031C	SELECTED LEFT RHC PITCH CMD	ORB 3-AX RHC SOP 2-AX RHC SOP 3-AX RHC SOP DL FMT 21/1 DL FMT 22/A DL FMT 23/B DL FMT 32/A	VDC	SPL		93017G	*
	V90H6101C	SELECTED RIGHT RHC ROLL CMD	ORB 3-AX RHC SOP 2-AX RHC SOP 3-AX RHC SOP DL FMT 21/1 DL FMT 22/A DL FMT 23/B DL FMT 32/A	VDC	SPL		93017G	*
	V90H6131C	SELECTED RIGHT RHC PITCH CMD	ORB 3-AX RHC SOP 2-AX RHC SOP 3-AX RHC SOP DL FMT 21/1 DL FMT 22/A DL FMT 23/B DL FMT 32/A	VDC	SPL		93017G	*
	V90H6410C	SELECTED BODY FLAP FDBK	ORB 3-AX RHC SOP BF PFB FDIR BF PFB SOP DL FMT 21/A DL FMT 23/A DL FMT 32/B	VDC	SPL		93017G	*

TABLE 4.1.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM SELECTION FILTERING (G4.71)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90H6710C	SELECTED SPEEDBRAKE FDBK	DL FMT 21/1 DL FMT 23/B DL FMT 32/B	VDC	SPL		93017G	*
	V90H7010C	SELECTED RUDDER FDBK	SB PFB SOP DL FMT 21/1 DL FMT 23/B DL FMT 32/B	VDC	SPL		93017G	*
	V90H7505C	SELECTED LIB ELEVON FDBK	RUD PFB SOP DL FMT 21/1 DL FMT 23/B DL FMT 32/B	VDC	SPL		93017G	*
	V90H7525C	SELECTED LOB ELEVON FDBK	ELVN PFB SOP DL FMT 21/1 DL FMT 23/B DL FMT 32/B	VDC	SPL		93017G	*
	V90H7555C	SELECTED RIB ELEVON FDBK	ELVN PFB SOP DL FMT 21/1 DL FMT 23/B DL FMT 32/B	VDC	SPL		93017G	*
	V90H7575C	SELECTED ROB ELEVON FDBK	ELVN PFB SOP DL FMT 21/1 DL FMT 23/B DL FMT 32/B	VDC	SPL		93017G	*
	V90M2844PA	CGRB_STATUS_2\$(8;)	DL FMT 23/1				93017G	*
	V90M2846PA	CGRB_STATUS_2\$(10;)	DL FMT 23/1				93017G	*
	V90M2848PC	CGRB_STATUS_2\$(12;)	DL FMT 23/1				93017G	*
	V90M2849P	CGRB_STATUS_2\$(13;)	DL FMT 23/1				93017G	*
	V90M2850PC	CGRB_STATUS_2\$(15;)	DL FMT 23/1				93017G	*
	V90M2851P	CGRB_STATUS_2\$(16;)	DL FMT 23/1				93017G	*
	V90M2883P	CGRB_STATUS_2\$(17;)	DL FMT 23/1				93017G	*
	V90M2884P	CGRB_STATUS_2\$(14;)	DL FMT 23/1				93017G	*
	V90M2885PA	MFE.CGRB_STATUS_2\$(2;)	DL FMT 23/1				93017G	*
	V90M2889P	MFE.CGRB_STATUS_2\$(1;)	DL FMT 23/1				93017G	*
	V90M2943P	MFE.CGRB_STATUS_2\$(4;)	DL FMT 23/1				93017G	*
	V90M2956P	MFE.CGRB_STATUS_2\$(3;)	DL FMT 23/1				93017G	*
	V90P2515C	SELECTED LOB ELVN PRI DELTA PRESS	DELTA P F/B SOP DL FMT 21/A DL FMT 23/2 GAX	VDC	SPL		93017G	*
	V90P2516C	SELECTED LIB ELVN PRI DELTA PRESS	DELTA P F/B SOP DL FMT 21/A DL FMT 23/2 GAX	VDC	SPL		93017G	*

TABLE 4.1.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM SELECTION FILTERING (G4.71)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90P2517C	SELECTED ROB ELVN PRI DELTA PRESS	DELTA P F/B SOP DL FMT 21/A DL FMT 23/2 GAX	VDC	SPL		93017G	*
	V90P2518C	SELECTED RIB ELVN PRI DELTA PRESS	DELTA P F/B SOP DL FMT 21/A DL FMT 23/2 GAX	VDC	SPL		93017G	*
	V90P2547C	SEL HYD SYS 1 PRESSURE	HYD SYS SOP	VDC			89854A	
	V90P2548C	SEL HYD SYS 2 PRESSURE	HYD SYS SOP	VDC			89854A	
	V90P2549C	SEL HYD SYS 3 PRESSURE	HYD SYS SOP	VDC			89854A	
	V90X2521X	LEFT RHC YAW DATA GOOD	3-AX RHC SOP DL FMT 23/1 ORB 3-AX RHC SOP		BD		93017G	*
	V90X2522X	RIGHT RHC YAW DATA GOOD	3-AX RHC SOP DL FMT 23/1 ORB 3-AX RHC SOP		BD		93017G	*
	V90X2523X	LEFT SBTC CMD DATA GOOD	SBTC SOP TLM					
	V90X2524X	RIGHT SBTC CMD DATA GOOD	SBTC SOP TLM					
	V90X2532X	HYD SYS 1 PRESSURE DATA GOOD	HYD SYS SOP				89854A	
	V90X2533X	HYD SYS 2 PRESSURE DATA GOOD	HYD SYS SOP				89854A	
	V90X2534X	HYD SYS 3 PRESSURE DATA GOOD	HYD SYS SOP				89854A	
	V90X2539X	AFT RHC ROLL DATA GOOD	ORB 3-AX RHC SOP					
	V90X2543X	AFT RHC PITCH DATA GOOD	ORB 3-AX RHC SOP					
	V90X2544X	AFT RHC YAW DATA GOOD	ORB 3-AX RHC SOP					
	V90X4413X	LEFT RPTA DATA GOOD	DL FMT 23/1 RPTA SOP		BD		93017G	*
	V90X4513X	RIGHT RPTA DATA GOOD	DL FMT 23/1 RPTA SOP		BD		93017G	*
	V90X6003X	LEFT RHC ROLL DATA GOOD	2-AX RHC SOP 3-AX RHC SOP DL FMT 23/1 ORB 3-AX RHC SOP		BD		93017G	*
	V90X6103X	RIGHT RHC ROLL DATA GOOD	2-AX RHC SOP 3-AX RHC SOP DL FMT 23/1 ORB 3-AX RHC SOP		BD		93017G	*
	V93A8201CB	DISPLAYED NORMAL ACCEL	ORBITAL RHC SOP HORIZ SIT DISP	FT/S				

TABLE 4.1.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM SELECTION FILTERING (G4.71)

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 4.1.4-3. SELECTION FILTERING (G4.71) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
LIMIT(26)	V97U3049C	FT	I	S	M	P	G4.71	00	RSI	DC0755	

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

TABLE 4.1.4-4. SELECTION FILTERING (G4.71) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
QQCSRB	V99U7113C	00	+3.25	E-01 DEG/SEC	F	S	P	G4.71	90094C	
RQCSRB	V99U7114C	00	+3.25	E-01 DEG/SEC	F	S	P	G4.71	90094C	

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

TABLE 4.1.4-5. SELECTION FILTERING (G4.71) 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 INERTIAL MEASUREMENT UNIT REDUNDANCY MANAGEMENT REQUIREMENTS (PF 4.72)

IMU RM detects and identifies failed IMU's based on their attitude and velocity output data, together with selected signals from the IMU BITE. In addition, IMU RM contains the attitude and velocity selection filters. Figure 4.2-1 is a block diagram of the IMU RM processing functions.

To facilitate the two-level attitude and velocity fault identification functions, skewed IMU alignment is required. Two-level fault identification functions would be impossible with co-aligned IMU's, except when BITE was able to identify the failure. All other RM processing functions (selection filtering, fault detection, and three-level fault identification) may be used with either skewed or co-aligned IMU's. Skewed IMU geometry is specified at the time of platform alignment by the stable member to a Mean of 50 reference matrices (T_C1_M50, T_C2_M50, T_C3_M50) to which the IMU's are aligned. These matrices are I-Loads to the IMU SOP and can be uplinked for the on-orbit alignment and calibration module of the IMU SOP. The relative transformation matrix (which transforms IMU's 1 to 2, 2 to 3, and 3 to 1 coordinate systems) has been optimized for the two-level identification logic described below and is given by the $+\sqrt{6}$ skewing matrix.

$$T_1 \text{ to } 2 = T_2 \text{ to } 3 = T_3 \text{ to } 1 = \begin{bmatrix} +0.25 & +0.75 & +0.6123724357 \\ +0.75 & +0.25 & -0.6123724357 \\ -0.6123724357 & +0.6123724357 & -0.5 \end{bmatrix}$$

Any other skewing geometry may be used; however, some sensitivity in identification of failures will be lost.

4.2.1 Inertial Measurement Unit Redundancy Management Detailed Functional Requirements

IMU RM functional requirements are specified separately for attitude error processing and velocity error processing. Each attitude and velocity error processing function is divided into the subfunctions of selection filtering, fault detection, and fault identification.

IMU RM is not active in MM101 before REFS_RDY is TRUE.

All IMU RM functions require knowledge of which IMU's are candidates for RM processing. An IMU is defined to be a candidate for RM processing if all the following conditions are satisfied.

1. Crew Selection: In OPS where crew candidate select is not available, the selection status shall be configured as it was at the end of the most recent flight phase in which this capability was available. Selection status shall be carried across the OPS transition in protected memory. In OPS where crew candidate select/deselect is available, IMU's deselected by crew candidate selection shall be initialized for automatic FDI and SF purposes only upon reselection. This shall include setting all tracking-test miscompare counters to zero and setting all failure status flags to unfailed setting for the associated IMU's only. Furthermore, a reselected IMU shall not be admitted into the candidate status in the velocity selection filter (VEL_SF) until a new bias (\bar{B}_K) has been calculated for it. Also, a reselected IMU shall not be admitted into candidate

status in the velocity fault detection and identification reselected IMU shall not be admitted into candidate status in the velocity fault detection and identification (VEL_FDI) module until a new previous velocity value ($\overline{PREV_K}$) has been computed.

2. No Previous Failure: The IMU must not have been previously declared failed by either the attitude or velocity automatic fault identification functions.
3. No Communications Fault: The IMU commfault flag must not be valid. When valid, this flag indicates that FCOS did not successfully update the associated IMU data at the most recent read cycle.

If the IMU commfault flag is set valid and then cleared, the associated IMU shall not be admitted into candidate status in the velocity selection filter (VEL_SF) until new BIAS ($\overline{B_K}$) has been calculated for it. Also, the associated IMU will be admitted into candidate status in the velocity fault detection and identification (VEL_FDI) module only after a previous velocity value ($\overline{PREV_K}$) been computed.

One fault detection is sufficient to invoke the fault identification testing for any one pass through FDIR processing functions. FI shall continue to run as long as a fault is detected. An IMU shall be declared permanently failed when N identical fault identifications occur in consecutive passes through the fault identification function. N shall be specified separately for attitude and velocity FDIR.

An IMU dilemma shall be signaled at the two-IMU level if the fault remains unidentified after a given period of consecutive fault detections. The dilemma periods shall be specified separately for attitude and velocity FDIR.

4.2.1.1 Inertial Measurement Unit Attitude Redundancy Management Functional Requirements.

IMU attitude redundancy management processing is divided into three functions: (1) attitude selection filter (ATT_SF), (2) attitude fault detection (ATT_FD), and (3) attitude fault identification (ATT_FI).

These functions shall be executed continuously at the rates specified in Tables 4.1-2 and 4.0-2. Execution of the ATT_SF module shall be sequenced with the outer loop of the A/E ATT_PROC module and with the inner and outer loops of ORB_ATT_PROC as follows:

1. ATT_PROC generates stable-member-to-stable-member quaternions based on gimbal angle data and sends them to ATT_SF; and then
2. ATT_SF generates the selected IMU ID and the attitude data-good flag; and
3. A/E ATT_PROC proceeds with the rest of its outer loop processing or ORB_ATT_PROC proceeds with the rest of its outer or inner loop processing.

This sequence requires that the same homogeneous data be used throughout. In addition, when the attitude selection filter is invoked, it shall output the selected IMU ID and the attitude data-good flag within the same minor cycle.

The ATT_SF module shall determine the number of candidate IMU's and, in the case of two or one candidate, it shall determine the ID numbers of the candidate IMU's. This information shall be stored in the IMU attitude status vector (IMU_ATT_STATUS) moding the ATT_FD and ATT_FI modules.

The ATT_SF module shall be executed at the user rate, as specified in Table 4.1-2. The ATT_FD module shall be executed at a slower rate, as specified in Table 4.0-2. The ATT_FI module shall be run at either of two rates shown in Table 4.0-2, depending on the status of the attitude data-good flag, as described in the next paragraph.

4.2.1.1.1 Inertial Measurement Unit Attitude Selection Filter Functional Requirements.

The attitude selection filter (ATT_SF) module provides a selected IMU identification number and an attitude data-good flag. ATT_SF also switches the conditional attitude fault identification execution rate and provides the attitude data-good flag to the attitude fault identification module. The ATT_SF module is executed at the rate given in Table 4.1-2. Figure 4.2-2 is a functional block diagram of the attitude selection filter.

If on-board alignment is being executed (ALIGN_IN_PROGRESS valid), then the ATT_SF module computes the number of candidate IMU's, as defined in paragraph 4.2.1, by combining the following information sources:

1. Crew selection (C_SEL_1, 2, 3)
2. Previous auto-FDIR failures (IMU_1, 2, 3_FAIL)
3. Slewing flag (IMU_SLEW_1, 2, 3)
4. Communication fault (COMM_FAULT_1, 2, 3),

A valid indication from any of the last three sources or an invalid indication from the first source is sufficient to remove the associated IMU from candidate status. An IMU becomes the selected IMU if it was previously selected when available. If the previously selected IMU is not available, the lowest numbered available IMU becomes the selected IMU. The ATT_SF passes the ID of the selected IMU and sets the attitude data-good flag valid and the attitude fault identification conditional rate flag to the slower rate (Table 4.0-2). No further attitude IMU RM processing is performed until on-board alignment is completed. If there are no candidates for selection, set the selected IMU ID to its previous value, the attitude data-good flag invalid, and the attitude fault identification conditional rate flag to the slower rate (Table 4.0-2).

If on-board alignment is not being executed (ALIGN_IN_PROGRESS invalid), then the ATT_SF module first computes the number of candidate IMU's, as defined in paragraph 4.2.1, by combining the following sources:

1. Crew selection (C_SEL_1, 2, 3)
2. Previous auto-FDIR failures (IMU_1, 2, 3_FAIL)

3. Communication faults (COMM_FAULT_1, 2, 3). A fault indication from any of these sources is sufficient to remove the associated IMU from candidate status.

If two IMU's are candidates, ATT_SF determines the ID numbers of the two candidates. If one IMU is a candidate, ATT_SF passes the ID of the remaining IMU. The number of candidate IMU's and their respective ID's (at the two and one level) are included in the IMU attitude status vector, which is sent to the attitude fault detection and the attitude fault identification modules. Based on the IMU status vector, ATT_SF proceeds to the appropriate level, as will be described in the next three paragraphs.

4.2.1.1.1.1 Three-Level IMU Attitude Selection Filter Functional Requirements.

The three-level IMU attitude selection filter shall be processed when the IMU attitude status vector indicates that three IMU's are candidates. The three-level IMU_ATT_SF shall send three squared attitude errors to the ATT_FD module as well as the selected IMU identification and attitude data-good flag to ATT_PROC. The selected IMU identification is also sent to the Star Tracker Subsystem Operating Program (SOP). The three-level IMU_ATT_SF shall also send the attitude data-good flag to the ATT_FI module and the attitude fault identification conditional rate to FCOS.

Three-level IMU_ATT_SF is divided into three steps:

1. Calculate the squared attitude errors among the three IMU's.
2. Find the ID number of the middle value IMU.
3. Set the attitude data-good flag valid and the attitude fault identification conditional rate to slow.

These steps are described as follows:

1. Calculate the squared attitude errors (AD_12, AD_13, and AD_23) which are proportional to the square of the total relative misalignments between the three IMU's. These squared attitude errors are a measure of the difference between the ideal skewed geometry and the actual skewed geometry existing at the present time. With the ideal quaternions [Q_SMSM_I(3), Q_SMSM_I(2), and Q_SMSM_I(1)] and the actual quaternions [Q_SMSM(3), Q_SMSM(2), and Q_SMSM(1)] provided by the ATT_PROC, the squared attitude errors may be calculated as follows:

Call QUAT_MULT [Q_SMSM_I*(k), Q_SMSM(k)] ASSIGN Q_AD(k) for k = 1, 2, 3

$$AD_{12} = \overline{Q_ADV(3)} \cdot \overline{Q_ADV(3)}$$

$$AD_{13} = \overline{Q_ADV(2)} \cdot \overline{Q_ADV(2)}$$

$$AD_{23} = \overline{Q_ADV(1)} \cdot \overline{Q_ADV(1)}$$

where QUAT_MULT is the quaternion multiply utility routine; the asterisk denotes quaternion_conjugation, $\overline{Q_ADV(k)}$ denotes the vector component of the error quaternion, Q_AD(k); Q_SMSM_I(3), Q_SMSM_I(2), and Q_SMSM_I(1) are the ideal transformation quaternions from IMU 1 to IMU 2, IMU 1 to IMU 3, and IMU 2 to IMU 3 stable member

coordinates, respectively, as received from IMU_RM_INIT, paragraph 4.2.5, Q_SMSM(3), Q_SMSM(2), and Q_SMSM(1) are the transformation quaternions from IMU 1 to IMU 2, IMU 1 to IMU 3, and IMU 2 to IMU 3 stable member coordinates, respectively, at the present time, as provided by ATT_PROC.

2. To find the middle value IMU, find the maximum squared attitude error (AD_12, AD_13, or AD_23) and set the selected IMU identification flag (SEL_IMU_ID) equal to the excluded index, as in the following example:

If AD_12 is greater than AD_13 and AD_23, then SEL_IMU_ID is set equal to 3.

If there are two maxima, i.e., two IMU inputs are identical, set the selected IMU identification flag (SEL_IMU_ID) according to the following:

If $AD_{IJ} = AD_{JK} > AD_{IK}$ (where I, J, K are IMU ID's), set SEL_IMU_ID to either I or K.

If all three squared attitude errors are the same, then any IMU ID may be used since all inputs are identical.

3. Set the attitude data-good flag (ATT_DG) valid. Set the attitude fault identification conditional rate (FI_RATE) equal to the slower rate given in Table 4.0-2.

4.2.1.1.1.2 Two-Level IMU Attitude Selection Filter Functional Requirements.

The two-level IMU ATT_SF module shall be executed when the IMU attitude status vector indicates only two IMU's are candidates. The two-level IMU ATT_SF shall send the selected IMU identification and attitude data-good flag to ATT_PROC. The selected IMU identification is also sent to the ST SOP. The two-level IMU_ATT_SF shall also send the attitude data-good flag to the ATT_FI module and the attitude fault identification conditional rate flag to FCOS.

Two-level IMU ATT_SF is divided into two steps:

1. Calculate the squared attitude error between the two IMU's identified by the IMU attitude status vector.
2. Compare the squared attitude error to the attitude data-good threshold. Set the selected IMU identification, the attitude data-good flag and the attitude fault identification conditional rate flag.

These steps are described as follows:

1. Calculate the squared attitude error (AD_IJ) which is proportional to the square of the total relative misalignment between the two candidate IMU's. This squared attitude error is a measure of the difference between the ideal skewed geometry and the actual skewed geometry existing at the present time. Using the corresponding ideal quaternion [Q_SMSM_I(k)] and the quaternion [Q_SMSM(k)] provided by ATT_PROC, one can calculate AD_IJ as follows:

$$\text{CALL QUAT_MULT [Q_SMSM_I}^*(k), \text{Q_SMSM}(k)]\text{ASSIGN Q_AD}(k) \text{ AD_IJ} = \overline{\text{Q_ADV}}(k) \cdot \overline{\text{Q_ADV}}(k)$$

where QUAT_MULT is the quaternion multiply utility routine; the asterisk denotes quaternion conjugation; $\overline{\text{Q_ADV}}(k)$ denotes the vector component of the error quaternion, Q_AD(k); Q_SMSM_I(k) is the ideal transformation quaternion from IMU i to IMU j stable member coordinates as described in paragraph 4.2.5; Q_SMSM(k) is the transformation quaternion from IMU i to IMU j stable member coordinates at the present time as provided by ATT_PROC; i and j indicate the two candidate IMU's as specified by the IMU status vector (IMU_ATT_STATUS).

2. The comparison of AD_IJ with TH_ATT_DG which has different values in different memory configurations and OPS loads (MC1: OPS1 beginning at platform reference update (REFS_RDY), OPS6; MC2: OPS 2; MC8: OPS 8;; MC3: OPS3) sets various flags, as follows: If $\text{AD_IJ} \geq \text{TH_ATT_DG}$, then set the attitude data good flag (ATT_DG) invalid and set the attitude fault identification conditional rate flag (FI_RATE) to the higher rate in Table 4.0-2; else set the attitude data-good flag valid, and set the attitude fault identification conditional rate flag (FI_RATE) to the slower rate in Table 4.0-2. The values for TH_ATT_DG are specified in Section 4.2.4.

The selected IMU ID flag (SEL_IMU_ID) is left unchanged from its previous value if this IMU is a candidate; otherwise, the selected IMU ID is set equal the lowest-numbered candidate IMU ID.

4.2.1.1.1.3 One-Level/No Available Sensor IMU Attitude Selection Filter Functional Requirements.

If only one IMU is a candidate, set the selected IMU identification flag equal to the IMU number indicated by the IMU attitude status (IMU_ATT_STATUS). During OPS-2 and 8, check the IMU BITE failure flag (IMU_i_BITE_FAIL). If this flag is valid, then set the attitude data-good flag (ATT_DG) invalid and the fault identification conditional rate (FI_RATE) to the higher rate in Table 4.0-2; else set the attitude data-good flag (ATT_DG) valid and the fault identification conditional rate (FI_RATE) to the slower rate in Table 4.0-2. For all other OPS, set the attitude data-good flag (ATT_DG) valid and set the attitude fault identification conditional rate flag (FI_RATE) to the slower rate given in Table 4.0-2.

When the IMU attitude status vector indicates that there are no available candidates for selection, set the attitude data-good flag (ATT_DG) and (during OPS-2) the ADI attitude flag (ADI_ATT) to invalid. The ADI attitude flag for all other IMU attitude status vector conditions shall be set to valid. The selected IMU ID flag (SEL_IMU_ID) is left unchanged from its previous value.

4.2.1.1.2 Inertial Measurement Unit Attitude Fault Detection Functional Requirements.

The IMU attitude fault detection (ATT_FD) module compares squared attitude errors that are either computed by this module or input from the attitude selection filter (ATT_SF) to a threshold and then sends miscompare flags to the attitude fault identification (ATT_FI) module. Three-level IMU_ATT_FD is processed when the IMU attitude status vector (IMU_ATT_STATUS) indicates that there are three candidate IMU's. Two-level IMU_ATT_FD is processed when the IMU attitude status vector indicates that there are only two candidate IMU's. ATT_FD is exited immediately when the IMU attitude status vector indicates that there is only one or zero IMU's available as candidates. Figure 4.2-3 is a functional block diagram of IMU attitude fault detection processing. IMU_ATT_FD is performed at the rate given in Table 4.0-2.

4.2.1.1.2.1 Three-Level IMU Attitude Fault Detection Functional Requirements.

The three-level ATT_FD module is executed when the IMU attitude status vector indicates that three IMU's are candidates. The three-level ATT_FD module sends three IMU miscompare flags to the attitude fault identification module. Three-level attitude fault detection processing is divided into two steps:

1. Compute the attitude fault detection threshold and square it.
2. Compare the squared attitude errors from ATT_SF with the square of the attitude fault detection threshold and set the attitude miscompare flags.

These steps are described as follows:

1. The basic form of the attitude fault detection threshold is a first-order polynomial. During different portions of the flight this polynomial is either reinitialized or recomputed with different coefficients. The events of the flight which initialize the attitude fault detection threshold (TH_ATT_D) are platform reference update (REFS_RDY) and each on-orbit alignment.

Thus beginning at platform reference update (REFS_RDY), the attitude fault detection threshold shall be specified by

$$TH_ATT_D = A_CONS_1 + A_RAMP_2 T_2$$

where

$$T_2 = TIME - TIME_0, \text{ and}$$

TIME_0 is initialized to the time of REFS_RDY. All parameters associated with the calculation of this threshold shall be carried across all further OPS transitions until the first on-orbit alignment. After each on-orbit alignment is completed, the attitude fault detection threshold shall be specified by

$$TH_ATT_D = A_CONS_3 + A_RAMP_3 T_3$$

where

$$T_3 = \text{TIME} - \text{TIME}_0$$

and TIME_0 is the time of each on-orbit alignment completion.

The attitude fault detection threshold shall have this form until it reaches a maximum value, at which point it shall be set equal to the maximum value:

$$\text{TH_ATT_D} = \text{A_CONS}_4$$

All parameters associated with the calculation of this threshold shall be carried across all further OPS transitions until the next alignment.

After the attitude fault detection threshold has been computed, it shall be squared. This may be computed as follows:

$$\text{TH_SQ_AD} = \text{TH_ATT_D} \text{ TH_ATT_D}$$

TIME is the current time as provided by the IMU SOP, TIME_0 , is the value of time at each specified event provided by the IMU SOP and saved in IMU_RM_INIT .

The values of the coefficients of the attitude fault detection threshold polynomial (A_CONS_1 , A_CONS_3 , A_CONS_4 , A_RAMP_2 , A_RAMP_3) are either I-loads or K-loads (Section 4.2.4).

- Each of the squared attitude errors (AD_{12} , AD_{13} , and AD_{23}) from the attitude selection filter is compared to the square of the attitude fault detection threshold (TH_SQ_AD). The appropriate IMU attitude miscompare flags (MC_ATT_{12} , MC_ATT_{13} , and MC_ATT_{23}) are then set. An example of the logic flow is as follows:

If $\text{AD}_{12} \geq \text{TH_SQ_AD}$; then $\text{MC_ATT}_{12} = \text{VALID}$; else $\text{MC_ATT}_{12} = \text{INVALID}$

If $\text{AD}_{13} \geq \text{TH_SQ_AD}$; then $\text{MC_ATT}_{13} = \text{VALID}$; else $\text{MC_ATT}_{13} = \text{INVALID}$

If $\text{AD}_{23} \geq \text{TH_SQ_AD}$; then $\text{MC_ATT}_{23} = \text{VALID}$; else $\text{MC_ATT}_{23} = \text{INVALID}$

These three attitude miscompare flags are then sent to the attitude fault identification module.

4.2.1.1.2.2 Two-Level IMU Attitude Fault Detection Functional Requirements.

Two-level ATT_FD module is executed when the IMU attitude status vector indicates that only two IMU's are candidates. The two-level ATT_FD module sends one miscompare flag to the attitude fault identification module. It also sends the square of the attitude error to the ATT_FI module.

Two-level attitude fault detection processing is divided into three steps:

- Compute the attitude fault detection threshold and square it.
- Compute the square of the attitude error.

3. Compare the squared attitude error with the square of the attitude fault detection threshold and set the attitude miscompare flag.

These steps are described as follows:

1. The basic form of the attitude fault detection threshold is a firstorder polynomial. During different portions of the flight, this polynomial is either reinitialized or recomputed with different coefficients. The events of the flight which initialize the attitude fault detection threshold (TH_ATT_D) are platform reference update (REFS_RDY), and each on-orbit alignment.

Thus beginning at platform reference update (REFS_RDY), the attitude fault detection threshold shall be specified by

$$TH_ATT_D = A_CONS_5 + A_RAMP_5 T_2$$

where

$$T_2 = TIME - TIME_0;$$

TIME_0 is initialized to the time of REFS_RDY. All parameters associated with the calculation of this threshold shall be carried across all further OPS transitions until the first on-orbit alignment. After completion of each on-orbit alignment, the attitude fault detection threshold shall be specified by

$$TH_ATT_D = A_CONS_7 + A_RAMP_6 T_3$$

where

$$T_3 = TIME - TIME_0$$

and TIME_0 is the time of each on-orbit alignment completion.

The attitude fault detection threshold shall have this form until it reaches a maximum value, at which point it shall be set equal to the maximum value:

$$TH_ATT_D = A_CONS_8$$

All parameters associated with the calculation of this threshold shall be carried across all further OPS transitions until the next alignment.

After the attitude fault detection threshold has been computed, it shall then be squared. This may be computed as follows:

$$TH_SQ_AD = TH_ATT_D TH_ATT_D$$

TIME is the value of the current time as provided by the IMU SOP; TIME_0 is the value of time at each specified event provided by the IMU SOP and saved in IMU_RM_INIT.

The values of the coefficients of the attitude fault detection threshold polynomial (A_CONS_5, A_CONS_7, A_CONS_8, A_RAMP_5, and A_RAMP_6) are either I-loads or K-loads (Section 4.2.4).

2. The square of the attitude error shall be computed as follows: Let Q_SMSM_0(k) be the IMU i to IMU j transformation quaternion at the time of IMU RM initialization; i.e., Q_SMSM(k) at TIME_0. Q_SMSM(k) is the IMU i to IMU j transformation quaternion at the current time. Calculate as follows:

CALL QUAT_MULT (Q_SMSM_0*(K), Q_SMSM(K)) ASSIGN Q_MAG

$$\text{MAG_SQ} = \overline{\text{Q_MAGV}} \cdot \overline{\text{Q_MAGV}}$$

Where QUAT_MULT is the quaternion multiply utility routine; the asterisk denotes quaternion conjugation; $\overline{\text{Q_MAGV}}$ is the vector component of error quaternion, Q_MAG.

3. The squared attitude error (MAG_SQ) is compared with the square of the attitude fault detection threshold (TH_SQ_AD). The value of the attitude miscompare flag (MC_ATT_ij) is determined as follows:

IF MAG_SQ \geq TH_SQ_AD; then MC_ATT_ij = VALID; else MC_ATT_ij = INVALID.

The attitude miscompare flag is sent to the attitude fault identification module.

4.2.1.1.3 IMU Attitude Fault Identification Functional Requirements.

The IMU attitude fault identification (ATT_FI) module shall determine the IMU dilemma flag for the crew interface module. In addition, ATT_FI shall determine the IMU failure flags for use by the crew interface and the attitude and velocity selection filter modules.

Three-level IMU attitude fault identification (ATT_FI) is executed when the IMU attitude status vector (IMU_ATT_STATUS) from ATT_SF indicates that there are three candidate IMU's. Two-level IMU ATT_FI is executed when the IMU attitude status vector indicates that there are only two candidate IMU's. During OPS 2 or 8, when one IMU is a candidate, the IMU BITE shall be checked. During all other OPS's when only one IMU is a candidate or during any OPS when no IMU is a candidate, the IMU dilemma flag is set invalid, and ATT_FI is exited. Figure 4.2-4 is a functional block diagram of IMU attitude fault identification processing.

The ATT_FI module is executed at the slower rate given in Table 4.0-2 when the attitude data-good flag (ATT_DG) is valid. When the attitude datagood flag is invalid, ATT_FI will be performed at the higher of the two rates shown in Table 4.0-2. ATT_FI conditional rate changes are determined by the ATT_SF module.

4.2.1.1.3.1 Three-Level IMU Attitude Fault Identification Functional Requirements.

Three-level IMU attitude fault identification (ATT_FI) shall send three IMU fail flags to the attitude and velocity selection filters, and to the crew interface.

Three-level attitude fault identification is divided into four steps:

1. Set the IMU dilemma flag (IMU_DILEMMA) invalid.
2. Determine if an IMU attitude failure has been detected.
3. Execute the three-level counting and voting fault identification logic.
4. Perform the ATT_FI N-counter testing.

These steps are described as follows:

1. Set the IMU dilemma flag (IMU_DILEMMA) invalid.
2. If any of the three attitude miscompare flags (MC_ATT_ij) from ATT_FD is valid, then proceed to Step 3; else reset to zero the ATT_FI N-counter (NC_ATT) and the fault identification index (IMU_ATT_FI) and exit ATT_FI processing this pass.
3. If exactly two attitude miscompare flags are valid, then the attitude fault identification index (IMU_ATT_FI) is set equal to the ID of the IMU common to the two valid miscompare flags: if MC_ATT_12 and MC_ATT_23 are valid and MC_ATT_13 is invalid, then IMU_ATT_FI is set equal to 2. Proceed to step 4. If, however, only one attitude flag is valid, then the attitude fault identification index and the ATT_FI N-counter are both reset to zero, the IMU dilemma flag is set to invalid, and ATT_FI processing is exited this pass.

If all three miscompare flags are valid, then ATT_FI processing is exited.

4. Compare the current fault identification index with its previous value. If the two disagree, set the ATT_FI N-counter (NC_ATT) to zero and exit ATT_FI processing this pass. If the two agree, then increment the ATT_FI N-counter (NC_ATT). If the ATT_FI N-counter is equal to the N-counter limit (N_ATT) specified in the K-loads (Section 4.2.4), then the IMU fail flag (IMU_i_FAIL) corresponding to the fault identification index is set valid.

4.2.1.1.3.2 Two-Level IMU Attitude Fault Identification Functional Requirements.

Two-level IMU attitude fault identification (ATT_FI) shall provide three IMU fail flags to the attitude and velocity selection filters. Two-level ATT_FI shall provide the same three IMU fail flags to the crew interface, along with the IMU dilemma flag. The IMU fail flag corresponding to the IMU which already failed is set valid. The two other IMU fail flags will be set based upon the processing at the two-level.

Two-level attitude fault identification is divided into eight steps:

1. Determine if an IMU attitude failure has been detected.
2. Perform the two-level IMU dilemma check.
3. Check IMU BITE fail flags.
4. Compute four squared attitude errors.

5. Compute the ATT_FI threshold and square it.
6. Compare the squared attitude errors with the square of the ATT_FI threshold.
7. Execute the two-level counting and voting fault identification logic.
8. Check for a dilemma and use RGM rates.
9. Perform the ATT_FI N-counter testing.

These steps are described as follows:

1. If the two-level attitude miscompare flag (MC_ATT_ij) from ATT_FD is invalid, and the attitude data-good flag (ATT_DG) from ATT_SF is valid, then no attitude failure is indicated. In this case do the following:

Reset the ATT_FI N-counter (NC_ATT) to zero.

Reset the attitude fault identification index (IMU_ATT_FI) to zero.

Reset the IMU dilemma N-counter (NC_DIL) to zero.

Exit ATT_FI this pass; else, proceed to the next step.

2. Check for the IMU dilemma case as follows:

Increment the IMU dilemma N-counter (NC_DIL). Compute the dilemma N-counter limit (ND_LIM) as follows:

If the attitude data-good flag was invalid, then set the dilemma N-counter limit (ND_LIM) equal to the high rate dilemma N-counter limit (ND_HIGH); else, set the dilemma N-counter limit equal to the low rate dilemma N-counter limit (ND_LOW). These limits are given in Section 4.2.4. If the dilemma N-counter (NC_DIL) is greater than or equal to the N-counter limit (ND_LIM), then the IMU dilemma flag (IMU_DILEMMA) is set valid. Proceed to Step 3.

3. Interrogate both IMU BITE failure flags from the IMU SOP (IMU_i_BITE_FAIL, IMU_j_BITE_FAIL) as follows:

If both IMU_i_BITE_FAIL and IMU_j_BITE_FAIL are invalid, proceed to Step 4 for further ATT_FI processing. If only one BITE flag is valid, then the attitude fault identification index (IMU_ATT_FI) is set equal to the IMU having the valid flag; proceed to Step 9 for N-counter testing. If both IMU BITE failure flags are valid, then proceed to Step 8.

4. The squares of the four attitude error components shall be computed as follows: Let $Q_{SMSM_0}(k)$ be the IMU i to IMU j transformation quaternion at the time of IMU RM initialization; i.e., $Q_{SMSM}(k)$ at TIME_0. $Q_{SMSM}(k)$ is the IMU i to IMU j transformation quaternion at the current time. Calculate as follows:

$$AEZ_I = [-Q_SMSM_0(k)_4 Q_SMSM(k)_1 + Q_SMSM_0(k)_3 Q_SMSM(k)_2 \\ -Q_SMSM_0(k)_2 Q_SMSM(k)_3 + Q_SMSM_0(k)_1 Q_SMSM(k)_4]^2$$

$$AEZ_J = [Q_SMSM_0(k)_4 Q_SMSM(k)_1 + Q_SMSM_0(k)_3 Q_SMSM(k)_2 \\ -Q_SMSM_0(k)_2 Q_SMSM(k)_3 - Q_SMSM_0(k)_1 Q_SMSM(k)_4]^2$$

If the attitude data-good flag (ATT_DG) is invalid, then

CALL QUAT_MULT [Q_SMSM_0(k), Q_SMSM(k)] ASSIGN Q_MAG

$$MAG_SQ = Q_MAGV \cdot Q_MAGV$$

else MAG_SQ is provided by the ATT_FD module

and set

$$AEXY_I = MAG_SQ - AEZ_I$$

$$AEXY_J = MAG_SQ - AEZ_J$$

The four squared attitude errors (AEXY_I, AEZ_I, AEXY_J, and AEZ_J) are the errors associated with each of the four gyros in the IMU pair. (The X and Y errors are combined since they are associated with the same two-degree-of-freedom gyro). A faulty gyro will cause a drift misalignment to appear not only on its own coordinate axis, but also along all coordinate axes in the other IMU. Consequently, three of the four attitude errors will be corrupted by a gyro failure, and the fourth uncorrupted attitude error will be associated with the remaining good gyro in the failed IMU. The three-of-four identification logic by which the faulty IMU is identified will be described in Step 7.

5. The basic form of the attitude fault identification threshold is a first-order polynomial. During different portions of the flight this polynomial is either reinitialized or recomputed with different coefficients. The events of the flight which initialize the attitude fault identification threshold (TH_ATT_I) are platform reference update (REFS_RDY), and each on-orbit alignment.

Thus, beginning at platform reference update (REFS_RDY) the attitude fault identification threshold shall be specified by

$$TH_ATT_I = A_CONS_9 + A_RAMP_8 T_2$$

where

$$T_2 = TIME - TIME_0$$

and TIME_0 is initialized to the time of REFS_RDY. All parameters associated with calculation of this threshold shall be carried across all further OPS transitions until the first on-orbit alignment. After each on-orbit alignment is completed, the attitude fault identification threshold shall be specified by

$$TH_ATT_I = A_CONS_11 + A_RAMP_9 T_3$$

where

$$T_3 = TIME - TIME_0$$

and TIME₀ is the time of on-orbit alignment completion.

All parameters associated with calculation of this threshold shall be carried across all further OPS transitions until the next alignment. After the attitude fault identification threshold has been computed, it shall then be squared. This may be computed as follows:

$$TH_SQ_AI = TH_ATT_I TH_ATT_I$$

TIME is the value of time as provided by the IMU SOP. TIME₀ is the value of time at each specified event provided by the IMU SOP saved by IMU_RM_INIT. The values of the coefficients of the attitude fault identification threshold polynomials (A_CONS₉, A_CONS₁₁, A_RAMP₈, and A_RAMP₉) are either I-Loads or K-loads (Section 4.2.4).

6. Each of the squared attitude errors is compared with the squared ATT_FI threshold (TH_SQ_AI), and four gyro miscompare flags (GMCXY_I, GMCZ_I, GMCXY_J, GMCZ_J) are set as follows:

If AEXY_I ≥ TH_SQ_AI, then GMCXY_I is set valid; else GMCXY_I is set invalid.

If AEZ_I ≥ TH_SQ_AI, then GMCZ_I is set valid; else GMCZ_I is set invalid.

If AEXY_J ≥ TH_SQ_AI, then GMCXY_J is set valid; else GMCXY_J is set invalid.

If AEZ_J ≥ TH_SQ_AI, then GMCZ_J is set valid; else GMCZ_J is set invalid

7. Execute the three-of-four fault identification logic. If three of the four gyro miscompare flags are valid simultaneously, then the fault identification index (IMU_ATT_FI) is set equal to the IMU with the single invalid miscompare flag as follows:

If either GMCXY_I or GMCZ_I is invalid,

then

$$IMU_ATT_FI = i$$

else

$$IMU_ATT_FI = j$$

where i and j indicate the two candidate IMU's (as computed in the ATT_SF module via the IMU attitude status vector). Proceed to Step 9 for N-counter testing. If, however, zero, one, two, or four gyro miscompare flags are valid, then the failure is not identifiable. In this case proceed to Step 8.

8. Check for a dilemma and use the RGM rates. If the dilemma N-counter (NC_DIL) is greater than or equal to the N-counter limit (ND_LIM), then set the attitude fault identification index (IMU_ATT_FI) equal to the IMU having the higher absolute compensated and filtered redundant axis rate (RGM_RATE_i) as provided by the IMU SOP and proceed to Step 9. Otherwise reset the ATT_FI N-counter (NC_ATT) and fault identification index (IMU_ATT_FI) to zero and exit ATT_FI processing this pass.
9. Perform the ATT_FI N-counter testing. Compare the current fault identification index with its previous value. If the two disagree, set the ATT_FI N-counter (NC_ATT) to zero and exit ATT_FI processing this pass. If the two agree, then increment the ATT_FI N-counter (NC_ATT) by one. If the ATT_FI N-counter is equal to the N-counter limit (N_ATT) specified in the K-loads (Section 4.2.4), then the IMU fail flag (IMU_i_FAIL) corresponding to the fault identification index is set valid and the ATT_FI N-counter is set to zero. If the ATT_FI N-counter is not equal to the N-counter limit, then exit ATT_FI processing this pass.

4.2.1.1.3.3 One-Level IMU Attitude Fault Identification Functional Requirements.

During OPS 2 and OPS 8 the one-level IMU attitude fault identification (ATT_FI) module shall provide three IMU fail flags to the crew interface, and attitude and velocity selection filters. The IMU fail flags corresponding to any IMU's which have been declared failed shall be set valid. The remaining IMU's fail flag shall be set based upon the following processing at the one-level. ATT_FI processing at the one level shall be executed at the rate as specified by the attitude fault identification conditional rate flag (FI_RATE).

One-level attitude fault identification is divided into two steps:

1. Check the IMU BITE failure flag.
2. Perform the ATT_FI N-counter testing

These steps are described as follows:

1. Interrogate the IMU BITE failure flag from the IMU SOP (IMU_i_BITE_FAIL). If it is valid, then set the attitude fault identification index (IMU_ATT_FI) equal to the IMU having the valid flag and proceed to step 2; else exit ATT_FI processing for this pass.
2. Perform the ATT_FI N-counter testing. Compare the current fault identification index with its previous value. If the two disagree, set the ATT_FI N-counter (NC_ATT) to zero and exit ATT_FI processing this pass. If the two agree, then increment the ATT_FI N-counter (NC_ATT) by one. If the ATT_FI N-counter is equal to the N-counter limit (N_ATT) specified in Section 4.2.4, then the IMU fail flag (IMU_i_FAIL) corresponding to the fault identification index is set valid and the ATT_FI N-counter is set to zero. If the ATT_FI N-counter is not equal to the N-counter limit, then exit ATT_FI processing this pass.

4.2.1.2 Inertial Measurement Unit Velocity Redundancy Management Functional Requirements.

IMU velocity redundancy management processing is divided into two functions: (1) velocity selection filter (VEL_SF), and (2) velocity fault detection and identification (VEL_FDI).

Both functions shall be executed continuously at the rates specified in Tables 4.1–2 and 4.0–2.

The VEL_SF module shall determine the number of candidate IMU's and, in the case of one or two candidates, it shall determine the ID numbers of the candidate IMU's. This information shall be stored in the IMU velocity status vector for moding the VEL_FDI module.

4.2.1.2.1 Inertial Measurement Unit Velocity Selection Filter Functional Requirements.

The velocity selection filter (VEL_SF) provides a navigation selection filter control vector (IMU_SFC) to the navigation state vector module and a selected total velocity in Mean of 50 coordinates to the NAV state vector module and user parameter processing module. The IMU velocity status vector (IMU_VEL_STATUS) is sent to the velocity fault detection and identification (VEL_FDI) module. The VEL_SF module is executed at the rate given in Table 4.1–2. Figure 4.2–5 is a functional block diagram of the velocity selection filter.

The VEL_SF module first computes two vectors which describe the availability of IMU velocity data to various users. The IMU velocity status vector (IMU_VEL_STATUS) counts the number of candidate IMU's, using the candidacy definition in Section 4.2.1, and includes the identification numbers of the candidate IMU's on the two and one levels, as was described in paragraph 4.2.1.1.1. If on-board alignment is being executed (ALIGN_IN_PROGRESS valid), then the IMU velocity status vector is set to indicate zero IMU's. The IMU velocity status vector is then sent to the VEL_FDI module.

If an IMU has been unavailable for velocity fault detection and identification processing (i.e., violated any of the VEL_FDI availability requirements), the IMU shall not be admitted into candidate status in the velocity fault detection and identification (VEL_FDI) module until a new previous velocity value (PREV_K) has been computed.

The navigation selection filter control vector's components (IMU_SFC) correspond to the IMU identification number and are set to one or zero if the corresponding IMU is available or not available, respectively, to the navigation state vector (NAV_SV) module. An IMU is available to NAV_SV if the following requirements are satisfied:

1. It has been selected by the crew
2. It has not been previously failed
3. Its IMU BITE failure flag is set invalid
4. It does not have a commfault

Condition 3 (invalid IMU BITE failure flag) will apply to determining an IMU's candidate status only at the one-IMU level (i.e., two IMU's of the three have been deselected, failed by tracking test or BITE, or have a commfault) during OPS 2 and 8.

During OPS 2 or OPS 8 if the navigation selection filter control vector (IMU_SFC) indicates that no IMU is available, the selected total velocity in Mean of 50 coordinates is set equal to its previous value, and the VEL_SF module is exited. During all other OPS, if the navigation selection filter control vector indicates that no IMU is available to the navigation selection filter, set the navigation selection filter control vector (IMU_SFC) equal to its previous value and continue selection filter processing at the appropriate level as described below.

If on-board alignment is being executed (ALIGN_IN_PROGRESS valid), then an IMU is defined to be available to NAV_SV if:

1. It has not been previously failed
2. It has been selected by the crew
3. It is not being slewed
4. It does not have a failure indicated by BITE
5. It does not have a communications fault

Condition 4 applies only where conditions 1, 2, 3, and 5 indicate one IMU is a candidate during OPS 2 and 8. If, during OPS 3, no IMU's are candidates, set the navigation selection filter control vector equal to its previous value. The navigation selection filter control vector (IMU_SFC) is then sent to NAV_SV.

When in OPS 3, the velocity selection filter (VEL_SF) shall automatically reset the IMU select/deselect command (C_SEL_I), (i. e., deselect the IMU) when the associated IMU's bypass flag is set. This automatic deselection of a bypassed IMU shall not occur if the the IMU to be deselected is the last remaining IMU.

If an IMU has been unavailable to the NAV_SV (i.e., violated any of the NAV_SV availability requirements), the IMU shall not be admitted into candidate status in the velocity selection filter (VEL_SF) until a new bias (\bar{B}_K) has been calculated for it. The exception to this is the special processing required for a "NO AVAILABLE SENSOR" condition.

The total velocities in M50 coordinates, as provided by the IMU SOP, are biased before further processing is performed. The biases (\bar{B}_1 , \bar{B}_2 , \bar{B}_3) are calculated once every 8 seconds by subtracting the total velocities (\bar{V}_1 , \bar{V}_2 , \bar{V}_3) from the selected velocity (SEL_V_M50). Each cyclic calculation of the velocity biases is referred to as a rectification cycle.

$$\bar{B}_1 = \bar{SEL_V_M50} - \bar{V}_1$$

$$\bar{B}_2 = \bar{SEL_V_M50} - \bar{V}_2$$

$$\bar{B}_3 = \bar{SEL_V_M50} - \bar{V}_3$$

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where the total velocities and the selected velocity are time homogeneous. These biases are then added to the total velocities ($\bar{V}_1, \bar{V}_2, \bar{V}_3$) to form the biased velocities ($\bar{V}B_1 = \bar{V}_1 + \bar{B}_1, \bar{V}B_2 = \bar{V}_2 + \bar{B}_2, \bar{V}B_3 = \bar{V}_3 + \bar{B}_3$). The biased velocities are sent to the appropriate selection filter as described below, according to the navigation selection filter control vector.

During OPS-2 and 8 only, the selected velocity shall be corrected for navbase to c.g. offset as follows:

$$\bar{S}EL_V_M50_CG = \bar{S}EL_V_M50 - \bar{V}_NB$$

where

$$\bar{V}_NB = QUAT_XFORM(Q_B_M50*, \bar{W}CR)$$

and

$$WCR = RATE_EST * \bar{R}_NB_CG \text{ RAD_PER_DEG}$$

Q_B_M50 is provided by the Orbit Attitude Processor; $\bar{R}ATE_EST$, by the Orbit DAP; \bar{R}_NB_CG , by I-Load (Section 4.2.4). $WCR, SEL_V_M50_CG$, and SEL_V_M50 shall be time tagged with the variable T_CG and downlisted. Note RAD_PER_DEG is a hard code conversion factor from degrees to radians ($\pi/180$).

The IMU parameters required for the GPS reference state processing principal function and the GPS SOP are set to the selected IMU accumulated velocities referenced to either the navbase or the orbiter c.g., corrected for navbase to c.g. offset, depending on the operational sequence.

The steps for storing the selected IMU data for the GPS related software are as follows.

For all operational sequences except OPS-2 and OPS-8, store the selected IMU velocities at the navbase as follows:

$$\bar{S}EL_VEL_GPS_M50 = \bar{S}EL_V_M50$$

For OPS-2 and OPS-8, store the selected IMU velocities, corrected for navbase to c.g. offset, as follows:

$$\bar{S}EL_VEL_GPS_M50 = \bar{S}EL_V_M50_CG$$

The time tag corresponding to the selected IMU velocities, $TIME_V$, is set equal to the IMU time tag from the IMU SOP, T_IMUS :

$$TIME_V = T_IMUS$$

T_IMUS is the time from the execution of the IMU SOP gimbal angle processing which executes at 6.25 Hz. The IMU SOP function which computes the individual IMU accumulated velocities can execute at a slower rate depending on major mode. Thus, $TIME_V$ represents the time of the IMU accumulated velocities for both the selected and individual IMUs until T_IMUS is updated again.

4.2.1.2.1.1 Three-Level IMU Velocity Selection Filter Functional Requirements.

The three-level IMU_VEL_SF is executed when the navigation selection filter control vector indicates that three IMU's are candidates for selection. The three-level IMU_VEL_SF sends selected total velocity in M50 coordinates ($\overline{SEL_V_M50}$) to the NAV state vector module and the guidance user parameter module. The components of the selected total velocity shall be middle-value-selected on a component-by-component basis from the three biased velocity vectors in M50 coordinates.

4.2.1.2.1.2 Two-Level IMU Velocity Selection Filter Functional Requirements.

The two-level IMU_VEL_SF is executed when navigation selection filter control vector indicates that only two IMU's are candidates for selection.

Two-level IMU_VEL_SF processing is divided into eight steps:

1. Compute the back-differenced selection filter velocity vector from each IMU.
2. Compute the magnitude squared of the incremental selection filter velocity error vector.
3. Compare it to the velocity data-good threshold.
4. Check the IMU BITE failure flags.
5. Compute four squared selection filter velocity errors.
6. Compare the squared selection filter velocity errors with the velocity data good identification threshold.
7. Execute the two-level voting data-good identification logic.
8. Average the two biased velocity vectors ($\overline{VB_i}$ and $\overline{VB_j}$).

Note that Steps 5-7 shall be executed only once for each continuous violation of the velocity data-good threshold without temporary BITE isolation.

These steps are described as follows:

1. Compute the back-differenced selection filter velocity vectors ($\overline{DVM50_SF_i}$, $\overline{DVM50_SF_j}$) from the total M50 velocities ($\overline{V_i}$, $\overline{V_j}$) and the

square of the cycle time as follows:

$$\overline{DVM50_SF_i} = \overline{V_i} - \overline{PREV_SF_i}$$

$$\overline{DVM50_SF_j} = \overline{V_j} - \overline{PREV_SF_j}$$

$$DELTA_SQ = (TIME_V - TIME_PREV_SF)^2$$

TIME_V is the time tag of the present total M50 velocities ($\overline{V_i}$, $\overline{V_j}$), and TIME_PREV_SF is the time tag of the previous total M50 velocities ($\overline{PREV_SF_i}$, $\overline{PREV_SF_j}$).

The velocities (\bar{V}_i , \bar{V}_j) and their timetag (TIME_V) are then saved (in $\bar{P}REV_SF_i$, $\bar{P}REV_SF_j$, TIME_PREV_SF) for use by the next VEL_SF cycle as follows:

$$\bar{P}REV_SF_i = \bar{V}_i$$

$$\bar{P}REV_SF_j = \bar{V}_j$$

$$TIME_PREV_SF = TIME_V$$

2. The magnitude squared of the incremental selection filter velocity error vector may be calculated as follows:

$$EDVM50 = (\bar{D}VM50_SF_i - \bar{D}VM50_SF_j) \cdot (\bar{D}VM50_SF_i - \bar{D}VM50_SF_j)$$

3. Compare the magnitude squared of the incremental selection filter velocity error vector (EDVM50) to the velocity data-good threshold (TH_VEL_DG). TH_VEL_DG is computed as follows:

$$TH_VEL_DG = TH_VEL_DG_XX_YYY \ DELT_SQ$$

DELT_SQ was computed in step 1 and TH_VEL_DG_XX_YYY assumes the following I-Load or K-Load values (Section 4.2.4):

TH_VEL_DG_HI_ASC for Major Modes 101 beginning at platform reference update (REFS_RDY), 102, 103, and 601

TH_VEL_DG_HI_RTLS for Major Modes 602 and 603

TH_VEL_DG_HI_ENT for Major Modes 304 and 305

TH_VEL_DG_LO_ASC for Major Modes 104, 105, and 106

TH_VEL_DG_LO_ORB for OPS 2 and 8

and

TH_VEL_DG_LO_ENT for Major Modes 301, 302, and 303.

If EDVM50 is less than TH_VEL_DG, then proceed to Step 8; else proceed to Step 4.

During orbit operations where GPC startups are possible without major functions base informations TH_VEL_DG shall be computed with the use of TH_VEL_DG_LO_ORB or TH_VEL_DG_LO_ENT, as appropriate.

4. Interrogate both IMU BITE failure flags (IMU_i_BITE_FAIL, IMU_j_BITE_FAIL) from the IMU SOP as follows:
 - a. If both IMU_i_BITE_FAIL and IMU_j_BITE_FAIL are invalid, proceed to Step 5.
 - b. If only one IMU BITE failure flag is valid, set the navigation selection filter control vector to indicate one IMU, the IMU with the invalid IMU BITE failure flag, and proceed to one-level IMU velocity selection filter processing described subsequently in 4.2.1.2.1.3.

- c. If both IMU_i_BITE_FAIL and IMU_j_BITE_FAIL are valid, proceed to Step 8.
5. If this is a subsequent, consecutive execution of this step, then use the result from the previous pass; i.e., set the navigation selection filter control vector equal to its previous value and proceed to the appropriate level. Otherwise, this is the first execution of this step after any velocity data–good threshold violation without temporary isolation by BITE; continue processing by computing the four squared selection filter velocity errors.

The four squared selection filter velocity errors are computed as follows:

First, transform the incremental selection filter velocities in M50 coordinates ($\overline{DVM50_SF_i}$, $\overline{DVM50_SF_j}$) to their respective IMU stable member coordinates ($\overline{DV_SF_i}$, $\overline{DV_SF_j}$). This transformation may be performed as follows:

$$\overline{DV_SF_i} = (T_Ci_M50)^T \overline{DVM50_SF_i}$$

$$\overline{DV_SF_j} = (T_Cj_M50)^T \overline{DVM50_SF_j}$$

where T_Ci_M50 is the transformation matrix from IMU i stable member coordinates to M50 coordinates, obtained from the IMU SOP.

Next, the incremental selection filter velocity error vector in stable member coordinates of IMU j ($\overline{SF_EDV_JI}$) is formed by transforming the back–differenced velocity in stable member coordinates of one IMU into the stable member coordinates of the other IMU and subtracting the two vectors. This incremental velocity error vector represents the difference in IMU–sensed velocity changes over one SF cycle. It may be computed as follows:

$$\overline{SF_EDV_JI} = \overline{DV_SF_j} - \text{QUAT_XFORM}(Q_SMSM(k), \overline{DV_SF_i})$$

where QUAT_XFORM is a utility function that transforms a vector from one coordinate system to another with use of the quaternion representation of the transformation; $Q_SMSM(k)$ is the transformation quaternion at the current time from IMU i to IMU j as computed by the ATT_PROC module.

Finally the squares of the four selection filter velocity error components (SF_VEXY_I , SF_VEZ_I , SF_VEXY_J , SF_VEZ_J) are computed as follows:

$$\text{SF_VEXY_J} = \text{SF_EDV_JI}(1)^2 + \text{SF_EDV_JI}(2)^2$$

$$\text{SF_VEZ_J} = \text{SF_EDV_JI}(3)^2$$

Next, transform the incremental selection filter velocity error vector in stable member coordinates of IMU j ($\overline{SF_EDV_JI}$) into the stable member coordinates of IMU i as in the following example:

$$\overline{SF_EDV_IJ} = \text{QUAT_XFORM}(Q_SMSM^*(k), \overline{SF_EDV_JI})$$

Finally

$$SF_VEXY_I = SF_EDV_IJ (1)^2 + SF_EDV_IJ (2)^2$$

$$SF_VEZ_I = SF_EDV_IJ (3)^2$$

6. Each of the squared selection filter velocity errors is compared to the velocity data-good identification threshold TH_VEL_DGI.

TH_VEL_DGI is computed as follows:

$$TH_VEL_DGI = TH_VEL_DGI_XX_YYY DELT_SQ$$

DELT_SQ was computed in step 1, and TH_VEL_DGI_XX_YYY assumes the following I-Load values (section 4.2.4):

TH_VEL_DGI_HI_ASC for Major Modes 101 beginning at platform reference update (REFS_RDY), 102, 103, and 601

TH_VEL_DGI_HI_RTLS for Major Modes 602 and 603

TH_VEL_DGI_HI_ENT for Major Modes 304 and 305

and

TH_VEL_DGI_LO for all other major modes.

During orbit operations where GPC startups are possible without major function base information, TH_VEL_DGI shall be calculated using TH_VEL_DGI_LO.

The four selection filter miscompare flags (SFMICY_I, SFMCZ_I, SFMICY_J, SFMCZ_J) are set as follows:

If $SF_VEXY_I \geq TH_VEL_DGI$, then SFMICY_I is set valid; else SFMICY_I is set invalid.

If $SF_VEZ_I \geq TH_VEL_DGI$, then SFMCZ_I is set valid; else SFMCZ_I is set invalid.

If $SF_VEXY_J \geq TH_VEL_DGI$, then SFMICY_J is set valid; else SFMICY_J is set invalid.

If $SF_VEZ_J \geq TH_VEL_DGI$, then SFMCZ_J is set valid; else SFMCZ_J is set invalid.

7. Execute the three-of-four data-good identification logic. If three of the four selection filter miscompare flags are valid simultaneously, then set the navigation selection filter control vector to indicate that IMU having both valid selection filter miscompare flags and proceed to one-IMU velocity selection filter processing described subsequently in 4.2.1.2.1.3; else (i.e., zero, one, two, or four valid selection filter miscompare flags) proceed to Step 8.
8. Compute a selected total velocity in M50 coordinates by averaging the two biased velocity vectors (\bar{V}_B_i and \bar{V}_B_j), where the values of i and j are indicated by the navigation selection filter control vector. This averaged vector is the selected total velocity vector in M50 coordinates, which is then sent to the user parameter processing module and the navigation state vector module.

4.2.1.2.1.3 One-Level IMU Velocity Selection Filter Functional Requirements.

The one-level IMU_VEL_SF is executed when the navigation selection filter control vector indicates that only one IMU is a candidate for selection. The one-level IMU_VEL_SF passes on the biased velocity vector for that IMU indicated by the navigation selection filter control vector. This velocity vector is designated as the selected total velocity in M50 coordinates for use by the navigation state vector and the user parameter processing module. If the navigation selection filter control vector indicates that more than one IMU is a candidate for selection after being at the one-IMU level or that the one IMU available is not the same as the IMU previously available, the additional selected IMU(s) shall not be admitted into candidate status in the velocity selection filter (VEL_SF) until its new bias (\bar{B}_K) has been computed.

4.2.1.2.1.4 NAS IMU Velocity Selection Filter Functional Requirements.

During OPS 2 or OPS 8 if the navigation selection filter control vector indicates that no IMU is available, the selected total velocity in Mean of 50 coordinates is set equal to its previous value and the VEL_SF module is exited. During all other OPS, if the navigation selection filter control vector indicates that no IMU is available to the navigation selection filter, set the navigation selection filter control vector (IMU_SFC) equal to its previous value and continue selection filter processing at the appropriate level.

4.2.1.2.2 IMU Velocity Fault Detection and Identification Functional Requirements.

The velocity fault detection and identification (VEL_FDI) module monitors the velocity data from the IMU SOP to detect and identify IMU failures. The three-level velocity FDI function will be used when the velocity IMU status vector (IMU_VEL_STATUS) indicates that all three IMU's are candidates. The two-level velocity FDI function shall be used when the IMU velocity status vector indicates that only two IMU's are candidates. In addition, at the two level, the IMU velocity status vector (of form N, i, j) will indicate the two candidate IMU's (namely, IMU i and IMU j).

Figure 4.2-6 is a functional block diagram of the IMU VEL_FDI processing. The VEL_FDI module shall be executed at the rate given in Table 4.0-2.

The VEL_FDI module performs certain common calculations before any further VEL_FDI routines are executed. This processing is divided into three steps:

1. Compute the back-differenced velocity vector from each IMU.
2. For two or three level, compute the square of the velocity fault detection threshold.
3. For one and NAS levels, reset the IMU dilemma indicator and exit VEL_FDI.

These steps are described as follows:

1. Compute the back-differenced velocity vectors ($\bar{DVM50}_1, \bar{DVM50}_2, \bar{DVM50}_3$) from the total M50 velocities ($\bar{V}_1, \bar{V}_2, \bar{V}_3$) as follows:

$$\bar{DVM50}_1 = \bar{V}_1 - \bar{PREV}_1$$

$$\bar{DVM50}_2 = \bar{V}_2 - \bar{PREV}_2$$

$$\bar{DVM50}_3 = \bar{V}_3 - \bar{PREV}_3$$

The velocities (\bar{V}_1 , \bar{V}_2 , \bar{V}_3) are then saved (in \bar{PREV}_1 , \bar{PREV}_2 , \bar{PREV}_3) for use by the next VEL_FDI cycle as follows:

$$\bar{PREV}_1 = \bar{V}_1$$

$$\bar{PREV}_2 = \bar{V}_2$$

$$\bar{PREV}_3 = \bar{V}_3$$

2. If two or three IMU's are indicated by the IMU velocity status vector to be candidates, then the velocity fault detection threshold is computed and squared as follows:

The velocity fault detection threshold (TH_VEL_D) shall be a constant throughout various portions of the flight, except during Major Mode 304, when it shall be a linear ramp until it reaches a maximum value, at which point it latches to that maximum value. The value of the constant velocity fault detection threshold shall vary according to which portion of the flight the Shuttle is in and according to how many IMU's are available for velocity fault detection and identification processing as indicated by the IMU velocity status vector (IMU_VEL_STATUS).

From platform reference update (REFS_RDY) to Major Mode 104 and during Major Mode 601,

$$TH_VEL_D = V_CONS_2 \text{ (3 IMU fault detect)}$$

$$TH_VEL_D = V_CONS_10 \text{ (2 IMU fault detect)}$$

During Major Modes 602 and 603,

$$TH_VEL_D = V_CONS_13 \text{ (3 IMU fault detect)}$$

$$TH_VEL_D = V_CONS_14 \text{ (2 IMU fault detect)}$$

During Major Modes 104, 105, 106, 301, 302, and 303 and during OPS 2 and OPS 8,

$$TH_VEL_D = V_CONS_3 \text{ (3 IMU fault detect)}$$

$$TH_VEL_D = V_CONS_11 \text{ (2 IMU fault detect)}$$

During orbit operations, where GPC start-ups are possible without major function base information, TH_VEL_D shall be set equal to V_CONS_3 (appropriate to the OPS cold-start).

Note: V_CONS_3 and V_CONS_11 may have different values in different memory configurations

Starting at Major Mode 304,

$$TH_VEL_D = V_CONS_3 + V_RAMP_1 T_1 \text{ (3 IMU fault detect)}$$

$$TH_VEL_D = V_CONS_11 + V_RAMP_3 T_1 \text{ (2 IMU fault detect)}$$

where

$$T_1 = TIME - TIME_MM304$$

and TIME_MM304 is the time of the start of Major Mode 304.

This ramp continues until it reaches a maximum value, at which point it latches at that maximum:

$$TH_VEL_D = V_CONS_4 \text{ (3 IMU fault detect)}$$

$$TH_VEL_D = V_CONS_12 \text{ (2 IMU fault detect)}$$

After the value of the threshold has been computed in this manner, it shall then be squared. It may be squared as follows:

$$TH_SQ_VD = TH_VEL_D TH_VEL_D$$

TIME is the value of time as provided by the IMU SOP and TIME_MM304 is the value of time provided by the IMU SOP at MM 304 initialization.

The velocity fault detection threshold constants (V_CONS_2, V_CONS_3, V_CONS_4, V_CONS_10, V_CONS_11, V_CONS_12, V_CONS_13 and V_CONS_14, and V_RAMP_1 and V_RAMP_3) are either I-loads or K-loads (Section 4.2.4).

After the velocity fault detection threshold is completed, the required three- or two-level velocity FDI routine is executed.

3. If one or zero candidate IMU is indicated by the IMU velocity status vector, then the IMU dilemma indicator (IMU_DILEMMA) is reset to invalid, and VEL_FDI processing is exited this pass.

4.2.1.2.2.1 Three-Level IMU Velocity Fault Detection and Identification Functional Requirements.

The three-level IMU VEL_FDI module provides IMU failure flags (IMU_1_FAIL, IMU_2_FAIL, and IMU_3_FAIL) to the VEL_SF, ATT_SF, and crew interface modules. Three-level VEL_FDI is executed when the IMU velocity status vector (IMU_VEL_STATUS) indicates that three IMU's are candidates. Figure 4.2-7 is a functional block diagram of the three-level VEL_FDI routine. Three-level IMU VEL_FDI is divided into six steps:

1. Transform the back-differenced velocities from Mean of 50 to the respective stable member coordinates.
2. Form the incremental velocity error vectors.
3. Compute the square of the magnitude of each incremental velocity error vector.
4. Compare the squares of the magnitudes of the incremental velocity error vector to the square of the velocity fault detection threshold and set the appropriate velocity miscompare flags.
5. Set the IMU dilemma (IMU_DILEMMA) invalid. Execute the three-level counting and voting logic and determine the IMU velocity fault identification index.
6. Perform the velocity N-counter testing and set the IMU failure flags accordingly.

These steps are described as follows:

1. Transform the back-differenced velocities in Mean of 50 coordinates ($\overline{DVM50_1}$, $\overline{DVM50_2}$, $\overline{DVM50_3}$) to their respective IMU stable member coordinates ($\overline{DV_1}$, $\overline{DV_2}$, $\overline{DV_3}$). This transformation may be done in the following manner:

$$\overline{DV_1} = (T_C1_M50)^T \overline{DVM50_1}$$

$$\overline{DV_2} = (T_C2_M50)^T \overline{DVM50_2}$$

$$\overline{DV_3} = (T_C3_M50)^T \overline{DVM50_3}$$

where T_Ci_M50 is the transformation matrix from IMU i stable member coordinates to Mean of 50 coordinates.

2. The incremental velocity error vectors ($\overline{EDV_21}$, $\overline{EDV_31}$, and $\overline{EDV_32}$) are formed by transforming the back-differenced velocities in stable member coordinates of one IMU into the stable member coordinates of another IMU and taking pair wise differences. These incremental velocity error vectors represent the differences in IMU-sensed velocity changes. They may be calculated as follows:

$$\overline{EV_21} = \overline{DV_2} - \text{QUAT_XFORM}(Q_SMSM(3), \overline{DV_1})$$

$$\overline{EV_31} = \overline{DV_3} - \text{QUAT_XFORM}(Q_SMSM(2), \overline{DV_1})$$

$$\overline{E}V_{32} = \overline{D}V_3 - \text{QUAT_XFORM}(Q_SMSM(1), \overline{D}V_2)$$

where QUAT_XFORM is a utility function that transforms a vector from one coordinate system to another with use of the quaternion representation of the transformation; Q_SMSM(3), Q_SMSM(2), and Q_SMSM(1) are the transformation quaternions at the current time from IMU 1 to IMU 2, IMU 1 to IMU 3, and IMU 2 to IMU 3, respectively.

3. Find the magnitude squared of each incremental velocity error vector (VD_12, VD_13, and VD_23). This may be computed as follows:

$$VD_{12} = \overline{E}DV_{21} \cdot \overline{E}DV_{21}$$

$$VD_{13} = \overline{E}DV_{31} \cdot \overline{E}DV_{31}$$

$$VD_{23} = \overline{E}DV_{32} \cdot \overline{E}DV_{32}$$

4. A velocity miscompare flag (MC_V_12, MC_V_13, or MC_V_23) is set valid if the corresponding magnitude squared of the incremental velocity error vector (VD_12, VD_13, or VD_23) equals or exceeds the square of the velocity fault detection threshold (TH_SQ_VD) described in paragraph 4.2.1.2.2. An example of the logic is as follows:

If $VD_{12} \geq TH_SQ_VD$, then $MC_V_{12} = VALID$; else $MC_V_{12} = INVALID$

If $VD_{13} \geq TH_SQ_VD$, then $MC_V_{13} = VALID$; else $MC_V_{13} = INVALID$

If $VD_{23} \geq TH_SQ_VD$, then $MC_V_{23} = VALID$; else $MC_V_{23} = INVALID$

5. Set the IMU dilemma flag (IMU_DILEMMA) invalid. If none of the velocity miscompare flags is valid, reset the VEL_FDI N-counter (NC_VEL) and the fault identification index IMU_VEL_FI to zero and exit VEL_FDI processing this pass. If exactly two velocity miscompare flags are valid, the velocity fault identification index (IMU_VEL_FI) is set equal to the ID of the IMU common to the two valid miscompare flags. If, however, only one velocity miscompare flag is valid, then the velocity fault identification index and the VEL_FDI N-counter (NC_VEL) are both reset to zero and VEL_FDI is exited this pass. If all three velocity miscompare flags are valid, then VEL_FDI is exited.
6. Compare the current fault identification index with its previous value. If the two agree, then increment the VEL_FDI N-counter (NC_VEL) by one; else the VEL_FDI N-counter (NC_VEL) is equal to zero. If the VEL_FDI N-counter is equal to the N-counter limit (N_VEL) specified in Section 4.2.4, then the IMU failure flag (IMU_i_FAIL) corresponding to the fault identification index (IMU_VEL_FI) is set valid.

4.2.1.2.2.2 Two-Level IMU Velocity Fault Detection and Identification Functional Requirements.

Two-level IMU velocity fault detection and identification (VEL_FDI) shall provide three IMU fail flags for the attitude and velocity selection filters. Two-level VEL_FDI shall send the same three IMU fail flags to the crew interface along with the IMU dilemma flag. The IMU fail flag corresponding to the IMU which

already failed is set valid. The two other IMU fail flags will be set based upon the processing at the two level. Figure 4.2–8 is a functional block diagram of the two–level VEL_FDI routine. Two–level VEL_FDI is divided into ten steps:

1. Transform the back–differenced velocities from Mean of 50 to the respective stable member coordinates.
2. Form the incremental velocity error vector.
3. Compute the magnitude squared of the incremental velocity error vector and compare it to the squared fault detection threshold.
4. Perform the two–level IMU dilemma check.
5. Check the IMU BITE failure flags.
6. Compute four squared velocity errors.
7. Compute the velocity fault identification threshold and square it.
8. Compare the squared velocity errors with the square of the VEL_FI threshold.
9. Execute the two–level counting and voting fault identification logic.
10. Perform the velocity N–counter testing.

These steps are described as follows:

1. Transform the back–differenced velocities in M50 coordinates ($\overline{DVM50}_i$, $VM50_j$) to their respective IMU stable member coordinates (\overline{DV}_I , \overline{DV}_J). This transformation may be performed as follows:

$$\overline{DV}_I = (T_{Ci\ M50})^T \overline{DVM50}_i$$

$$\overline{DV}_J = (T_{Cj\ M50})^T \overline{DVM50}_j$$

where $T_{Ci\ M50}$ is the transformation matrix from IMU i stable member coordinates to M50 coordinates, obtained from the IMU SOP.

2. The incremental velocity error vector (\overline{EDV}_{JI}) is formed by transforming the back–differenced velocity in stable member coordinates of one IMU into the stable member coordinates of the other IMU and subtracting the two vectors. This incremental velocity error vector represents the difference in IMU–sensed velocity changes over one FDI cycle. It may be computed as follows:

$$EDV_{JI} = DV_J - QUAT_XFORM(Q_SMSM(k), DV_I)$$

where $QUAT_XFORM$ is a utility function that transforms a vector from one coordinate system to another with use of the quaternion representation of the transformation; $Q_SMSM(k)$

is the transformation quaternion at the current time from IMU *i* to IMU *j* as computed by the ATT_PROC module.

3. Find the magnitude squared of the incremental velocity error vector (VD_JI) as follows:

$$VD_JI = \overline{EDV_J1} \cdot \overline{DV_J1}$$

Then compare the magnitude squared error (VD_JI) to the squared velocity fault detection threshold (TH_SQ_VD) described in paragraph 4.2.1.2.2, and set the velocity miscompare flag (MC_V_IJ) as follows:

If $VD_JI \geq TH_SQ_VD$, then MC_V_IJ is set valid; else MC_V_IJ is set invalid.

4. If the two-level velocity miscompare flag is valid, then check for the IMU dilemma case as follows:

Increment the IMU dilemma velocity N-counter (NC_DIL_VEL). If this N-counter exceeds the velocity dilemma N-counter limit (ND_VEL), then the IMU dilemma flag (IMU_DILEMMA) is set valid and proceed to Step 5 below. The value of ND_VEL is specified in Section 4.2.4.

If the two level IMU velocity miscompare flag (MC_V_IJ) is invalid, then do the following: reset to zero the VEL_FI N-counter (NC_VEL); reset to zero the velocity fault identification index (IMU_VEL_FI); reset to zero the velocity dilemma N-counter (NC_DIL_VEL); and exit VEL_FDI this pass.

5. Interrogate both IMU BITE failure flags (IMU_i_BITE_FAIL, IMU_j_BITE_FAIL) from the IMU SOP as follows:

If both IMU_i_BITE_FAIL and IMU_j_BITE_FAIL are invalid, then proceed to Step 6 for further VEL_FDI processing.

If only one IMU BITE failure flag is valid, then the velocity fault identification index (IMU_VEL_FI) is set equal to the IMU having the valid flag; proceed to Step 10 for N-counter testing.

If both IMU BITE failure flags are valid, then reset the VEL_FI N-counter (NC_VEL) and the fault identification index (IMU_VEL_FI) to zero and exit VEL_FDI processing this pass.

6. The squares of the four velocity error components (VEXY_I, VEZ_I, VEXY_J, VEZ_J) are computed as follows:

$$VEXY_J = EDV_JI(1)^2 + EDV_JI(2)^2$$

$$VEZ_J = EDV_JI(3)^2$$

Next transform the incremental velocity error vector ($\overline{EDV_JI}$) into the stable member coordinates of IMU *i* as in the following example:

$$EDV_IJ = \text{QUAT_XFORM}(Q_SMSM^*(k), EDV_JI)$$

Finally

$$VEXY_I = EDV_IJ(1)^2 + EDV_IJ(2)^2$$

$$VEZ_I = EDV_IJ(3)^2$$

The four squared velocity errors (VEXY_I, VEZ_I, VEXY_J, and VEZ_J) are the errors associated with each of the four accelerometers in the IMU pair. (The X and Y velocity errors are combined since they are associated with the same two-degree-of-freedom accelerometer.)

An erroneous ΔV measurement from an accelerometer will appear as a ΔV bias along the input axis of the failed accelerometer. The skewing geometry establishes a unique spatial direction for each accelerometer input axis. An accelerometer bias in one IMU can thus be resolved by all the accelerometers in the other IMU (i.e., the velocity error will appear along all axes in the good IMU, but only along one or two axes in the failed IMU).

Therefore, three of the four velocity errors will be corrupted by an accelerometer failure, and the fourth uncorrupted velocity error will be associated with the good accelerometer in the failed IMU. The three-of-four identification logic by which the faulty IMU is identified will be described in Step 9.

7. The velocity fault identification threshold (TH_VEL_I) shall be constant throughout various portions of the flight, except during Major Mode 304, when it shall be a linear ramp until it reaches a maximum value, at which point it latches to that maximum value. The value of the constant velocity fault identification threshold shall vary according to which portion of the flight the Shuttle is in.

From platform reference update (REFS_RDY) to Major Mode 104 and during Major Mode 601,

$$TH_VEL_I = V_CONS_6$$

During Major Modes 602 and 603,

$$TH_VEL_I = V_CONS_15$$

During Major Modes 104, 105, 106, 301, 302, and 303 and during OPS 2 and OPS 8,

$$TH_VEL_I = V_CONS_7$$

During orbit operations, where GPC start-ups are possible without major function base information, TH_VEL_I shall be set equal to V_CONS_7.

Starting at Major Mode 304,

$$TH_VEL_I = V_CONS_7 + V_RAMP_2 T_1$$

where

$$T_1 = \text{TIME} - \text{TIME_MM304}$$

and TIME_MM304 is the time of the start of Major Mode 304.

This ramp continues until it reaches a maximum value, at which point it latches at that maximum:

$$\text{TH_VEL_I} = \text{V_CONS_8}$$

After the value of the threshold has been computed in this manner, it shall then be squared. It may be squared as follows:

$$\text{TH_SQ_VI} = \text{TH_VEL_I TH_VEL_I}$$

Time is the current time as provided by the IMU SOP. The threshold constants (V_CONS_6, V_CONS_7, V_CONS_8, V_CONS_15, and V_RAMP_2) are either I-loads or K-loads (Section 4.2.4)

- Each of the squared velocity errors is compared to the squared VEL_FI threshold (TH_SQ_VI), and four accelerometer miscompare flags (VMCXY_I, VMCZ_I, VMCXY_J, VMCZ_J) are set as follows:

If VEXY_I \geq TH_SQ_VI, then VMCXY_I is set valid; else VMCXY_I is set invalid.

If VEZ_I \geq TH_SQ_VI, then VMCZ_I is set valid; else VMCZ_I is set invalid.

If VEXY_J \geq TH_SQ_VI, then VMCXY_J is set valid; else VMCXY_J is set invalid.

If VEZ_J \geq TH_SQ_VI, then VMCZ_J is set valid; else VMCZ_J is set invalid.

- Execute the three-of-four fault identification logic. If three of the four accelerometer miscompare flags are valid simultaneously, then the fault identification index (IMU_VEL_FI) is set equal to the IMU with the single invalid miscompare flag as follows:

If either

VMCXY_I or VMCZ_I is invalid

then

IMU_VEL_FI = i

else

IMU_VEL_FI = j

where i and j indicate the two candidate IMU's (as computed in the VEL_SF module via the IMU velocity status vector).

If zero, one, two or four accelerometer miscompare flags are valid, then the failure is not identifiable. In this case the VEL_FI N-counter (NC_VEL) and the fault identification index (IMU_VEL_FI) are reset to zero, and VEL_FDI is exited this pass.

10. Compare the current fault identification index with its previous value. If the two disagree, reset to zero the VEL_FI N-counter (NC_VEL) and exit VEL_FDI processing this pass. If the two agree, then increment the VEL_FI N-counter (NC_VEL) by one. If the VEL_FI N-counter is equal to the N-counter limit (N_VEL) specified in Section 4.2.4, then the IMU fail flag (IMU_i_FAIL) corresponding to the fault identification index is set valid and the IMU dilemma flag (IMU_DILEMMA) is reset to invalid. Else, exit VEL_FDI processing this pass.

4.2.2 Processing Requirements

The ATT_SF and VEL_SF modules shall be executed at the rates shown in Table 4.1-2. Furthermore, execution of the ATT_SF module shall be sequenced with the ATT_PROC modules as described in paragraph 4.2.1.1.

The ATT_FD and VEL_FDI modules shall be executed at the rates shown in Table 4.0-2.

The ATT_FI module shall be executed at one of two conditional rates shown in Table 4.0-2. ATT_FI conditional rate changes are determined by the ATT_SF module as shown in paragraph 4.2.1.1.2.

BITE processing by the IMU SOP is required by the following IMU RM modules under the given conditions and at the following rates:

ATT_SF at the one-IMU level during OPS 2 and 8 (Table 4.1-2).

ATT_FI at the two-IMU level during all OPS and at the one-IMU level during OPS 2 and 8 (Table 4.0-2).

VEL_SF at the two-IMU level during all OPS and at the one-IMU level during OPS 2 and 8 (Table 4.1-2).

VEL_FDI at the two-IMU level during all OPS's (Table 4.0-2).

4.2.3 IMU Redundancy Management Initialization Requirements

The IMU redundancy management initialization module (IMU_RM_INIT) shall be executed at platform reference update (REFS_RDY) after completion of each on-orbit IMU alignment and after all OPS transitions except OPS 9 to OPS 1. The IMU_RM_INIT module shall be executed before any other IMU RM module at the time of initialization. The IMU_RM_INIT module shall perform the following five functions based on the particular phase of the mission:

1. At platform reference update (REFS_RDY) and after each on-orbit IMU alignment:
 - a. Store the value of the time of initialization (TIME_0) for use in the ATT_FD and ATT_FI modules.

- b. Store the values of the quaternions representing the stable member to stable member transformations at IMU RM initialization (Q_SMSM_0(1), Q_SMSM_0(2), and Q_SMSM_0(3)) for use in the ATT_FD and ATT_FI modules.
- c. Compute the ideal stable member to stable member transformation quaternions (Q_SMSM_I(1), Q_SMSM_I(2), and Q_SMSM_I(3)) for use in the ATT_SF module. These quaternions may be calculated as follows:

$$M_{12} = (T_{C2_M50})^T (T_{C1_M50})$$

$$M_{13} = (T_{C3_M50})^T (T_{C1_M50})$$

$$M_{23} = (T_{C3_M50})^T (T_{C2_M50})$$

$$Q_SMSM_I(3) = MAT_TO_QUAT(M_{12})$$

$$Q_SMSM_I(2) = MAT_TO_QUAT(M_{13})$$

$$Q_SMSM_I(1) = MAT_TO_QUAT(M_{23})$$

where MAT_TO_QUAT is a utility function that provides the quaternion corresponding to the given transformation matrix.

2. Upon platform reference update (REFS_RDY) only:
 - a. Set to zero the velocity selection filter velocity biases (\bar{B}_1 , \bar{B}_2 , \bar{B}_3).
 - b. Set the previous values of the total M50 velocities ($\bar{P}REV_1$, $\bar{P}REV_2$, $\bar{P}REV_3$) equal to their respective current values of the total M50 velocities (\bar{V}_1 , \bar{V}_2 , \bar{V}_3).
3. At platform reference update (REFS_RDY), all OPS transitions except OPS 9 to OPS 1 and after each on-orbit IMU alignment completion:
 - a. Set to zero the attitude fault identification N-counter (NC_ATT) and the attitude fault identification index (IMU_ATT_FI). These initializations are required by the ATT_FI module.
 - b. Set to invalid the IMU dilemma flag for use in the VEL_FDI, ATT_FI, and crew interface modules. Set to zero the attitude dilemma N-counter (NC_DIL).
4. At platform reference update (REFS_RDY) and all OPS transitions except OPS 9 to OPS 1, set to zero the velocity fault identification N-counter (NC_VEL), the velocity fault identification index (IMU_VEL_FI), and the velocity dilemma N-counter (NC_DIL_VEL). These initializations are required by the VEL_FDI module. The OPS transition logic shall also recognize when the GMT (CLOCK) indicates that a reset of GMT for a year end rollover has occurred during a transition into OPS 3, and adjust TIME_0 by subtracting 31,622,400 seconds if LAUNCH_YEAR was a leap year or by subtracting 31,536,000 seconds otherwise.

Note that the value of LAUNCH_YEAR used in this calculation is one that has not been updated by the Deorbit/Landing Navigation Sequencer.

5. Upon platform reference update (REFS_RDY), or following an ON_ORBIT IPL, the IMU's will be initialized as unavailable to IMU velocity processing. Each IMU will remain unavailable to the velocity SF until a new velocity bias has been calculated for it. Each IMU will remain unavailable to velocity FDIR until a previous velocity has been calculated for it.

4.2.4 IMU Redundancy Management Protected Memory Requirements

All variables to be saved in protected memory during OPS transitions (except OPS 9 to OPS 1) are shown in Table 4.2-1. At platform reference update (REFS_RDY) and all OPS transitions except OPS 9 to OPS 1 a new value for the attitude data-good threshold will be read from the I-load/K-load. All N-counters and fault identification indices shall be set to zero, and all miscompare flags shall be set to invalid at platform reference update (REFS_RDY) and all OPS transition except OPS 9 to OPS 1.

4.2.5 Parameter Tables for Inertial Measurement Unit RM

The IDD inputs and outputs are listed in Tables 4.2.5-1 and 4.2.5-2 respectively. Values for the I-loads are contained in the I-load requirements document (JSC-19350); however, I-load definitions applicable to this principal function are listed in Table 4.2.5-3. K-loads are listed in Table 4.2.5-4. Constants are listed in Table 4.2.5-5.

Table 4.2-1. IMU RM Protected Memory Parameters

Name	Description	Type	Range	Units
IMU_1_FAIL	IMU 1 failed	B	0,1	–
IMU_2_FAIL	IMU 2 failed	B	0,1	–
IMU_3_FAIL	IMU 3 failed	B	0,1	–
C_SEL_1	IMU 1 select/deselect cmd	B	0,1	–
C_SEL_2	IMU 2 select/deselect cmd	B	0,1	–
C_SEL_3	IMU 3 select/deselect cmd	B	0,1	–
COMM_FAULT_1	IMU 1 commfault	B	0,1	–
COMM_FAULT_2	IMU 2 commfault	B	0,1	–
COMM_FAULT_3	IMU 3 commfault	B	0,1	–
IMU_DILEMMA	IMU dilemma indicator	B	0,1	–
IMU_SFC(1)	IMU 1 selection filter command	B	0,1	–
IMU_SFC(2)	IMU 2 selection filter command	B	0,1	–
IMU_SFC(3)	IMU 3 selection filter command	B	0,1	–
Q_SMSM_I(1)	SM 2 to SM 3 ideal trans quat	Struc: S,V	+1	–
Q_SMSM_I(2)	SM 1 to SM 3 ideal trans quat	Struc: S,V	+1	–
Q_SMSM_I(3)	SM 1 to SM 2 ideal trans quat	Struc: S,V	+1	–
TIME_0	GMT of IMU RM initialization	S	$\pm 10^8$	sec
Q_SMSM_0(1)	SM 2 to SM 3 trans quat at time of initialization	Struc: S,V	± 1	–
Q_SMSM_0(2)	SM 1 to SM 3 trans quat at time of initialization	Struc: S,V	± 1	–
Q_SMSM_0(3)	SM 1 to SM 2 trans quat at time of initialization	Struc: S,V	± 1	–
A_CONS_I	Present value of attitude FD threshold constant	S	$0-10^{-1}$	rad
A_RAMP_I	Present value of attitude FD threshold ramp	S	$0-10^{-5}$	rad/sec
A_CONS_(I+8)	Present value of attitude FI threshold constant	S	$0-10^{-1}$	rad
A_RAMP_(I+6)	Present value of attitude FI threshold ramp	S	$0-10^{-5}$	rad/sec
\bar{B}_1	IMU 1 velocity bias	V	$\pm 10^6$	ft/sec
\bar{B}_2	IMU 2 velocity bias	V	$\pm 10^6$	ft/sec
\bar{B}_3	IMU 3 velocity bias	V	$\pm 10^6$	ft/sec
$\bar{S}EL_V_M50$	Selected velocity in M50 coords	V	$\pm 10^6$	ft/sec
V_CONS_I	Present value of velocity FD threshold constant	S	$0-10^2$	ft/sec
V_CONS_(I+4)	Present value of velocity FI threshold constant	S	$0-10^2$	ft/sec
$\bar{P}REV_1$	IMU 1 present total accum velocity in M50 coords	V	$\pm 10^6$	ft/sec
$\bar{P}REV_2$	IMU 2 present total accum velocity in M50 coords	V	$\pm 10^6$	ft/sec
$\bar{P}REV_3$	IMU 3 present total accum velocity in M50 coords	V	$\pm 10^6$	ft/sec
T_C1_M50	SM 1 to M50 transformation matrix	M	± 1	–
T_C2_M50	SM 2 to M50 transformation matrix	M	± 1	–
T_C3_M50	SM 3 to M50 transformation matrix	M	± 1	–

Table 4.2-2. IMU RM Variable Cross-Reference	
Local Name	Source Name
ALIGN_IN_PROGRESS	ALIGN_IN_PRO
C_SEL_K; IMU K, K = 1, 2, 3	IMU_K_DES
COMM_FAULT_K; IMU K, K = 1, 2, 3	IMU_CF(K)
IMU_K_BITE_FAIL; IMU K, K = 1, 2, 3	IMU_FAIL_IND(K)
MM_104	MM_CODE_104
MM_304	MM_CODE_304
MM_601	MM_CODE_601
MM_602	MM_CODE_602
Q_B_M50	Q_BOD_M50
RGM_RATE_K; IMU K, K = 1, 2, 3	WRCF(K)
T_CLUSTER_M50(X, Y); IMU K, K = 1, 2, 3; ELEMENT X, Y; X = 1, 2, 3, Y = 1, 2, 3	T_CLUSTER_M50(K, X, Y)
V_K (1); IMU K, K = 1, 2, 3	VELSUMM50X (K)
V_K (2); IMU K, K = 1, 2, 3	VELSUMM50Y (K)
V_K (3); IMU K, K = 1, 2, 3	VELSUMM50Z (K)

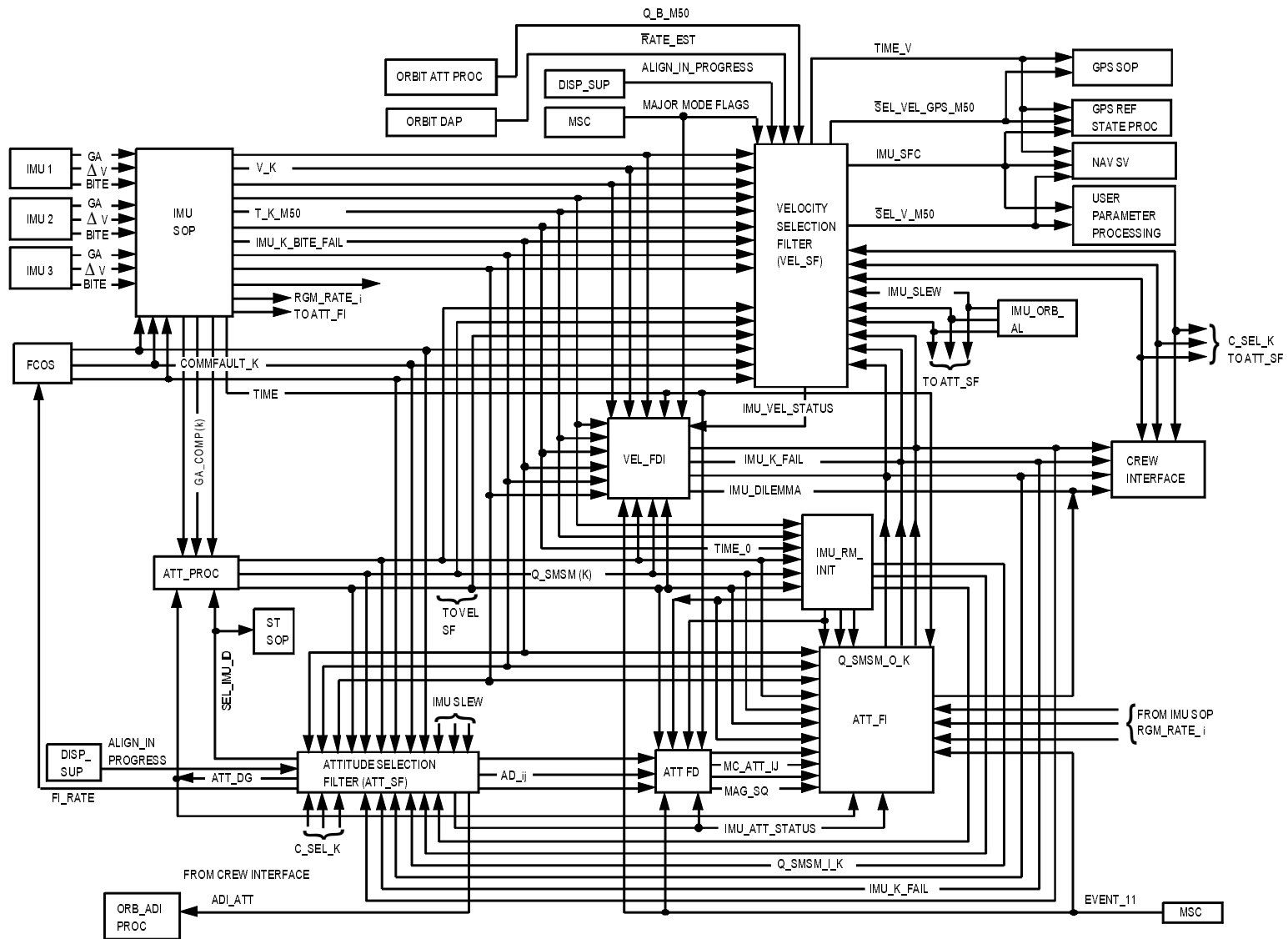


FIGURE 4.2-1. IMU RM Block Diagram

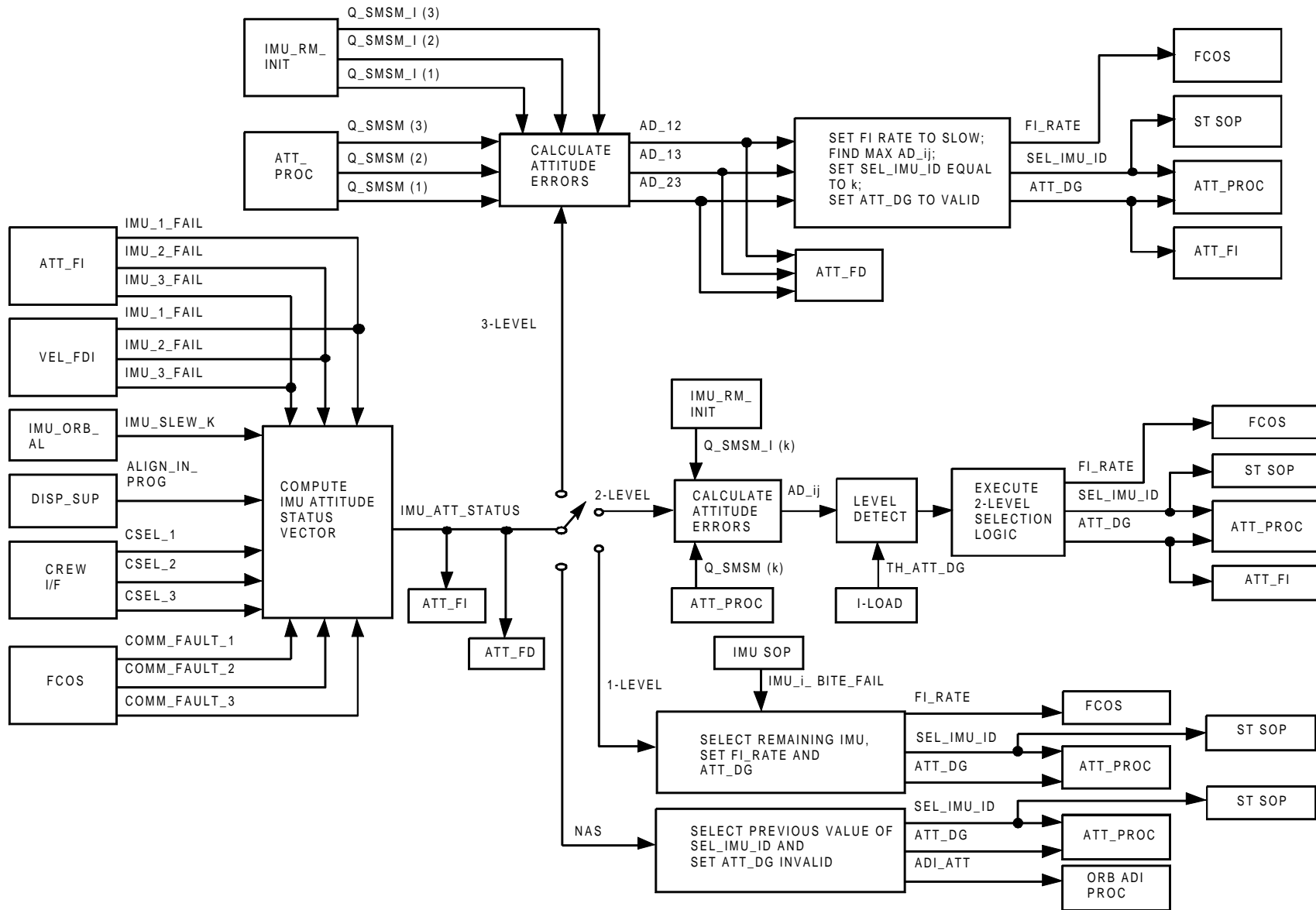


FIGURE 4.2-2. Attitude Selection Filter Functional Diagram

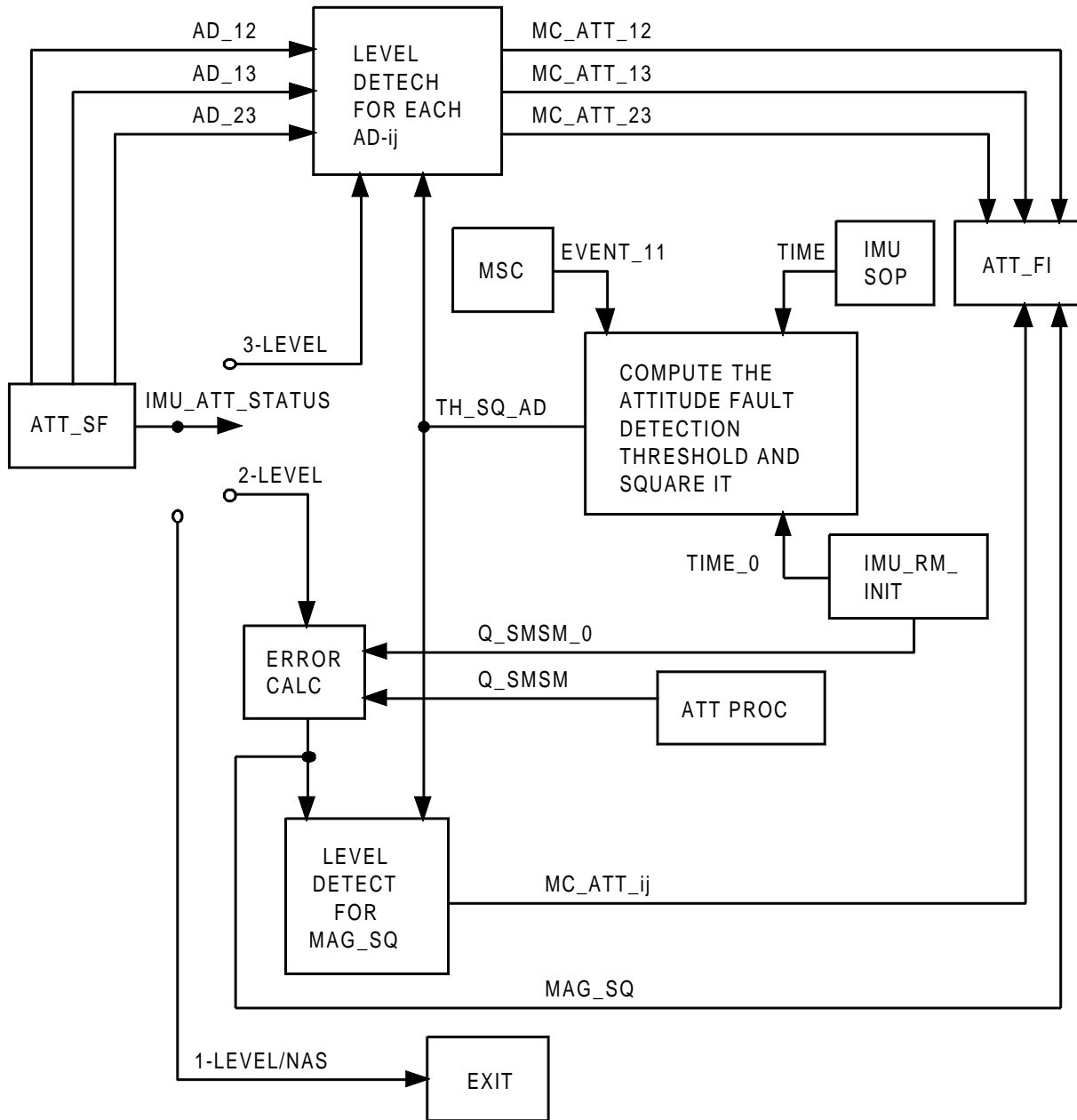


FIGURE 4.2-3. IMU Attitude Fault Detection Functional Diagram

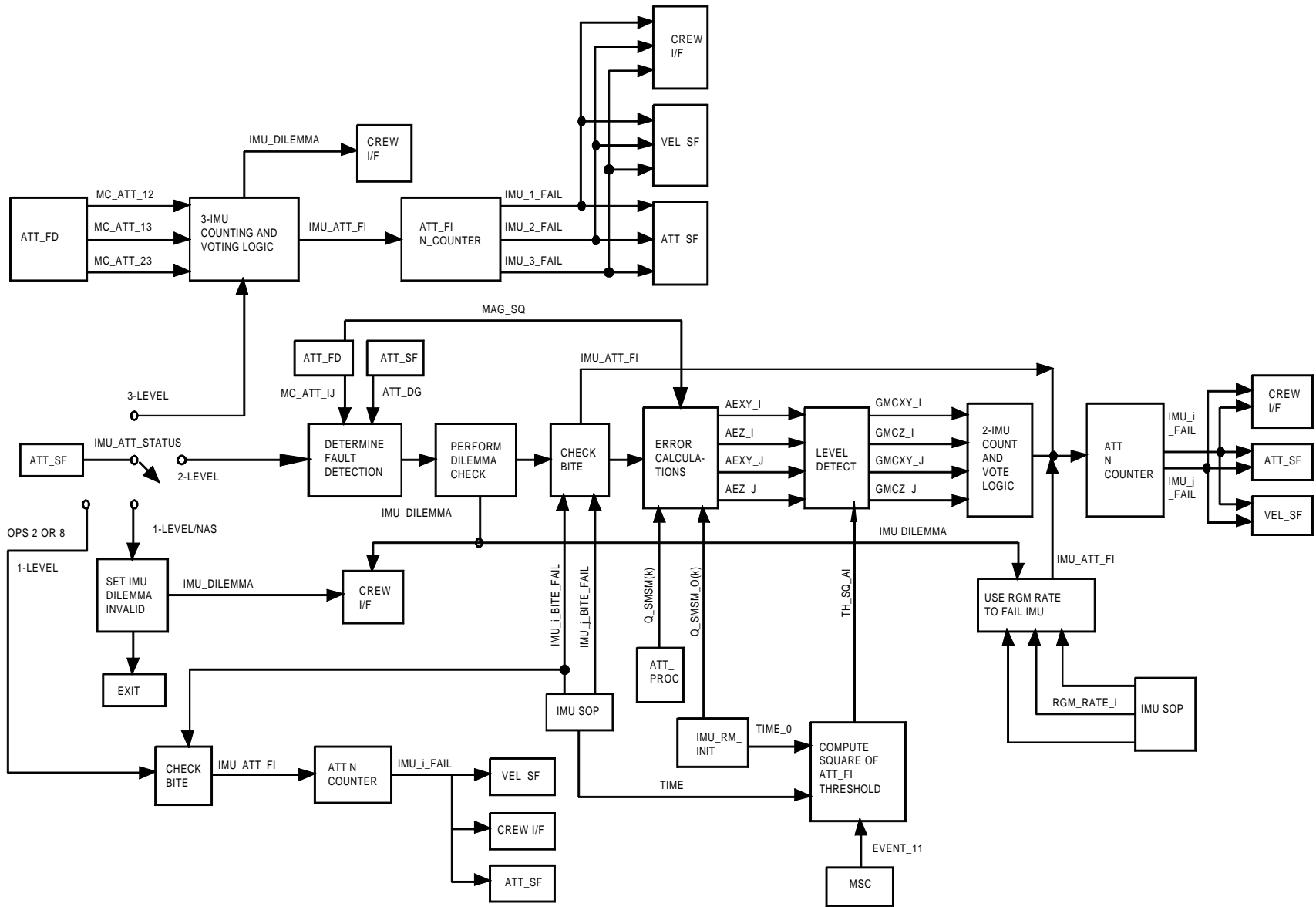


FIGURE 4.2-4. IMU Attitude Fault Identification Functional Diagram

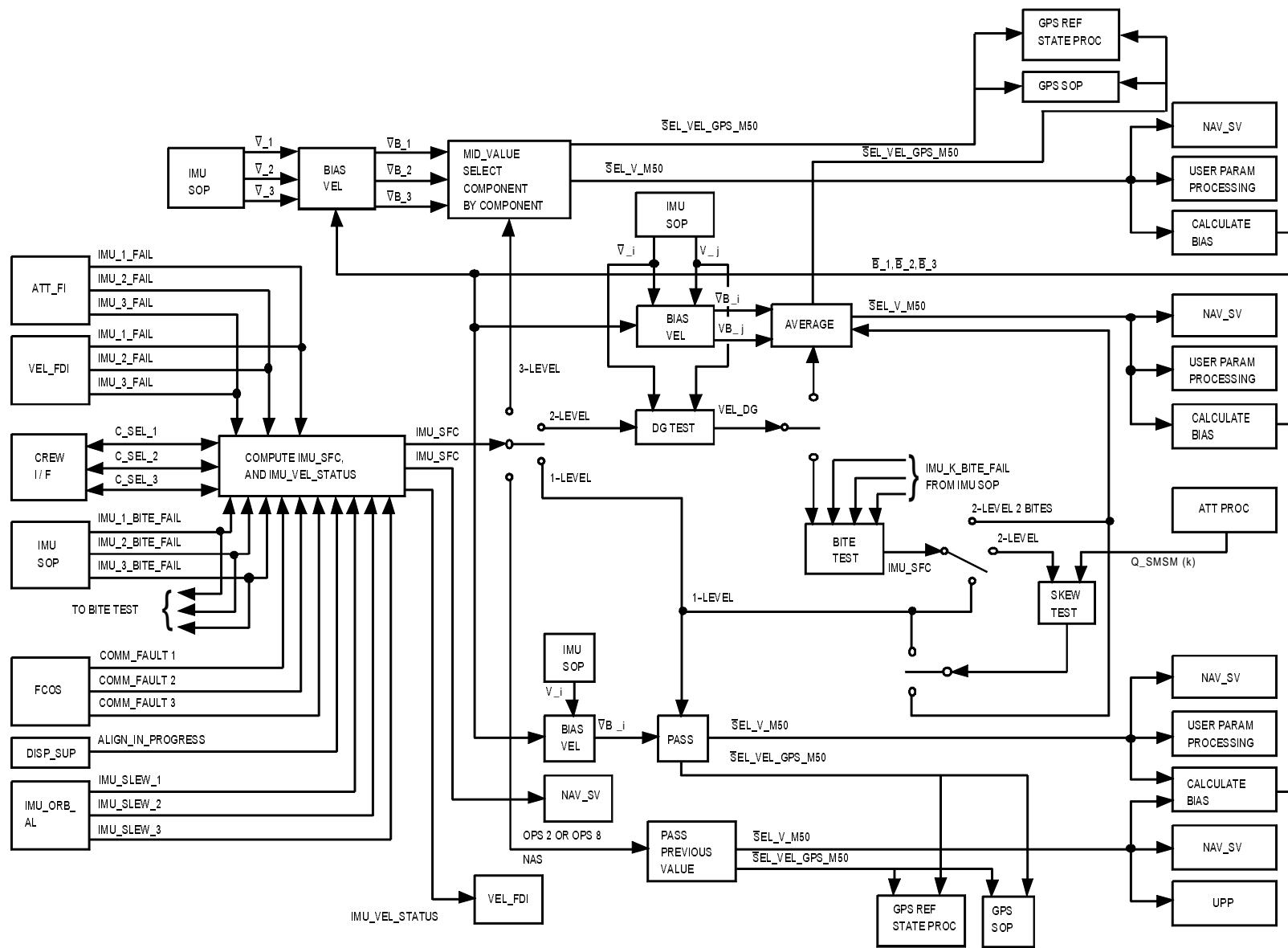


FIGURE 4.2-5. IMU Velocity Selection Filter Functional Diagram

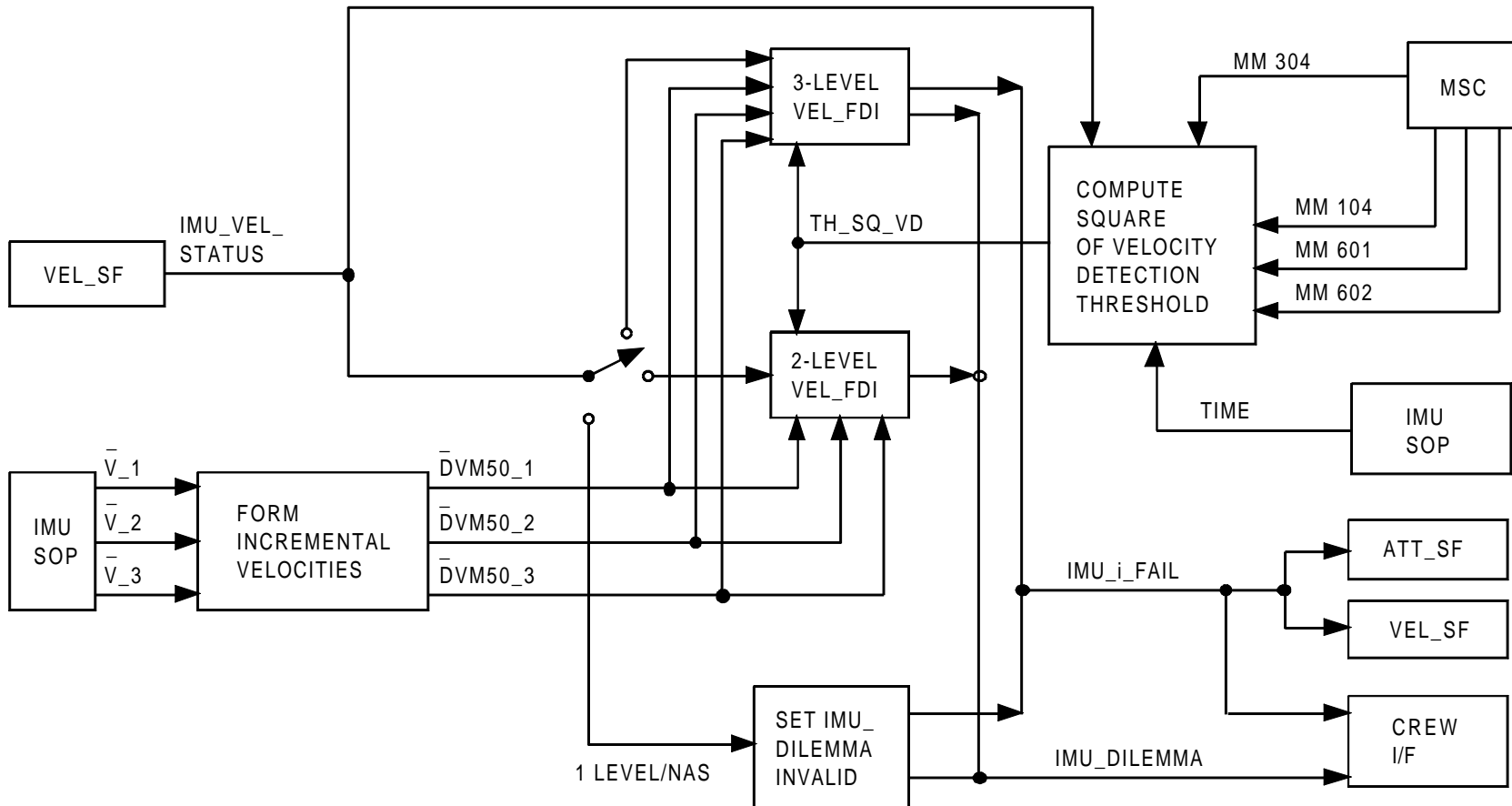


FIGURE 4.2-6. IMU Velocity FDI Functional Diagram

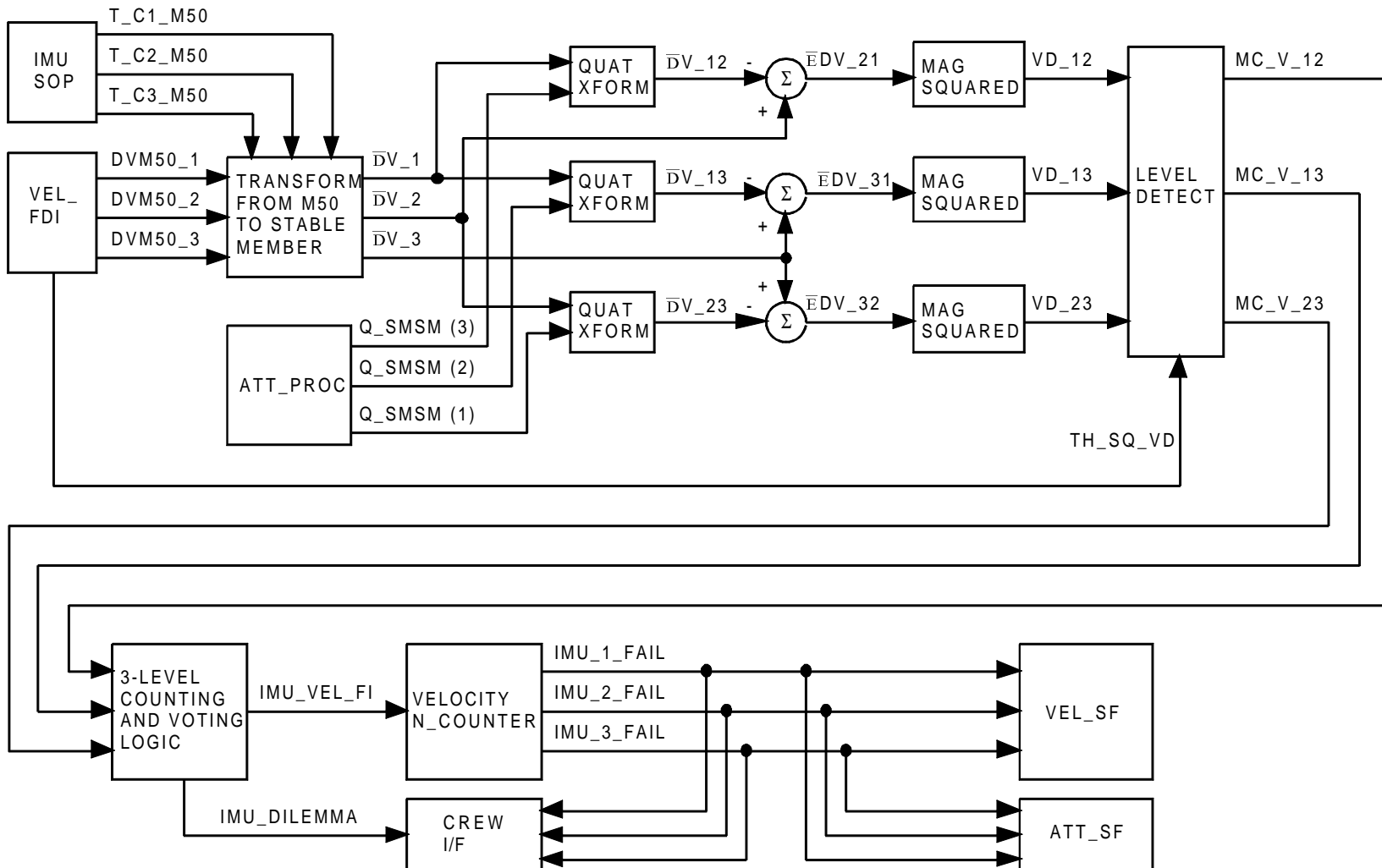


FIGURE 4.2-7. Three-Level IMU Velocity Fault Detection and Identification

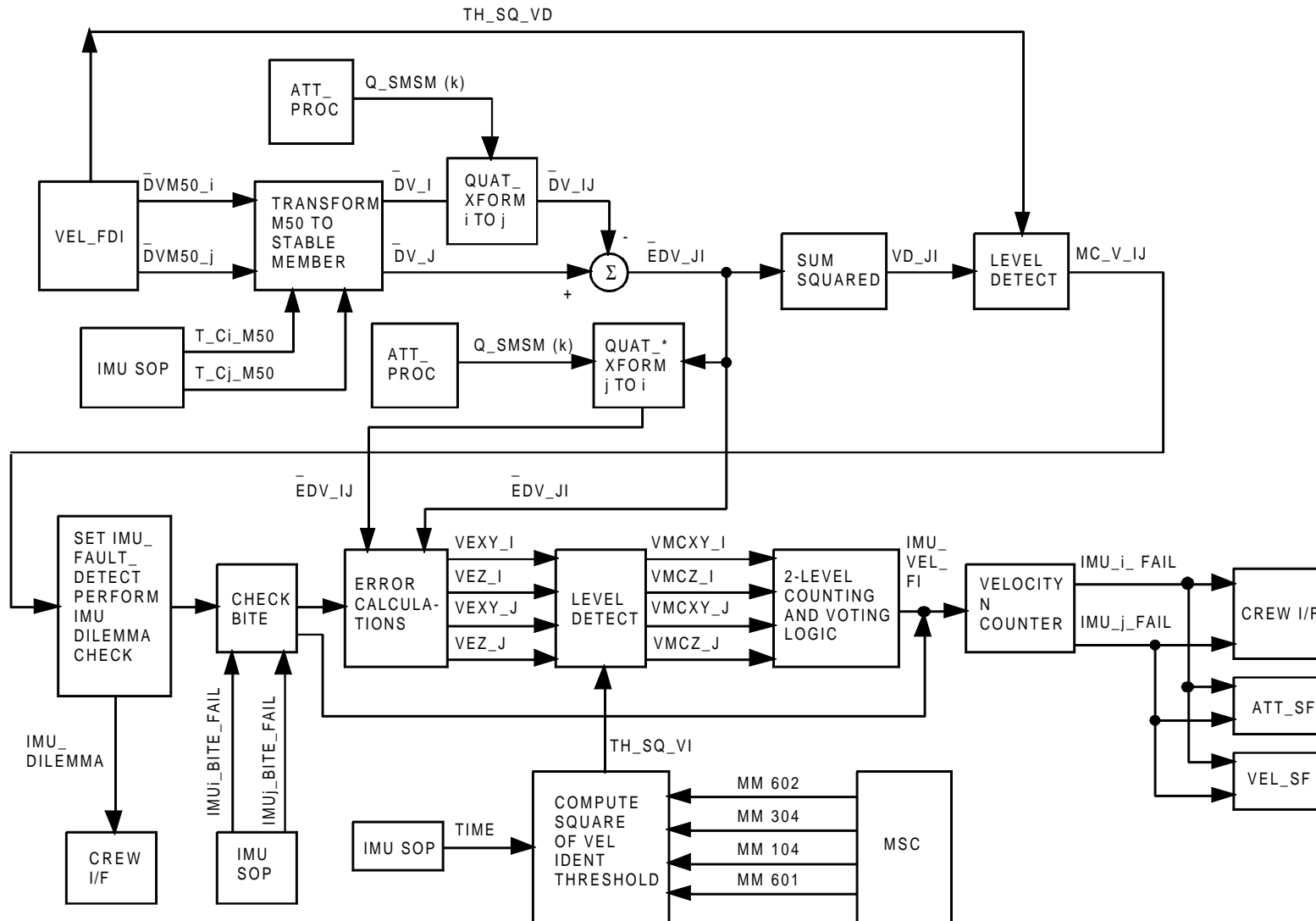


FIGURE 4.2-8. Two-Level IMU Velocity FDI Functional Diagram

TABLE 4.2.5-1. INPUT FUNCTIONAL PARAMETERS FOR INERTIAL MEASUREMENT UNIT REDUNDANCY MANAGEMENT
(G4.72)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ALIGN_IN_PRO	V95X0583X	ALIGN IN PROGRESS	IMU ORB A/CAL		BD		93017G	*
CLOCK/CLOCKTIME	V91W5000C	CLOCK-COMPUTER(GMT)	FCOS	S			93160B	*
IMU_1_BITE_FAIL	V95X0044X	IMU 1 FAILURE IND BY BITE	IMU INT PROC					
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_2_BITE_FAIL	V95X1044X	IMU 2 FAILURE IND BY BITE	IMU INT PROC					
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_3_BITE_FAIL	V95X2044X	IMU 3 FAILURE IND BY BITE	IMU INT PROC					
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_BYBASS(1)	V91X2273X	FF1 IMU BYPASS(MFE)	FCOS		BD		93017G	*
IMU_BYPASS(2)	V91X2274X	FF2 IMU BYPASS(MFE)	FCOS		BD		93017G	*
IMU_BYPASS(3)	V91X2275X	FF3 IMU BYPASS(MFE)	FCOS		BD		93017G	*
IMU_CF(1)	V91X3101X	IMU 1 COMMFault	FCOS				92354	
IMU_CF(2)	V91X3131X	IMU 2 COMMFault	FCOS				92354	
IMU_CF(3)	V91X3161X	IMU 3 COMMFault	FCOS				92354	
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	*
IMU_FAIL_IND(3)	V95X2023XA	IMU 3 FAILURE INDICATOR	IMU INT PROC				93017G	*
IMU_SLEW(1)	V95X0649X	IMU-1 SLEW FLAG	IMU ORB A/CAL					
IMU_SLEW(2)	V95X0650X	IMU-2 SLEW FLAG	IMU ORB A/CAL					
IMU_SLEW(3)	V95X0651X	IMU-3 SLEW FLAG	IMU ORB A/CAL					
LAUNCH_YEAR	V97U5383C	LAUNCH YEAR FOR RNP MATRIX CALC	UL	YEARS	HXS		93160B	*
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_301/MM_301	V90X8183X	MAJOR MODE 301 FLAG	MSC				93064D	
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	
OPS3_INDICATOR	V90X8649X	OPS 3 IND	MSC		BD		93023D	
Q_BOD_M50(1)/Q_B_M50(1)	V90U2240CB	M50 TO BODY QUAT MEASURED ELEM 1	ORB ATT PROC		SPL		93017G	*
Q_BOD_M50(2)/Q_B_M50(2)	V90U2241CB	M50 TO BODY QUAT MEASURED ELEM 2	ORB ATT PROC		SPL		93017G	*
Q_BOD_M50(3)/Q_B_M50(3)	V90U2242CB	M50 TO BODY QUAT MEASURED ELEM 3	ORB ATT PROC		SPL		93017G	*
Q_BOD_M50(4)/Q_B_M50(4)	V90U2243CB	M50 TO BODY QUAT MEASURED ELEM 4	ORB ATT PROC		SPL		93017G	*
Q_SM_SM(1,1)	V90U2263CA	SM2 TO SM3 TRANS QUAT ELEMENT 1	A/E ATT PROC					
Q_SM_SM(1,1)	V90U2263CB	SM2 TO SM3 TRANS QUAT ELEMENT 1	ORB ATT PROC					
Q_SM_SM(1,2)	V90U2264CA	SM2 TO SM3 TRANS QUAT ELEMENT 2	A/E ATT PROC					
Q_SM_SM(1,2)	V90U2264CB	SM2 TO SM3 TRANS QUAT ELEMENT 2	ORB ATT PROC					
Q_SM_SM(1,3)	V90U2265CA	SM2 TO SM3 TRANS QUAT ELEMENT 3	A/E ATT PROC					
Q_SM_SM(1,3)	V90U2265CB	SM2 TO SM3 TRANS QUAT ELEMENT 3	ORB ATT PROC					
Q_SM_SM(1,4)	V90U2266CA	SM2 TO SM3 TRANS QUAT ELEMENT 4	A/E ATT PROC					

TABLE 4.2.5-1. INPUT FUNCTIONAL PARAMETERS FOR INERTIAL MEASUREMENT UNIT REDUNDANCY MANAGEMENT
(G4.72)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
Q_SM_SM(1,4)	V90U2266CB	SM2 TO SM3 TRANS QUAT ELEMENT 4	ORB ATT PROC					
Q_SM_SM(2,1)	V90U2259CA	SM1 TO SM3 TRANS QUAT ELEMENT 1	A/E ATT PROC					
Q_SM_SM(2,1)	V90U2259CB	SM1 TO SM3 TRANS QUAT ELEMENT 1	ORB ATT PROC					
Q_SM_SM(2,2)	V90U2260CA	SM1 TO SM3 TRANS QUAT ELEMENT 2	A/E ATT PROC					
Q_SM_SM(2,2)	V90U2260CB	SM1 TO SM3 TRANS QUAT ELEMENT 2	ORB ATT PROC					
Q_SM_SM(2,3)	V90U2261CA	SM1 TO SM3 TRANS QUAT ELEMENT 3	A/E ATT PROC					
Q_SM_SM(2,3)	V90U2261CB	SM1 TO SM3 TRANS QUAT ELEMENT 3	ORB ATT PROC					
Q_SM_SM(2,4)	V90U2262CA	SM1 TO SM3 TRANS QUAT ELEMENT 4	A/E ATT PROC					
Q_SM_SM(2,4)	V90U2262CB	SM1 TO SM3 TRANS QUAT ELEMENT 4	ORB ATT PROC					
Q_SM_SM(3,1)	V90U2255CA	SM1 TO SM2 TRANS QUAT ELEMENT 1	A/E ATT PROC					
Q_SM_SM(3,1)	V90U2255CB	SM1 TO SM2 TRANS QUAT ELEMENT 1	ORB ATT PROC					
Q_SM_SM(3,2)	V90U2256CA	SM1 TO SM2 TRANS QUAT ELEMENT 2	A/E ATT PROC					
Q_SM_SM(3,2)	V90U2256CB	SM1 TO SM2 TRANS QUAT ELEMENT 2	ORB ATT PROC					
Q_SM_SM(3,3)	V90U2257CA	SM1 TO SM2 TRANS QUAT ELEMENT 3	A/E ATT PROC					
Q_SM_SM(3,3)	V90U2257CB	SM1 TO SM2 TRANS QUAT ELEMENT 3	ORB ATT PROC					
Q_SM_SM(3,4)	V90U2258CA	SM1 TO SM2 TRANS QUAT ELEMENT 4	A/E ATT PROC					
Q_SM_SM(3,4)	V90U2258CB	SM1 TO SM2 TRANS QUAT ELEMENT 4	ORB ATT PROC					
RATE_EST(1)/BOD_RATE(1)	V90R2223C	IMU DERIVED BODY RATE X-AXIS	ORB DAP	DEG/S	SPL		93017G	*
RATE_EST(2)/BOD_RATE(2)	V90R2224C	IMU DERIVED BODY RATE Y-AXIS	ORB DAP	DEG/S	SPL		93017G	*
RATE_EST(3)/BOD_RATE(3)	V90R2225C	IMU DERIVED BODY RATE Z-AXIS	ORB DAP	DEG/S	SPL		93017G	*
REFS_RDY	V95X0780X	REFSMAT COMPUTATION COMPLETED	IMU GC ALIGN		BD		93017G	*
REFS_RDY	V95X0780XA	REFSMAT COMPUTATION COMPLETED	IMU INT PROC		BD		93017G	*
T_CLUSTER_M50(1,1,1)	V99U3450CA	CLUSTER TO M50/IMU-1 COMPONENT 1,1	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(1,1,1)	V99U3450CB	CLUSTER TO M50/IMU-1 COMPONENT 1,1	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(1,1,2)	V99U3453CA	CLUSTER TO M50/IMU-1 COMPONENT 1,2	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(1,1,2)	V99U3453CB	CLUSTER TO M50/IMU-1 COMPONENT 1,2	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(1,1,3)	V99U3456CA	CLUSTER TO M50/IMU-1 COMPONENT 1,3	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(1,1,3)	V99U3456CB	CLUSTER TO M50/IMU-1 COMPONENT 1,3	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(1,2,1)	V99U3459CA	CLUSTER TO M50/IMU 1 COMPONENT 2,1	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(1,2,1)	V99U3459CB	CLUSTER TO M50/IMU 1 COMPONENT 2,1	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(1,2,2)	V99U3462CA	CLUSTER TO M50/IMU-1 COMPONENT 2,2	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(1,2,2)	V99U3462CB	CLUSTER TO M50/IMU-1 COMPONENT 2,2	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(1,2,3)	V99U3465CA	CLUSTER TO M50/IMU-1 COMPONENT 2,3	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(1,2,3)	V99U3465CB	CLUSTER TO M50/IMU-1 COMPONENT 2,3	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(1,3,1)	V99U3468CA	CLUSTER TO M50/IMU-1 COMPONENT 3,1	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(1,3,1)	V99U3468CB	CLUSTER TO M50/IMU-1 COMPONENT 3,1	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(1,3,2)	V99U3471CA	CLUSTER TO M50/IMU-1 COMPONENT 3,2	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(1,3,2)	V99U3471CB	CLUSTER TO M50/IMU-1 COMPONENT 3,2	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(1,3,3)	V99U3474CA	CLUSTER TO M50/IMU-1 COMPONENT 3,3	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(1,3,3)	V99U3474CB	CLUSTER TO M50/IMU-1 COMPONENT 3,3	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(2,1,1)	V99U3451CA	CLUSTER TO M50/IMU-2 COMPONENT 1,1	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(2,1,1)	V99U3451CB	CLUSTER TO M50/IMU-2 COMPONENT 1,1	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(2,1,2)	V99U3454CA	CLUSTER TO M50/IMU-2 COMPONENT 1,2	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(2,1,2)	V99U3454CB	CLUSTER TO M50/IMU-2 COMPONENT 1,2	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(2,1,3)	V99U3457CA	CLUSTER TO M50/IMU-2 COMPONENT 1,3	IMU ORB A/CAL				93017G	*

TABLE 4.2.5-1. INPUT FUNCTIONAL PARAMETERS FOR INERTIAL MEASUREMENT UNIT REDUNDANCY MANAGEMENT (G4.72)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
T_CLUSTER_M50(2,1,3)	V99U3457CB	CLUSTER TO M50/IMU-2 COMPONENT 1,3	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(2,2,1)	V99U3460CA	CLUSTER TO M50/IMU-2 COMPONENT 2,1	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(2,2,1)	V99U3460CB	CLUSTER TO M50/IMU-2 COMPONENT 2,1	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(2,2,2)	V99U3463CA	CLUSTER TO M50/IMU-2 COMPONENT 2,2	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(2,2,2)	V99U3463CB	CLUSTER TO M50/IMU-2 COMPONENT 2,2	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(2,2,3)	V99U3466CA	CLUSTER TO M50/IMU-2 COMPONENT 2,3	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(2,2,3)	V99U3466CB	CLUSTER TO M50/IMU-2 COMPONENT 2,3	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(2,3,1)	V99U3469CA	CLUSTER TO M50/IMU-2 COMPONENT 3,1	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(2,3,1)	V99U3469CB	CLUSTER TO M50/IMU-2 COMPONENT 3,1	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(2,3,2)	V99U3472CA	CLUSTER TO M50/IMU-2 COMPONENT 3,2	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(2,3,2)	V99U3472CB	CLUSTER TO M50/IMU-2 COMPONENT 3,2	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(2,3,3)	V99U3475CA	CLUSTER TO M50/IMU-2 COMPONENT 3,3	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(2,3,3)	V99U3475CB	CLUSTER TO M50/IMU-2 COMPONENT 3,3	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(3,1,1)	V99U3452CA	CLUSTER TO M50/IMU-3 COMPONENT 1,1	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(3,1,1)	V99U3452CB	CLUSTER TO M50/IMU-3 COMPONENT 1,1	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(3,1,2)	V99U3455CA	CLUSTER TO M50/IMU-3 COMPONENT 1,2	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(3,1,2)	V99U3455CB	CLUSTER TO M50/IMU-3 COMPONENT 1,2	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(3,1,3)	V99U3458CA	CLUSTER TO M50/IMU-3 COMPONENT 1,3	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(3,1,3)	V99U3458CB	CLUSTER TO M50/IMU-3 COMPONENT 1,3	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(3,2,1)	V99U3461CA	CLUSTER TO M50/IMU-3 COMPONENT 2,1	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(3,2,1)	V99U3461CB	CLUSTER TO M50/IMU-3 COMPONENT 2,1	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(3,2,2)	V99U3464CA	CLUSTER TO M50/IMU-3 COMPONENT 2,2	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(3,2,2)	V99U3464CB	CLUSTER TO M50/IMU-3 COMPONENT 2,2	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(3,2,3)	V99U3467CA	CLUSTER TO M50/IMU-3 COMPONENT 2,3	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(3,2,3)	V99U3467CB	CLUSTER TO M50/IMU-3 COMPONENT 2,3	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(3,3,1)	V99U3470CA	CLUSTER TO M50/IMU-3 COMPONENT 3,1	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(3,3,1)	V99U3470CB	CLUSTER TO M50/IMU-3 COMPONENT 3,1	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(3,3,2)	V99U3473CA	CLUSTER TO M50/IMU-3 COMPONENT 3,2	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(3,3,2)	V99U3473CB	CLUSTER TO M50/IMU-3 COMPONENT 3,2	IMU GC ALIGN				93017G	*
T_CLUSTER_M50(3,3,3)	V99U3476CA	CLUSTER TO M50/IMU-3 COMPONENT 3,3	IMU ORB A/CAL				93017G	*
T_CLUSTER_M50(3,3,3)	V99U3476CB	CLUSTER TO M50/IMU-3 COMPONENT 3,3	IMU GC ALIGN				93017G	*
T_IMUS	V95W0002C	IMU INPUT TRANS TIME TAG	IMU INT PROC	S	DPL		93017G	*
VELSUMM50X(1)/V_1(1)	V95L0065C	IMU 1 ACCUM SENSED CHANGE X VEL	IMU INT PROC	FT/S	DPL		93017G	*
VELSUMM50X(2)/V_2(1)	V95L1065C	IMU 2 ACCUM SENSED CHANGE X VEL	IMU INT PROC	FT/S	DPL		93017G	*
VELSUMM50X(3)/V_3(1)	V95L2065C	IMU 3 ACCUM SENSED CHANGE X VEL	IMU INT PROC	FT/S	DPL		93017G	*
VELSUMM50Y(1)/V_1(2)	V95L0066C	IMU 1 ACCUM SENSED CHANGE Y VEL	IMU INT PROC	FT/S	DPL		93017G	*
VELSUMM50Y(2)/V_2(2)	V95L1066C	IMU 2 ACCUM SENSED CHANGE Y VEL	IMU INT PROC	FT/S	DPL		93017G	*
VELSUMM50Y(3)/V_3(2)	V95L2066C	IMU 3 ACCUM SENSED CHANGE Y VEL	IMU INT PROC	FT/S	DPL		93017G	*
VELSUMM50Z(1)/V_1(3)	V95L0067C	IMU 1 ACCUM SENSED CHANGE Z VEL	IMU INT PROC	FT/S	DPL		93017G	*
VELSUMM50Z(2)/V_2(3)	V95L1067C	IMU 2 ACCUM SENSED CHANGE Z VEL	IMU INT PROC	FT/S	DPL		93017G	*
VELSUMM50Z(3)/V_3(3)	V95L2067C	IMU 3 ACCUM SENSED CHANGE Z VEL	IMU INT PROC	FT/S	DPL		93017G	*
WRCF(1)/RGM_RATE_1	V95R0660CA	IMU 1 COMP AND FLTRD RED AXIS RATE	IMU INT PROC	DEG/HR			93017G	*
WRCF(2)/RGM_RATE_2	V95R0661CA	IMU 2 COMP AND FLTRD RED AXIS RATE	IMU INT PROC	DEG/HR			93017G	*
WRCF(3)/RGM_RATE_3	V95R0662CA	IMU 3 COMP AND FLTRD RED AXIS RATE	IMU INT PROC	DEG/HR			93017G	*

TABLE 4.2.5-1. INPUT FUNCTIONAL PARAMETERS FOR INERTIAL MEASUREMENT UNIT REDUNDANCY MANAGEMENT
(G4.72)

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 4.2.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM INERTIAL MEASUREMENT UNIT REDUNDANCY MANAGEMENT
(G4.72)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ADI_ATT	V90X2573X	ADI ATTITUDE FLAG	ORB ADI PROC					
AD_12	V90H2574C	IMU 1-2 ATTITUDE DIFFERENCE	DL FMT 23/1	RAD2	SPL		93017G	*
AD_13	V90H2575C	IMU 1-3 ATTITUDE DIFFERENCE	DL FMT 23/1	RAD2	SPL		93017G	*
AD_23	V90H2576C	IMU 2-3 ATTITUDE DIFFERENCE	DL FMT 23/1	RAD2	SPL		93017G	*
ATT_DG	V90X2555X	ATTITUDE DATA GOOD FLAG	A/E ATT PROC				93017G	*
			DL FMT 22/1					
			DL FMT 23/1					
			DL FMT 32/1					
			ORB ATT PROC					
			ORB DAP					
			VERRIDE DISP					
EDVM50	V90H2578C	VELOCITY DATA GOOD TEST PARAMETER	DL FMT 23/1	FT/S2	SPL		93017G	*
FI_RATE	V90X2562X	ATTITUDE FAULT IDENTIFICATION RATE	FCOS				89741B	
IMU_1_DES/C_SEL_1	V93X6711XC	IMU 1 SEL/DES CMD	DL FMT 21/A		BD		93017G	*
			DL FMT 22/A					
			DL FMT 23/A					
			DL FMT 32/A					
			IMU ALIGN DISP					
			VERRIDE DISP					
IMU_1_FAIL	V90X2601X	IMU 1 FAIL	DL FMT 21/A		BD		93017G	*
			DL FMT 22/A					
			DL FMT 23/A					
			DL FMT 32/A					
			GAX					
			IMU ORB A/CAL					
IMU_2_DES/C_SEL_2	V93X6712XC	IMU 2 SEL/DES CMD	DL FMT 21/A		BD		93017G	*
			DL FMT 22/A					
			DL FMT 23/A					
			DL FMT 32/A					
			IMU ALIGN DISP					
			VERRIDE DISP					
IMU_2_FAIL	V90X2701X	IMU 2 FAIL	DL FMT 21/A		BD		93017G	*
			DL FMT 22/A					
			DL FMT 23/A					
			DL FMT 32/A					
			GAX					
			IMU ORB A/CAL					
IMU_3_DES/C_SEL_3	V93X6713XC	IMU 3 SEL/DES CMD	DL FMT 21/A		BD		93017G	*
			DL FMT 22/A					
			DL FMT 23/A					
			DL FMT 32/A					
			IMU ALIGN DISP					
			VERRIDE DISP					

TABLE 4.2.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM INERTIAL MEASUREMENT UNIT REDUNDANCY MANAGEMENT
(G4.72)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
IMU_3_FAIL	V90X2801X	IMU 3 FAIL	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/A GAX		BD		93017G	*
IMU_DILEMMA	V90X2552X	IMU DILEMMA INDICATOR	IMU ORB A/CAL DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/A GAX		BD		93017G	*
IMU_SFC	V90J2503C	IMU SELECTION FILTER COMMAND	IMU ORB A/CAL A/L UPP D/L NAV SEQ DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 ENT NAV ENT UPP PRELAND NAV RTLS NAV RTLS UPP TAEM UPP		BSU	S	93017G	*
MAG_SQ SEL_IMU_ID	V90H2577C V90J2560C	2 IMU ATTITUDE ERROR SQUARED SELECTED IMU ID	DL FMT 23/1 A/E ATT PROC DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/A IMU ORB A/CAL ORB ATT PROC OVERRIDE DISP STAR TRCK SOP VU	RAD2	SPL HXS		93017G 93017G	* *
SEL_VEL_GPS_M50(1)	V90L2631C	SEL TOTAL M50 X VEL FOR GPS	GPS REF STATE PROC GPS SOP	FT/S	DPL		92369B	
SEL_VEL_GPS_M50(2)	V90L2632C	SEL TOTAL M50 Y VEL FOR GPS	GPS REF STATE PROC GPS SOP	FT/S	DPL		92369B	
SEL_VEL_GPS_M50(3)	V90L2633C	SEL TOTAL M50 Z VEL FOR GPS	GPS REF STATE PROC GPS SOP	FT/S	DPL		92369B	

TABLE 4.2.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM INERTIAL MEASUREMENT UNIT REDUNDANCY MANAGEMENT
(G4.72)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
SEL_V_M50(1)	V90L2557C	SEL TOTAL X VEL M50	A/E ATT PROC A/L UPP ASC DAP ASC NAV ASC NAV SEQ ASC UPP D/L NAV SEQ DL FMT 21/A DL FMT 22/A DL FMT 23/B DL FMT 32/A ENT NAV ENT UPP ORB ATT PROC PRELAND NAV RTLS NAV RTLS UPP TAEM UPP	FT/S	DPL		93017G	*
SEL_V_M50(2)	V90L2558C	SEL TOTAL Y VEL M50	A/E ATT PROC A/L UPP ASC DAP ASC NAV ASC NAV SEQ ASC UPP D/L NAV SEQ DL FMT 21/A DL FMT 22/A DL FMT 23/B DL FMT 32/A ENT NAV ENT UPP ORB ATT PROC PRELAND NAV RTLS NAV RTLS UPP TAEM UPP	FT/S	DPL		93017G	*

TABLE 4.2.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM INERTIAL MEASUREMENT UNIT REDUNDANCY MANAGEMENT
(G4.72)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
SEL_V_M50(3)	V90L2559C	SEL TOTAL Z VEL M50	A/E ATT PROC A/L UPP ASC DAP ASC NAV ASC NAV SEQ ASC UPP D/L NAV SEQ DL FMT 21/A DL FMT 22/A DL FMT 23/B DL FMT 32/A ENT NAV ENT UPP ORB ATT PROC PRELAND NAV RTLS NAV RTLS UPP TAEM UPP	FT/S	DPL		93017G	*
SEL_V_M50_CG(1)	V90L2607C	SEL TOTAL X VEL M50 AT CG	ORB UPP ORB/RND NAV	FT/S				
SEL_V_M50_CG(2)	V90L2608C	SEL TOTAL Y VEL M50 AT CG	ORB/RND NAV SEQ ORB UPP ORB/RND NAV	FT/S				
SEL_V_M50_CG(3)	V90L2609C	SEL TOTAL Z VEL M50 AT CG	ORB/RND NAV SEQ ORB UPP ORB/RND NAV	FT/S				
TH_SQ_AD	V90U2595C	IMU ATT RM THRESHOLD	ORB/RND NAV SEQ DL FMT 22/1 DL FMT 23/1	RAD2	SPL		93017G	*
TH_SQ_VD	V90L2567C	IMU VEL THRESHOLD	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1	FT2/S2	SPL		93017G	*
TIME_V	V90W2553CA	TIME OF SEL TOTAL M50 VEL	ASC DAP ASC NAV ASC NAV SEQ GPS REF STATE PROC GPS SOP	S			91051K	
T_CG	V90W2599C	SEL V M50 AND WRC TIME TAG	DL FMT 22/1 DL FMT 32/1		DPL		93017G	*
VD_12	V90L2563C	IMU 1-2 VEL DIFF	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1	FT2/S2	SPL		93017G	*

TABLE 4.2.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM INERTIAL MEASUREMENT UNIT REDUNDANCY MANAGEMENT (G4.72)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
VD_13	V90L2564C	IMU 1-3 VEL DIFF	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1	FT2/S2	SPL		93017G	*
VD_23	V90L2565C	IMU 2-3 VEL DIFF	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1	FT2/S2	SPL		93017G	*
WCR(1)	V90L2596C	NAV BASE BODY VELOCITY-X	DL FMT 22/1 DL FMT 32/1	FT/S	SPL		93017G	*
WCR(2)	V90L2597C	NAV BASE BODY VELOCITY-Y	DL FMT 22/1 DL FMT 32/1	FT/S	SPL		93017G	*
WCR(3)	V90L2598C	NAV BASE BODY VELOCITY-Z	DL FMT 22/1 DL FMT 32/1	FT/S	SPL		93017G	*
	V90M2924P	CGMB_IPF_FLG1_MFE	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 DL FMT 32/1				93017G	*
	V93M0500PC	CGUB_IMU_SEL_MFE	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/A				93017G	*
	V95M2841P	CGMB_IMU_FLAG_WD1	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/A				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 4.2.5-3. INERTIAL MEASUREMENT UNIT REDUNDANCY MANAGEMENT (G4.72) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
A_CONS_1	V97U4209C	RAD	F	S	D	P	G4.72	00	IRA	DC2092	
A_CONS_5	V97U4215C	RAD	F	S	D	P	G4.72	00	IRA	DC2092	
A_CONS_9	V97U4221C	RAD	F	S	D	P	G4.72	00	IRA	DC2092	
A_RAMP_2	V97U4213C	RAD/SEC	F	S	M	P	G4.72	00	IRA	DC2092	
A_RAMP_5	V97U4219C	RAD/SEC	F	S	M	P	G4.72	00	IRA	DC2092	
A_RAMP_8	V97U4224C	RAD/SEC	F	S	M	P	G4.72	00	IRA	DC2092	
LAUNCH_YEAR	V97U5383C	YEARS	I	S	D	C	G4.123 G4.16 G4.38 G4.72	00	GPT	93160B	*
R_NB_CG(1)	V99U7493C	FT	F	S	D	P	G4.72	00	IRO	DC0599	
R_NB_CG(2)	V99U7494C	FT	F	S	D	P	G4.72	00	IRO	DC0599	
R_NB_CG(3)	V99U7495C	FT	F	S	D	P	G4.72	00	IRO	DC0599	
TH_ATT_DGA	V97U4226C	RAD**2	F	S	M	P	G4.72	00	ZFY	DC0599	
TH_ATT_DGE	V97U4228C	RAD**2	F	S	M	P	G4.72	00	IRE	DC0599	
TH_ATT_DG_RTLS	V96U8939C	RAD**2	F	S	M	P	G4.72	00	IRA	DC2092	
TH_VEL_DGI_HI_ASC	V97U4241C	FT**2/SEC**4	F	S	M	P	G4.72	00	ZFY	DC0599	
TH_VEL_DGI_HI_ENT	V96U8932C	FT**2/SEC**4	F	S	M	P	G4.72	00	IRE	DC0599	
TH_VEL_DGI_HI_RTLS	V96U8931C	FT**2/SEC**4	F	S	M	P	G4.72	00	IRA	DC2092	
TH_VEL_DGI_LO	V97U4242C	FT**2/SEC**4	F	S	M	P	G4.72	00	ZFY	DC0599	
TH_VEL_DG_HI_ASC	V97U4239C	FT**2/SEC**4	F	S	M	P	G4.72	00	ZFY	DC0599	
TH_VEL_DG_HI_ENT	V96U8930C	FT**2/SEC**4	F	S	M	P	G4.72	00	IRE	DC0599	
TH_VEL_DG_HI_RTLS	V96U8929C	FT**2/SEC**4	F	S	M	P	G4.72	00	IRA	DC2092	
TH_VEL_DG_LO_ASC	V97U4240C	FT**2/SEC**4	F	S	M	P	G4.72	00	ZFY	DC0599	
TH_VEL_DG_LO_ENT	V96U8934C	FT**2/SEC**4	F	S	M	P	G4.72	00	IRE	DC0599	
V_CONS_10	V96U8710C	FT/SEC	F	S	M	P	G4.72	00	IRA	DC2092	
V_CONS_11	V96U8711C	FT/SEC	F	S	M	P	G4.72	01	IRA	DC2092	
								02	IRO		
								03	IRE		
								08	IRO		
V_CONS_12	V96U8712C	FT/SEC	F	S	M	P	G4.72	00	IRE	DC0599	
V_CONS_13	V96U8935C	FT/SEC	F	S	M	P	G4.72	00	IRA	DC2092	
V_CONS_14	V96U8936C	FT/SEC	F	S	M	P	G4.72	00	IRA	DC2092	
V_CONS_15	V96U8937C	FT/SEC	F	S	M	P	G4.72	00	IRA	DC2092	
V_CONS_2	V97U4230C	FT/SEC	F	S	M	P	G4.72	00	IRA	DC2092	
V_CONS_3	V97U4231C	FT/SEC	F	S	M	P	G4.72	00	IRA	DC2092	
V_CONS_3E	V96U8938C	FT/SEC	F	S	M	P	G4.72	00	IRE	DC0599	
V_CONS_30	V96U8940C	FT/SEC	F	S	M	P	G4.72	00	IRO	DC0599	
V_CONS_4	V97U4232C	FT/SEC	F	S	M	P	G4.72	00	IRE	DC0599	
V_CONS_6	V97U4235C	FT/SEC	F	S	M	P	G4.72	00	IRA	DC2092	
V_CONS_7	V97U4236C	FT/SEC	F	S	M	P	G4.72	00	IRO	DC0599	
V_CONS_8	V97U4237C	FT/SEC	F	S	M	P	G4.72	00	IRE	DC0599	
V_RAMP_1	V97U4233C	FT/SEC**2	F	S	M	P	G4.72	00	IRE	DC0599	
V_RAMP_2	V97U4238C	FT/SEC**2	F	S	M	P	G4.72	00	IRE	DC0599	
V_RAMP_3	V96U8713C	FT/SEC**2	F	S	M	P	G4.72	00	IRE	DC0599	

TABLE 4.2.5-3. INERTIAL MEASUREMENT UNIT REDUNDANCY MANAGEMENT (G4.72) 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 4.2.5-4. INERTIAL MEASUREMENT UNIT REDUNDANCY MANAGEMENT (G4.72) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
A_CONS_11 IMU ATT FI THRESHOLD 2	V97U4222C	00	+1.13	E-03 RAD	F	S	P	G4.72	69213	
A_CONS_3 IMU ATT 3 LEV FD THRESHOLD 2	V97U4210C	00	+1.23	E-03 RAD	F	S	P	G4.72	69213	
A_CONS_4 IMU ATT 3 LEV FD THRESHOLD 3	V97U4211C	00	+8.72	E-03 RAD	F	S	P	G4.72	69213	
A_CONS_7 IMU ATT 2 LEV FD THRESHOLD 2	V97U4216C	00	+2.37	E-03 RAD	F	S	P	G4.72	69213	
A_CONS_8 IMU ATT 2 LEV FD THRESHOLD 3	V97U4217C	00	+6.54	E-03 RAD	F	S	P	G4.72	69213	
A_RAMP_3 IMU ATT 3 LEV FD THRESHOLD 6	V97U4214C	00	+2.24	E-07 RAD/SEC	F	S	P	G4.72	69213	
A_RAMP_6 IMU ATT 2 LEV FD THRESHOLD 6	V97U4220C	00	+5.8	E-07 RAD/SEC	F	S	P	G4.72	69213	
A_RAMP_9 IMU ATT FI THRESHOLD 5	V97U4225C	00	+2.06	E-07 RAD/SEC	F	S	P	G4.72	69213	
ND_HIGH IMU DILEMMA HIGH-RATE N COUNTER	V97U3059C	00	+4	ND	I	S	P	G4.72	79265	
ND_LOW IMU DILEMMA LOW-RATE N COUNTER	V97U3060C	00	+4	ND	I	S	P	G4.72	79265	
ND_VEL IMU VEL DELIM COUNTER	V97U4243C	00	+4	ND	I	S	P	G4.72	69213	
N_ATT IMU ATTITUDE N COUNTER	V97U3057C	00	+2	ND	I	S	P	G4.72	69213	
N_VEL IMU VELOCITY N COUNTER	V97U3058C	00	+2	ND	I	S	P	G4.72	69213	
TH_ATT_DGO IMU ATT D/G THRESHOLD OPS 2 AND 8	V97U4227C	00	+7.61	E-05 RAD**2	F	S	P	G4.72	69213	
TH_VEL_DG_LO_ORB	V96U8933C	00	+1.03	E-01 FT**2/SEC**4	F	S	P	G4.72	69213	

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

TABLE 4.2.5-5. INERTIAL MEASUREMENT UNIT REDUNDANCY MANAGEMENT (G4.72) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
RAD_PER_DEG DEGREE TO RADIAN CONVERSION FACTOR	V97U0383C	00	+1.7453293	E-02	RAD/DEG	F	S	C A6.9 G4.1 G4.126 G4.127 G4.128 G4.144 G4.15 G4.158 G4.175 G4.20 G4.201 G4.204 G4.205 G4.209 G4.210 G4.211 G4.213 G4.220 G4.223 G4.226 G4.227 G4.236 G4.237 G4.3 G4.35 G4.36 G4.7 G4.72 G4.9 G4.97 G5.27	93090E	

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

4.3 ADTA RM PROCESSING (PF 4.73)

This section defines requirements for ADTA redundancy management processing. ADTA RM performs the following functions:

1. Probe RM, to determine deploy status of probes
2. Usability status, to determine which data are usable for selection filter and FDI
3. Selection filter, to select or average ADTA data for SOP usage
4. Transient detector, to prevent passing bad data to SOP
5. Threshold computation, to be used by comparison tests
6. Comparison tests, to determine if a failure occurs and which parameter failed
7. ADTA RM status determination, to inform SOP of bad data or dilemma and to inform crew of RM status
8. ADTA input conversion, to convert data from counts to engineering units

4.3.1 ADTA RM Overview

Sensors for the air data system (ADS) consist of two probes and four air data transducer assemblies (ADTA's). One probe is located on the vehicle's left side; the other, on the vehicle's right side. Two ADTA's are connected to each probe.

Figure 4.3-1 is a block diagram of ADTA RM. Flow of data, from redundant inputs to selected outputs, is shown by heavy lines. Air data RM can be generally divided into two functions, selection filters and FDI, as depicted in the block diagram.

Figure 4.3-2 is a requirements flow chart for ADS RM processing. This requirements flow chart does not in any way imply software coding requirements; the intent is to convey information as to interrelationships between the various functional processes.

ADS RM shall be performed in Major Modes 304, 305, 602, and 603. Both ADTA's connected to a particular probe will be downmoded while that probe is not deployed. If neither probe has been deployed, only the probe RM section of ADS RM shall be performed.

Failed ADTA's and ADS DILEMMA may be reset by the crew via the SELECT/DESELECT command.

The following discussion of ADS RM is divided into three parts:

1. Section 4.3.1.1, Selection Filter Functional Requirements—an overview of selection filter processing required to select data and test for transients.
2. Section 4.3.1.2, FDI Functional Requirements—an overview of FDI processing required to detect and identify failures.

3. Section 4.3.2, Functional Details—a detailed discussion of functions that are utilized by selection filters, FDI, or both. Probe RM is also discussed in this section.

Selection filters are described in Section 4.3.2.3, the transient detector is described in Section 4.3.2.4, and the RM dilemma is described in Section 4.3.2.6.

<u>Section</u>	<u>Function</u>
4.3.2.1	Probe RM
4.3.2.2	ADTA Usability Status
4.3.2.3	Selection Filters
4.3.2.4	Transient Detectors
4.3.2.5	Comparison Tests
4.3.2.6	Dilemma
4.3.2.7	Comparison Test Thresholds
	.1 Same-Side Thresholds
	.2 Percent and Slipside Compensation
	.3 Cross-Side Thresholds
4.3.2.8	ADTA Data Conversion

4.3.1.1 Selection Filter Functional Requirements.

Depending upon ADTA usability status, described in Section 4.3.2.2, and utilizing comparator thresholds, described in Section 4.3.2.7, selection filter processing performs the following functions:

1. Select data from the left side (probe), the left select filter.
 - If both ADTA's usable, average their outputs.
 - If only one ADTA usable, use its output.
 - If neither ADTA usable and ADTA 1 has no commfault, then use ADTA 1 data; otherwise, use ADTA 3 data.
2. Select data from the right side (probe), the right select filter.
 - Same technique as left side.
 - If neither ADTA usable and ADTA 2 has no commfault, then use ADTA 2 data; otherwise, use ADTA 4 data.

3. Average data from left and right sides to remove sideslip effects, the center select filter.
 - If only one side usable, output data from that side.
 - If neither side usable, declare an RM dilemma.
4. Test for transients by comparing data before allowing ADS SOP to compute air data for GN&C.
 - If both sides usable, compare data between sides.
 - If only one side usable, compare data between ADTA's on that side.
 - If transient detected, set ADTA_DG flag to bad state, thus preventing bad data from being processed for GN&C by SOP.

4.3.1.2 Failure Detection and Identification Functional Requirements.

FDI detects that a failure has occurred, identifies the failed ADTA, and reconfigures ADS RM software to not use the failed ADTA. If the failed ADTA cannot be identified, an ADS RM dilemma is declared. This RM dilemma will cause ADS SOP to stop computing measured air data for GN&C and start processing default air data or NAV-derived air data for GN&C. SOP will compute measured air data for dedicated displays regardless of RM dilemma. FDI informs the crew of RM status via ADTA fail flags and the ADS dilemma flag.

The crew controls ADS RM via the SELECT/DESELECT keyboard command. If an ADTA is not selected, then it may not be used by RM. It is required that, once declared failed, ADTA failure status and the associated crew annunciation be latched in such a fashion that the software may not logically reset them without direct crew participation via SELECT/DESELECT commands. Any time an ADTA is selected or deselected by the crew, all fail indicators associated with the ADTA shall be reset to the not-failed state.

FDI must first update the usability status of all ADTA's, described in Section 4.3.2.2. Depending upon systems status, FDI will then perform comparison tests on each parameter as described below.

Comparison tests are detailed in Section 4.3.2.5. Prior to performing these comparison tests, FDI must compute the percent value, and the comparison test thresholds as described in Section 4.3.2.7, Comparison Test Thresholds.

If Both Left Side ADTA's Are Usable

1. Compare parameters between ADTA 1 and ADTA 3 (the C1 left side test and counter).
 - First, compute the C1 test threshold.
2. If the C1 counter is less than N, then an ADTA failure has not been detected on the left side.

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3. If the C1 counter is equal to/greater than N and data are available from the right side for comparison purposes, then identify the failed left side ADTA as follows:
 - Compute the left cross-side threshold which is a function of a percentage of right selected data, sideslip, and Mach.
 - Compare ADTA 1 data with right selected data (the C4 test).
 - Compare ADTA 3 data with right selected data (the C5 test). Note there are no counters associated with C4 and C5.
 - If C4 test miscompares but C5 test does not miscompare, then declare ADTA 1 failed.
 - If C5 test miscompares but C4 test does not miscompare, then declare ADTA 3 failed.
 - If neither, or both, C4 or C5 are miscompared, then do nothing. They will be tested again on the next pass.
 - If an ADTA is declared failed, then the C3 counter must be reset to prevent a dilemma declaration.
4. If the C1 counter is equal to/greater than N and data are not available from the right side, then declare a dilemma situation.

If Both Right Side ADTA's Are Usable

Perform FDI on the right side ADTA's in exactly the same manner as described for the left side, substituting:

1. ADTA 2 for ADTA 1
2. ADTA 4 for ADTA 3
3. C2 for C1
4. C6 for C4
5. C7 for C5
6. Left selected data for right selected data

If Data From Both Sides Are Usable

If, for any parameter, the cross-side comparison test (C3) has miscompared N consecutive times, then declare a dilemma. The exception is: do not declare a dilemma for static pressure if the C3 test fails in the Mach jump region. Note that if a failure occurs that exceeds both the C1 test threshold (or the C2 test threshold) and the C3 test threshold, the C3 counter will be reset (by the ADTA failure declaration) prior to the dilemma declaration.

4.3.2 Functional Details

4.3.2.1 Probe RM.

Air data SOP and RM processing are keyed to probe status. Each probe has two redundant deployed discrettes and two redundant stowed discrettes. Probe deploy status for each probe is a logical function of these four discrettes. The logical expression is:

$$L_PROBE_DEPLOY = (L_D1 \text{ AND } \overline{L_D1_CF} \text{ AND } \overline{L_S1} \text{ AND } \overline{L_S1_CF} \text{ OR } \\ (L_D2 \text{ AND } \overline{L_D2_CF} \text{ AND } \overline{L_S2} \text{ AND } \overline{L_S2_CF})$$

$$R_PROBE_DEPLOY = (R_D1 \text{ AND } \overline{R_D1_CF} \text{ AND } \overline{R_S1} \text{ AND } \overline{R_S1_CF} \text{ OR } \\ (R_D2 \text{ AND } \overline{R_D2_CF} \text{ AND } \overline{R_S2} \text{ AND } \overline{R_S2_CF})$$

where

L_D1 = Left probe deployed discrete 1

L_S1 = Left probe stowed discrete 1

L_D2 = Left probe deployed discrete 2

L_S2 = Left probe stowed discrete 2

R_D1 = Right probe deployed discrete 1

R_S1 = Right probe stowed discrete 1

R_D2 = Right probe deployed discrete 2

R_S2 = Right probe stowed discrete 2

L_PROBE_DEPLOY = Left probe deployed flag

R_PROBE_DEPLOY = Right probe deployed flag

X_XX_CF = Commfault for the discrete

Air Data RM and SOP will not be processed until at least one probe is deployed; therefore, a flag that indicates that either probe is deployed must be generated. This flag will go true when both probes are deployed or a single probe has been deployed for 15 seconds. This is expressed in logical form as:

$$E_PROBE_DEPLOY = (L_PROBE_DEPLOY \text{ AND } R_PROBE_DEPLOY) \text{ OR } \\ [(L_PROBE_DEPLOY \text{ OR } R_PROBE_DEPLOY) \text{ AND } \\ (15 \text{ Seconds})]$$

where

E_PROBE_DEPLOY = Either probe deployed flag.

15 seconds = 15 seconds have passed since either L_PROBE_DEPLOY or R_PROBE_DEPLOY went true.

Once the E_PROBE_DEPLOY flag has switched to the deployed state, it shall be latched for the remainder of the flight.

4.3.2.2 ADTA Usability Status.

If a parameter is to be used by RM and SOP, it must have the following attributes:

1. Its probe must be deployed.
2. Its ADTA must be SELECTED by the crew.
3. None of the parameters in its ADTA may be failed.
4. Its ADTA must not have communication fault (CF) flag.

These attributes can be expressed in logical form as:

$$(USE)_j = (SEL)_j \text{ AND } (PROBE \text{ DEPLOY})_k \text{ AND } (\overline{CF})_j \text{ AND } (\overline{ADTA_FAIL})_j$$

where

j = ADTA's 1 through 4

(USE)_j = Usability of parameter set for ADTA j

(SEL)_j = Select/Deselect Status for ADTA j

(PROBE DEPLOY)_k = Probe deployed flag for ADTA j; i.e., L_PROBE_DEPLOY flag or R_PROBE_DEPLOY flag

CF_j = Commfault flag for ADTA j

(ADTA_FAIL)_j = ADTA fail flag for ADTA j

and

(ADTA_FAIL)_j = (PS_FAIL)_j OR (PAC_FAIL)_j OR

(PAL_FAIL)_j OR (PAU_FAIL)_j

where

(PS_FAIL)_j = Static pressure (PS) fail for ADTA j

(PAC_FAIL)_j = Center port pressure (PAC) fail for ADTA j

(PAL_FAIL)_j = Lower port pressure (PAL) fail for ADTA j

(PAU_FAIL)_j = Upper port pressure (PAU) fail for ADTA j

Selection filter commands (SELCOM) shall be computed as part of ADTA usability status. These selection filter commands shall then be used to mode the selection filters and to determine which comparison tests to perform.

If none of the ADTA's are usable, then the ADS_DILEMMA flag and the D_DILEMMA flag shall be set to the dilemma state and the ADTA_DG flag shall be set to the bad state.

Table 4.3–1 summarizes the selection filter commands and action required by the selection filters as a function of usability status of the applicable ADTA.

4.3.2.3 Selection Filters.

All selection filters (left, right, and center) shall use the SELCOM terms, which are computed to determine how to process the input data. (Refer to Table 4.3–1, Selection Filter Commands, for requirements of the selection filters.)

4.3.2.4 Transient Detector.

Before selected data can be output by RM and used by ADS SOP to compute GN&C air data, a transient test must be performed to protect against transients in data going to GN&C. This transient test is either the C3, C1, or C2 comparison test. If the transient test passes, then ADS SOP will compute air data for GN&C in a normal manner. If the transient test fails, then ADS SOP will not update measured air data for GN&C. The transient test does not apply to SOP air data computations for crew displays (AMI/AVVI) using selected left data and selected right data or the RM sensors spec page.

If at least one ADTA on each side is usable, then compare left selected data with right selected data (the C3 cross-side comparison test) for the transient test. If both ADTA's on the left side (ADTA 1 and ADTA 3) are usable and neither ADTA on the right side usable, then compare ADTA 1 data with ADTA 3 data (the C1 comparison test) for the transient test. If both ADTA's on the right side (ADTA 2 and ADTA 4) are usable and neither ADTA on the left side is usable, then compare ADTA 2 data with ADTA 4 data (the C2 comparison test) for the transient test.

If any parameter fails the transient test, a data-good (ADTA_DG) flag shall be set to the bad state. This ADTA_DG flag will cause ADS SOP to not update measured air data for GN&C. The ADTA_DG flag will be reset to the good state when all parameters pass the transient test or when only one ADTA remains usable. If no ADTA's are usable, set the ADTA_DG flag to the bad state.

Using the C1 test or C2 test for the transient test can be accomplished in the following manner. Store the results of the C1 or C2 test (the DG_PRIME flag), then if the C3 test is not performed (i.e., one side is not usable), set the ADTA_DG flag equal to the DG_PRIME flag.

4.3.2.5 Comparison Tests.

Data comparisons are performed for three purposes: transient protection, failure detection (requires a counter), and failure identification. Referring to Figure 4.3-1, Air Data System Functional Block Diagram, the comparators are described as follows:

C3 Cross-Side Comparator

The C3 comparator is performed when data are usable on both sides. It provides transient protection and detection of a side failure. The C3 Comparison test is performed as follows:

If $|(Left\ Selected\ Data)_i - (Right\ Selected\ Data)_i| \geq (C3\ Threshold)_i$ then set DG flag to bad state

Advance the C3 counter for the ith parameter.

Else reset the C3 counter for the ith parameter.

If, for any parameter, the C3 comparison test miscompares N consecutive times, then the C3 test shall be deemed failed. The C3 failure status is used by FDI to determine if a dilemma situation has occurred.

C1 Left-Side Comparator

The C1 comparator is performed in FDI to detect failures between ADTA 1 and ADTA 3 on the left side. Also, if neither ADTA is usable on the right side and both ADTA's are usable on the left side, then C1 comparison tests will be performed for transient tests and dilemma tests. If C1 is used for the transient test, then its data good flag (DG_PRIME) will be used to denote a transient test failure. The C1 comparison test is performed as follows:

If $|(ADTA\ 1\ Data)_i - (ADTA\ 3\ Data)_i| \geq (C1\ Threshold)_i$

then advance the C1 counter for the ith parameter.

Set DG_PRIME flag to bad state.

Else reset the C1 counter for the ith parameter.

If, for any parameter, the C1 comparison test miscompares N consecutive times, then the C1 test shall be deemed failed. Once failed, the C1 test cannot be reset to the not-failed state until one or more of the ADTA's has its usability state changed (USE_i).

C2 Right-Side Comparator

The C2 comparator operates on the right side (ADTA 2 and ADTA 4) in exactly the same manner as C1 operates on the left side.

C4 and C5 Cross-Side Comparators

The C4 and C5 comparison tests are performed only when C1 has detected a parameter failure (after N count) and at least one ADTA is usable on the right side. The C4 and C5 comparison tests are performed as follows:

If $|(\text{ADTA 1 Data})_i - (\text{Right Selected Data})_i| \geq (\text{Left Threshold})_i$ then deem C4 test miscompared.

If $|(\text{ADTA 3 Data})_i - (\text{Right Selected Data})_i| \geq (\text{Left Threshold})_i$ then deem C5 test miscompared.

C6 and C7 Cross-Side Comparators

The C6 and C7 comparison tests are performed only when C2 has detected a parameter failure (after N count) and at least one ADTA is usable on the left side. The C6 and C7 comparison tests are performed as follows:

If $|(\text{ADTA 2 Data})_i - (\text{Left Selected Data})_i| \geq (\text{Right Threshold})_i$ then deem C6 test miscompared.

If $|(\text{ADTA 4 Data})_i - (\text{Left Selected Data})_i| \geq (\text{Right Threshold})_i$ then deem C7 test miscompared.

Comparison Test Counter Reset

Any time an ADTA's usability status (USE) has changed, then all comparison test counters (C1, C2, C3) shall be reset to zero.

4.3.2.6 Dilemma.

A dilemma is defined as a detected fault that has no possibility of being identified because only two sources of data are available and they disagree. Section 4.3.1.2 defines the conditions for which a dilemma will be declared. They are summarized as follows:

1. ADTA's are usable on both sides.
 - Detected failure exists between sides.
2. No ADTA's are usable on one side.
 - Detected failure exists between ADTA's on the remaining side.
3. No ADTA's are usable on either side.
 - Automatically declare a dilemma and set DG false.

The logic is given below.

Usable ADTA's		Dilemma Logic
Left Side	Right Side	
Both ADTA's	Both ADTA's	DILEMMA = C3 test failed
Both ADTA's	Only one ADTA	DILEMMA = C3 test failed
Only one ADTA	Both ADTA's	DILEMMA = C3 test failed
Only one ADTA	Only one ADTA	DILEMMA = C3 test failed
Both ADTA's	No ADTA's	DILEMMA = C1 test failed
No ADTA's	Both ADTA's	DILEMMA = C2 test failed
No ADTA's	No ADTA's	Declare a dilemma; set DG false
Exception: If in the Mach-jump region, do not declare a dilemma if static pressure fails the C3 test.		

A dilemma will always be treated the same no matter if detected by left-side, right-side, or cross-side comparators.

If a dilemma is declared, the following shall occur:

1. Set the delayed dilemma flag D_DILEMMA to true. This will cause ADS SOP to invoke the DEFAULT ADS or NAV-derived system as long as the D_DILEMMA flag is true. This will also be used to alert the crew, via MEDS, CRT display and C&W, that an ADS dilemma situation exists.
2. Set the ADS_DILEMMA flag to true.

Once a dilemma has been declared and a dilemma flag is set, it shall stay set until the following occurs. When any ADTA is selected or deselected by the crew, commfault cleared, or ADTA declared failed, then the ADS_DILEMMA flag shall be reset to the no-dilemma state. In addition, if the probe deploy has changed states, then the ADS_DILEMMA flag shall be reset to the no-dilemma state. The D_DILEMMA flag reset shall be delayed until both the ADS_DILEMMA is reset and the appropriate transient test has been performed and the ADTA_DG flag set to the good state.

4.3.2.7 Comparison Test Thresholds.

4.3.2.7.1 Same-Side Thresholds.

Same-side thresholds are given below for all pressure comparison tests performed between ADTA's on the same side (probe); that is, the C1 comparison test between ADTA 1 versus ADTA 3 and the C2 comparison test between ADTA 2 versus ADTA 4. Same-side thresholds are identical for the C1 and C2 tests and are expressed in inches of mercury.

$$C1_THRESH_PS, C2_THRESH_PS = K_{SS1}$$

$$C1_THRESH_PAC, C2_THRESH_PAC = K_{SS2}$$

$$C1_THRESH_PAL, C2_THRESH_PAL = K_{SS3}$$

$$C1_THRESH_PAU, C2_THRESH_PAU = K_{SS4}$$

where

C1_THRESH_XXX = Left same-side thresholds (in. Hg)

C2_THRESH_XXX = Right same-side thresholds (in. Hg)

K_{SSi} = Threshold constants (in. Hg)

4.3.2.7.2. Percent Computations and Sideslip Compensation.

Crossside comparison test thresholds are computed to be a percent of the incoming data being tested. This percent will vary with Mach and estimated sideslip:

$$ABSBETA = \text{Absolute value of (RMBETA)}$$

where

ABSBETA = Multiplier that will vary cross-side trip levels as a function of sideslip (deg)

and

RMBETA = An estimate of vehicle sideslip (deg)

The ABSBETA term must be limited to be less than its limit value (BETA_LIM).

If $ABSBETA > BETA_LIM$,

then set $ABSBETA = BETA_LIM$

The Mach term must be limited:

$$MACHL = MIDVAL (M_LIML, MACH, M_LIMH)$$

where

MACH = Mach output by Air Data SOP to GN&C will be either AD_CALC Mach or NAVDAD MACH (ND)

M_LIML = Lower limit for Mach (ND)

M_LIMH = Upper limit for Mach (ND)

MACHL = Limited value of MACH, used in computing thresholds (ND)

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The format for computing PERCENT for static pressure (PS), center alpha pressure (PAC), and upper alpha pressure (PAU) is composed of three segments, each segment being a linear function of Mach with the slope and/or bias increasing as a function of sideslip.

For Static Pressure (PS)

$$\text{If } MACHL \geq MBRK5, \text{BIASPS} = \text{BIAS1_PS} + (\text{BIAS2_PS}) \text{ ABSBETA}$$

$$\text{If } MACHL \geq MBRK1, \text{PERCENT}_{\text{PS}} = \text{BIASPS} + [\text{SLOPE1_PS} + (\text{SLOPE2_PS}) \text{ ABSBETA}] (\text{MACHL} - \text{MBRK1})$$

$$\text{If } MACHL < MBRK1, \text{PERCENT}_{\text{PS}} = \text{BIASPS}$$

$$\text{If } MACHL < MBRK5, \text{PERCENT}_{\text{PS}} = \text{BIAS3_PS} + (\text{BIAS4_PS}) \text{ ABSBETA} + [\text{SLOPE3_PS} + (\text{SLOPE4_PS}) \text{ ABSBETA}] (\text{MACHL} - \text{M_LIML})$$

where

$\text{PERCENT}_{\text{PS}}$ = Percentage of incoming static pressure for computing cross-side trip levels (ND)

BIASPS = the computed bias value for PS (ND)

$\left. \begin{array}{l} \text{BIAS1_PS} \\ \text{BIAS3_PS} \end{array} \right\}$ = Bias value for PS, independent of sideslip (ND)

$\left. \begin{array}{l} \text{BIAS2_PS} \\ \text{BIAS4_PS} \end{array} \right\}$ = Incremental bias per degree of sideslip (deg^{-1})

$\left. \begin{array}{l} \text{SLOPE1_PS} \\ \text{SLOPE3_PS} \end{array} \right\}$ = Slopes of percent line per Mach for PS, independent of sideslip

$\left. \begin{array}{l} \text{SLOPE2_PS} \\ \text{SLOPE4_PS} \end{array} \right\}$ = Incremental slope to be added per degree of sideslip (deg^{-1})

MACHL = Limited GN&C Mach (ND)

$\text{MBRK1}, \text{MBRK5}$ = Mach breakpoints between segments (ND)

M_LIML = Lower limit for Mach (ND)

ABSBETA = Limited, absolute value of sideslip (deg)

For Center Alpha Pressure (PAC)

$$\text{BIASPAC} = \text{BIAS1_PAC} + (\text{BIAS2_PAC}) \text{ ABSBETA}$$

$$\text{If } \text{MACHL} \geq \text{MBRK1}, \text{PERCENT}_{\text{PAC}} = \text{BIASPAC} + [\text{SLOPE1_PAC} + (\text{SLOPE2_PAC}) \text{ ABSBETA}] (\text{MACHL} - \text{MBRK1})$$

$$\text{If } \text{MBRK1} > \text{MACHL} \geq \text{MBRK2}, \text{PERCENT}_{\text{PAC}} = \text{BIASPAC}$$

$$\text{If } \text{MACHL} < \text{MBRK2}, \text{PERCENT}_{\text{PAC}} = \text{BIASPAC} - [\text{SLOPE3_PAC} + (\text{SLOPE4_PAC}) \text{ ABSBETA}] (\text{MBRK2} - \text{MACHL})$$

where

$\text{PERCENT}_{\text{PAC}}$ = Percentage of incoming center alpha pressure for computing cross-side trip levels (ND)

BIASPAC = The computed bias value for PAC (ND)

BIAS1_PAC = Bias value for PAC, independent of sideslip (ND)

BIAS2_PAC = Incremental bias per degree of sideslip (deg^{-1})

MACHL = Limited GN&C Mach (ND)

$\text{MBRK1}, \text{MBRK2}$ = MACH breakpoints between segments (ND)

$\left. \begin{array}{l} \text{SLOPE1_PAC} \\ \text{SLOPE3_PAC} \end{array} \right\}$ = Slopes of percent line per Mach for PAC, independent of sideslip (ND)

$\left. \begin{array}{l} \text{SLOPE2_PAC} \\ \text{SLOPE4_PAC} \end{array} \right\}$ = Incremental slope to be added per degree of sideslip (deg^{-1})

ABSBETA = Limited, absolute value of sideslip function (deg)

For Upper Alpha Pressure (PAU)

$$\text{If } \text{MACHL} \geq \text{MBRK1}, \text{PERCENT}_{\text{PAU}} = \text{BIAS1_PAU} + [\text{SLOPE1_PAU} + (\text{SLOPE2_PAU}) \text{ ABSBETA}] (\text{MACHL} - \text{MBRK3})$$

$$\text{If } \text{MACHL} < \text{MBRK1}, \text{BIASPAU} = \text{BIAS2_PAU} + (\text{BIAS3_PAU}) \text{ ABSBETA}$$

$$\text{If } \text{MACHL} \geq \text{MBRK4}, \text{PERCENT}_{\text{PAU}} = \text{BIASPAU} - [\text{SLOPE3_PAU} + (\text{SLOPE4_PAU}) \text{ ABSBETA}] (\text{MACHL} - \text{MBRK4})$$

$$\text{If } \text{MACHL} < \text{MBRK4}, \text{PERCENT}_{\text{PAU}} = \text{BIASPAU} - [\text{SLOPE5_PAU} + (\text{SLOPE6_PAU}) \text{ ABSBETA}] (\text{MBRK4} - \text{MACHL})$$

where

PERCENT_{PAU} = Percentage of incoming upper alpha pressure for computing cross-side trip levels (ND)

BIASPAU = Calculated bias value for PAU

BIAS1_PAU, }
BIAS2_PAU } = Bias values for PAU, independent of sideslip (ND)

BIAS3_PAU = Bias value for PAU, function of sideslip

SLOPE1_PAU, }
SLOPE3_PAU, } = Slopes of percent line per Mach for PAU, independent of Mach (ND)
SLOPE5_PAU }

SLOPE2_PAU, }
SLOPE4_PAU, } = Incremental slope per degree of sideslip (deg⁻¹)
SLOPE6_PAU }

MBRK1, }
MBRK4 } = Mach breakpoints between segments (ND)

MBRK3 = Mach reference point for slope in segment three (ND)

MACHL = Limited GN&C Mach (ND)

ABSBETA = Limited, absolute value of sideslip functions (deg)

For Lower Alpha Pressure (PAL)

PERCENT_{PAL} = BIAS_PAL + [SLOPE1_PAL + (SLOPE2_PAL) ABSBETA] (MACHL)

where

PERCENT_{PAL} = Percentage of incoming lower alpha pressure for computing cross-side trip levels (ND)

BIAS_PAL = Bias value for PAL (ND)

SLOPE1_PAL = Slope of percent line per Mach for PAL, independent of sideslip (ND)

SLOPE2_PAL = Incremental slope to be added per degree of sideslip (deg⁻¹)

ABSBETA = Limited, absolute value of sideslip function (deg)

MACHL = Limited GN&C Mach (ND)

4.3.2.7.3 Cross-Side Thresholds.

Cross-side thresholds are computed for all pressure comparison tests that are performed between ADTA's on different sides (probes): that is, C3, C4, C5, C6, and C7 comparison tests. The C4, C5, C6, and C7 comparison test thresholds shall be computed when called as a result of C1 or C2 comparison tests failures. The general form for computing cross-side thresholds is as follows:

For the C3 test

$$(C3_THRESH)_i = (PERCENT)_i (Center\ Selected\ Data)_i$$

For the left side (C4 and C5)

$$(LT_THRESH)_i = (PERCENT)_i (Right\ Selected\ Data)_i$$

For the right side (C6 and C7)

$$(RT_THRESH)_i = (PERCENT)_i (Left\ Selected\ Data)_i$$

where

i = Each pressure

$$\left. \begin{array}{l} (C3_THRESH)_i \\ (LT_THRESH)_i \\ (RT_THRESH)_i \end{array} \right\} = \text{Cross_side thresholds for each pressure}$$

PERCENT_i = Computed percent for each pressure

$$\left. \begin{array}{l} (Center\ Selected\ Data)_i \\ (Right\ Selected\ Data)_i \\ (Left\ Selected\ Data)_i \end{array} \right\} = \text{Output of selection filters}$$

The cross-side thresholds are summarized as follows:

Comparator	Equations for Cross-Side Threshold
C3 (Left Side versus Right Side)	C3_THRESH_PS = (PERCENT _{PS}) (Center Selected PS) C3_THRESH_PAC = (PERCENT _{PAC}) (Center Selected PAC) C3_THRESH_PAL = (PERCENT _{PAL}) (Center Selected PAL) C3_THRESH_PAU = (PERCENT _{PAU}) (Center Selected PAU)
C4 and C5 (Left ADTA versus Right Side)	LT_THRESH_PS = (PERCENT _{PS}) (Right Selected PS) LT_THRESH_PAC = (PERCENT _{PAC}) (Right Selected PAC) LT_THRESH_PAL = (PERCENT _{PAL}) (Right Selected PAL) LT_THRESH_PAU = (PERCENT _{PAU}) (Right Selected PAU)
C6 and C7 (Right ADTA versus Left Side)	RT_THRESH_PS = (PERCENT _{PS}) (Left Selected PS) RT_THRESH_PAC = (PERCENT _{PAC}) (Left Selected PAC) RT_THRESH_PAL = (PERCENT _{PAL}) (Left Selected PAL) RT_THRESH_PAU = (PERCENT _{PAU}) (Left Selected PAU)

4.3.2.8 ADTA Data Conversion.

Data that has been selected from the left side (left select data) and from the right side (right select data) must be converted from counts to engineering units for use by the air data SOP in order to provide air data for the dedicated displays (AMI/AVVI). This converted data will also be used by the center select filter. Conversion is accomplished by multiplying each pressure (which is in counts) by the scale factor for that pressure. The general form of this conversion is:

$$C_LT_SEL_DATA_i = (LT_SEL_DATA_i) (ADTA\ SF_i)$$

$$C_RT_SEL_DATA_i = (RT_SEL_DATA_i) (ADTA\ SF_i)$$

where

C_LT_SEL_DATA_i = Converted left side data in engineering units (in. Hg)

LT_SEL_DATA_i = Selected left side data in counts

C_RT_SEL_DATA_i = Converted right side data in engineering units (in. Hg)

RT_SEL_DATA_i = Selected right side data in counts

ADTA_SF_i = Scale factor for pressure i

4.3.3 Initialization Requirements

Parameters requiring initialization and initialization values are defined in Table 4.3-2.

4.3.4 Processing Requirements

Processing requirements are defined for ADTA RM in Table 4.3-3.

4.3.5 Parameter Tables for ADTA RM

The IDD inputs and outputs are listed in Tables 4.3.5-1 and 4.3.5-2 respectively. Values for the I-loads are contained in the I-load requirements document (JSC-19350); however, I-load definitions applicable to this principal function are listed in Table 4.3.5-3. Constants are listed in Table 4.3.5-5. There are no K-load requirements for ADTA RM.

Table 4.3-1. Selection Filter Commands			
LEFT SELECTION FILTER COMMAND			
Usability Status		LEFT_ SELCOM	Left Selection Filter Output (left selected data)
(USE) ₁	(USE) ₃		
1	1	3	Average of ADTA 1 and ADTA 3 data
1	0	2	ADTA 1 data
0	1	1	ADTA 3 data
0	0	0	ADTA 1 data (if ADTA 1 has not commfaulted) or ADTA 3 data (if ADTA 1 has comm-faulted)
RIGHT SELECTION FILTER COMMAND			
Usability Status		RIGHT_ SELCOM	Right Selection Filter Output (right selected data)
(USE) ₂	(USE) ₄		
1	1	3	Average of ADTA 2 and ADTA 4 data
1	0	2	ADTA 2 data
0	1	1	ADTA 4 data
0	0	0	ADTA 2 data (if ADTA 2 has not commfaulted) or ADTA 4 data (if ADTA 2 has commfaulted)
CENTER SELECTION FILTER COMMAND			
Usability Status		CENTER_ SELCOM	Center Selection Filter Output (Center selected data)
(USE) ₁ or (USE) ₃	(USE) ₂ or (USE) ₄		
1	1	3	Average of left selected data and right selected data
1	0	2	Left selected data
0	1	1	Right selected data
0	0	*0	Do not update center selected data
*Set ADS_DILEMMA flag and D_DILEMMA flag to the dilemma state; set ADTA_DG flag to bad state			

Table 4.3-2. ADTA RM Data Initialization Parameters

Name	Description	Const	Type	Value	Units
L_PROBE_DEPLOY	Left probe deployed flag (T = deployed)		D	False	
R_PROBE_DEPLOY	Right probe deployed flag (T = deployed)		D	False	
E_PROBE_DEPLOY	Either probe deployed flag (T = deployed)		D	False	
ADTA_FAIL(1)	Fail status for ADTA (1) (T = fail)		D	False	
ADTA_FAIL(2)	Fail status for ADTA (2) (T = fail)		D	False	
ADTA_FAIL(3)	Fail status for ADTA (3) (T = fail)		D	False	
ADTA_FAIL(4)	Fail status for ADTA (4) (T = fail)		D	False	
ADTA_DG	ADTA data good flag (T = good)		D	False	
D_DILEMMA	Delayed air data RM dilemma flag (T = dilemma)		D	False	
ADS_DILEMMA	Air data RM dilemma flag (T = dilemma)		D	False	
C1_COUNT_PS	C1 test counter for PS		I	0	
C1_COUNT_PAC	C1 test counter for PAC		I	0	
C1_COUNT_PAL	C1 test counter for PAL		I	0	
C1_COUNT_PAU	C1 test counter for PAU		I	0	
C2_COUNT_PS	C2 test counter for PS		I	0	
C2_COUNT_PAC	C2 test counter for PAC		I	0	
C2_COUNT_PAL	C2 test counter for PAL		I	0	
C2_COUNT_PAU	C2 test counter for PAU		I	0	
C3_COUNT_PS	C3 test counter for PS		I	0	
C3_COUNT_PAC	C3 test counter for PAC		I	0	
C3_COUNT_PAL	C3 test counter for PAL		I	0	
C3_COUNT_PAU	C3 test counter for PAU		I	0	
N	Test counter value to declare failure		I	3	
LT_SELCOM	Left select filter command		I	0	
RT_SELCOM	Right select filter command		I	0	
ADTASF(PS)	Static pressure scale factor (PS)	R	FLOAT PT	1.0987E-3	in-Hg/CNT
ADTASF(PAC)	Center alpha press scale factor (PAC)	R	FLOAT PT	1.587E-3	in-Hg/CNT
ADTASF(PAL)	Lower alpha press scale factor (PAL)	R	FLOAT PT	1.587E-3	in-Hg/CNT
ADTASF(PAU)	Upper alpha press scale factor (PAU)	R	FLOAT PT	1.587E-3	in-Hg/CNT

Table 4.3-3. ADTA RM Processing Rates		
Function	Execution Rates	
	Entry (MM 304) RTLS (MM 602)	TAEM/Land (MM 305) RTLS (MM 603)
Selection Filters	1.04 Hz	1.04 Hz
Transient Detector	1.04 Hz	1.04 Hz
ADTA Usability Status	1.04 Hz	1.04 Hz
Comparison Test Thresholds	1.04 Hz	1.04 Hz
Comparison Tests	1.04 Hz	1.04 Hz
ADTA Data Conversion	1.04 Hz	1.04 Hz
Status Determination	1.04 Hz	1.04 Hz
Probe RM	0.52 Hz	0.52 Hz

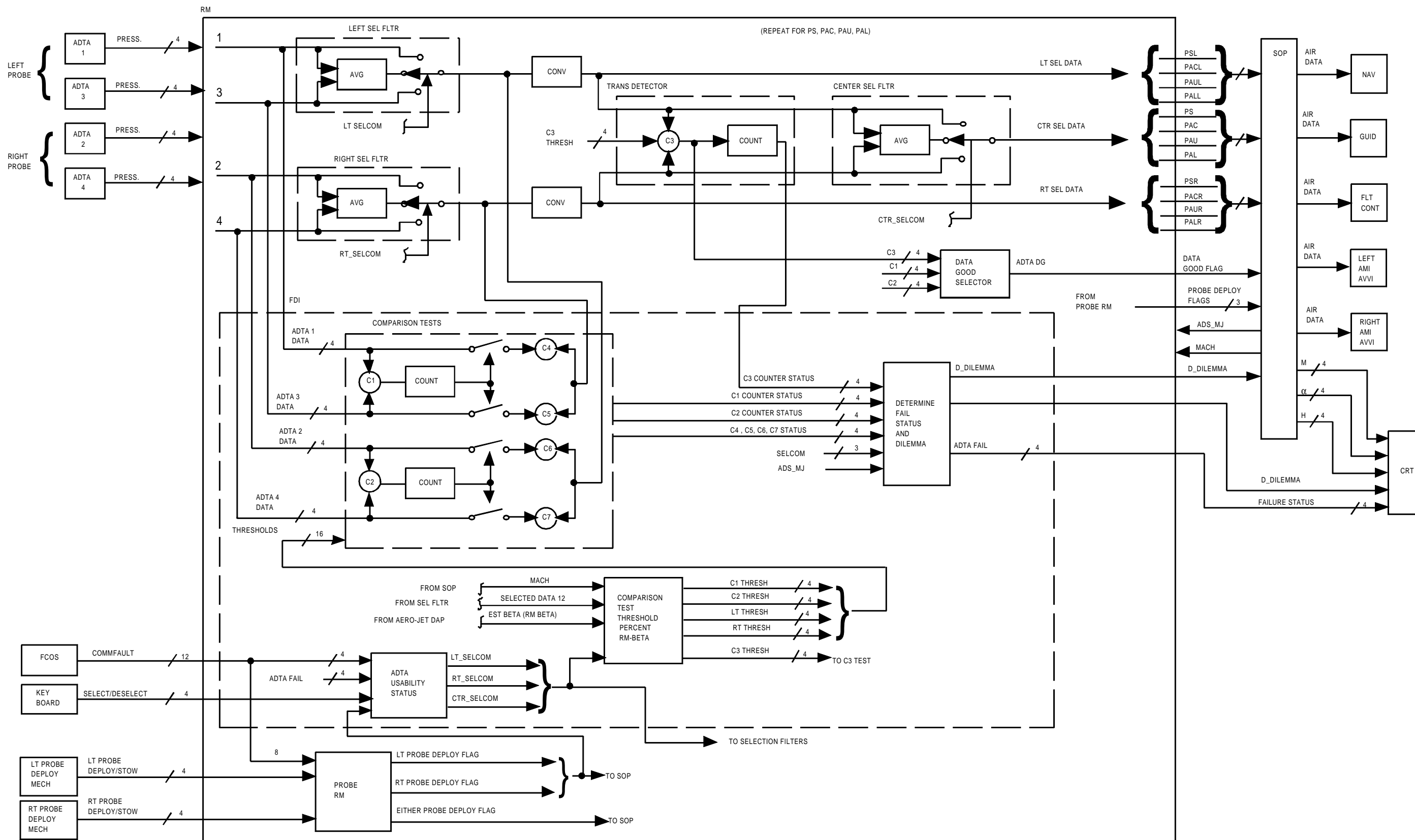


FIGURE 4.3-1. Air Data System RM Block Diagram

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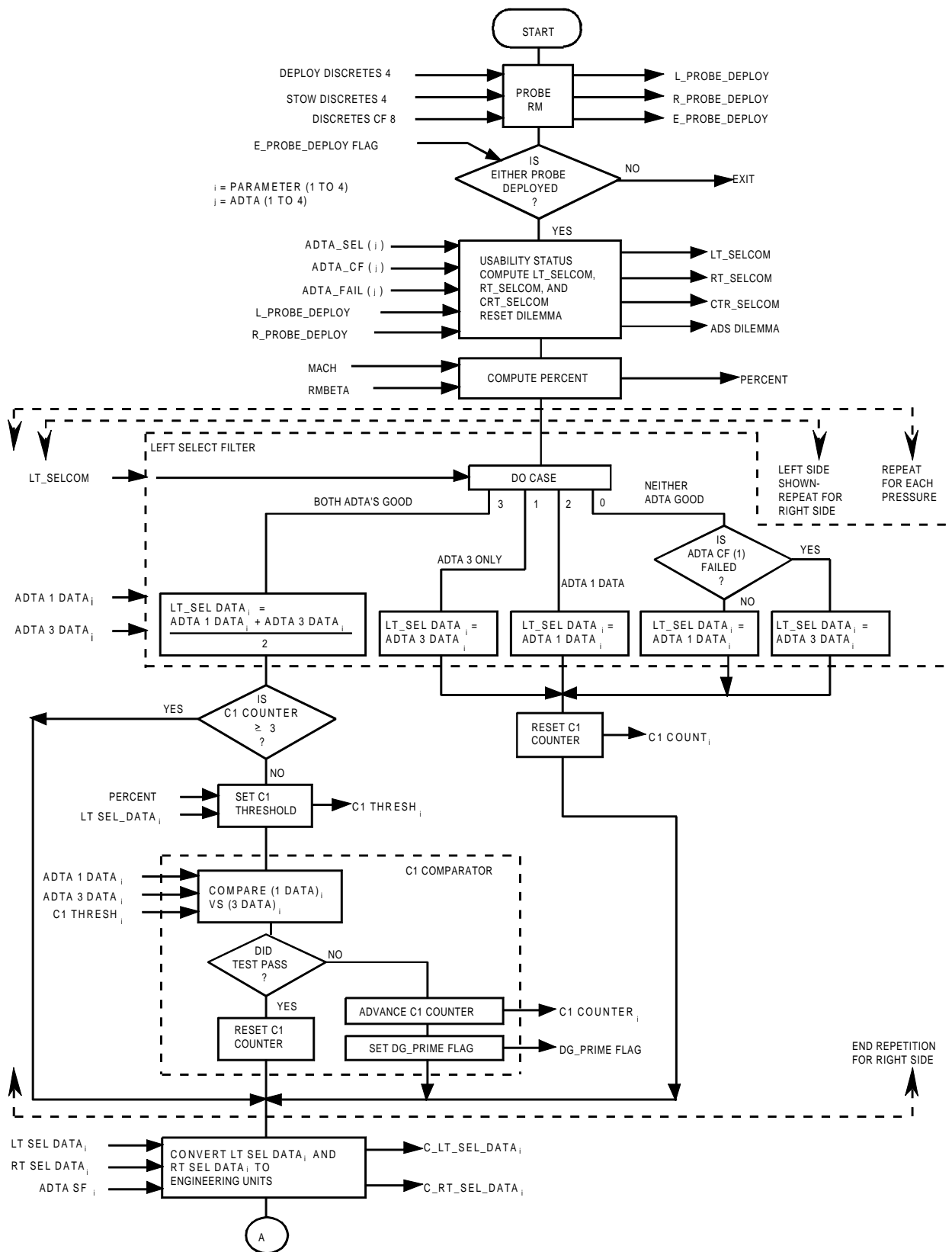


FIGURE 4.3-2.(1) Air Data System RM Requirements Flow Chart (Sheet 1 of 2)

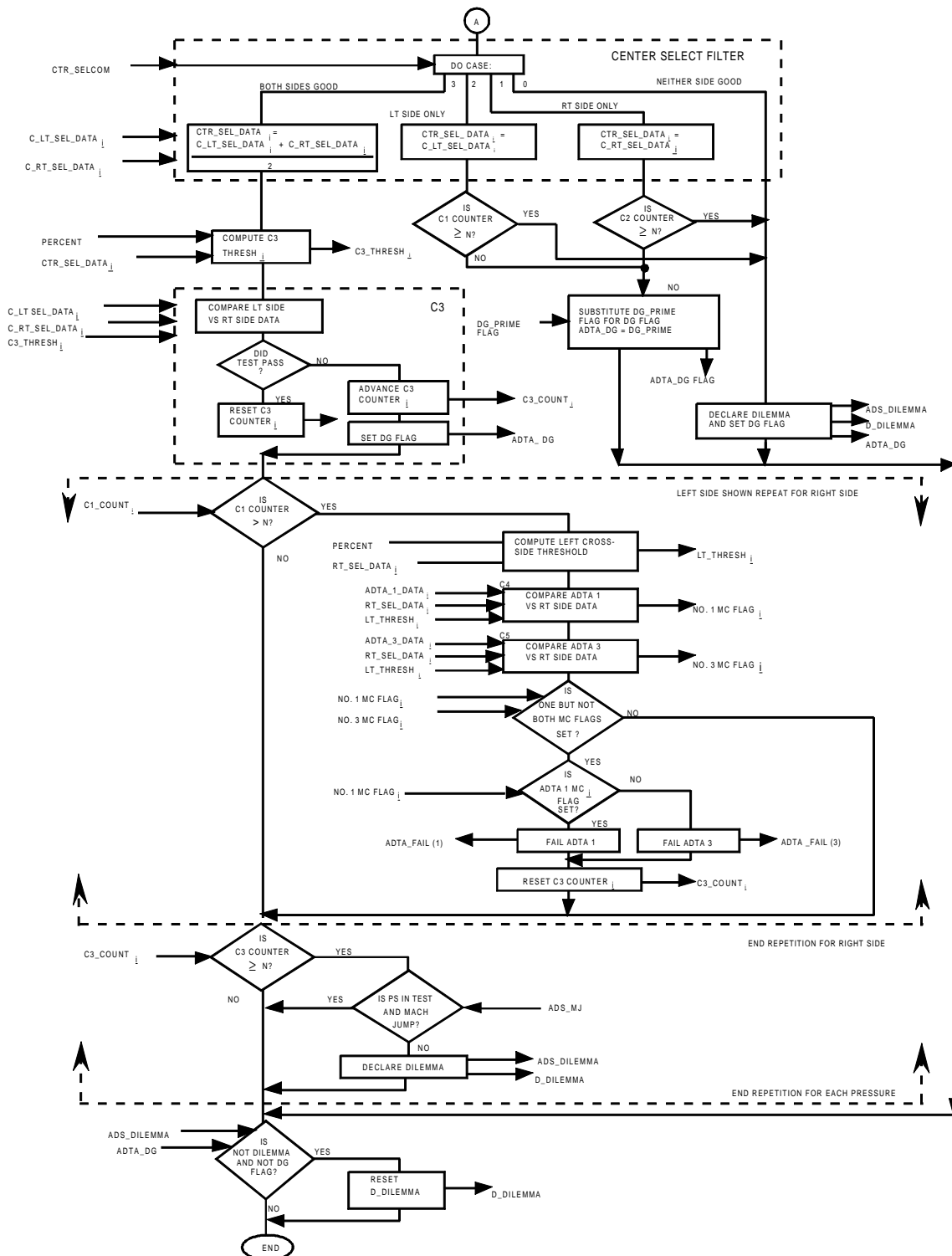


FIGURE 4.3-2.(2) Air Data System RM Requirements Flow Chart (Sheet 2 of 2)

TABLE 4.3.5-1. INPUT FUNCTIONAL PARAMETERS FOR AIR DATA TRANSDUCER ASSEMBLY FDI (G4.73)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ADS_MJ	V95X3112X	ADS MACH JUMP FLAG	ADTA SOP		BD		93017G	*
ADTAM(1,2)	V71P7040B	ADTA 1 STATIC PRESS	WD2	ADTA 1	COUNTS	HXS	93017G	*
ADTAM(1,3)	V71P7080B	ADTA 1 CTR ALPHA PRESS(PAC)	WD3	ADTA 1	COUNTS	HXS	93017G	*
ADTAM(1,5)	V71P7120B	ADTA 1 LWR ALPHA PRESS(PAL)	WD5	ADTA 1	COUNTS	HXS	93017G	*
ADTAM(1,6)	V71P7140B	ADTA 1 UPR ALPHA PRESS(PAU)	WD6	ADTA 1	COUNTS	HXS	93017G	*
ADTAM(2,2)	V71P7540B	ADTA 2 STATIC PRESS	WD2	ADTA 2	COUNTS	HXS	93017G	*
ADTAM(2,3)	V71P7580B	ADTA 2 CTR ALPHA PRESS(PAC)	WD3	ADTA 2	COUNTS	HXS	93017G	*
ADTAM(2,5)	V71P7620B	ADTA 2 LWR ALPHA PRESS(PAL)	WD5	ADTA 2	COUNTS	HXS	93017G	*
ADTAM(2,6)	V71P7640B	ADTA 2 UPR ALPHA PRESS(PAU)	WD6	ADTA 2	COUNTS	HXS	93017G	*
ADTAM(3,2)	V71P8040B	ADTA 3 STATIC PRESS	WD2	ADTA 3	COUNTS	HXS	93017G	*
ADTAM(3,3)	V71P8080B	ADTA 3 CTR ALPHA PRESS(PAC)	WD3	ADTA 3	COUNTS	HXS	93017G	*
ADTAM(3,5)	V71P8120B	ADTA 3 LWR ALPHA PRESS(PAL)	WD5	ADTA 3	COUNTS	HXS	93017G	*
ADTAM(3,6)	V71P8140B	ADTA 3 UPR ALPHA PRESS(PAU)	WD6	ADTA 3	COUNTS	HXS	93017G	*
ADTAM(4,2)	V71P8540B	ADTA 4 STATIC PRESS	WD2	ADTA 4	COUNTS	HXS	93017G	*
ADTAM(4,3)	V71P8580B	ADTA 4 CTR ALPHA PRESS(PAC)	WD3	ADTA 4	COUNTS	HXS	93017G	*
ADTAM(4,5)	V71P8620B	ADTA 4 LWR ALPHA PRESS(PAL)	WD5	ADTA 4	COUNTS	HXS	93017G	*
ADTAM(4,6)	V71P8640B	ADTA 4 UPR ALPHA PRESS(PAU)	WD6	ADTA 4	COUNTS	HXS	93017G	*
ADTA_CF(1)	V91X3300X	ADTA 1 COMMFAULT		FCOS				
ADTA_CF(2)	V91X3330X	ADTA 2 COMMFAULT		FCOS				
ADTA_CF(3)	V91X3360X	ADTA 3 COMMFAULT		FCOS				
ADTA_CF(4)	V91X3390X	ADTA 4 COMMFAULT		FCOS				
LH_PROBE_DEPLOY(1)	V59X2600X	LH AIR DATA PROBE DEPLOY 1		MCA F1		BD	93017G	*
LH_PROBE_DEPLOY(2)	V59X2602X	LH AIR DATA PROBE DEPLOY 2		MCA F2		BD	93017G	*
LH_PROBE_STOW(1)	V59X2604X	LH AIR DATA PROBE STOW 1		MCA F1		BD	93017G	*
LH_PROBE_STOW(2)	V59X2606X	LH AIR DATA PROBE STOW 2		MCA F2		BD	93017G	*
L_D1_CF	V91X5385X	LH PROBE DEPLOY(1) COMMFAULT		FCOS				
L_D2_CF	V91X5386X	LH PROBE DEPLOY(2) COMMFAULT		FCOS				
L_S1_CF	V91X5387X	LH PROBE STOW(1) COMMFAULT		FCOS				
L_S2_CF	V91X5388X	LH PROBE STOW(2) COMMFAULT		FCOS				
M/MACH	V95L3029C	GN&C MACH NUMBER		ADTA SOP		SPL	93017G	*
RH_PROBE_DEPLOY(1)	V59X2700X	RH AIR DATA PROBE DEPLOY 1		MCA F3		BD	93017G	*
RH_PROBE_DEPLOY(2)	V59X2702X	RH AIR DATA PROBE DEPLOY 2		MCA F2		BD	93017G	*
RH_PROBE_STOW(1)	V59X2704X	RH AIR DATA PROBE STOW 1		MCA F3		BD	93017G	*
RH_PROBE_STOW(2)	V59X2706X	RH AIR DATA PROBE STOW 2		MCA F2		BD	93017G	*
RMBETA	V90H1646CA	RMBETA		AEROJET DAP	DEG		89862A	
RMBETA	V90H1646CB	RMBETA		GRTLS DAP	DEG		89862A	
R_D1_CF	V91X5389X	RH_PROBE DEPLOY(1) COMMFAULT		FCOS				
R_D2_CF	V91X5390X	RH_PROBE DEPLOY(2) COMMFAULT		FCOS				
R_S1_CF	V91X5391X	RH_PROBE STOW(1) COMMFAULT		FCOS				
R_S2_CF	V91X5392X	RH_PROBE STOW(2) COMMFAULT		FCOS				
	V93X4571XA	ADTA 1 DES CMD		SENSOR SELF TEST DISP			93017G	*
	V93X4571XB	ADTA 1 DES CMD		OVERRIDE DISP			93017G	*
	V93X4573XA	ADTA 2 DES CMD		SENSOR SELF TEST DISP			93017G	*
	V93X4573XB	ADTA 2 DES CMD		OVERRIDE DISP			93017G	*
	V93X4575XA	ADTA 3 DES CMD		SENSOR SELF TEST DISP			93017G	*
	V93X4575XB	ADTA 3 DES CMD		OVERRIDE DISP			93017G	*

TABLE 4.3.5-1. INPUT FUNCTIONAL PARAMETERS FOR AIR DATA TRANSDUCER ASSEMBLY FDI (G4.73)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V93X4577XA	ADTA 4 DES CMD	SENSOR SELF TEST DISP				93017G	*
	V93X4577XB	ADTA 4 DES CMD	VERRIDE DISP				93017G	*

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

TABLE 4.3.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM AIR DATA TRANSDUCER ASSEMBLY FDI (G4.73)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ADTA_FAIL(1)	V90X5001X	ADTA 1 FAIL	DL FMT 23/1 GAX		BD		93017G	*
ADTA_FAIL(2)	V90X5051X	ADTA 2 FAIL	DL FMT 23/1 GAX		BD		93017G	*
ADTA_FAIL(3)	V90X5101X	ADTA 3 FAIL	DL FMT 23/1 GAX		BD		93017G	*
ADTA_FAIL(4)	V90X5151X	ADTA 4 FAIL	DL FMT 23/1 GAX		BD		93017G	*
BARO_DATA_GOOD	V90X5180X	ADTA DATA GOOD	ADTA SOP DL FMT 23/1		BD		93017G	*
D_DILEMMA	V90X4840X	DELAYED ADTA DILEMA FLAG	ADTA SOP DL FMT 23/1 GAX		BD		93017G	*
E_PROBE_DEPLOY	V90X4877X	EITHER PROBE DEPLOYED	MEDS FC GNC XFER ADTA SOP DL FMT 23/1		BD		93017G	*
L_PROBE_DEPLOY	V90X4870X	LEFT PROBE DEPLOYED FLAG	ADTA SOP DL FMT 21/1 DL FMT 23/1		BD		93017G	*
PAC	V90P4711C	CENTER SELECTED ADTA PAC	E/L EV AN PROC ADTA SOP DL FMT 23/1	INHG	SPL		93017G	*
PACL	V90P4811C	LEFT SELECTED ADTA PAC	ADTA SOP	INHG				
PACR	V90P4911C	RIGHT SELECTED ADTA PAC	ADTA SOP	INHG				
PAL	V90P4712C	CENTER SELECTED ADTA PAL	ADTA SOP DL FMT 23/1	INHG	SPL		93017G	*
PALL	V90P4812C	LEFT SELECTED ADTA PAL	ADTA SOP	INHG				
PALR	V90P4912C	RIGHT SELECTED ADTA PAL	ADTA SOP	INHG				
PAU	V90P4710C	CENTER SELECTED ADTA PAU	ADTA SOP DL FMT 23/1	INHG	SPL		93017G	*
PAUL	V90P4810C	LEFT SELECTED ADTA PAU	ADTA SOP	INHG				
PAUR	V90P4910C	RIGHT SELECTED ADTA PAU	ADTA SOP	INHG				
PS	V90P4706C	CENTER SELECTED ADTA PS	ADTA SOP DL FMT 23/1	INHG	SPL		93017G	*
PSL	V90P4806C	LEFT SELECTED ADTA PS	ADTA SOP	INHG				
PSR	V90P4906C	RIGHT SELECTED ADTA PS	ADTA SOP	INHG				
R_PROBE_DEPLOY	V90X4871X	RIGHT PROBE DEPLOYED FLAG	ADTA SOP DL FMT 21/1 DL FMT 23/1		BD		93017G	*
	V90M2927P	CGEB_FLT_LG2_FLAG2_HFE	E/L EV AN PROC DL FMT 23/1				93017G	*
	V90M2936P	CGYB_PROBE_DEPLOY\$(1:)	DL FMT 21/1 DL FMT 23/1				93017G	*
	V90M2937P	CGYB_PROBE_DEPLOY\$(2:)	DL FMT 21/1 DL FMT 23/1				93017G	*
	V90M2944P	CGYB_E_PROBE_DEPLOY	DL FMT 23/1				93017G	*

TABLE 4.3.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM AIR DATA TRANSDUCER ASSEMBLY FDI (G4.73)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90M2945P	CGYB_ADTA_DG	DL FMT 23/1				93017G	*
	V93X4571XC	ADTA 1 DES CMD	OVERRIDE DISP					
	V93X4573XC	ADTA 2 DES CMD	OVERRIDE DISP					
	V93X4575XC	ADTA 3 DES CMD	OVERRIDE DISP					
	V93X4577XC	ADTA 4 DES CMD	OVERRIDE 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 4.3.5-3. AIR DATA TRANSDUCER ASSEMBLY FDI (G4.73) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
BETA_LIM	V96U7911C	DEG	F	S	D	P	G4.73	00	ZSK	DC0599	
BIAS1_PAC	V96U7920C	ND	F	S	D	P	G4.73	00	ZSK	DC0599	
BIAS1_PAU	V96U7933C	ND	F	S	D	P	G4.73	00	ZSK	DC0599	
BIAS1_PS	V96U7914C	ND	F	S	D	P	G4.73	00	ZSK	DC0599	
BIAS2_PAC	V96U7921C	DEG** -1	F	S	D	P	G4.73	00	ZSK	DC0599	
BIAS2_PAU	V96U7934C	ND	F	S	D	P	G4.73	00	ZSK	DC0599	
BIAS2_PS	V96U7924C	DEG** -1	F	S	D	P	G4.73	00	ZSK	DC0599	
BIAS3_PAU	V96U7935C	DEG** -1	F	S	D	P	G4.73	00	ZSK	DC0599	
BIAS3_PS	V96U7925C	ND	F	S	D	P	G4.73	00	ZSK	DC0599	
BIAS4_PS	V96U7926C	DEG** -1	F	S	D	P	G4.73	00	ZSK	DC0599	
BIAS_PAL	V96U7917C	ND	F	S	D	P	G4.73	00	ZFK	DC0599	
KSS1	V98U9717C	IN-HG	F	S	D	P	G4.73	00	ZFK	DC0599	
KSS2	V98U9718C	IN-HG	F	S	D	P	G4.73	00	ZFK	DC0599	
KSS3	V98U9719C	IN-HG	F	S	D	P	G4.73	00	ZFK	DC0599	
KSS4	V98U9720C	IN-HG	F	S	D	P	G4.73	00	ZFK	DC0599	
MBRK1	V96U7931C	ND	F	S	D	P	G4.73	00	ZSK	DC0599	
MBRK2	V96U7932C	ND	F	S	D	P	G4.73	00	ZSK	DC0599	
MBRK3	V96U7943C	ND	F	S	D	P	G4.73	00	ZSK	DC0599	
MBRK4	V96U7944C	ND	F	S	D	P	G4.73	00	ZSK	DC0599	
MBRK5	V96U7942C	ND	F	S	D	P	G4.73	00	ZSK	DC0599	
M_LIMH	V96U7913C	ND	F	S	D	P	G4.73	00	ZFK	DC0599	
M_LIML	V96U7912C	ND	F	S	D	P	G4.73	00	ZSK	DC0599	
SLOPE1_PAC	V96U7922C	ND	F	S	D	P	G4.73	00	ZSK	DC0599	
SLOPE1_PAL	V96U7918C	ND	F	S	D	P	G4.73	00	ZFK	DC0599	
SLOPE1_PAU	V96U7936C	ND	F	S	D	P	G4.73	00	ZSK	DC0599	
SLOPE1_PS	V96U7915C	ND	F	S	D	P	G4.73	00	ZSK	DC0599	
SLOPE2_PAC	V96U7923C	DEG** -1	F	S	D	P	G4.73	00	ZSK	DC0599	
SLOPE2_PAL	V96U7919C	DEG** -1	F	S	D	P	G4.73	00	ZFK	DC0599	
SLOPE2_PAU	V96U7937C	DEG** -1	F	S	D	P	G4.73	00	ZSK	DC0599	
SLOPE2_PS	V96U7916C	DEG** -1	F	S	D	P	G4.73	00	ZSK	DC0599	
SLOPE3_PAC	V96U7929C	ND	F	S	D	P	G4.73	00	ZSK	DC0599	
SLOPE3_PAU	V96U7938C	ND	F	S	D	P	G4.73	00	ZSK	DC0599	
SLOPE3_PS	V96U7927C	ND	F	S	D	P	G4.73	00	ZSK	DC0599	
SLOPE4_PAC	V96U7930C	DEG** -1	F	S	D	P	G4.73	00	ZSK	DC0599	
SLOPE4_PAU	V96U7939C	DEG** -1	F	S	D	P	G4.73	00	ZSK	DC0599	
SLOPE4_PS	V96U7928C	DEG** -1	F	S	D	P	G4.73	00	ZSK	DC0599	
SLOPE5_PAU	V96U7940C	ND	F	S	D	P	G4.73	00	ZSK	DC0599	
SLOPE6_PAU	V96U7941C	DEG** -1	F	S	D	P	G4.73	00	ZSK	DC0599	

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

TABLE 4.3.5-4. AIR DATA TRANSDUCER ASSEMBLY FDI (G4.73) 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 4.3.5-5. AIR DATA TRANSDUCER ASSEMBLY FDI (G4.73) CONSTANTS

FSSR NAME DESCRIPTION	MSID	MC	CONSTANT VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
N TEST COUNTER VALUE TO DECLARE FAILURE	V97U6283C	00	+3	ND	I	S	P	G4.213 G4.73	90374C	

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

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4.4 FLIGHT CONTROL SENSORS

4.4.1 Orbiter RGA FDIR (PF 4.74)

The Orbiter rate gyros are a quad redundant subsystem. FDIR shall operate on pitch, roll, and yaw rate data. Orbiter RGA FDIR shall operate as described in paragraph 4.0.2 for the RGA four-parameter case. FDIR shall be performed on all four LRU's whenever there are four LRU's and shall be terminated if one or more units are not usable.

4.4.1.1 Functional Requirements.

The limits for the RGA differencing tests shall be determined as follows:

$$\text{LIMIT} = | \text{Selected Rate} | \frac{(\text{LSF})}{100} + \text{CON}$$

where

LSF = limit scale factor, percent

CON = a limit constant

Separate LSF and CON values required for the roll, pitch, and yaw rate tests are K-loads (see paragraph 4.4.1.3). The selected rate shall be the last available SF output.

4.4.1.2 Processing Requirements.

ORB RGA FDIR will be processed at the rate shown on Table 4.0-2 during the entry phase (OPS 3), ascent phase (OPS 1), and in RTLS (OPS 6).

4.4.1.3 Parameter Tables for ORB RGA FDIR.

The IDD inputs and outputs are listed in Tables 4.4.1.3-1 and 4.4.1.3-2 respectively. K-loads are listed in Table 4.4.1.3-4. There are no I-load or constants requirements for RGA FDIR.

TABLE 4.4.1.3-1. INPUT FUNCTIONAL PARAMETERS FOR ORBITER RATE GYRO FDIR (G4.74)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
PC(1)	V95R4001C	COMPENSATED ROLL RATE 1	ORB RG SOP	DEG/S	SPL		93017G	*
PC(2)	V95R4002C	COMPENSATED ROLL RATE 2	ORB RG SOP	DEG/S	SPL		93017G	*
PC(3)	V95R4003C	COMPENSATED ROLL RATE 3	ORB RG SOP	DEG/S	SPL		93017G	*
PC(4)	V95R4004C	COMPENSATED ROLL RATE 4	ORB RG SOP	DEG/S	SPL		93017G	*
P_ORB	V90R5301CA	SELECTED RGA ROLL RATE	SF	DEG/S			93017G	*
QC(1)	V95R4031C	COMPENSATED PITCH RATE 1	ORB RG SOP	DEG/S	SPL		93017G	*
QC(2)	V95R4032C	COMPENSATED PITCH RATE 2	ORB RG SOP	DEG/S	SPL		93017G	*
QC(3)	V95R4033C	COMPENSATED PITCH RATE 3	ORB RG SOP	DEG/S	SPL		93017G	*
QC(4)	V95R4034C	COMPENSATED PITCH RATE 4	ORB RG SOP	DEG/S	SPL		93017G	*
Q_ORB/Q	V90R5321CA	SELECTED RGA PITCH RATE	SF	DEG/S			93017G	*
RC(1)	V95R4061C	COMPENSATED YAW RATE 1	ORB RG SOP	DEG/S	SPL		93017G	*
RC(2)	V95R4062C	COMPENSATED YAW RATE 2	ORB RG SOP	DEG/S	SPL		93017G	*
RC(3)	V95R4063C	COMPENSATED YAW RATE 3	ORB RG SOP	DEG/S	SPL		93017G	*
RC(4)	V95R4064C	COMPENSATED YAW RATE 4	ORB RG SOP	DEG/S	SPL		93017G	*
RGA_PIT_CF(1)	V91X3701X	RGA 1 PITCH COMMFAULT	FCOS				79556D	
RGA_PIT_CF(2)	V91X3731X	RGA 2 PITCH COMMFAULT	FCOS				79556D	
RGA_PIT_CF(3)	V91X3761X	RGA 3 PITCH COMMFAULT	FCOS				79556D	
RGA_PIT_CF(4)	V91X3791X	RGA 4 PITCH COMMFAULT	FCOS				79556D	
RGA_ROLL_CF(1)	V91X3700X	RGA 1 ROLL COMMFAULT	FCOS				79556D	
RGA_ROLL_CF(2)	V91X3730X	RGA 2 ROLL COMMFAULT	FCOS				79556D	
RGA_ROLL_CF(3)	V91X3760X	RGA 3 ROLL COMMFAULT	FCOS				79556D	
RGA_ROLL_CF(4)	V91X3790X	RGA 4 ROLL COMMFAULT	FCOS				79556D	
RGA_YAW_CF(1)	V91X3702X	RGA 1 YAW COMMFAULT	FCOS				79556D	
RGA_YAW_CF(2)	V91X3732X	RGA 2 YAW COMMFAULT	FCOS				79556D	
RGA_YAW_CF(3)	V91X3762X	RGA 3 YAW COMMFAULT	FCOS				79556D	
RGA_YAW_CF(4)	V91X3792X	RGA 4 YAW COMMFAULT	FCOS				79556D	
R_ORB	V90R5341CA	SELECTED RGA YAW RATE	SF	DEG/S			93017G	*
	V93X4516XA	RGA 1 DES CMD/FAIL	CNTLS DISP	EVENT	BD		93017G	*
	V93X4516XB	RGA 1 DES CMD/FAIL	SENSOR SELF TEST DISP	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	*
	V93X4518XB	RGA 2 DES CMD/FAIL	SENSOR SELF TEST DISP	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	*
	V93X4520XB	RGA 3 DES CMD/FAIL	SENSOR SELF TEST DISP	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	*
	V93X4522XB	RGA 4 DES CMD/FAIL	SENSOR SELF TEST DISP	EVENT	BD		93017G	*
	V93X4522XD	RGA 4 DES CMD/FAIL	ORB RGA SMRD RM	EVENT	BD		93017G	*

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

TABLE 4.4.1.3-2. OUTPUT FUNCTIONAL PARAMETERS FROM ORBITER RATE GYRO FDIR (G4.74)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90M2892PC	CGRB_STATUS_2\$(21:)	DL FMT 21/1				93017G	*
			DL FMT 23/1					
	V90U5660CA	ORB RGA SF COMMAND	SF				90477E	
	V90X5401X	ORB RGA 1 FAIL	GAX		BD		79901D	
	V90X5429X	ORB RGA ROLL RATE DISAGREE	GAX				92354	
	V90X5430X	ORB RGA PITCH RATE DISAGREE	GAX				92354	
	V90X5431X	ORB RGA YAW RATE DISAGREE	GAX				92354	
	V90X5501X	ORB RGA 2 FAIL	GAX		BD		79901D	
	V90X5601X	ORB RGA 3 FAIL	GAX		BD		79901D	
	V90X5651X	ORB RGA 4 FAIL	GAX		BD		79901D	
	V93X4516XC	RGA 1 DES CMD/FAIL	CNTLS DISP	EVENT	BD		93017G	*
			DL FMT 21/1					
			DL FMT 23/1					
	V93X4518XC	RGA 2 DES CMD/FAIL	ORB RGA SMRD RM	EVENT	BD		93017G	*
			CNTLS DISP					
			DL FMT 21/1					
			DL FMT 23/1					
	V93X4520XC	RGA 3 DES CMD/FAIL	ORB RGA SMRD RM	EVENT	BD		93017G	*
			CNTLS DISP					
			DL FMT 21/1					
			DL FMT 23/1					
	V93X4522XC	RGA 4 DES CMD/FAIL	ORB RGA SMRD RM	EVENT	BD		93017G	*
			CNTLS DISP					
			DL FMT 21/1					
			DL FMT 23/1					
			ORB RGA SMRD RM					

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 4.4.1.3-3. ORBITER RATE GYRO FDIR (G4.74) 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 4.4.1.3-4. ORBITER RATE GYRO FDIR (G4.74) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
CON(01)	V97U3021C	01	+7.9999995	E-01	DEG/SEC	F	S	P G4.74	90508B	
ORB RGA ROLL RATE LIMIT CONSTANT		03	+1.19	E+00						
CON(02)	V97U3022C	01	+5.4999995	E-01	DEG/SEC	F	S	P G4.74	90508B	
ORB RGA PITCH RATE LIMIT CONSTANT		03	+6.5	E-01						
CON(03)	V97U3023C	01	+6.2999999	E-01	DEG/SEC	F	S	P G4.74	90508B	
ORB RGA YAW RATE LIMIT CONSTANT		03	+6.5	E-01						
LSF(01)	V97U3053C	01	+7.9999983	E+00	PCT	F	S	P G4.74	90508B	
ORB RGA ROLL RATE LIMIT SC FACTOR		03	+8.9	E+00						
LSF(02)	V97U3054C	01	+6.4999997	E+00	PCT	F	S	P G4.74	90508B	
ORB RGA PITCH RATE LIMIT SC FACTOR		03	+6.0000000	E+00						
LSF(03)	V97U3055C	01	+6.4999997	E+00	PCT	F	S	P G4.74	90508B	
ORB RGA YAW RATE LIMIT SC FACTOR		03	+6.0000000	E+00						
N_ORB_RGA	V97U3079C	01	+10		ND	I	S	P G4.74	90094C	
		03	+3							
PQC	V96U8591C	01	+4.0	E-01	DEG/SEC	F	S	X G4.74	90254	
		03	+5.95	E-01						
QQC	V96U8592C	01	+2.2	E-01	DEG/SEC	F	S	X G4.74	90254	
		03	+3.22	E-01						
RQC	V96U8593C	00	+2.2	E-01	DEG/SEC	F	S	A G4.74	90254	
ORB RGA YAW QMVS CONST										

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

TABLE 4.4.1.3-5. ORBITER RATE GYRO FDIR (G4.74) 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.

4.4.2 AA FDIR (PF 4.76)

The accelerometers are a quad redundant subsystem. FDIR shall operate on normal and lateral accelerations. AA FDIR shall operate as described in paragraph 4.0.2 for the AA four parameter case (without BITE). FDIR shall be performed on all four LRU's whenever there are four LRU's and shall be terminated if one or more units are not usable.

4.4.2.1 Functional Requirements.

The limits for the AA differencing test and their values are K-loads (see paragraph 4.4.2.3).

4.4.2.2 Processing Requirements.

AA FDIR shall be processed at the rate shown in Table 4.0-2 during the entry phase (OPS 3), ascent phase (OPS 1), and in RTLS (OPS 6).

4.4.2.3 Parameter Tables for AA FDIR.

The IDD inputs and outputs are listed in Tables 4.4.2.3-1 and 4.4.2.3-2 respectively. K-loads are listed in Table 4.4.2.3-4. There are no I-load or constants requirements for AA FDIR.

TABLE 4.4.2.3-1. INPUT FUNCTIONAL PARAMETERS FOR ACCELEROMETER ASSEMBLY FDIR (G4.76)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
AA_LAT_CF(1)	V91X3650X	AA 1 LATERAL ACCEL COMMFAULT	FCOS				79556D	
AA_LAT_CF(2)	V91X3660X	AA 2 LATERAL ACCEL COMMFAULT	FCOS				79556D	
AA_LAT_CF(3)	V91X3670X	AA 3 LATERAL ACCEL COMMFAULT	FCOS				79556D	
AA_LAT_CF(4)	V91X3680X	AA 4 LATERAL ACCEL COMMFAULT	FCOS				79556D	
AA_NOR_CF(1)	V91X3651X	AA 1 NORMAL ACCEL COMMFAULT	FCOS				79556D	
AA_NOR_CF(2)	V91X3661X	AA 2 NORMAL ACCEL COMMFAULT	FCOS				79556D	
AA_NOR_CF(3)	V91X3671X	AA 3 NORMAL ACCEL COMMFAULT	FCOS				79556D	
AA_NOR_CF(4)	V91X3681X	AA 4 NORMAL ACCEL COMMFAULT	FCOS				79556D	
LC(1)	V95A4101C	COMPENSATED LAT ACCELN 1	AA SOP	G	SPL		93017G	*
LC(2)	V95A4102C	COMPENSATED LAT ACCELN 2	AA SOP	G	SPL		93017G	*
LC(3)	V95A4103C	COMPENSATED LAT ACCELN 3	AA SOP	G	SPL		93017G	*
LC(4)	V95A4104C	COMPENSATED LAT ACCELN 4	AA SOP	G	SPL		93017G	*
NC(1)	V95A4151C	COMPENSATED NORM ACCELN 1	AA SOP	G	SPL		93017G	*
NC(2)	V95A4152C	COMPENSATED NORM ACCELN 2	AA SOP	G	SPL		93017G	*
NC(3)	V95A4153C	COMPENSATED NORM ACCELN 3	AA SOP	G	SPL		93017G	*
NC(4)	V95A4154C	COMPENSATED NORM ACCELN 4	AA SOP	G	SPL		93017G	*
NY	V90A5361C	SELECTED AA LATERAL ACCEL	SF	G	SPL		93017G	*
NZ	V90A5381C	SELECTED AA NORMAL ACCEL	SF	G	SPL		93017G	*
	V93X4435XA	AA 1 DES CMD/FAIL	CNTLS DISP				93017G	*
	V93X4435XB	AA 1 DES CMD/FAIL	SENSOR SELF TEST DISP				93017G	*
	V93X4436XA	AA 2 DES CMD/FAIL	CNTLS DISP				93017G	*
	V93X4436XB	AA 2 DES CMD/FAIL	SENSOR SELF TEST DISP				93017G	*
	V93X4437XA	AA 3 DES CMD/FAIL	CNTLS DISP				93017G	*
	V93X4437XB	AA 3 DES CMD/FAIL	SENSOR SELF TEST DISP				93017G	*
	V93X4438XA	AA 4 DES CMD/FAIL	CNTLS DISP				93017G	*
	V93X4438XB	AA 4 DES CMD/FAIL	SENSOR SELF TEST DISP				93017G	*

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

TABLE 4.4.2.3-2. OUTPUT FUNCTIONAL PARAMETERS FROM ACCELEROMETER ASSEMBLY FDIR (G4.76)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90M2904PC	CGRB_STATUS_2\$(24:)	DL FMT 21/1 DL FMT 23/1				93017G	*
	V90U5960C	AA SF COMMAND	SF					
	V90X5701X	AA 1 FAIL	GAX		BD		79901D	
	V90X5725X	AA NORMAL ACC DISAGREE	GAX				92354	
	V90X5726X	AA LATERAL ACC DISAGREE	GAX				92354	
	V90X5801X	AA 2 FAIL	GAX		BD		79901D	
	V90X5901X	AA 3 FAIL	GAX		BD		79901D	
	V90X5951X	AA 4 FAIL	GAX		BD		79901D	
	V93X4435XC	AA 1 DES CMD/FAIL	CNTLS DISP DL FMT 21/1 DL FMT 23/1				93017G	*
	V93X4436XC	AA 2 DES CMD/FAIL	CNTLS DISP DL FMT 21/1 DL FMT 23/1				93017G	*
	V93X4437XC	AA 3 DES CMD/FAIL	CNTLS DISP DL FMT 21/1 DL FMT 23/1				93017G	*
	V93X4438XC	AA 4 DES CMD/FAIL	CNTLS DISP 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 4.4.2.3-3. ACCELEROMETER ASSEMBLY FDIR (G4.76) 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 4.4.2.3-4. ACCELEROMETER ASSEMBLY FDIR (G4.76) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
LIMIT(04) AA NORMAL ACCEL LIM	V97U3030C	01	+6.2999963	E-02	G	F	S	P G4.76	90508B	
LIMIT(05) AA LATERAL ACCEL LIM	V97U3031C	01	+7.9999983	E-02	G	F	S	P G4.76	90508B	
NYQC AA LATERAL ACCEL QHVS CONST	V96U8594C	00	+3.0	E-02	G	F	S	C G4.76	90254	
NZQC AA NORMAL ACCEL QHVS CONST	V96U8595C	00	+0.0	E+00	G	F	S	A G4.76	90254	
N_AA AA N COUNTER	V97U3000C	00	+5		ND	I	S	P G4.76	90254	

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

TABLE 4.4.2.3-5. ACCELEROMETER ASSEMBLY FDIR (G4.76) 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.

4.5 TACAN RM (PF 4.77)

TACAN RM performs the following functions:

1. Selects range and bearing data and associated LRU member for users.
2. Declares range and bearing failures.
3. Filters anomalous data behavior (design based on ALT experience).

4.5.1 Functional Requirements

The requirements for TACAN RM are expressed in terms of the design shown in Figure 4.5–1. Alternate designs are acceptable provided all requirements are met. The modules used in this design are:

1. TACAN moding executive
2. Cone calculator
3. Bearing module
4. Bearing post–selection filter
5. Range module
6. Range post–selection filter
7. Acquisition filter (subroutine)
8. Redundant set (subroutine)

4.5.1.1 TACAN Moding Executive Functional Requirements.

The TACAN moding executive, which is shown in flow chart form in Figure 4.5–2, performs the following functions:

1. Determines the set of range data to be selected and monitored for failures (RANGE_USE_CMD, a 3–bit word where 1 = use, 0 = do not use). The bits have weight such that LRU 3 = 1, LRU 2 = 2, and LRU 1 = 4.
2. Determines the set of bearing data to be selected and monitored for failures (IN_BRG_USE_CMD) (same format as RANGE_USE_CMD).
3. Resets range and bearing failures based on keyboard inputs.
4. Selects an LRU ID associated with the selected range and bearing data.

Detailed requirements are as follows:

Initialize OUT_RNG_DG and OUT_BRG_DG to false. Then check vehicle altitude (ALT_WHEELS) against a limit (ALT_CUTOFF) and whether any TACAN LRUs are installed in the vehicle (NUM_GPS_INSTALLED < 3).

If the vehicle is above the limit and TACAN LRUs are installed, examine both the bearing and the range self-test request flags. If any of these flags are set true, then check to see if a bearing self-test was requested (TAC_BRG_STREQ ≠ 0). If this is the case, then do not change the OUT_BRG_USE_CMD from its previous value and call the BRG module. If TAC_BRG_STREQ = 0, then the dilemma is in range; therefore, do not change the RNG_USE_CMD from its previous value and call the RNG module. These steps preclude changing redundancy levels (from 2 to 1 or 3) while in the midst of a self-test and consequently not examining the self-test results, which may let undetected failures continue to lurk in the system.

If no self-test requests are true, then check if TCH_CHNG_N = true. If it is, then set FIRST_LOCK (N) = true, set FIRST_LOCK (N+3) = true, set FIRST_RNG_DG = true, and set FIRST_BRG_DG = true for N = 1, 2, 3. Next reset the COM_ID word to zero in preparation for setting bits in it on subsequent steps. The format of the COM_ID word is the same as that of the range and bearing USE CMD words so that they may be directly "ANDed." A "1" indicates a common channel ID (including X or Y mode) with another LRU and both LRU's are not deselected. Next the acquisition filter module is called to determine the acquisition status of each range and bearing parameter. Three bit RNG_ACQ and BRG_ACQ words are developed such that a "1" indicates acquisition. The format is the same as the use commands. Acquisition is defined for both range and bearing in Section 4.5.1.7, Acquisition Filter.

The next step is to check the TACAN deselect status from the VU. If TAC_DES_N is false for the first execution of the TACAN Moding Executive or if TAC_DES_N just changed to false, set the range and bearing fail flags to false, and reset the appropriate fail counters. If, on the other hand, TAC_DES_N is set TRUE, continue on to the next set of TACAN Moding Executive logic.

The next step is to determine if INTEGER (COM_ID) = 0. If this is the case, then examine the LRU power status ANDed with TAC_DES and COMMFAULT. If more than one LRU is powered, and not deselected, and not COMMFAULTed, then set the IN_BRG_USE_CMD = (0,0,0), RNG_USE_CMD = (0,0,0) (not in the requirements but see flow chart Figure 4.5-2 (5 of 8)). If only one LRU is powered, and not COMMFAULTed and selected, then its data will be sent out provided that it has not been failed, has valid acquisition, and does not have a COMMFAULT. These tests apply to range and bearing individually. This prime selected data shall be processed through the associated post-selection filter to provide as much protection as possible. The LRU number of the prime selected unit shall be output to navigation.

If there is more than one LRU tuned to the same channel, then:

1. Select the LRU ID associated with the lowest numbered LRU in the set of LRU's that have the same channel ID.

2. Generate a 3-bit word (same format as all the others) called R_RM_STAT. It is equal to the common ID set, “ANDed” with COMMFAULT, “ANDed” with FAIL_RNG, “ANDed” with POWER_STATUS, “ANDed” with TAC_DES. Thus, R_RM_STAT is the available set of redundant range data except for RNG_ACQ status. The discrimination is necessary, as will be shown in the next steps.
3. Generate a 3-bit word (same format again) called RNG_DEL_CAND = R_RM_STAT “ANDed” with RNG_ACQ.
4. Next, check the ONE_RNG_LOCK flag. If true, set RNG_USE_CMD equal to RNG_DEL_CAND. If the ONE_RNG_LOCK is false, call the redundant set subroutine (RED_SET) to compute the RNG_USE_CMD, as a function of RNG_DEL_CAND and R_RM_STAT.
5. Next, generate a 3-bit word (same format again) called B_RM_STAT. It is equal to the common ID set, “ANDed” with COMMFAULT “ANDed” with FAIL_BRG “ANDed” with POWER_STATUS, “ANDed” with TAC_DES . Thus, B_RM_STAT is the available set of redundant bearing data except for BRG_ACQ status.
6. Generate a word called BRG_DEL_CAND=B_RM_STAT “ANDed” with BRG_ACQ.
7. Next, call the TACAN bearing glitch module (TAC_BRG_GLIT) to zero the bit in BRG_DEL_CAND for any LRU having a bearing 40-degree glitch. Detailed requirements for the bearing glitch module are in Section 4.5.1.9.
8. Next, the ONE_BRG_LOCK flag for bearing is checked, and the bearing use command (IN_BRG_USE_CMD) is computed by the same approach that was used to compute the RNG_USE_CMD word.

The next step is to call the cone calculator, which will determine if the vehicle is in the “cone of confusion” with respect to the bearing data. See Section 4.5.1.2 for detailed requirements.

The next step is to call the bearing module. This module does the selection and fault monitoring of the bearing data. See Section 4.5.1.3 for detailed requirements. After the bearing module is done, call the bearing post-selection filter. This function screens out bearing jumps. See Section 4.5.1.4 for detailed requirements.

Next, call, in order, the range module and then the range post-selection filter. Their functions are similar to the associated bearing operations described above. See Sections 4.5.1.5 and 4.5.1.6 for the detailed requirements.

Next, “OR” the bearing, range failure, and dilemma status to generate LRU failure and dilemma status, respectively, which are used by GAX. Next, “OR” the range and bearing self-test request to generate an LRU self-test request, which is sent to the TACAN SOP and both post-selection filters.

4.5.1.2 Cone Calculator.

First, find the (earth-fixed) position vector of the TACAN station ($\bar{R}_{TACAN_EF_SL_1}$) associated with the selected LRU (SEL_LRU_ID). Next, get the (earth-fixed) position vector of the Shuttle (\bar{R}_{EF}).

Next, compute the elevation angle as follows:

$$ELEV_ANG = \sin^{-1} [\text{UNIT}(\bar{R}_{EF} - \bar{R}_{TACAN_EF_SL_1}) \cdot \text{UNIT}(\bar{R}_{TACAN_EF_SL_1})]^*$$

* This equation shall be protected against arc sine of arguments whose magnitudes are greater than unity.

Next, check the ELEV_ANG against the threshold ELEV_ANG_LIM. If it is equal to or greater than the threshold, then set the bearing use command (OUT_BRG_USE_CMD) = (0, 0, 0) and the IN_CONE_FLAG to true. Otherwise, set the OUT_BRG_USE_CMD equal to the status set by the TACAN Moding Executive (IN_BRG_USE_CMD) and set the IN_CONE_FLAG = false. A flow chart showing the cone calculator processing is presented in Figure 4.5-3.

4.5.1.3 Bearing Module.

The bearing module processing flow chart is shown in Figure 4.5-4.

The bearing module selects the bearing data that will be sent to the bearing post-selection filter (IN_SEL_BRG), determines the bearing data-good flag sent to the bearing post-selection filter (IN_BRG_DG), and determines failures based on voting and self-test results.

The fundamental requirements presented above are the same for both range and bearing. If there are two or more valid acquisition indications, then process the redundant data (tuned to the same ground station). If only one valid acquisition is indicated and the ONE_LOCK flag is false, then it must be decided if more than one acquisition would be expected and whether to wait for additional units to acquire. If this is the case, no range data shall be output. Conversely, if one acquisition is all that could be expected or the ONE_LOCK flag is true, then output that data. Range lock-on is used rather than acquisition for station switching. Otherwise, the criteria for switching stations are the same as the criteria for passing data.

A single time tag is shown as an input and output. It is assumed the FCOS does the redundancy management of time so that the time tag will be correct even for failure modes of the data processing system. The requirement is that a valid time tag be available that is consistent with the selected range and bearing data used by navigation.

All bearing failure counters will be reset to zero when there is a change in the bearing use command status. Except for the zero and the one element cases, subsequent failure counting will be done on consecutive cycles when the bearing use command status remains unchanged.

Determine the redundancy level available through a DO CASE on the OUT_BRG_USE_CMD. If 0, no data available, and the only action is to set IN_BRG_DG = false; hence, navigation knows no bearing data are available. If 1, only No. 3 bearing data are available and will be selected, and the data-good output shall be set true. Similarly for cases 2 and 4, only data from units 2 or 1 (respectively) shall be selected, and the data-good flag shall be set true. For each of these simplex cases, the BRG_DILEMMA flag shall be set false. If the case is 3, call the bearing 2 element processor for units 2 and 3 for more processing. In

like manner, if the case is 5 or 6, call the bearing 2 element processor for units 1 and 3, or 1 and 2 (respectively). See Section 4.5.1.3.1 for a description of the bearing 2 element processors.

Finally, if the case is 7, then all three sets of bearing data are available. Set the BRG_DILEMMA flag false and call the bearing 3 element processor. See Section 4.5.1.3.2 for a description of the bearing 3 element processor.

4.5.1.3.1 Bearing 2 Element Processor.

The first step is to test the difference between the two applicable bearing measurements against the tolerance (BRG_TOL). If the difference is less than allowable, then check the bearing failure counter (B_FAIL_COUNT(I,J)) to see if it has counted out ($> \text{BRG_COUNT_LIM}$). (I,J in this section refers to the applicable pairs 1, 2; 1, 3; or 2, 3.) If it has, then set the IN_BRG_DG flag = false. If it has not counted out, reset its value to zero; the selected bearing will be the average of the two applicable bearing inputs, and the IN_BRG_DG flag will be set true. If the difference is greater than the tolerance, then two possibilities exist:

1. There is a failure or transient out-of-tolerance condition.
2. The vehicle is directly south of the chosen ground station and there is a modulo 360-degree effect, (i.e., $\text{BRG I} = 2^\circ$ and $\text{BRG J} = 359^\circ$).

To test for this condition, find the smaller of the two inputs and add 360 degrees to it. Test this new difference against the tolerance. If it now is less than the tolerance, then it was a modulo 360-degree effect, and check the failure counter as above. If it has counted out, then set IN_BRG_DG = false. If the counter is less than its limit, then set IN_BRG_DG = true, IN_SEL_BRG = average of the two applicable inputs, and reset the failure counter value to zero. If the difference still exceeds the tolerance, then a real failure is indicated, so increment B_FAIL_COUNT(I,J) and set IN_BRG_DG = false. (No bearing data selection is required since navigation will not use it.)

The next step is to test the failure counter against its limit (BRG_COUNT_LIM). If it is less than the limit, set the FIRST_PASS_B = true. If equal to or greater than its limit, then check a first-pass flag. If FIRST_PASS_B = true, then reset FIRST_PASS_B to false, request self-test only for the two applicable LRU's and set BRG_DILEMMA = true. The reason for requesting self-test on only two LRU's is that the TACAN SOP will check the MANUAL status on each of the LRU's. If both are not in AUTO, then both cannot be self-tested and correct failure isolation cannot be guaranteed. If both LRU's are not in AUTO, then TACAN SOP will immediately give a self-test complete indication and flag both LRU's as failed. This serves as an immediate indication to the crew that they must do the isolation manually (reset to AUTO or power down). (Be aware that spurious self-test failure indications are put out of the TACAN hardware even when self-test is not requested. These failure indications shall be ignored by only examining self-test failure status after self-test is requested.) On subsequent passes, check to see if self-test is completed. If it is, then reset the self-test request (which re-enables the post-selection filters) and check the results of the self-test. If isolation was possible, then fail the applicable bearing parameter (but not the range parameter) and reset the BRG_DILEMMA flag. Otherwise, leave the BRG_DILEMMA flag set true. Until the crew takes action, the failure counter stays counted out and no data are available to navigation because the IN_BRG_DG flag will be set false.

4.5.1.3.2 Bearing Three Element Processor.

Check each pairwise difference against 150 degrees and compensate for the modulo 360-degree effect.

The bearing normalization algorithm to correct for the modulo 360-degree effect is as follows:

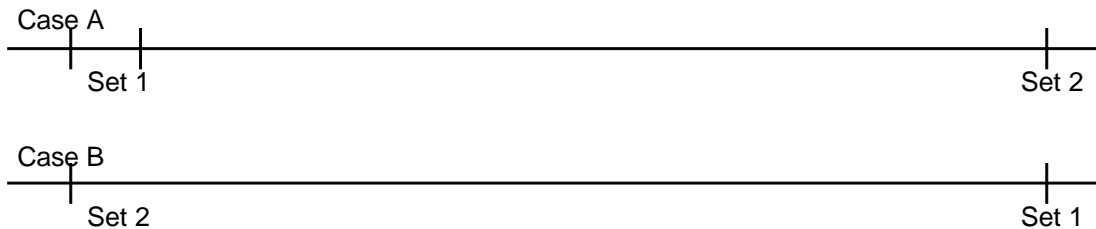
I	B ₁₂	B ₂₃	B ₁₃	Action
0	0	0	0	None
1	0	0	1	None
2	0	1	0	None
3	0	1	1	
4	1	0	0	None
5	1	0	1	
6	1	1	0	
7	1	1	1	

where B_{XY} is “one” when the absolute difference between bearing X and bearing Y values is greater than 150 degrees. Otherwise B_{XY} is equal to zero.

For I = 0, all difference values are within 150 degrees. No action is required.

For I = 1, 2, 4, all differences are within 300 degrees. Again no action is required.

For I = 3, 5, 6, the bearing values are situated as follows:



Set 1 contains two bearing values that are within 150 degrees, and Set 2 has only one value that is outside the 150-degree limit when compared to the values in Set 1.

For Case A, where the two values in Set 1 are less than the value in Set 2, add 360 degrees to each bearing value in Set 1.

For Case B, where the two values in Set 1 are greater than the value in Set 2, add 360 degrees to the bearing value in Set 2.

For I = 7, all bearing values are spread out across the 0 to 360-degree range. For this case, 360 degrees is simply added to the lowest bearing value.

First, check each pairwise difference against 150 degrees and compensate for the modulo 360-degree effect. After normalization is completed, check each pairwise difference against the fault tolerance and increment or reset pairwise failure counters in a manner similar to the Bearing 2 element processor.

Next, do a midvalue select of the three bearing inputs (the answer may be greater than 360 degrees, but this is taken care of in the bearing postselection filter).

Next, check to see if all three counters are greater than zero. If this is true, then set IN_BRG_DG = false and reset them all to zero. The presumption is that some unforeseen transient condition has occurred and that no real failure has happened. If only one counter is greater than zero, reset it to zero. This ensures simultaneous 2 and 3 voting and precludes sequential counter setting, which can result in a false alarm due to normal system tolerances.

Finally, check to see if two counters are greater than or equal to the limit (BRG_COUNT_LIM). If this is true, then fail the parameter common to the two counters (if B_FAIL_COUNT (1, 2) and B_FAIL_COUNT (2, 3) \geq BRG_COUNT_LIM, then fail bearing No. 2).

4.5.1.4 Bearing Post-Selection Filter.

The bearing post-selection filter performs the following functions:

1. Checks if IN_SEL_BRG > 360 degrees; if so subtracts 360 degrees.
2. Checks for “jumping” data (known problem from ALT).
3. Returns with the OUT_BRG_DG flag in the proper state.

The first step is to check the selected bearing (IN_SEL_BRG) to see if it is greater than 360 degrees. If it is, then subtract 360 degrees. Otherwise, set OUT_SEL_BRG = IN_SEL_BRG. Next, check the IN_BRG_DG flag. If it is false, leave OUT_BRG_DG* = false and set FIRST_BRG_DG = true. If the IN_BRG_DG = true, check the FIRST_BRG_DG flag. If it's true, set FIRST_BRG_DG = false, BRG_REF = OUT_SEL_BRG, and BRG_JUMP_CTR = 0 and leave OUT_BRG_DG = false. If FIRST_BRG_DG = false, then proceed to check the absolute value of the present selected bearing (OUT_SEL_BRG) minus BRG_REF against the bearing jump limit (BRG_JUMP_LIM) and against (360 degrees – BRG_JUMP_LIM). If less than the BRG_JUMP_LIM or greater than (360 degrees – BRG_JUMP_LIM), then no jump is indicated, so set OUT_BRG_DG = true, update BRG_REF = OUT_SEL_BRG, and reset BRG_JUMP_CTR = 0. If equal to or greater than the limit, then a bearing jump has occurred, so leave OUT_BRG_DG = false and increment BRG_JUMP_CTR; then test BRG_JUMP_CTR against its limit. If it is greater than or equal to its limit (BRG_JUMP_CTR_LIM), then presumably the original bearing reference was set incorrectly (used a jump value) and all the subsequent valid data appear to be jumping and no data are being sent to navigation. Therefore, reset the reference BRG_REF = OUT_SEL_BRG and reset BRG_JUMP_CTR to zero. Subsequent cycles of data should now pass the jump check. The bearing post-selection filter processing is shown in a flow chart in Figure 4.5-5.

* OUT_BRG_DG set equal to false when TACAN MODING EXEC is called (Figure 4.5-2).

4.5.1.5 Range Module.

A range module flow diagram is shown in Figure 4.5-6.

The range module works in a manner similar to the bearing module except that range data are not subject to the modulo 360-degree problem.

All range failure counters will be reset to zero when there is a change in the range use command status. Except for the zero and the one element cases, subsequent failure counting will be done on consecutive cycles when the range use command status remains unchanged.

Determine the redundancy level by doing a DO CASE on the RNG_USE_CMD. As before, if no data are available (DO CASE value = 0), set IN_RNG_DG = false. For the simplex cases (DO CASE value = 1, 2, 4), select the associated range data and set IN_RNG_DG = true and set RNG_DILEMMA = false. If the duplex case exists, call the associated range 2-element processor (this design uses three different 2-element processors). Refer to Section 4.5.1.5.1 for a description of the general range 2-element processors.

Finally, if in the triplex case then set the RNG_DILEMMA flag = false and call the RNG 3-element processor. Refer to Section 4.5.1.5.2 for more details.

4.5.1.5.1 Range Two-Element Processor.

The first step is to test the absolute value of the difference between the two applicable range measurements against the limit (RNG_TOL). If greater than the limit, increment the applicable failure counter and set IN_RNG_DG = false. If less than the limit, check to see if the failure counter value is less than its limit (RNG_COUNT_LIM). If it is, then reset the counter to zero, set IN_SEL_RNG = average of the two range measurements, and set IN_RNG_DG = true. If the failure counter is greater than or equal to its limit, then set IN_RNG_DG = false.

Next, test the range failure counter against its limit (again). If less than its limit, set FIRST_PASS_R = true. If equal to or greater than its limit, then test the first-pass flag. If it is true, request self-test only for the two applicable LRU's, set the FIRST_PASS_R flag = false, and set RNG_DILEMMA = true. If the FIRST_PASS_R flag = false, check to see if self-test is done. If it is done, reset the self-test request and check to see if the self-test results can isolate the failure (i.e., only one of the two ranges failed self-test). If self-test can isolate, then fail the applicable range measurement (but not the bearing) and reset the RNG_DILEMMA flag. If self-test cannot isolate, then leave the RNG_DILEMMA flag = true. The crew must do the failure isolation manually.

4.5.1.5.2 Range Three-Element Processor.

The first step is to check the absolute value of each of the pairwise differences against the limit (RNG_TOL). If greater than or equal to the limit, then increment the applicable failure counter. If less than the tolerance, then reset the applicable failure counter if its present value is less than its limit (RNG_COUNT_LIM). The next step is to set IN_SEL_RNG = midvalue select of the three range measurements and set IN_RNG_DG = true.

Next, check if all three fail counters are greater than zero. If so, set the IN_RNG_DG = false and reset all fail counters to zero because some type of noise phenomena have probably been encountered, and not any real failures. Next, if only one counter is greater than zero, then reset it to zero to preclude false alarms as described under the bearing module. Finally, test the pair failure counters to see if they have counted out. If two have counted out (\geq RNG_COUNT_LIM), then fail the common parameter (i.e., if both R_FAIL_COUNT (1, 2) and R_FAIL_COUNT (2, 3) are \geq RNG_COUNT_LIM, then fail range NO. 2).

4.5.1.6 Range Post-Selection Filter.

First, check IN_RNG_DG. If it is false, leave OUT_RNG_DG* = false and set FIRST_RNG_DG = true. If IN_RNG_DG = true, check the FIRST_RNG_DG flag. If it is true, set RNG_REF = IN_SEL_RNG, FIRST_RNG_DG = false, leave OUT_RNG_DG = false, and RNG_JUMP_CTR = 0. If FIRST_RNG_DG = false, calculate the range jump limit (RNG_JUMP_LIM) = RNG_K + (RNG_R) (V_GROUND_SPEED). Next, check for jumps. If $|\text{IN_SEL_RNG} - \text{RNG_REF}| \leq \text{RNG_JUMP_LIM}$, then the input data are valid. Therefore, set OUT_SEL_RNG = IN_SEL_RNG, set OUT_RNG_DG = true, and set RNG_REF = IN_SEL_RNG, and RNG_JUMP_CTR = 0. If a jump has happened (difference > RNG_JUMP_LIM), then set OUT_RNG_DG = false and increment RNG_JUMP_CTR. Next test the RNG_JUMP_CTR against its limit (RNG_JUMP_CTR_LIM) to see if an improper reference was originally set. If greater than the limit, then set RNG_REF = IN_SEL_RNG and reset the RNG_JUMP_CTR to zero. Subsequent data should now pass the jump check. The range post-selection filter flow chart is shown in Figure 4.5-7.

* OUT_RNG_DG set equal to false when TACAN MODING EXEC is called (Figure 4.5-2).

4.5.1.7 Acquisition Filter.

Range and bearing acquisition are defined as follows:

Acquisition is true for a range or bearing parameter if there are X continuous lock-on signals for that parameter (six parameters: 3 range and 3 bearing).

Where, for range,

$$X = R_ACQ_LIM_L \text{ for } V_GROUND_SPEED \leq V_RNG_LIM$$

$$X = R_ACQ_LIM_H \text{ for } V_GROUND_SPEED > V_RNG_LIM$$

and, for bearing

$X = B_ACQ_LIM_L$ for $V_GROUND_SPEED \leq V_BRG_LIM$

$X = B_ACQ_LIM_H$ for $V_GROUND_SPEED > V_BRG_LIM$

A flow diagram for the acquisition filter is shown in Figure 4.5–8.

4.5.1.8 Redundant Set.

The redundant set subroutine shown in flow chart form in Figure 4.5–9 is used to compute the range and bearing use commands.

An output command (CMD) is equal to the range or bearing candidate (CAND_STAT) if:

1. There are two or three true bits in the candidate status (CAND_STAT) word.
- or
2. There is only one true bit in the candidate status word (CAND_STAT) and $CAND_STAT = RM_STAT$, where RM_STAT is the redundancy management status word. Otherwise, the output command is equal to (0,0,0).

4.5.1.9 Bearing Glitch.

The bearing glitch subroutine shown in flowchart form in Figure 4.5–10 is used to zero out the bit in the BRG_DEL_CAND word for any LRU having a bearing 40-degree glitch. This is to prevent fail counters from continuing to increment when 40-degree glitches occur, eventually failing the unit. The bearing glitch subroutine will only be called to flag 40-degree glitches in the 3-LRU case and can only down-mode to the 2-LRU case. In all other cases no action will be taken.

Before testing the LRU's for bearing 40-degree glitches, this algorithm first requires that the residual ratio (DISP_SIG(1)) computed by navigation have a value from zero to one. For all other values of DISP_SIG(1) other than zero to one no action will be taken. The MSID number for DISP_SIG(1) is V90U0216CC. When this condition is satisfied, each of the 3 LRU's is tested for a 40-degree glitch as follows:

1. Save current value of BRG_DEL_CAND.
2. A quantity DEL_BRG is computed as the absolute difference of the bearing value and the bearing reference.
3. Since the bearing values at this point have not been adjusted for the 360-degree modulo effect, DEL_BRG will be tested and bearing differences in this 360-degree boundary crossover area will be ignored. For example, bearing values above 355.5 degrees where the bearing reference may be 1 degree will not be tested for 40-degree glitches.

4. This DEL_BRG is tested to determine whether it is greater than or equal to the quantity 40 degrees minus the bearing jump limit (40°-BRG_JUMP_LIM). If not, a 40-degree glitch does not exist for this LRU. If the test passes, further testing for 40-degree glitch is done as follows:
 - (a) A quantity DM40 is computed as the modulus of DEL_BRG with 40 degrees.
 - (b) If DM40 is either less than the BRG_JUMP_LIM or greater than (40°-BRG_JUMP_LIM) a 40-degree glitch is taken to have occurred. Accordingly, the bit for this LRU in the BRG_DEL_CAND is zeroed.
5. The modulo expression X-ZY is computed where X is the DEL_BRG and Y is 40 degrees. Where Z denotes the integral part of (X/Y).
6. Test BRG_DEL_CAND for more than one 40-degree glitch. If true, reset BRG_DEL_CAND to original value.

4.5.2 Processing Requirements

TACAN SF shall run according to Tables 4.1-1 and 4.1-2. TACAN FDIR shall be run according to Tables 4.0-1 and 4.0-2.

4.5.3 Initialization Requirements

All TACAN's shall be initially unfailed. All TACAN failure counters shall be initially zeroed.

TACAN_FAIL(1), TACAN_FAIL(2), TACAN_FAIL(3) and TACANDIL shall be initially OFF. When three GPS receivers and no TACAN LRUs are installed in the vehicle (indicated by NUM_GPS_INSTALLED = 3), the processing logic of TACAN RM ensures that these variables will remain OFF. This prevents the nuisance annunciation of the "RM FAIL TAC" (V94X4724X) and "RM DLMA TAC" (V94X4725X) messages by GAX when no TACAN LRUs are installed.

4.5.4 Parameter Tables for TACAN RM

The IDD inputs and outputs are listed in Tables 4.5.4-1 and 4.5.4-2 respectively. K-loads are listed in Table 4.5.4-4. There are no I-load or constants requirements for TACAN RM. Cross references are shown below.

TACAN RM Principal Function Variable Cross-Reference	
Local Name	Source Name
BRGK; K = 1, 2, 3	TACBEARO(K)
CHAN_ID _K ; K = 1, 2, 3	TACCHAN(K)
COMMFAULT _K ; K = 1, 2, 3	TAC_CF(K)
ONE_RNG_LOCK	ONE_RANGE_LOCK
POWER_STATUS _K ; K = 1, 2, 3	TACPON(K)

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TACAN RM Principal Function Variable Cross-Reference	
Local Name	Source Name
RNGK; K = 1, 2, 3	TACRANGEO(K)

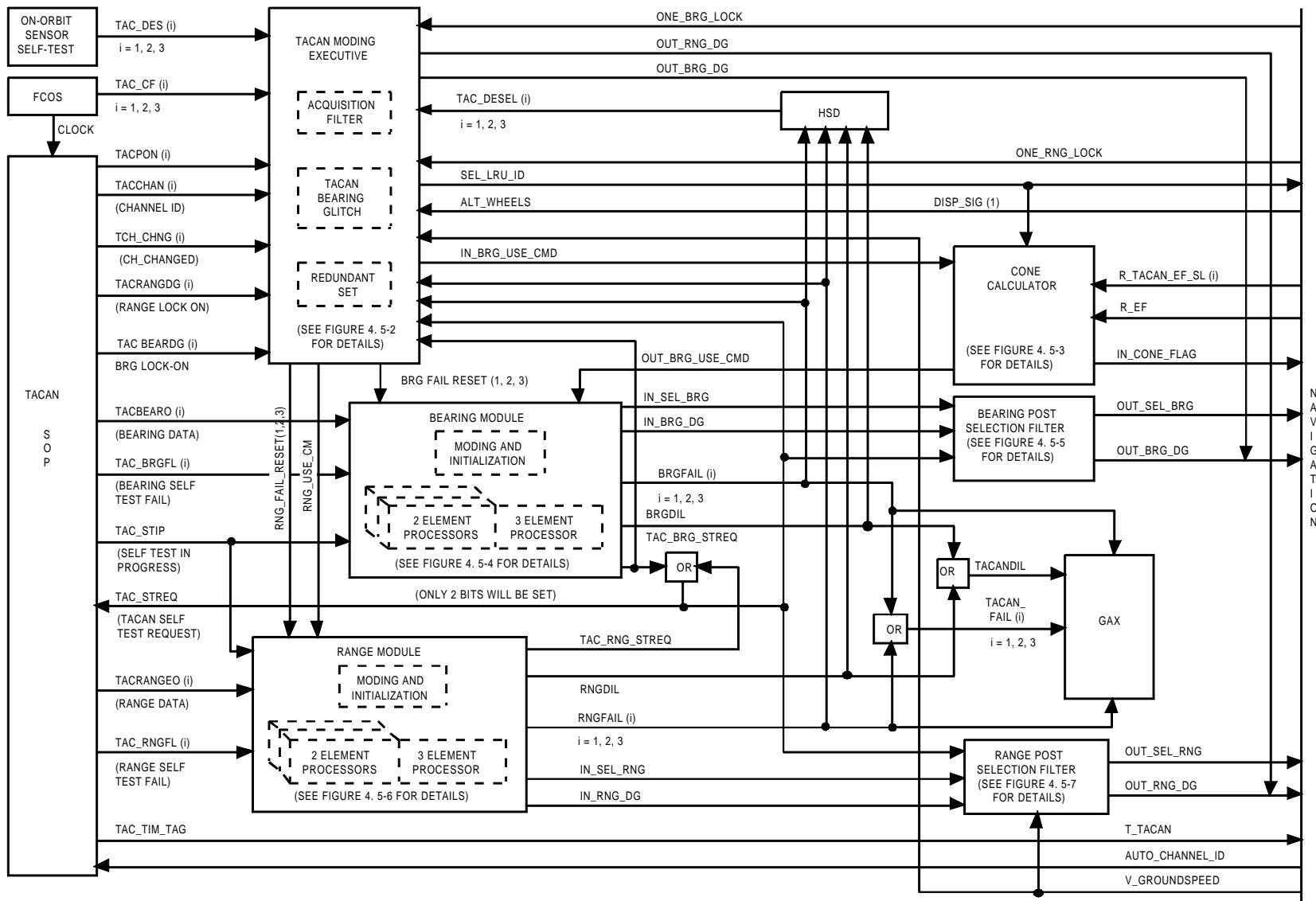


FIGURE 4.5-1. TACAN RM Overall Flow Diagram

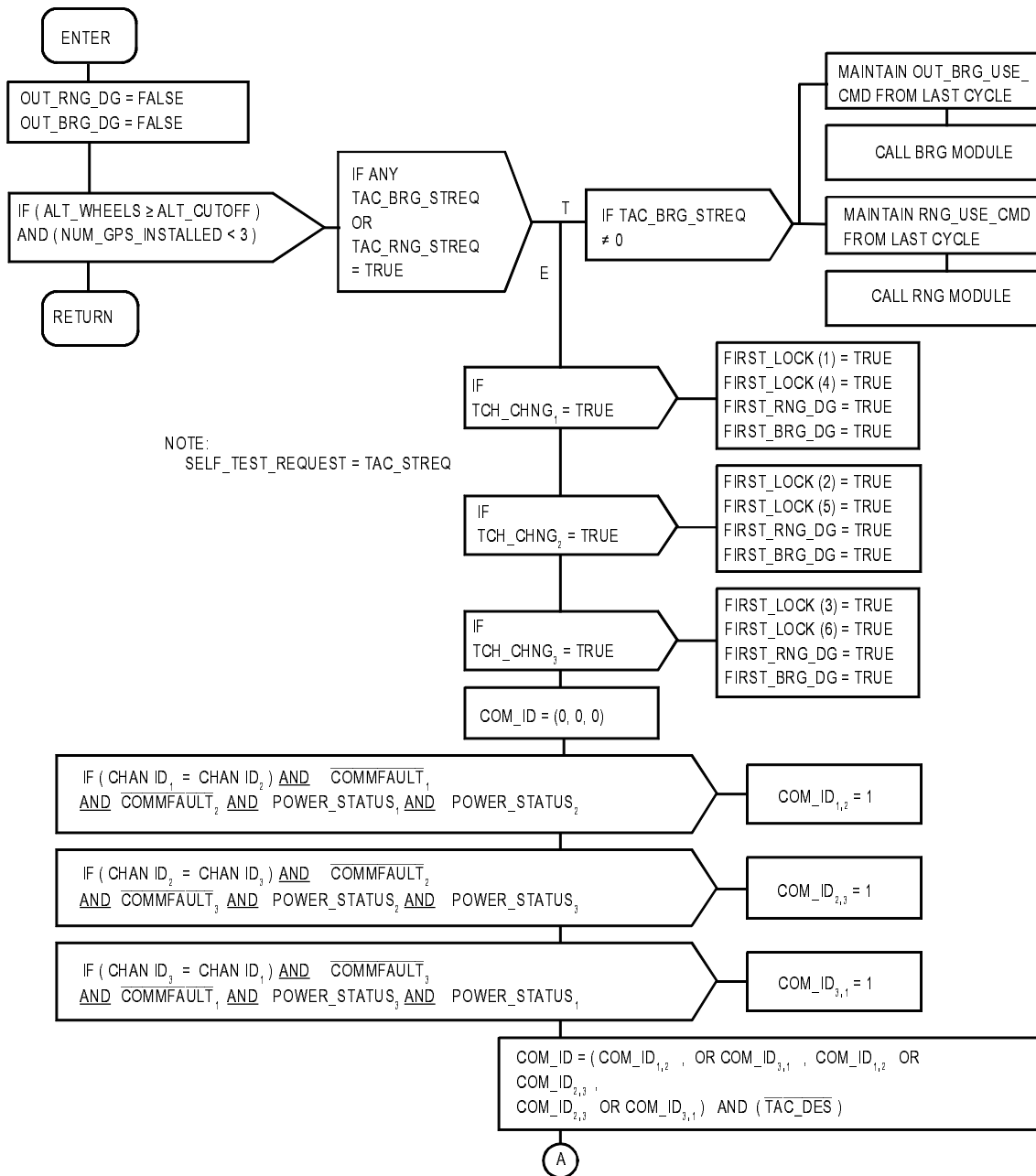
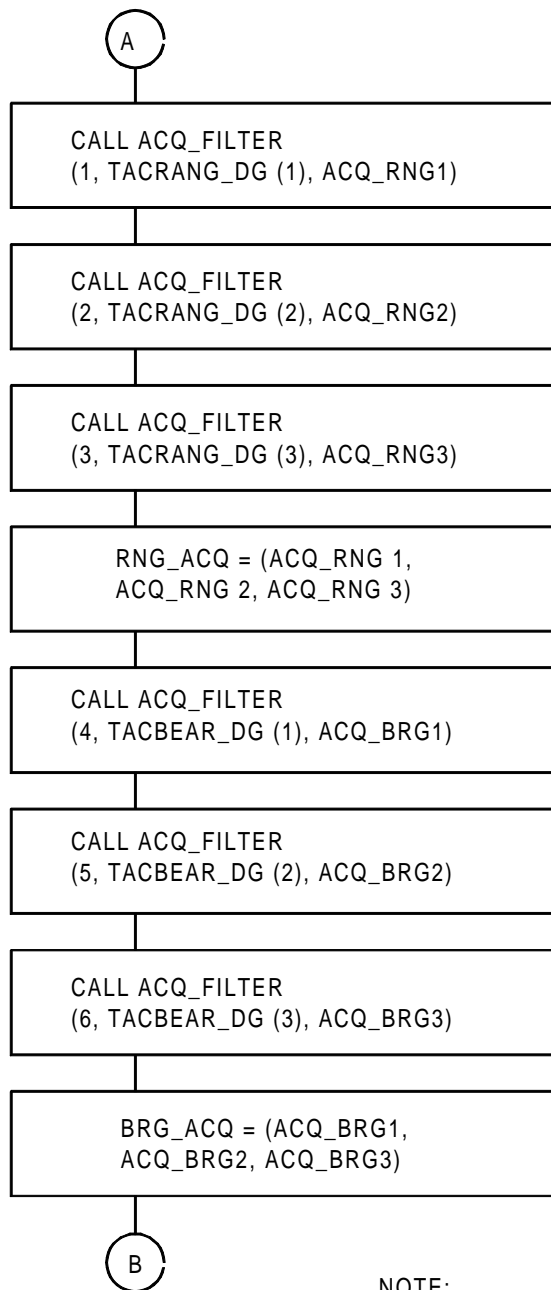


FIGURE 4.5-2.(1) TACAN Moding Executive (Sheet 1 of 8)



NOTE:
ACQ_RNGN AND ACQ_BRGN ARE
OBTAINED FROM ACQ_LRU_MEAS
THAT IS RETURNED FROM THE
ACQ_FILTER SUBROUTINE

FIGURE 4.5-2.(2) TACAN Moding Executive (Sheet 2 of 8)

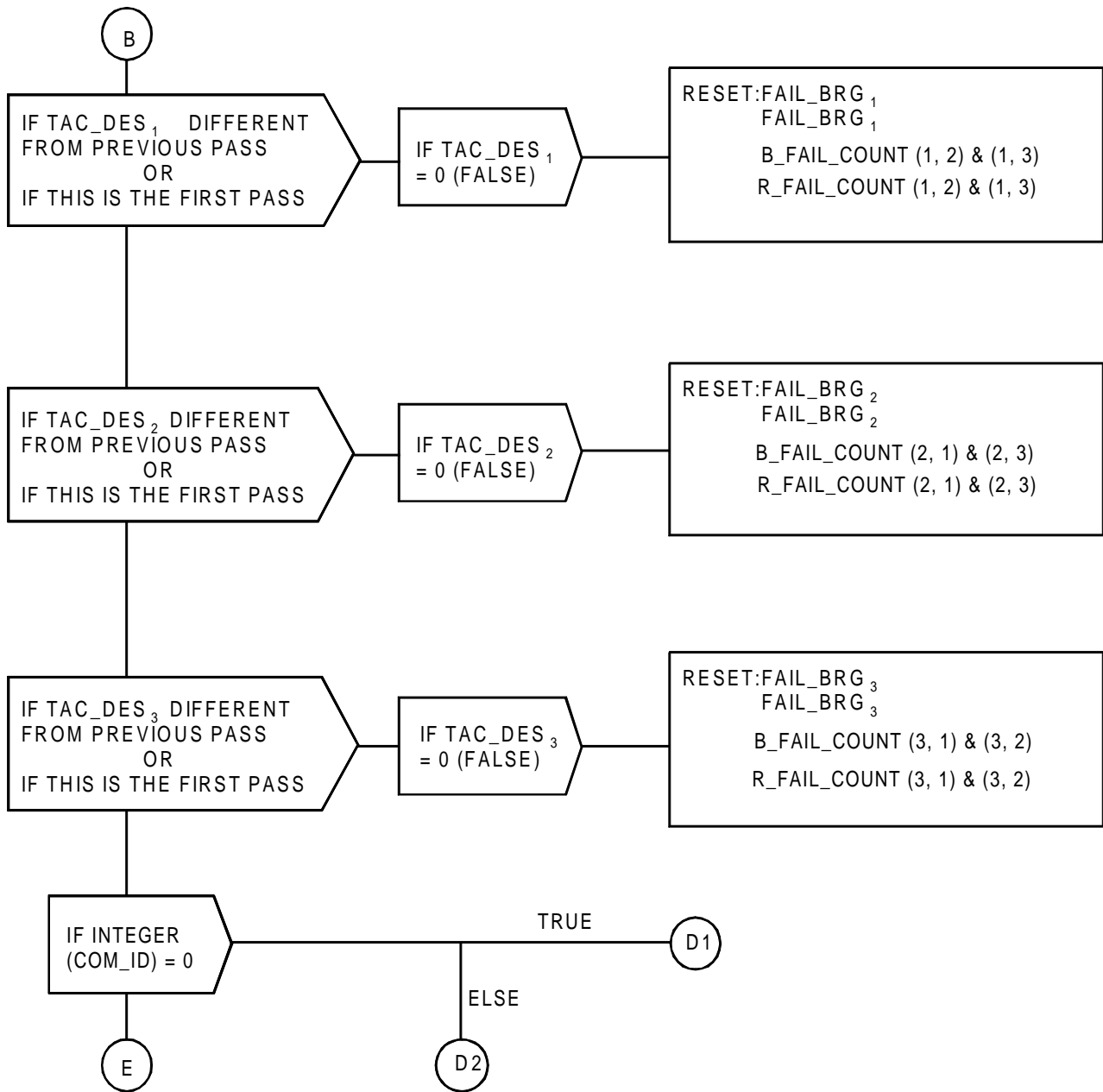


FIGURE 4.5-2.(3) TACAN Moding Executive (Sheet 3 of 8)

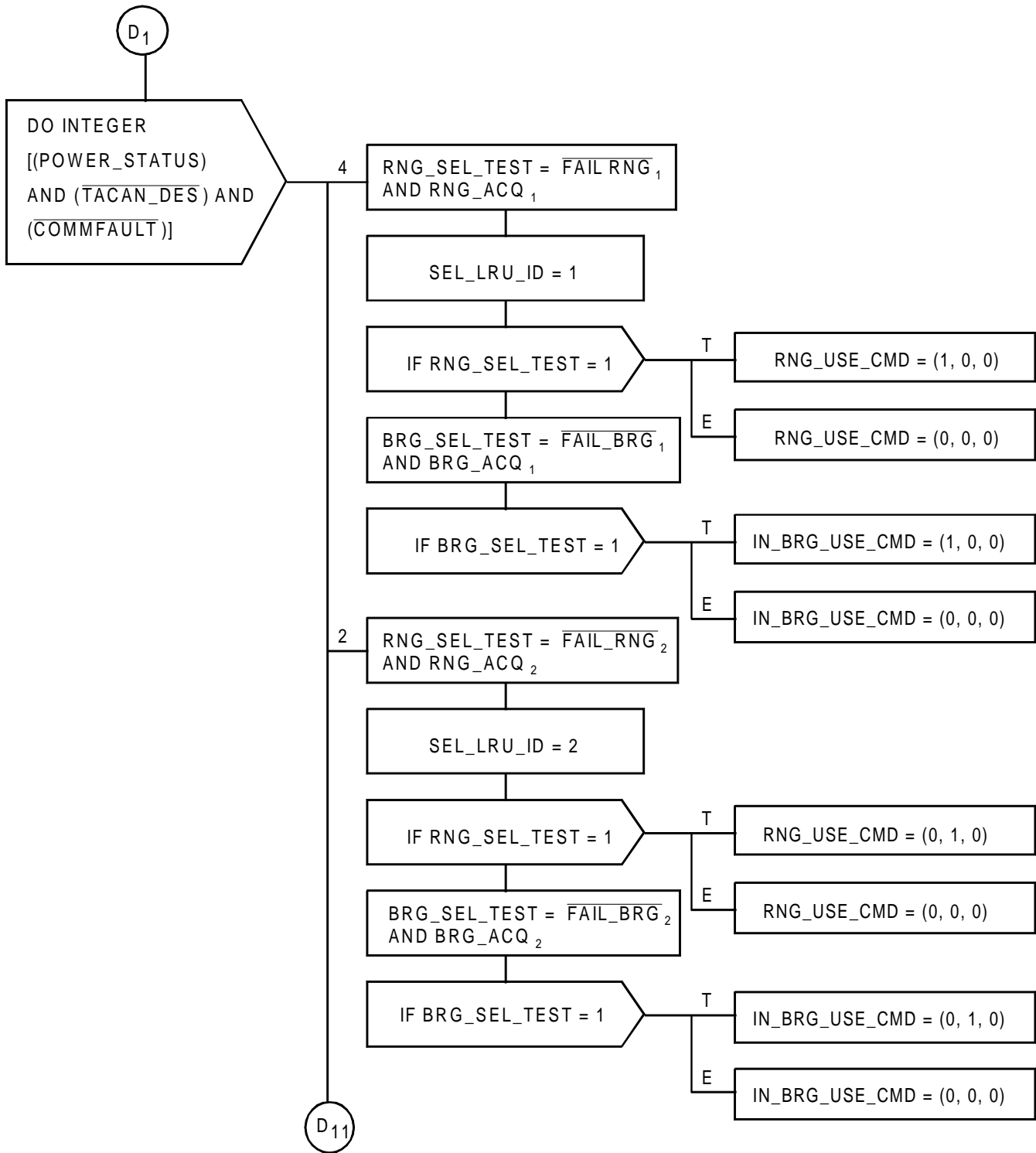


FIGURE 4.5-2.(4) TACAN Moding Executive (Sheet 4 of 8)

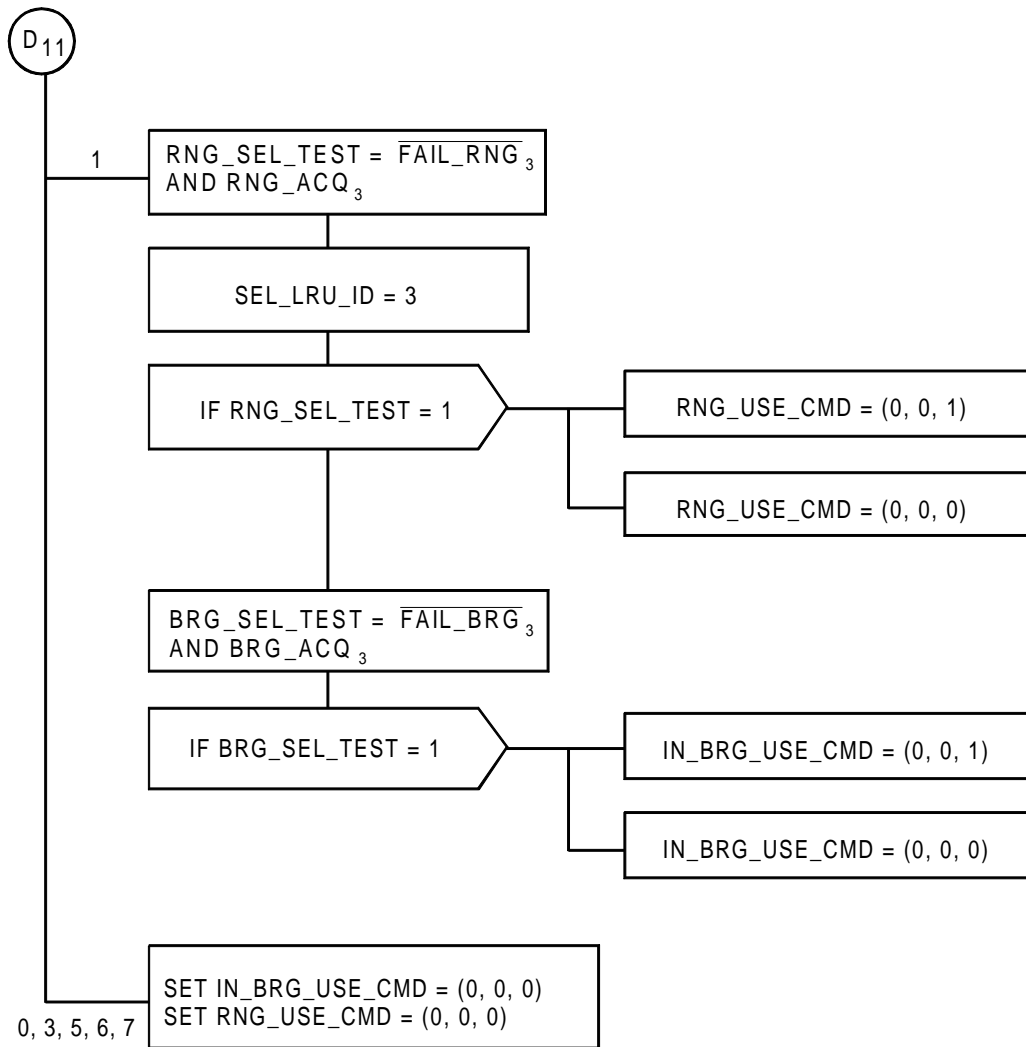


FIGURE 4.5-2.(5) TACAN Moding Executive (Sheet 5 of 8)

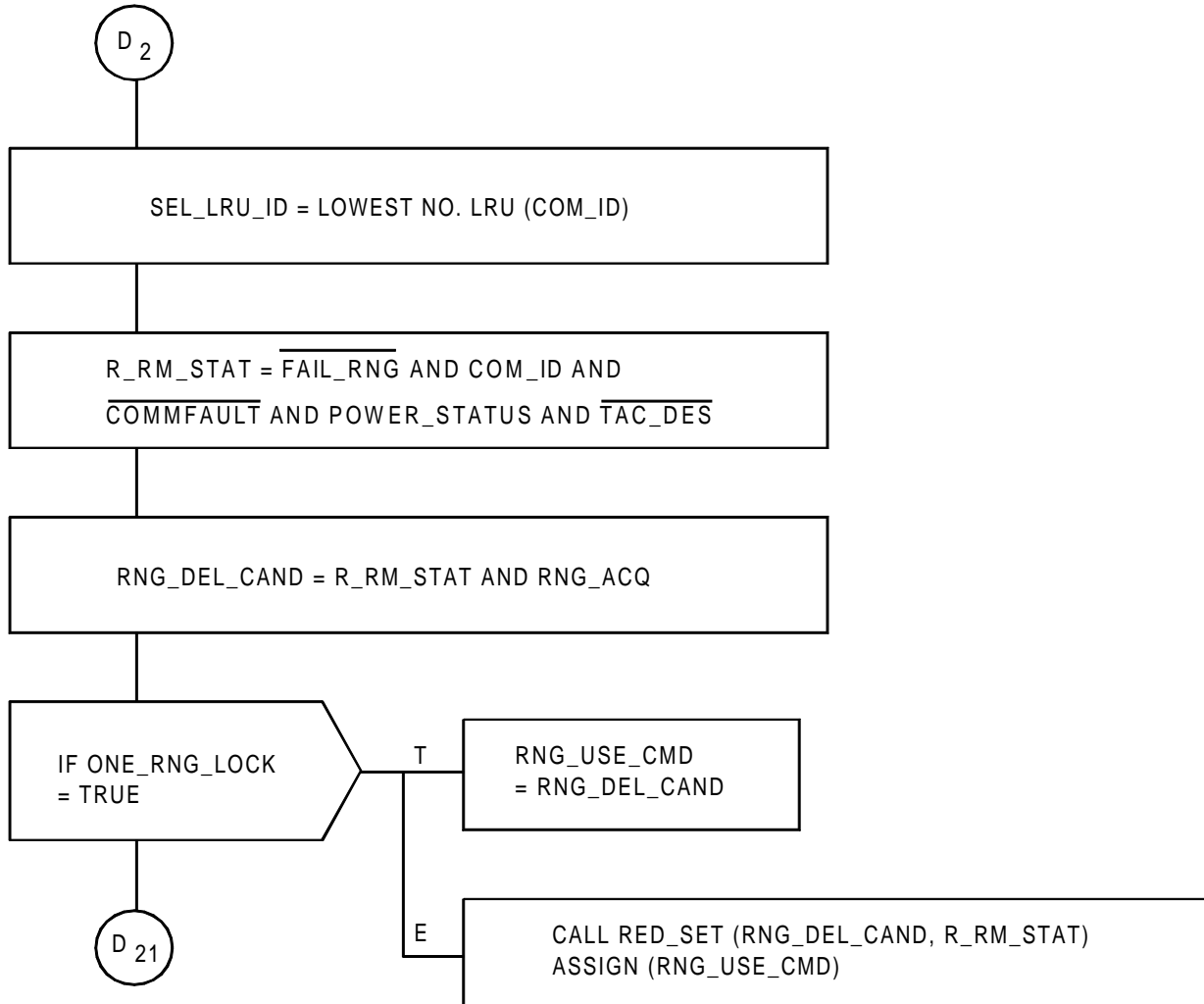


FIGURE 4.5-2.(6) TACAN Moding Executive (Sheet 6 of 8)

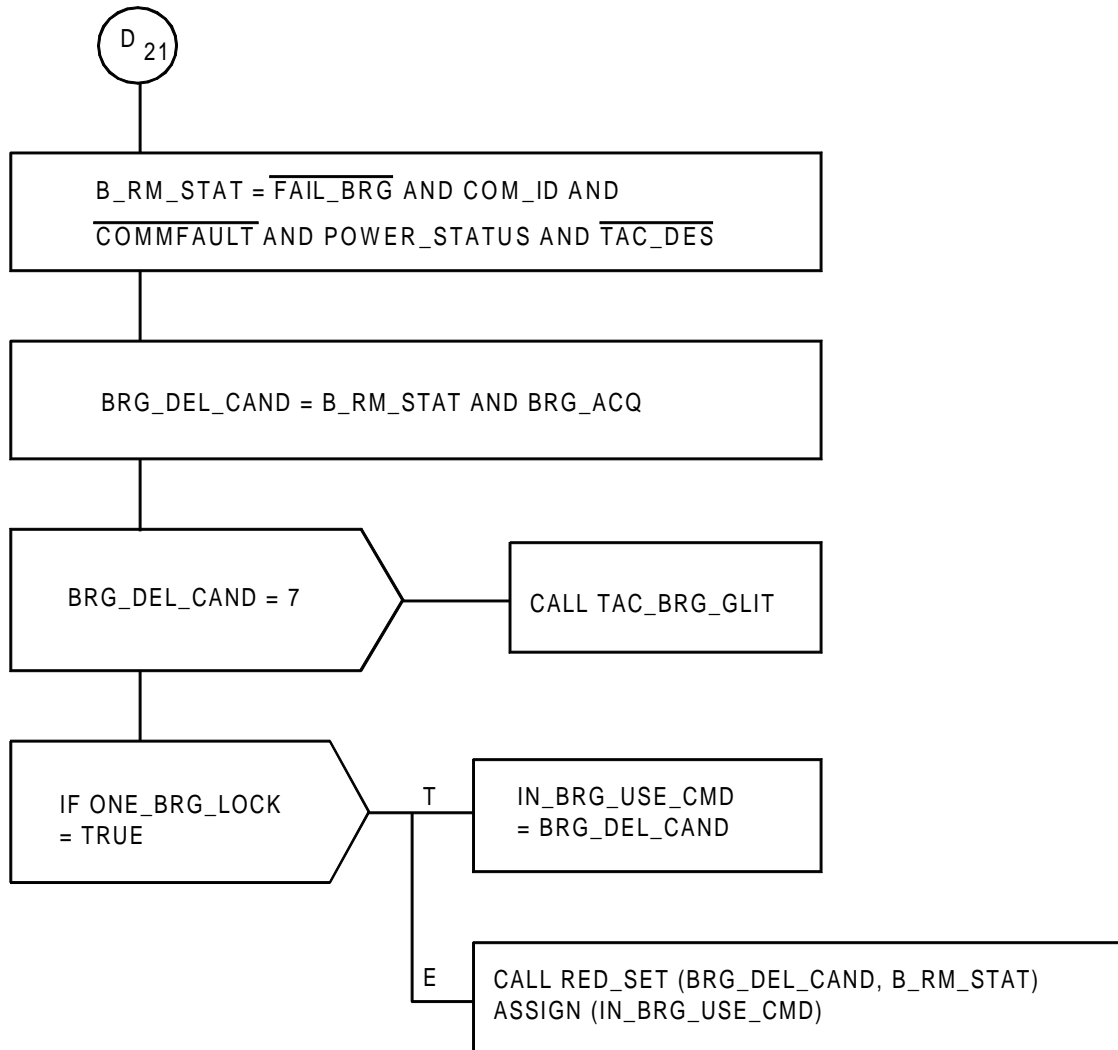


FIGURE 4.5-2.(7) TACAN Moding Executive (Sheet 7 of 8)

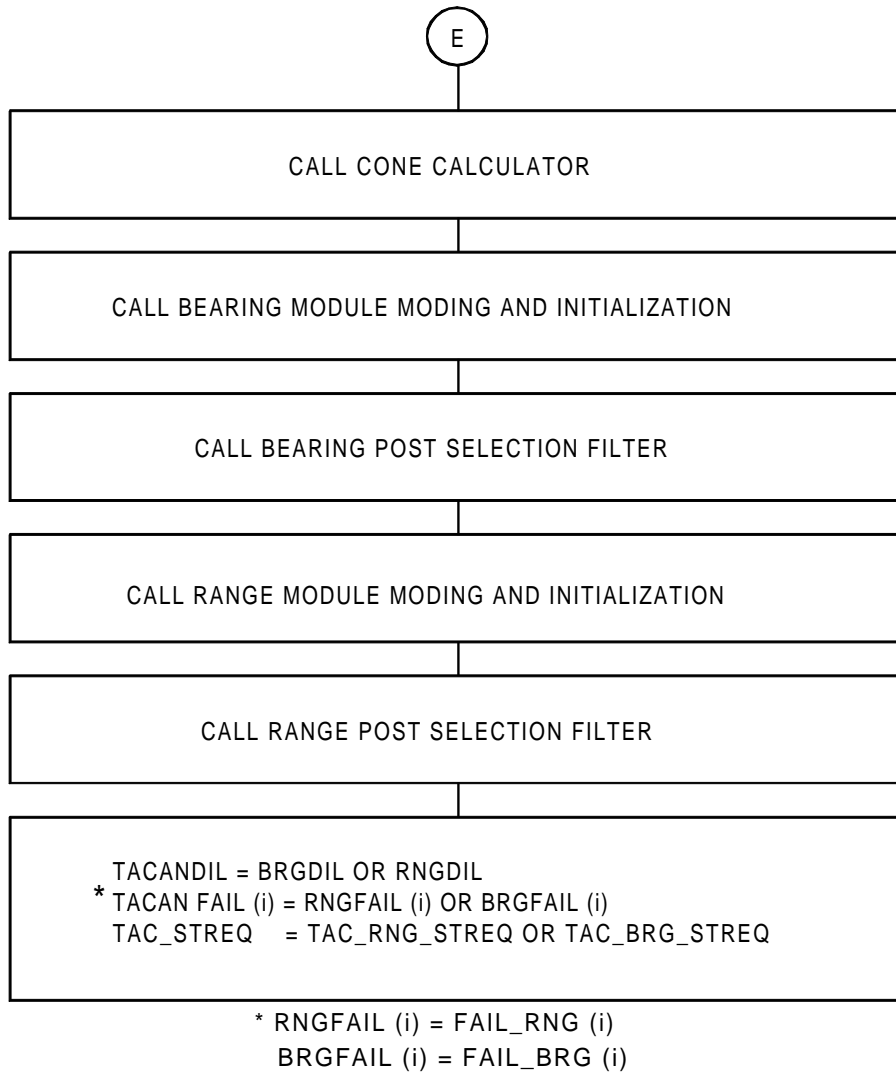


FIGURE 4.5-2.(8) TACAN Moding Executive (Sheet 8 of 8)

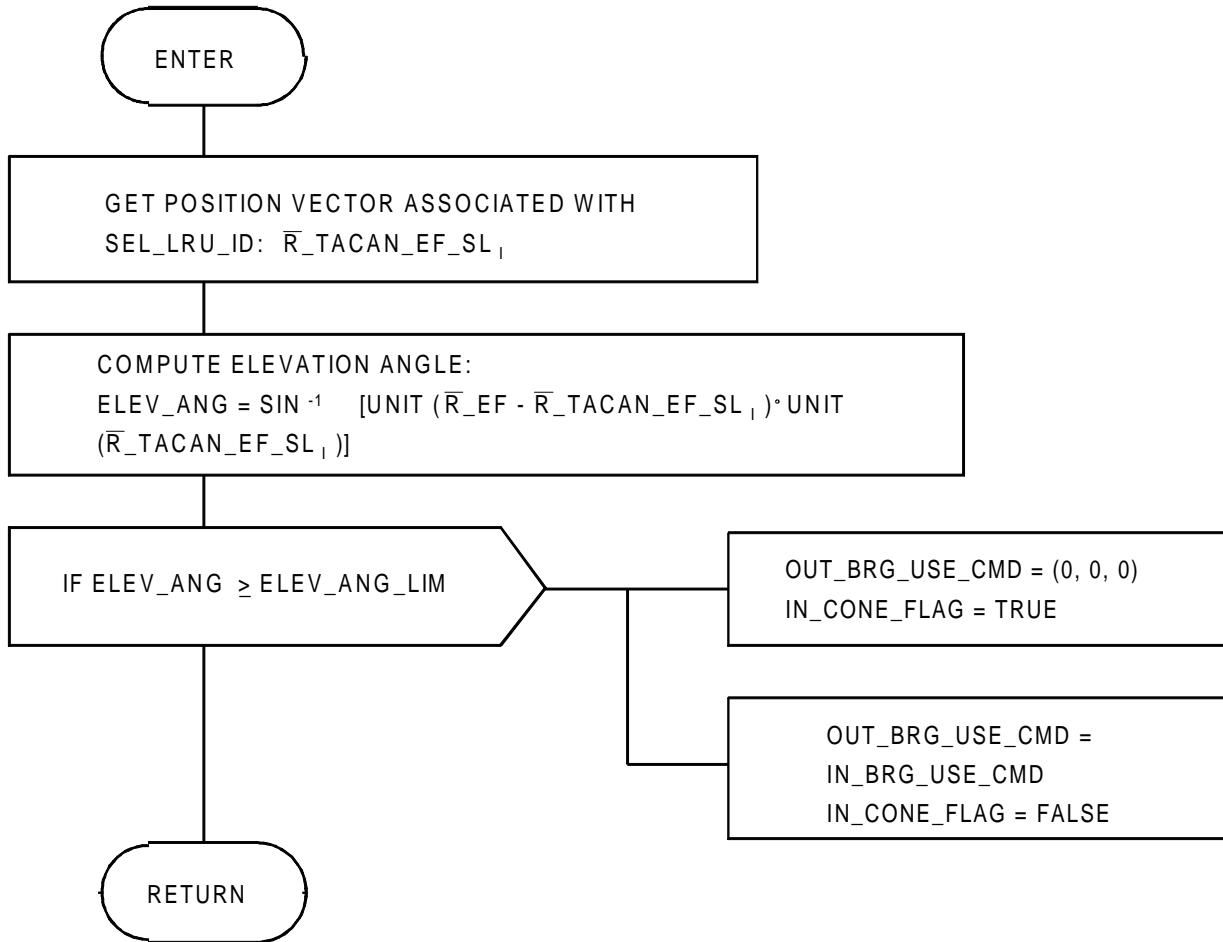


FIGURE 4.5-3. Cone Calculator

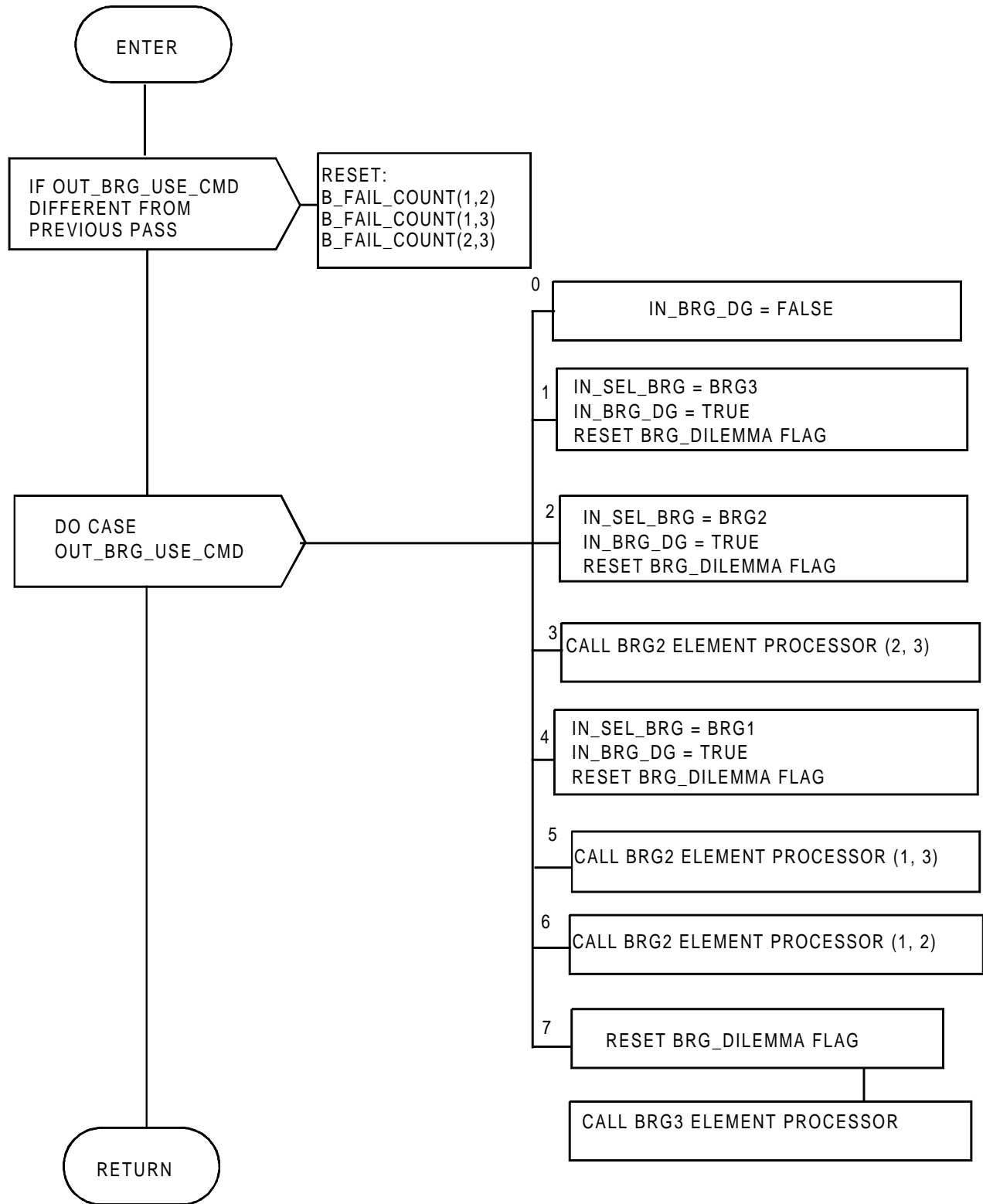


FIGURE 4.5-4.(1) BRG Module - Moding and Initialization (Sheet 1 of 7)

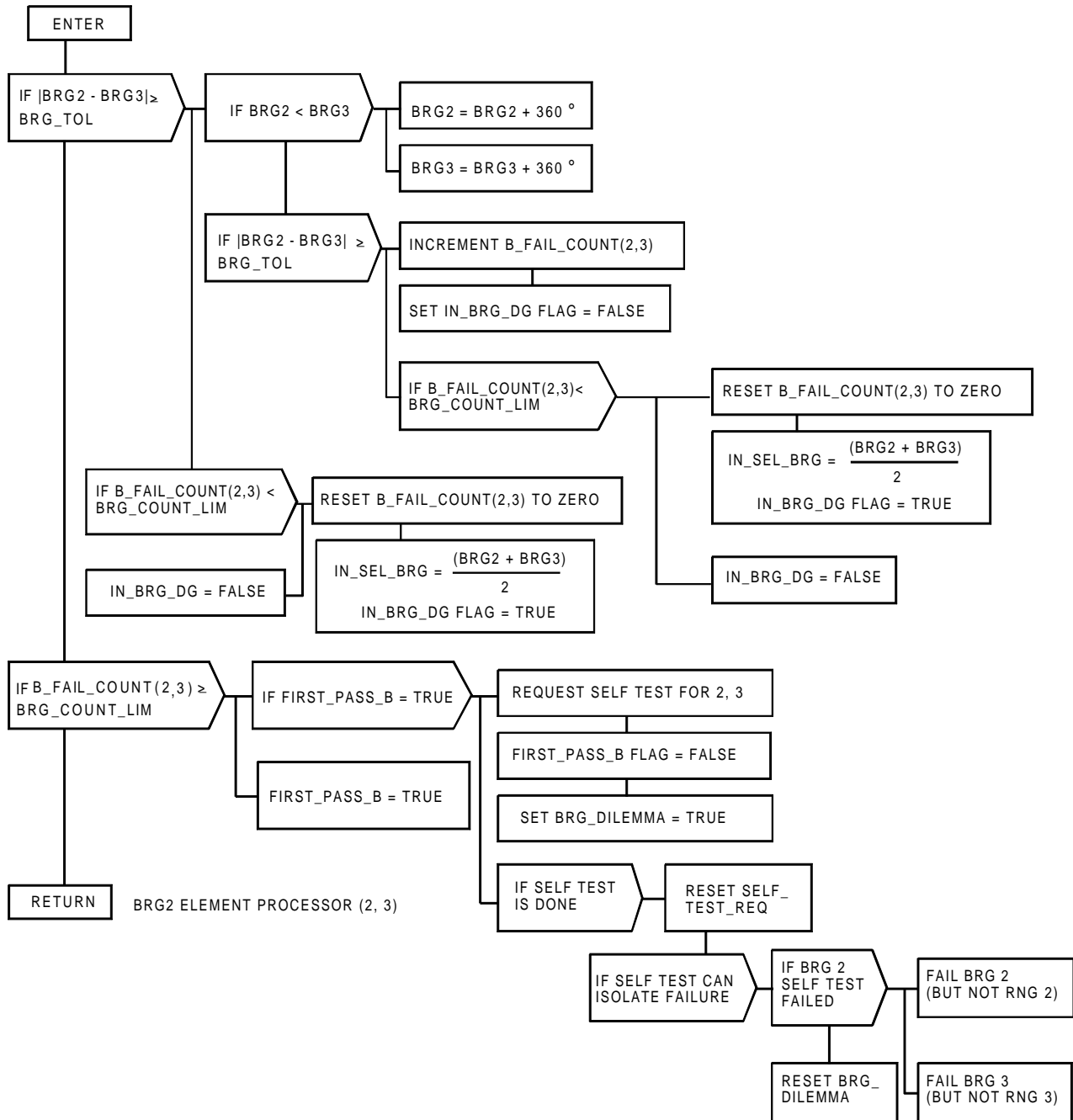


FIGURE 4.5-4.(2) BRG Module - Moding and Initialization (Sheet 2 of 7)

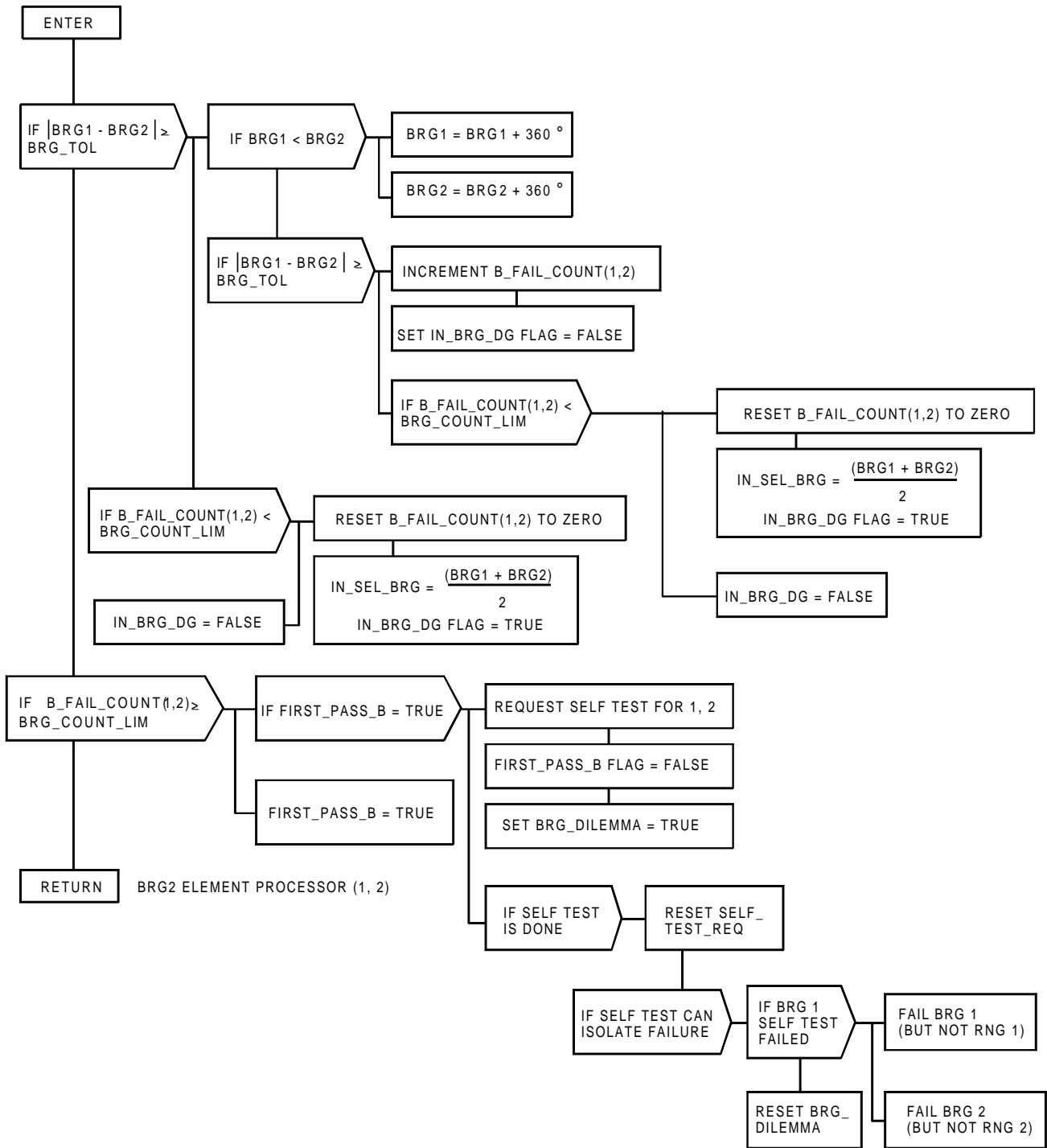


FIGURE 4.5-4.(3) BRG Module - Moding and Initialization (Sheet 3 of 7)

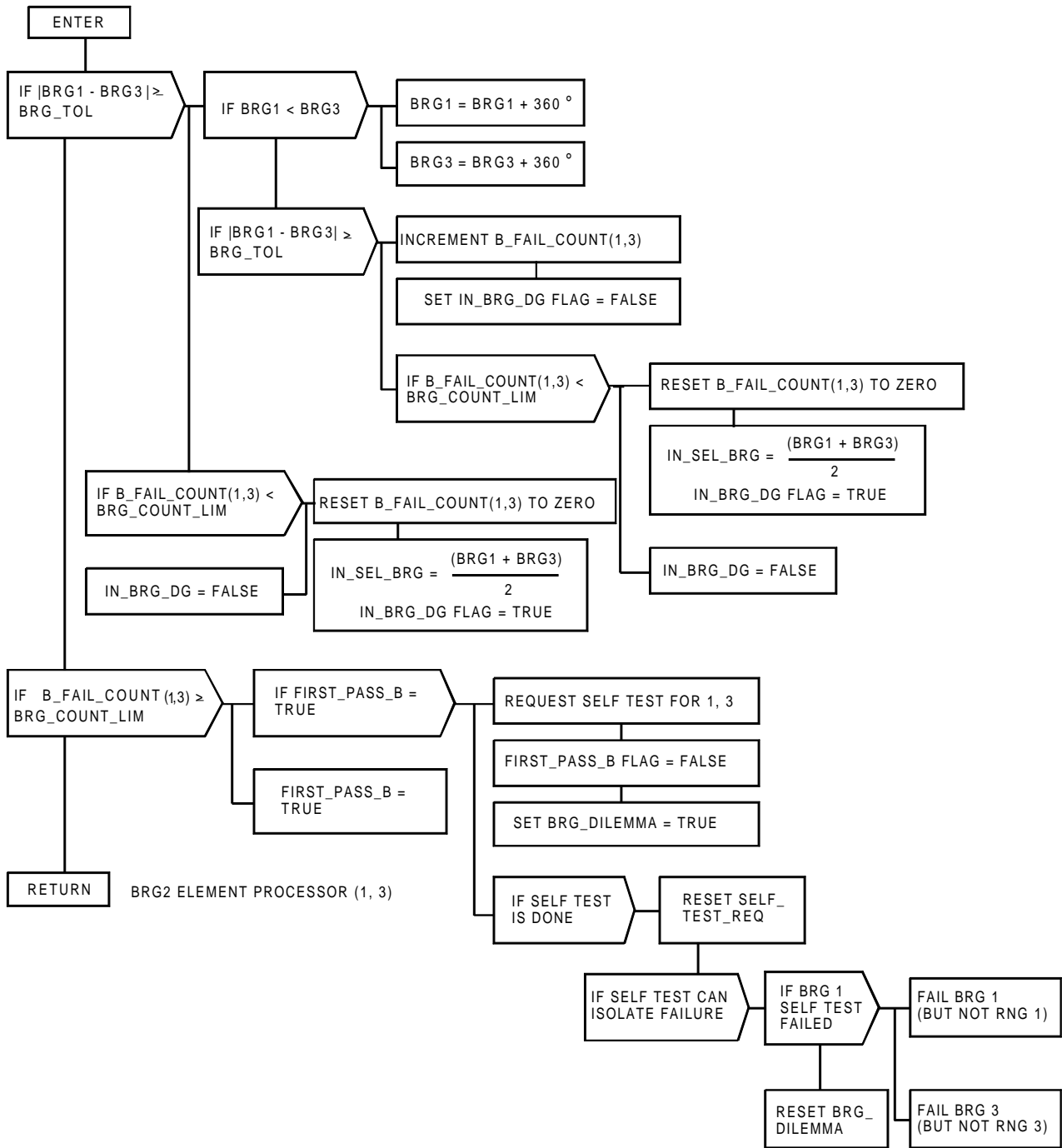


FIGURE 4.5-4.(4) BRG Module - Moding and Initialization (Sheet 4 of 7)

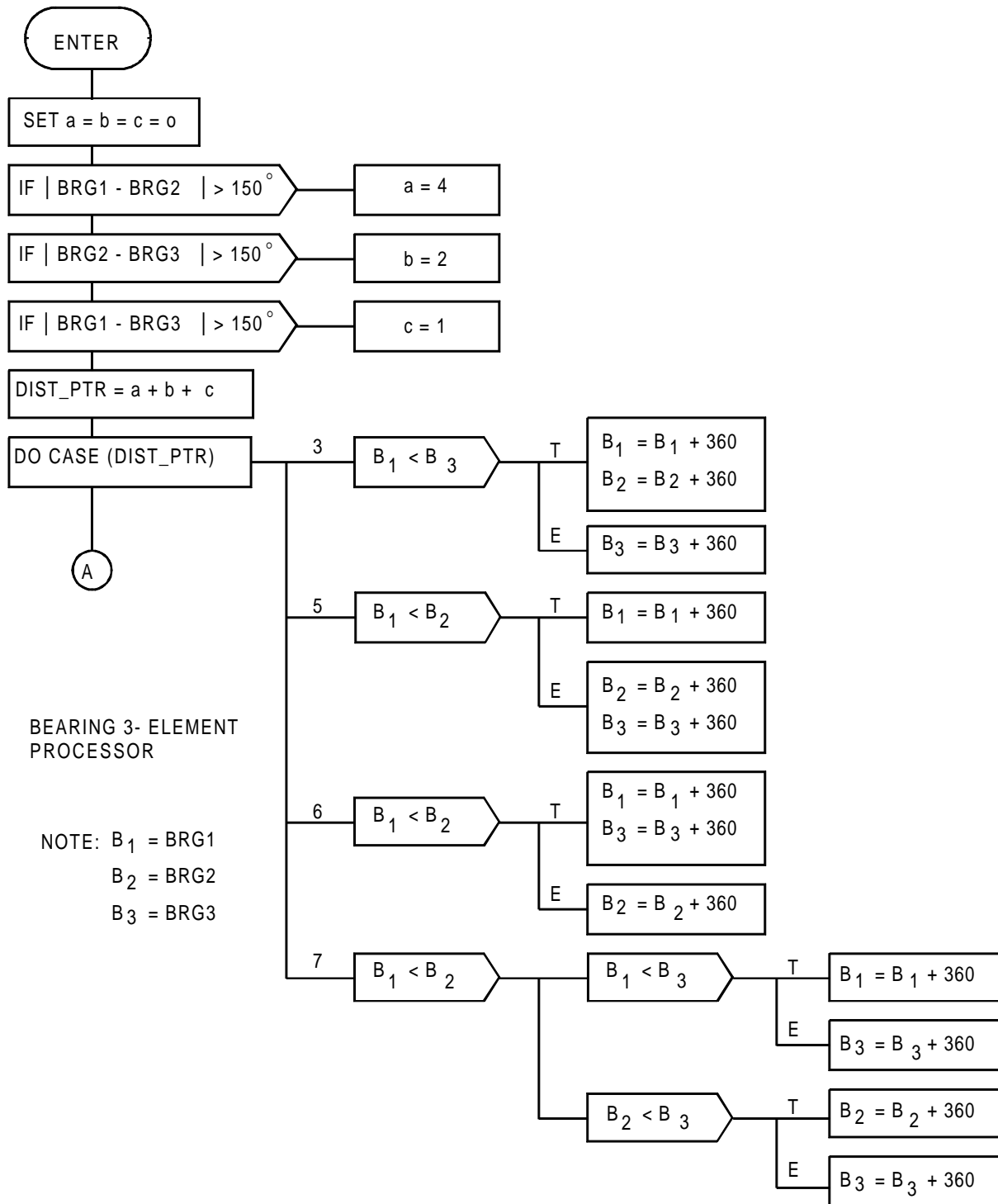


FIGURE 4.5-4.(5) BRG Module - Moding and Initialization (Sheet 5 of 7)

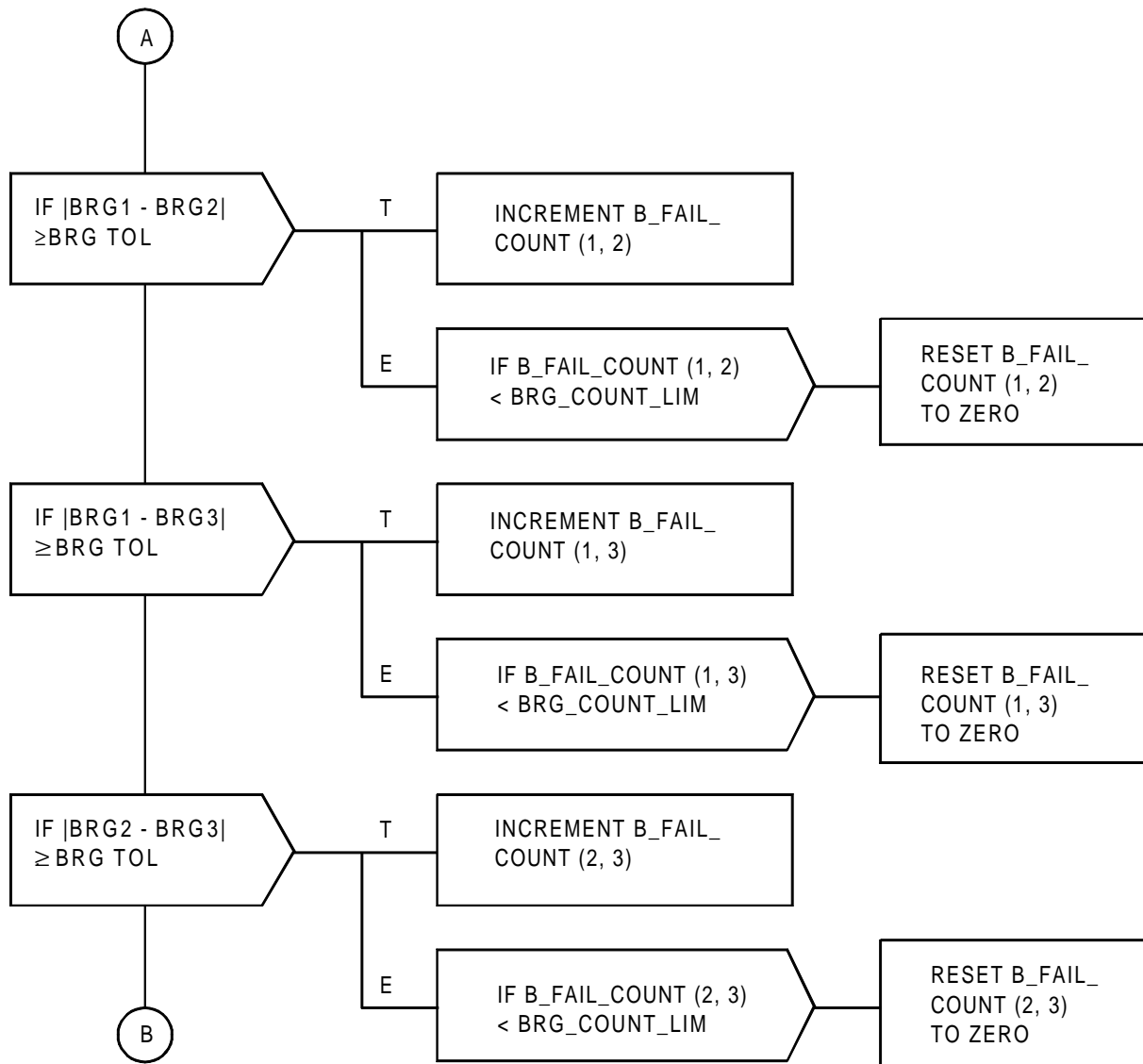


FIGURE 4.5-4.(6) BRG Module - Moding and Initialization (Sheet 6 of 7)

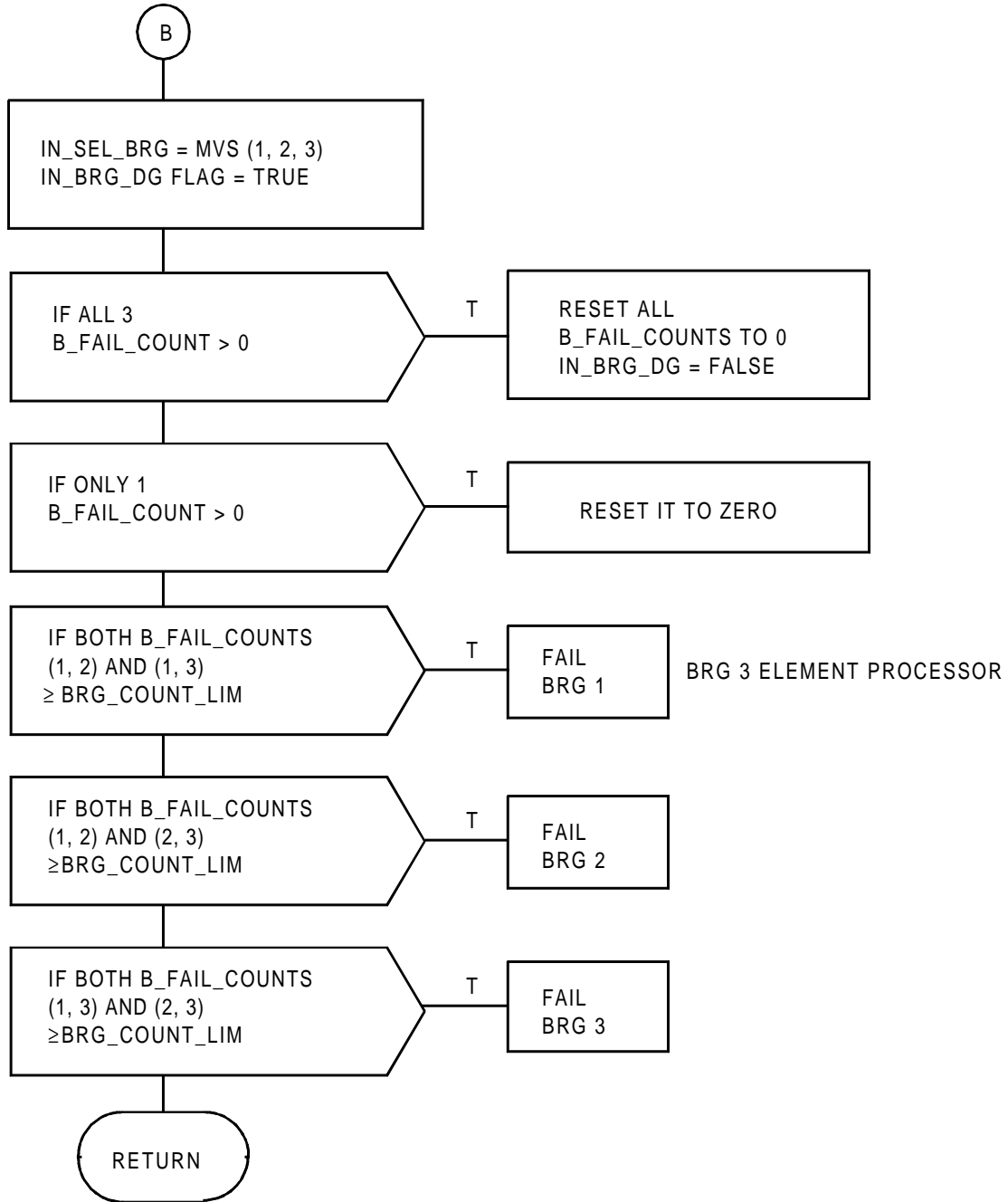


FIGURE 4.5-4.(7) BRG Module - Moding and Initialization (Sheet 7 of 7)

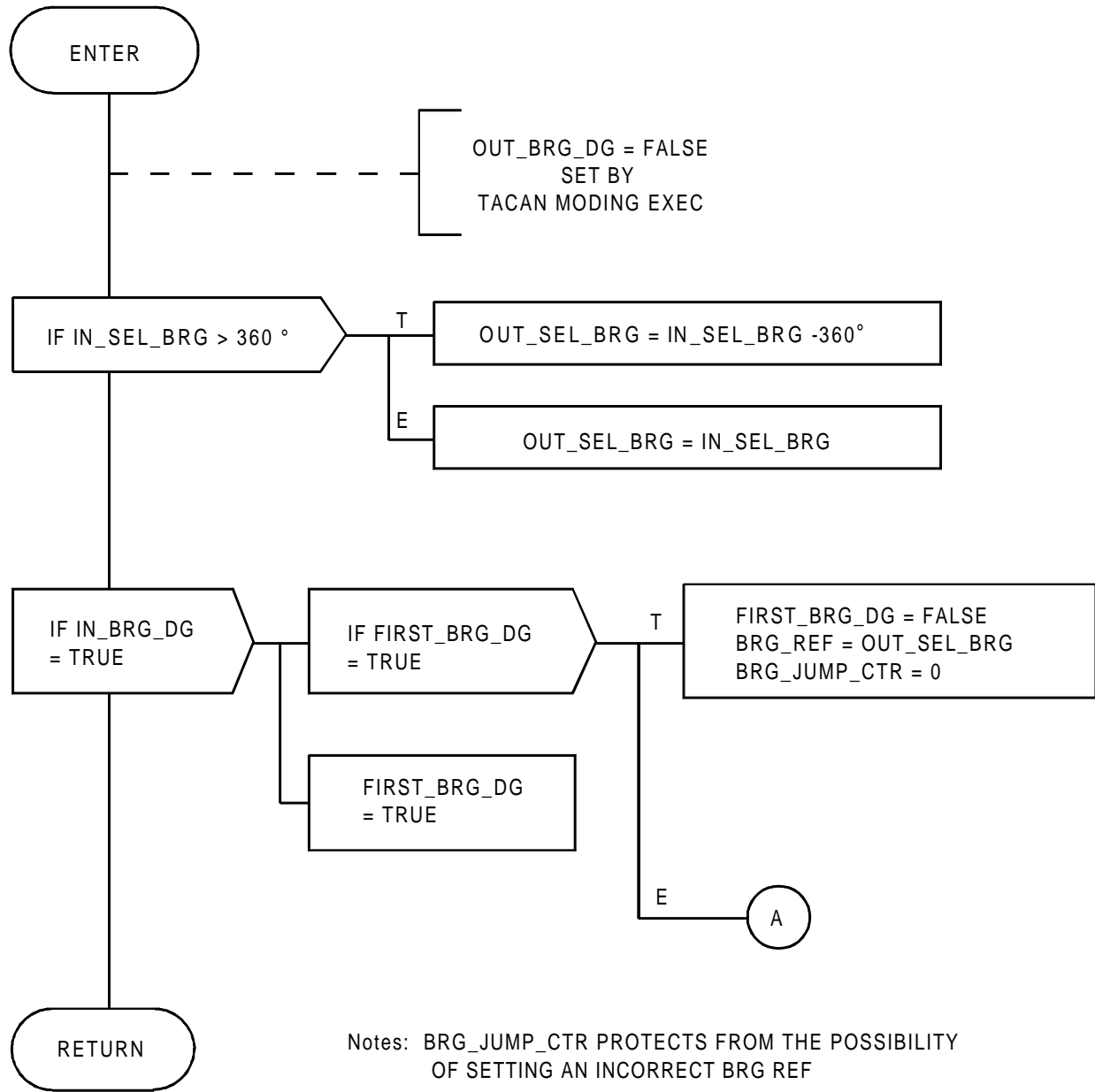


FIGURE 4.5-5.(1) Bearing Post - Selection Filter (Sheet 1 of 2)

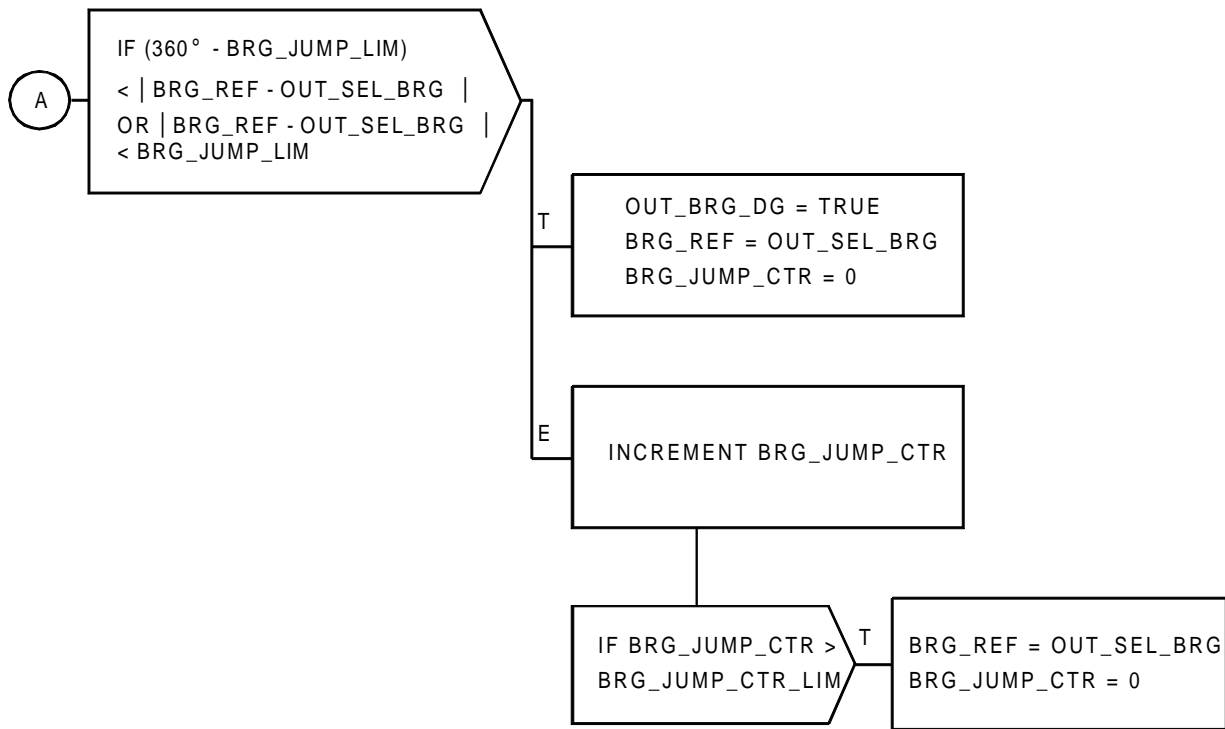


FIGURE 4.5-5.(2) Bearing Post - Selection Filter (Sheet 2 of 2)

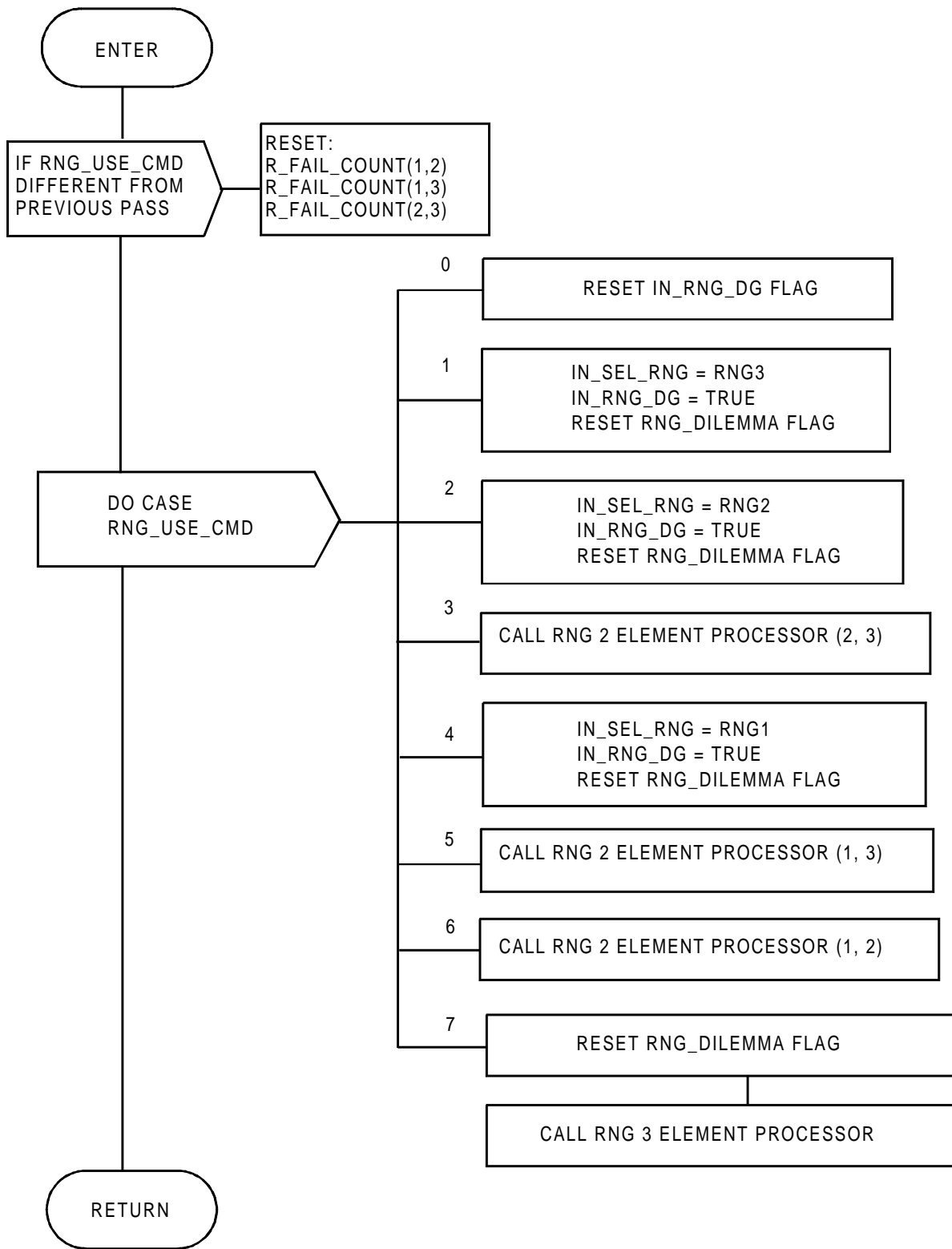


FIGURE 4.5-6.(1) RNG Module - Moding and Initialization (Sheet 1 of 6)

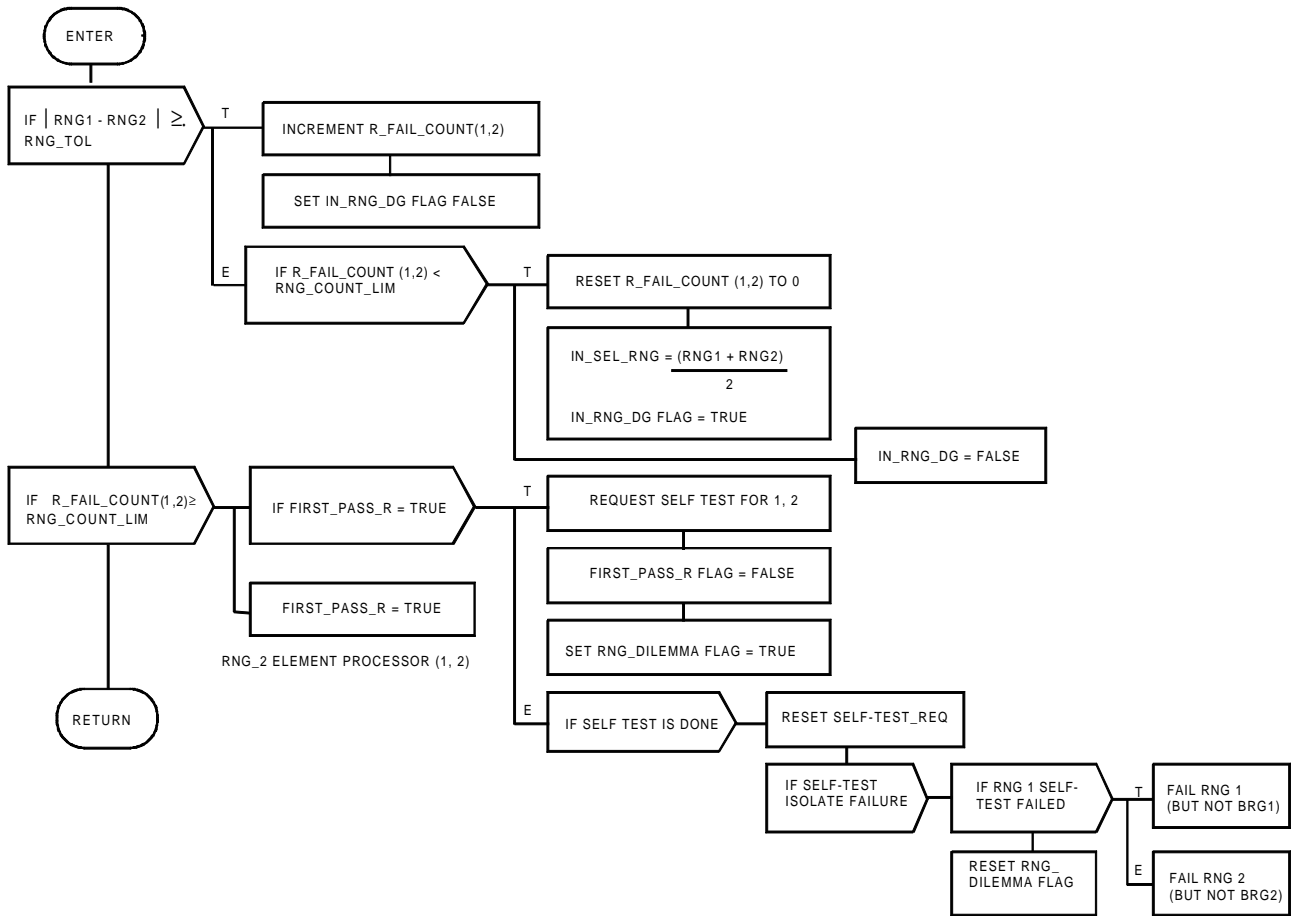


FIGURE 4.5-6.(2) RNG Module - Moding and Initialization (Sheet 2 of 6)

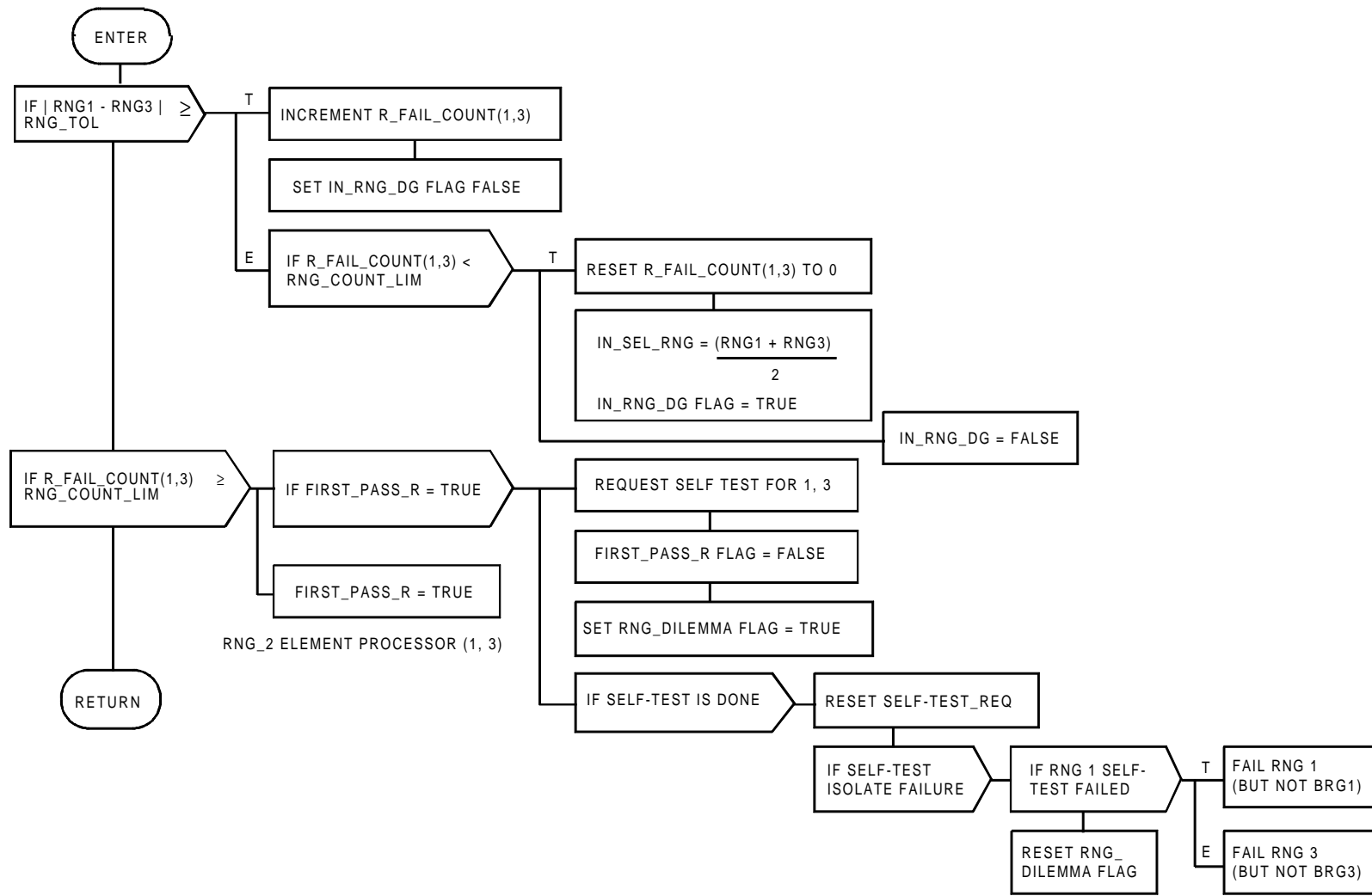


FIGURE 4.5-6.(3) RNG Module - Moding and Initialization (Sheet 3 of 6)

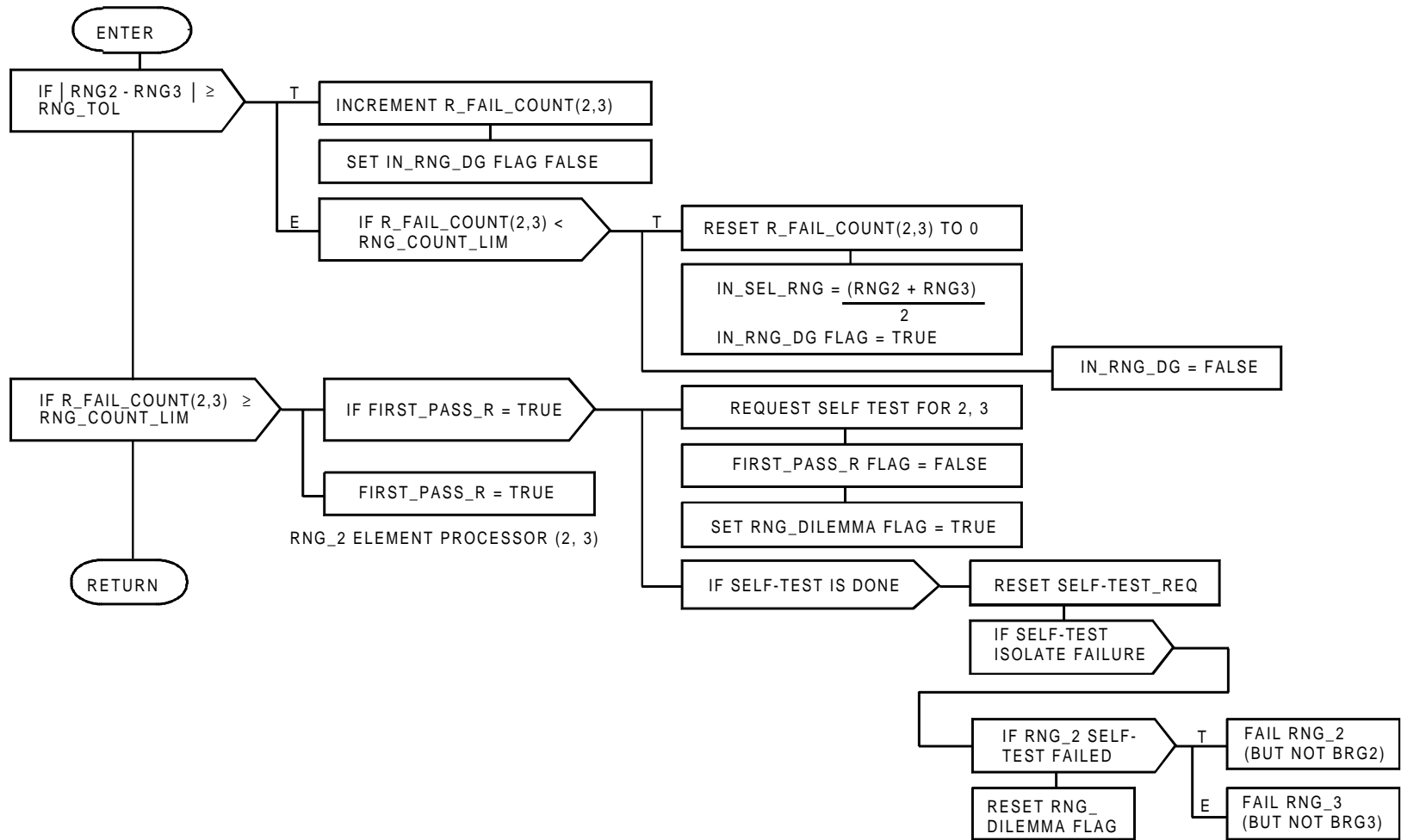


FIGURE 4.5-6.(4) RNG Module - Moding and Initialization (Sheet 4 of 6)

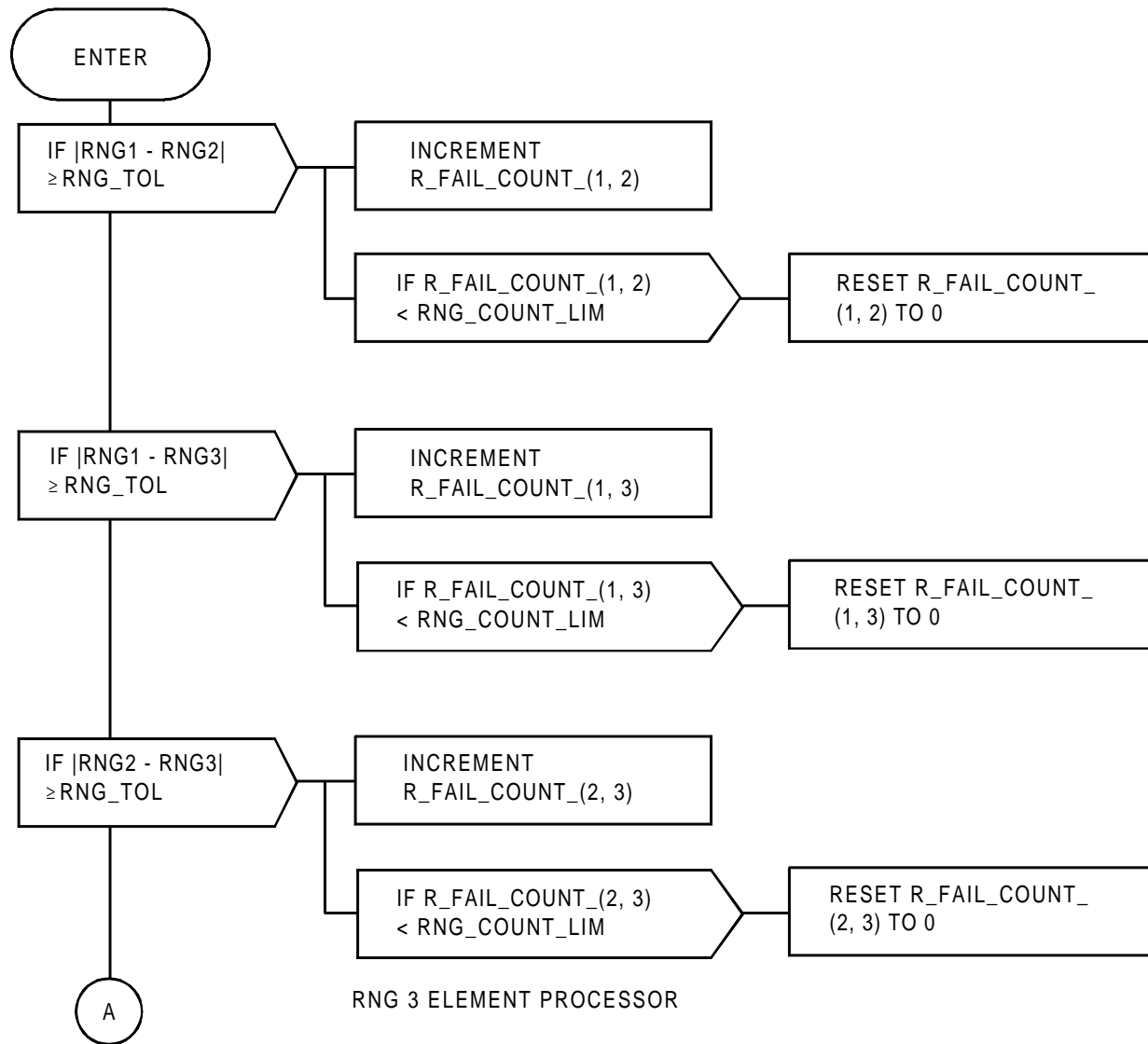


FIGURE 4.5-6.(5) RNG Module - Moding and Initialization (Sheet 5 of 6)

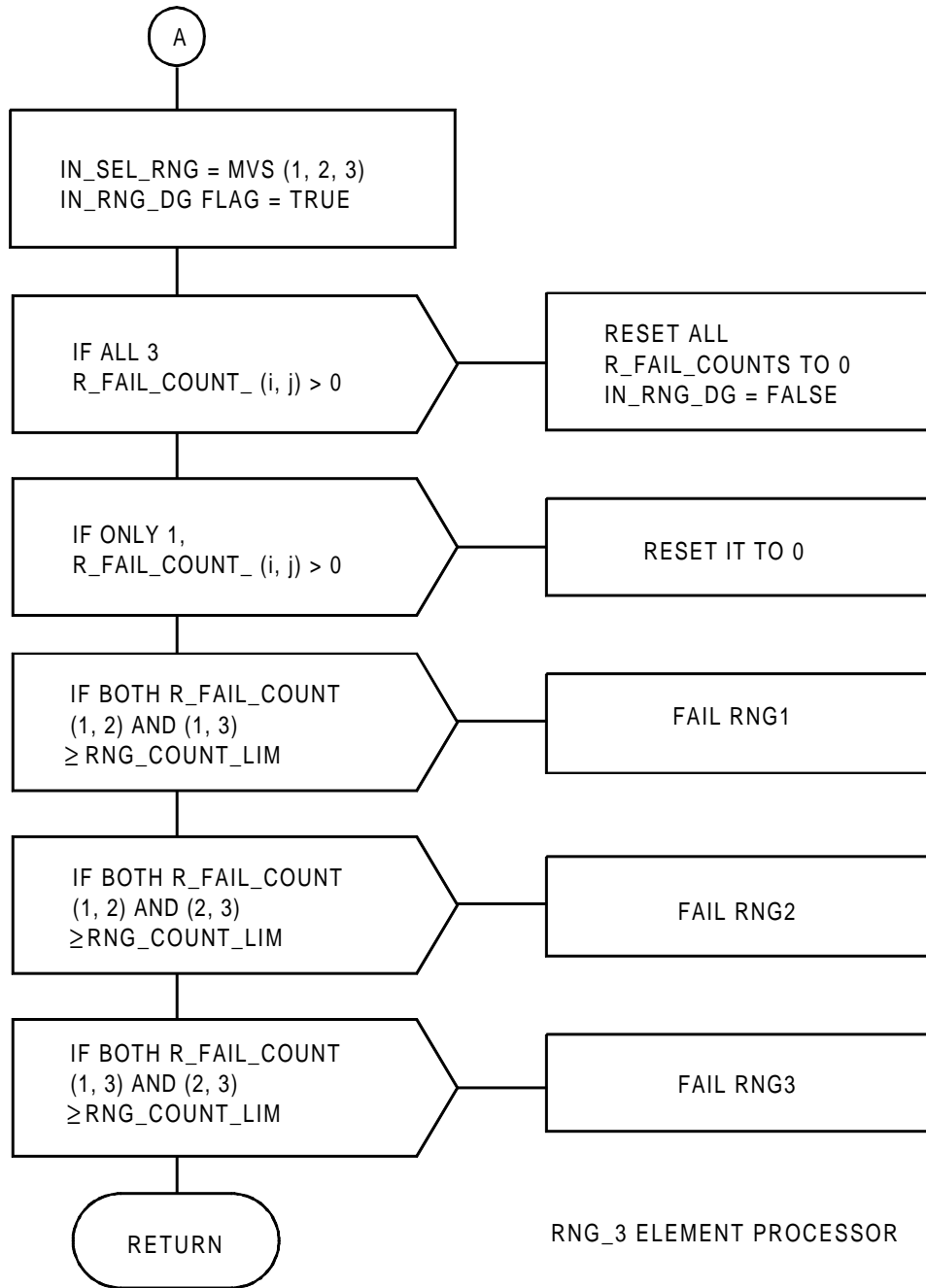


FIGURE 4.5-6.(6) RNG Module - Moding and Initialization (Sheet 6 of 6)

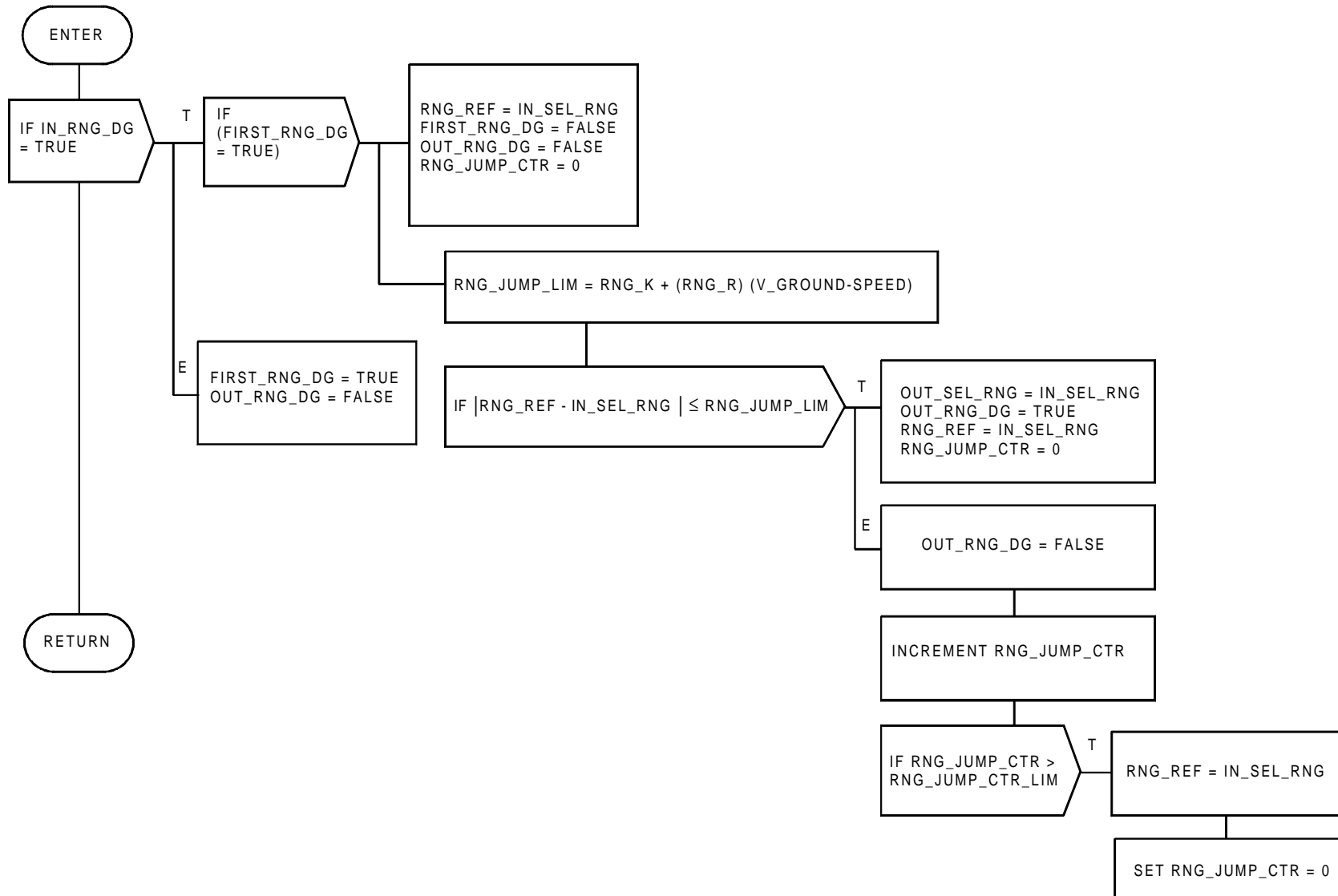


FIGURE 4.5-7. Range Post - Selection Filter

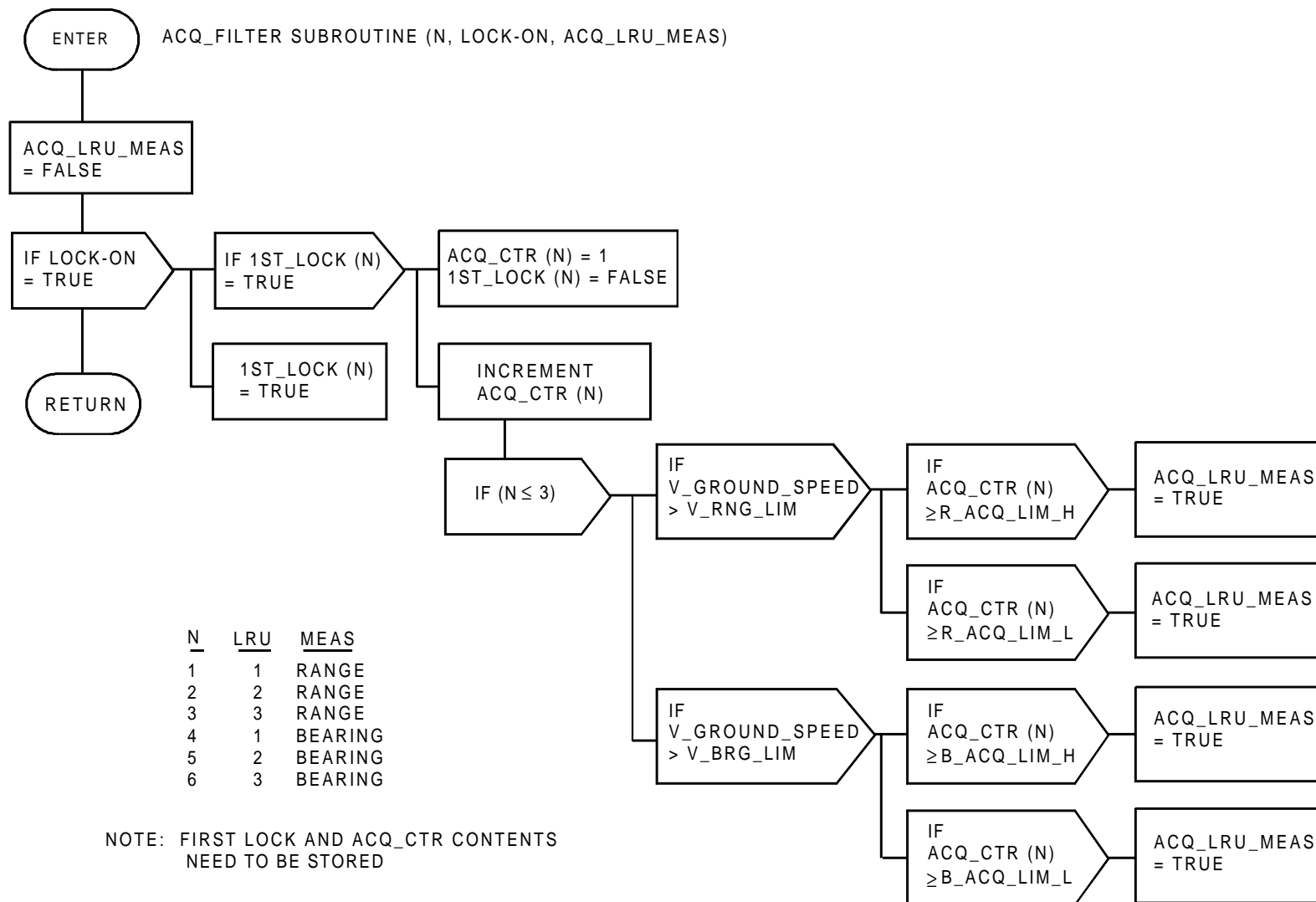


FIGURE 4.5-8. ACQ_FILTER Subroutine (N, LOCK_ON, ACQ_LRU_MEAS)

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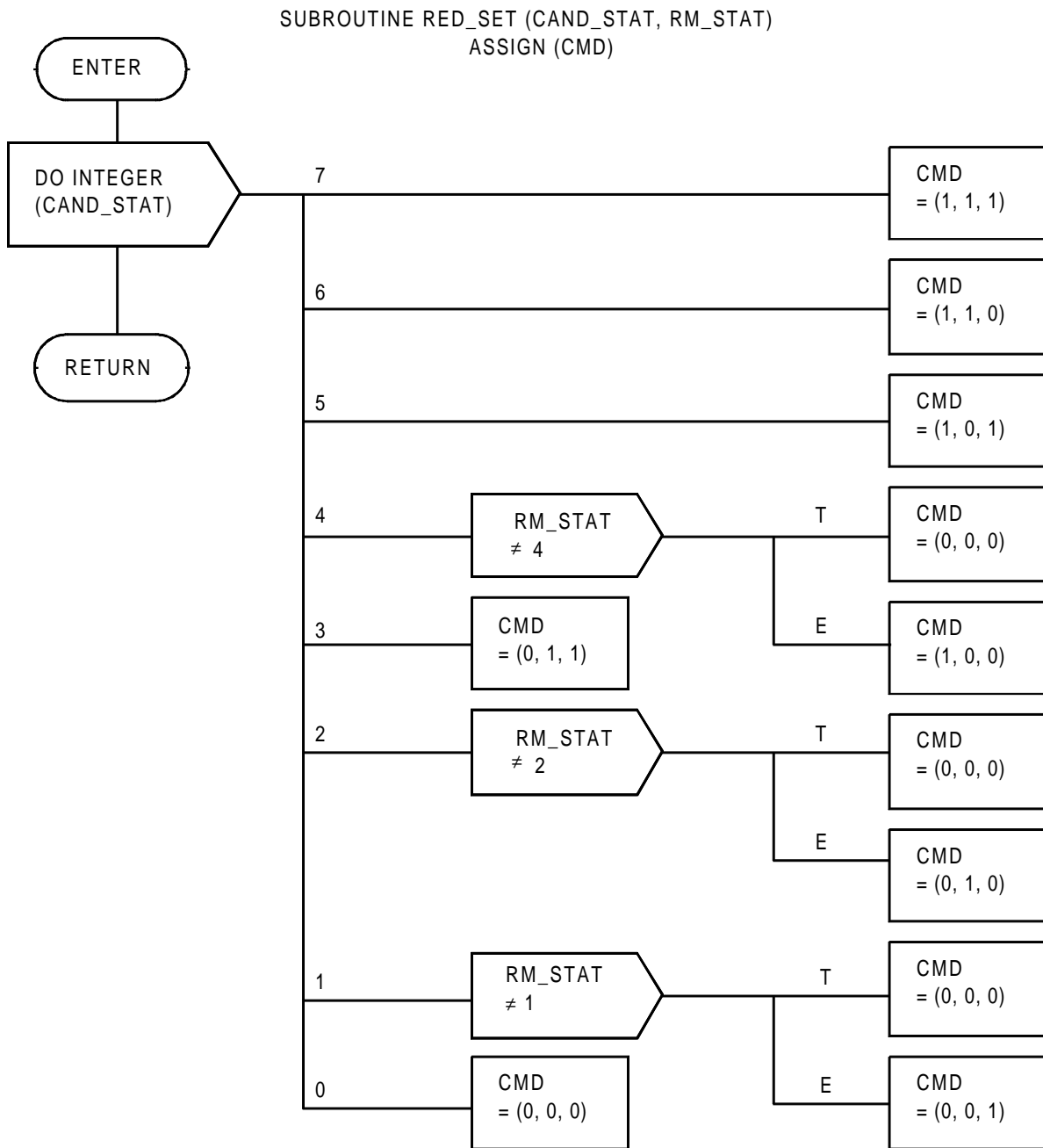


FIGURE 4.5-9. Subroutine RED_SET (CAND_STAT, RM_STAT) ASSIGN (CMD)

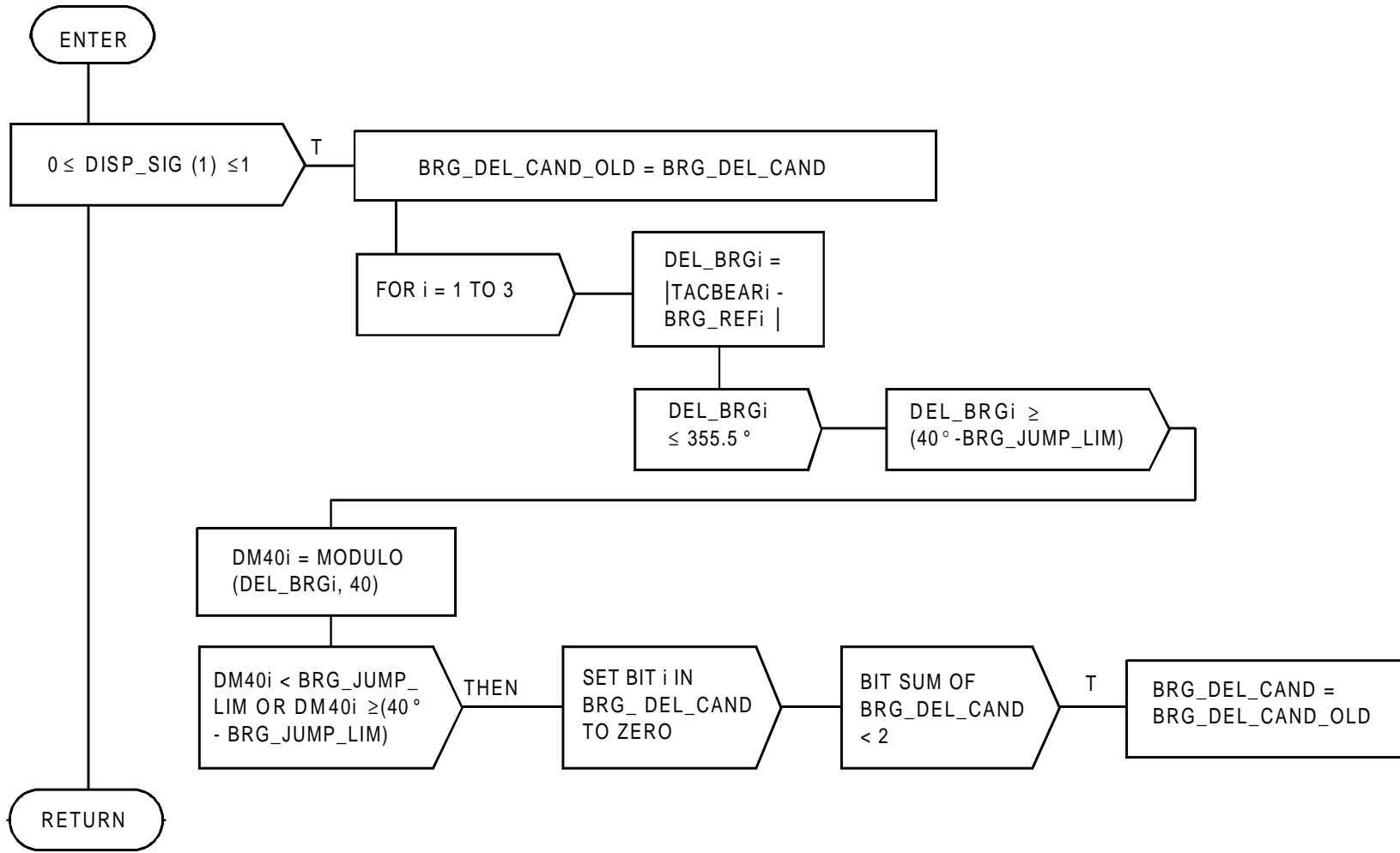


FIGURE 4.5-10. Subroutine TAC_BRG_GLIT

TABLE 4.5.4-1. INPUT FUNCTIONAL PARAMETERS FOR TACTICAL AIR NAVIGATION REDUNDANCY MANAGEMENT (G4.77)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
ALT_WHEELS	V95H0165CA	ALT TO REAR WHEELS/NAV BASE(ENTRY)	RTLS UPP	FT			93017G	*
ALT_WHEELS	V95H0165CB	ALT TO REAR WHEELS/NAV BASE(ENTRY)	ENT UPP	FT	DPL		93017G	*
ALT_WHEELS	V95H0165CC	ALT TO REAR WHEELS/NAV BASE(ENTRY)	TAEM UPP	FT	DPL		93017G	*
ALT_WHEELS	V95H0165CD	ALT TO REAR WHEELS/NAV BASE(ENTRY)	A/L UPP	FT	DPL		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	*
NUM_GPS_INSTALLED	V90U3671C	NUMBER OF GPS RCVRS INSTALLED	GPS SOP		HXS		92067D	
ONE_BRG_LOCK	V90X0769XA	TACAN RM 1 LRU BRG LOCKON RQMT FLG	ENT NAV				93017G	*
ONE_BRG_LOCK	V90X0769XB	TACAN RM 1 LRU BRG LOCKON RQMT FLG	PRELAND NAV				93017G	*
ONE_BRG_LOCK	V90X0769XC	TACAN RM 1 LRU BRG LOCKON RQMT FLG	RTLS NAV				93017G	*
ONE_RANGE_LOCK	V90X0768XA	TACAN RM 1 LRU RNG LOCKON RQMT FLG	ENT NAV				93017G	*
ONE_RANGE_LOCK	V90X0768XB	TACAN RM 1 LRU RNG LOCKON RQMT FLG	PRELAND NAV				93017G	*
ONE_RNG_LOCK	V90X0768XC	TACAN RM 1 LRU RNG LOCKON RQMT FLG	RTLS NAV				93017G	*
R_EF(1)	V95H0155CA	ORBITER X POSITION EF(TOD)	ENT UPP	FT	DPL		93090E	
R_EF(1)	V95H0155CB	ORBITER X POSITION EF(TOD)	RTLS UPP	FT	DPL		93090E	
R_EF(1)	V95H0155CC	ORBITER X POSITION EF(TOD)	TAEM UPP	FT	DPL		93090E	
R_EF(1)	V95H0155CD	ORBITER X POSITION EF(TOD)	A/L UPP	FT	DPL		93023D	
R_EF(2)	V95H0156CA	ORBITER Y POSITION EF(TOD)	ENT UPP	FT	DPL		93090E	
R_EF(2)	V95H0156CB	ORBITER Y POSITION EF(TOD)	RTLS UPP	FT	DPL		93090E	
R_EF(2)	V95H0156CC	ORBITER Y POSITION EF(TOD)	TAEM UPP	FT	DPL		93090E	
R_EF(2)	V95H0156CD	ORBITER Y POSITION EF(TOD)	A/L UPP	FT	DPL		93023D	
R_EF(3)	V95H0157CA	ORBITER Z POSITION EF(TOD)	ENT UPP	FT	DPL		93090E	
R_EF(3)	V95H0157CB	ORBITER Z POSITION EF(TOD)	RTLS UPP	FT	DPL		93090E	
R_EF(3)	V95H0157CC	ORBITER Z POSITION EF(TOD)	TAEM UPP	FT	DPL		93090E	
R_EF(3)	V95H0157CD	ORBITER Z POSITION EF(TOD)	A/L UPP	FT	DPL		93023D	
R_TACAN_EFSL1(1)	V90H1834CA	X-COMP EF POS VECTOR OF TACAN 1	ENT SITE LOOKUP	FT				
R_TACAN_EFSL1(1)	V90H1834CB	X-COMP EF POS VECTOR OF TACAN 1	ASC SITE LOOKUP	FT				
R_TACAN_EFSL1(2)	V90H1835CA	Y-COMP EF POS VECTOR OF TACAN 1	ENT SITE LOOKUP	FT				
R_TACAN_EFSL1(2)	V90H1835CB	Y-COMP EF POS VECTOR OF TACAN 1	ASC SITE LOOKUP	FT				
R_TACAN_EFSL1(3)	V90H1836CA	Z-COMP EF POS VECTOR OF TACAN 1	ENT SITE LOOKUP	FT				
R_TACAN_EFSL1(3)	V90H1836CB	Z-COMP EF POS VECTOR OF TACAN 1	ASC SITE LOOKUP	FT				
R_TACAN_EFSL2(1)	V90H1837CA	X-COMP EF POS VECTOR OF TACAN 2	ENT SITE LOOKUP	FT				
R_TACAN_EFSL2(1)	V90H1837CB	X-COMP EF POS VECTOR OF TACAN 2	ASC SITE LOOKUP	FT				
R_TACAN_EFSL2(2)	V90H1838CA	Y-COMP EF POS VECTOR OF TACAN 2	ENT SITE LOOKUP	FT				
R_TACAN_EFSL2(2)	V90H1838CB	Y-COMP EF POS VECTOR OF TACAN 2	ASC SITE LOOKUP	FT				
R_TACAN_EFSL2(3)	V90H1839CA	Z-COMP EF POS VECTOR OF TACAN 2	ENT SITE LOOKUP	FT				
R_TACAN_EFSL2(3)	V90H1839CB	Z-COMP EF POS VECTOR OF TACAN 2	ASC SITE LOOKUP	FT				
R_TACAN_EFSL3(1)	V90H1840CA	X-COMP EF POS VECTOR OF TACAN 3	ENT SITE LOOKUP	FT				
R_TACAN_EFSL3(1)	V90H1840CB	X-COMP EF POS VECTOR OF TACAN 3	ASC SITE LOOKUP	FT				
R_TACAN_EFSL3(2)	V90H1841CA	Y-COMP EF POS VECTOR OF TACAN 3	ENT SITE LOOKUP	FT				
R_TACAN_EFSL3(2)	V90H1841CB	Y-COMP EF POS VECTOR OF TACAN 3	ASC SITE LOOKUP	FT				
R_TACAN_EFSL3(3)	V90H1842CA	Z-COMP EF POS VECTOR OF TACAN 3	ENT SITE LOOKUP	FT				
R_TACAN_EFSL3(3)	V90H1842CB	Z-COMP EF POS VECTOR OF TACAN 3	ASC SITE LOOKUP	FT				
TACBEARDG(1)	V95X5124XA	TACAN NO 1 BEARING LOCKED ON	TACAN SOP					
TACBEARDG(2)	V95X5224XA	TACAN NO 2 BEARING LOCKED ON	TACAN SOP					
TACBEARDG(3)	V95X5324XA	TACAN NO 3 BEARING LOCKED ON	TACAN SOP					

TABLE 4.5.4-1. INPUT FUNCTIONAL PARAMETERS FOR TACTICAL AIR NAVIGATION REDUNDANCY MANAGEMENT (G4.77)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
TACBEARO(1)	V95H5122CA	TACAN NO 1 BEARING OUT	TACAN SOP	RAD				
TACBEARO(2)	V95H5222CA	TACAN NO 2 BEARING OUT	TACAN SOP	RAD				
TACBEARO(3)	V95H5322CA	TACAN NO 3 BEARING OUT	TACAN SOP	RAD				
TACCHAN(1)	V95J5130CA	TACAN NO 1 CHANNEL W/MODE	TACAN SOP					
TACCHAN(2)	V95J5230CA	TACAN NO 2 CHANNEL W/MODE	TACAN SOP					
TACCHAN(3)	V95J5330CA	TACAN NO 3 CHANNEL W/MODE	TACAN SOP					
TACPON(1)	V95X5145XA	TACAN NO 1 BUFFERED POWER STATUS	TACAN SOP				90182	
TACPON(2)	V95X5245XA	TACAN NO 2 BUFFERED POWER STATUS	TACAN SOP				90182	
TACPON(3)	V95X5345XA	TACAN NO 3 BUFFERED POWER STATUS	TACAN SOP				90182	
TACRANGDG(1)	V95X5104XA	TACAN NO 1 RANGE LOCKED ON	TACAN SOP					
TACRANGDG(2)	V95X5204XA	TACAN NO 2 RANGE LOCKED ON	TACAN SOP					
TACRANGDG(3)	V95X5304XA	TACAN NO 3 RANGE LOCKED ON	TACAN SOP					
TACRANGE(1)	V95H5102CA	TACAN NO 1 RANGE OUT	TACAN SOP	FT				
TACRANGE(2)	V95H5202CA	TACAN NO 2 RANGE OUT	TACAN SOP	FT				
TACRANGE(3)	V95H5302CA	TACAN NO 3 RANGE OUT	TACAN SOP	FT				
TAC_BRGFL(1)	V95X5143X	TACAN NO 1 BEARING SELF TEST FAIL	TACAN SOP					
TAC_BRGFL(2)	V95X5243X	TACAN NO 2 BEARING SELF TEST FAIL	TACAN SOP					
TAC_BRGFL(3)	V95X5343X	TACAN NO 3 BEARING SELF TEST FAIL	TACAN SOP					
TAC_CF(1)	V91X3500X	TACAN 1 COMMFault	FCOS				92025B	
TAC_CF(2)	V91X3510X	TACAN 2 COMMFault	FCOS				92025B	
TAC_CF(3)	V91X3520X	TACAN 3 COMMFault	FCOS				92025B	
TAC_RNGFL(1)	V95X5144X	TACAN NO 1 RANGE SELF TEST FAIL	TACAN SOP					
TAC_RNGFL(2)	V95X5244X	TACAN NO 2 RANGE SELF TEST FAIL	TACAN SOP					
TAC_RNGFL(3)	V95X5344X	TACAN NO 3 RANGE SELF TEST FAIL	TACAN SOP					
TAC_STIP	V95X5006X	TACAN SELF TEST IN PROGRESS	TACAN SOP		BD			
TAC_TIM_TAG	V95W5001CA	TACAN TIME TAG	TACAN SOP	S			93017G	*
TCH_CHNG(1)	V95X5146X	TACAN 1 CHANNEL CHANGE INDICATOR	TACAN SOP					
TCH_CHNG(2)	V95X5246X	TACAN 2 CHANNEL CHANGE INDICATOR	TACAN SOP					
TCH_CHNG(3)	V95X5346X	TACAN 3 CHANNEL CHANGE INDICATOR	TACAN SOP					
V_GROUNDSPEED/VH	V95L0178CA	GROUNDSPED	RTLS UPP	FT/S			92389C	
V_GROUNDSPEED/VH	V95L0178CB	GROUNDSPED	ENT UPP	FT/S			92389C	
V_GROUNDSPEED/VH	V95L0178CC	GROUNDSPED	TAEM UPP	FT/S			92389C	
V_GROUNDSPEED/VH	V95L0178CD	GROUNDSPED	A/L UPP	FT/S			92450C	
	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	*

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

TABLE 4.5.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM TACTICAL AIR NAVIGATION REDUNDANCY MANAGEMENT
(G4.77)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
BRGDIL	V90X3603X	TACAN BEARING DILEMMA FLAG	DL FMT 21/1 DL FMT 23/A HORIZ SIT DISP HORIZ SIT SPEC		BD		93017G	*
BRGFAIL(1)	V90X3608X	TACAN BEARING 1 FAIL	DL FMT 21/1 DL FMT 23/A GAX HORIZ SIT DISP HORIZ SIT SPEC		BD		93017G	*
BRGFAIL(2)	V90X3708X	TACAN BEARING 2 FAIL	DL FMT 21/1 DL FMT 23/A GAX HORIZ SIT DISP HORIZ SIT SPEC		BD		93017G	*
BRGFAIL(3)	V90X3808X	TACAN BEARING 3 FAIL	DL FMT 21/1 DL FMT 23/A GAX HORIZ SIT DISP HORIZ SIT SPEC		BD		93017G	*
ELEV_ANG	V90U0720CD	TACAN/SHUTTLE ELEV ANG	DL FMT 21/1 DL FMT 23/A	DEG			93017G	*
IN_CONE_FLAG	V90X3598X	INSIDE CONE FLAG	ENT NAV PRELAND NAV RTLS NAV					
OUT_BRG_DG	V90X3591X	BEARING DATA GOOD	DL FMT 23/1 ENT NAV PRELAND NAV RTLS NAV		BD		93017G	*
OUT_RNG_DG	V90X3593X	RANGE DATA GOOD	DL FMT 23/1 ENT NAV PRELAND NAV RTLS NAV		BD		93017G	*
OUT_SEL_BRG	V90H3590C	SELECTED BEARING DATA	DL FMT 21/1 DL FMT 23/1 ENT NAV PRELAND NAV RTLS NAV	DEG	DPL		93017G	*
OUT_SEL_RNG	V90H3592C	SELECTED RANGE DATA	DL FMT 21/1 DL FMT 23/1 ENT NAV PRELAND NAV RTLS NAV	FT	DPL		93017G	*

TABLE 4.5.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM TACTICAL AIR NAVIGATION REDUNDANCY MANAGEMENT
(G4.77)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
RNGDIL	V90X3604X	TACAN RANGE DILEMMA FLAG	DL FMT 21/1 DL FMT 23/1 HORIZ SIT DISP HORIZ SIT SPEC		BD		93017G	*
RNGFAIL(1)	V90X3611X	TACAN RANGE 1 FAIL	DL FMT 21/1 DL FMT 23/1 GAX HORIZ SIT DISP HORIZ SIT SPEC		BD		93017G	*
RNGFAIL(2)	V90X3711X	TACAN RANGE 2 FAIL	DL FMT 21/1 DL FMT 23/1 GAX HORIZ SIT DISP HORIZ SIT SPEC		BD		93017G	*
RNGFAIL(3)	V90X3811X	TACAN RANGE 3 FAIL	DL FMT 21/1 DL FMT 23/1 GAX HORIZ SIT DISP HORIZ SIT SPEC		BD		93017G	*
SEL_LRU_ID	V90J3595C	SELECTED LRU ID	ENT NAV PRELAND NAV RTLS NAV TLM					
TACANDIL	V90X3605X	TACAN DILEMMA	GAX					
TACAN_FAIL(1)	V90X3601X	TACAN 1 FAIL	GAX					
TACAN_FAIL(2)	V90X3701X	TACAN 2 FAIL	GAX					
TACAN_FAIL(3)	V90X3801X	TACAN 3 FAIL	GAX					
TAC_STREQ	V90J3602C	TACAN SELF TEST REQUEST	TACAN SOP	BITS			92025B	
	V90M2922PC	CGRB_TAC_FAIL\$(1:)	DL FMT 21/1 DL FMT 23/A				93017G	*
	V90M2923P	CGRB_TAC_FAIL\$(2:)	DL FMT 21/1 DL FMT 23/1				93017G	*
	V90M2941P	CGPB_TAC_BRG_DG_MFE	DL FMT 23/1				93017G	*
	V90M2942P	CGPB_TAC_RNG_DG_MFE	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 4.5.4-3. TACTICAL AIR NAVIGATION REDUNDANCY MANAGEMENT (G4.77) 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 4.5.4-4. TACTICAL AIR NAVIGATION REDUNDANCY MANAGEMENT (G4.77) 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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NOTE: REFERENCE TABLE 1.3-1 FOR EXPLANATION OF DATA ELEMENTS.

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TABLE 4.5.4-5. TACTICAL AIR NAVIGATION REDUNDANCY MANAGEMENT (G4.77) 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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4.6 MSBLS FDIR (PF 4.78)

MSBLS FDIR is a triply-redundant subsystem. FDIR will operate on range, bearing, and elevation data. MSBLS FDIR will operate as described in paragraph 4.0.2 for the three-parameter case (with BITE). The candidate elements for FDIR will be those currently selected as data candidates for the selection filter.

4.6.1 Functional Requirements

The limits for the MSBLS differencing test are K-loads (see paragraph 4.6.3).

4.6.2 Processing Requirements

MSBLS FDIR shall be processed at the rates shown in Table 4.0-2 during the landing phase (MM305) and RTLS (MM603).

4.6.3 Parameter Tables for MSBLS FDIR.

The IDD inputs and outputs are listed in Tables 4.6.3-1 and 4.6.3-2 respectively. K-loads are listed in Table 4.6.3-4. There are no I-loads or constants requirements for MSBLS FDIR.

TABLE 4.6.3-1. INPUT FUNCTIONAL PARAMETERS FOR MICROWAVE SCAN BEAM LANDING SYSTEM FDIR (G4.78)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
MSBAZIMDG(1)	V95X6124X	MSBLS 1 AZIMUTH LOCKED ON	MSBLS SOP				92297B	
MSBAZIMDG(2)	V95X6224X	MSBLS 2 AZIMUTH LOCKED ON	MSBLS SOP				92297B	
MSBAZIMDG(3)	V95X6324X	MSBLS 3 AZIMUTH LOCKED ON	MSBLS SOP				92297B	
MSBAZIMO(1)	V95H6122C	MSBLS 1 AZIMUTH OUT	MSBLS SOP	RAD			90278D	
MSBAZIMO(2)	V95H6222C	MSBLS 2 AZIMUTH OUT	MSBLS SOP	RAD			90278D	
MSBAZIMO(3)	V95H6322C	MSBLS 3 AZIMUTH OUT	MSBLS SOP	RAD			90278D	
MSBELEVDG(1)	V95X6144X	MSBLS 1 ELEVATION LOCKED ON	MSBLS SOP				92297B	
MSBELEVDG(2)	V95X6244X	MSBLS 2 ELEVATION LOCKED ON	MSBLS SOP				92297B	
MSBELEVDG(3)	V95X6344X	MSBLS 3 ELEVATION LOCKED ON	MSBLS SOP				92297B	
MSBELEVO(1)	V95H6142C	MSBLS 1 ELEVATION OUT	MSBLS SOP	RAD			90278D	
MSBELEVO(2)	V95H6242C	MSBLS 2 ELEVATION OUT	MSBLS SOP	RAD			90278D	
MSBELEVO(3)	V95H6342C	MSBLS 3 ELEVATION OUT	MSBLS SOP	RAD			90278D	
MSBELVSTB(1)	V95X6148X	MSBLS NO 1 ELEVATION SELF TEST BAD	MSBLS SOP					
MSBELVSTB(2)	V95X6248X	MSBLS NO 2 ELEVATION SELF TEST BAD	MSBLS SOP					
MSBELVSTB(3)	V95X6348X	MSBLS NO 3 ELEVATION SELF TEST BAD	MSBLS SOP					
MSBLS_CF(1)	V91X3550X	MSBLS 1 COMMFAULT	FCOS					
MSBLS_CF(2)	V91X3560X	MSBLS 2 COMMFAULT	FCOS					
MSBLS_CF(3)	V91X3570X	MSBLS 3 COMMFAULT	FCOS					
MSBRANGDG(1)	V95X6104X	MSBLS 1 RANGE LOCKED ON	MSBLS SOP				92297B	
MSBRANGDG(2)	V95X6204X	MSBLS 2 RANGE LOCKED ON	MSBLS SOP				92297B	
MSBRANGDG(3)	V95X6304X	MSBLS 3 RANGE LOCKED ON	MSBLS SOP				92297B	
MSBRANGE(1)	V95H6102C	MSBLS 1 RANGE OUT	MSBLS SOP	FT			90278D	
MSBRANGE(2)	V95H6202C	MSBLS 2 RANGE OUT	MSBLS SOP	FT			90278D	
MSBRANGE(3)	V95H6302C	MSBLS 3 RANGE OUT	MSBLS SOP	FT			90278D	
	V93X4421X	MSBLS 1 DES CMD	SENSOR SELF TEST DISP		BD		93017G	*
	V93X4423X	MSBLS 2 DES CMD	SENSOR SELF TEST DISP		BD		93017G	*
	V93X4425X	MSBLS 3 DES CMD	SENSOR SELF TEST DISP		BD		93017G	*

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

TABLE 4.6.3-2. OUTPUT FUNCTIONAL PARAMETERS FROM MICROWAVE SCAN BEAM LANDING SYSTEM FDIR (G4.78)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
FAILMSBLS1	V90X3101X	MSBLS 1 FAIL	DL FMT 23/1 GAX		BD		93017G	*
FAILMSBLS2	V90X3201X	MSBLS 2 FAIL	DL FMT 23/1 GAX		BD		93017G	*
FAILMSBLS3	V90X3301X	MSBLS 3 FAIL	DL FMT 23/1 GAX		BD		93017G	*
MSBAZIM_D	V90X3005X	MSBLS AZIMUTH DISAGREE	DL FMT 23/1 GAX		BD		93017G	*
MSBELEV_D	V90X3035X	MSBLS ELEVATION DISAGREE	DL FMT 23/1 GAX		BD		93017G	*
MSBRANGE_D	V90X3065X	MSBLS RANGE DISAGREE	DL FMT 23/1 GAX		BD		93017G	*
	V90M2886P	MFE.CGRB_STATUS_1\$(3;)	DL FMT 23/1				93017G	*
	V90M2887P	MFE.CGRB_STATUS_1\$(4;)	DL FMT 23/1				93017G	*
	V90M2888P	MFE.CGRB_STATUS_1\$(2;)	DL FMT 23/1				93017G	*
	V90X3000X	MSBLS SELECTION FILTER COMMAND	SF					
	V90X3105X	MSBLS 1 AZIMUTH FAIL	DL FMT 23/1		BD		93017G	*
	V90X3106X	MSBLS 1 ELEVATION FAIL	DL FMT 23/1		BD		93017G	*
	V90X3107X	MSBLS 1 RANGE FAIL	DL FMT 23/1		BD		93017G	*
	V90X3205X	MSBLS 2 AZIMUTH FAIL	DL FMT 23/1		BD		93017G	*
	V90X3206X	MSBLS 2 ELEVATION FAIL	DL FMT 23/1		BD		93017G	*
	V90X3207X	MSBLS 2 RANGE FAIL	DL FMT 23/1		BD		93017G	*
	V90X3305X	MSBLS 3 AZIMUTH FAIL	DL FMT 23/1		BD		93017G	*
	V90X3306X	MSBLS 3 ELEVATION FAIL	DL FMT 23/1		BD		93017G	*
	V90X3307X	MSBLS 3 RANGE FAIL	DL FMT 23/1		BD		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 4.6.3-3. MICROWAVE SCAN BEAM LANDING SYSTEM FDIR (G4.78) 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 4.6.3-4. MICROWAVE SCAN BEAM LANDING SYSTEM FDIR (G4.78) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
LIMIT(23) MSBLS RNG RELATIVE ERROR TOLERANCE	V97U3046C	00	+2.0000000	E+03 FT	F	S	P	G4.78	89667E	
LIMIT(24) MSBLS AZ RELATIVE ERROR TOLERANCE	V97U3047C	00	+5.0000000	E-01 DEG	F	S	P	G4.78	89667E	
LIMIT(25) MSBLS ELEV RELATIVE ERROR TOLERANCE	V97U3048C	00	+4.0	E-01 DEG	F	S	P	G4.78	89667E	
N_MSBL MSBLS FAULT DETECTION COUNTER LIMIT	V97U3056C	00	+3	ND	I	S	P	G4.78	89667E	

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

TABLE 4.6.3-5. MICROWAVE SCAN BEAM LANDING SYSTEM FDIR (G4.78) 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.

4.7 AERO SURFACES FEEDBACK

4.7.1 ELVN PFB FDIR (PF 4.81)

ELVN PFB FDIR will operate on four elevon transducers (i.e., right outboard, right inboard, left outboard, and left inboard). Each transducer signal is quadruply-redundant, and will be processed as described in paragraph 4.0.2 for the four-parameter case (without BITE). FDIR shall be performed on the three LRU's in use by the selection filter whenever there are four LRU's and shall be terminated if one or more units are not usable.

4.7.1.1 Functional Requirements.

The limits for the ELVN PFB differencing test are K-loads (see paragraph 4.7.1.3).

4.7.1.2 Processing Requirements.

ELVN PFB FDIR shall be processed at the rates shown in Table 4.0-2 during the entry phase (OPS 3) and RTLS (MM602 and 603).

4.7.1.3 Parameter Tables for ELVN PFB FDIR.

The IDD inputs and outputs are listed in Tables 4.7.1.3-1 and 4.7.1.3-2 respectively. K-loads are listed in Table 4.7.1.3-4. There are no I-load or constants requirements for ELVN PFB FDIR.

TABLE 4.7.1.3-1. INPUT FUNCTIONAL PARAMETERS FOR ELEVON POSITION FEEDBACK FDIR (G4.81)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
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	*
LIB_FBK_CF(1)	V91X7000X	LIB ELEVON FDBK 1 COMMFAULT	FCOS		BD		79556D	
LIB_FBK_CF(2)	V91X7001X	LIB ELEVON FDBK 2 COMMFAULT	FCOS		BD		79556D	
LIB_FBK_CF(3)	V91X7002X	LIB ELEVON FDBK 3 COMMFAULT	FCOS		BD		79556D	
LIB_FBK_CF(4)	V91X7003X	LIB ELEVON FDBK 4 COMMFAULT	FCOS		BD		79556D	
LOB_FBK_CF(1)	V91X7050X	LOB ELEVON FDBK 1 COMMFAULT	FCOS		BD		79556D	
LOB_FBK_CF(2)	V91X7051X	LOB ELEVON FDBK 2 COMMFAULT	FCOS		BD		79556D	
LOB_FBK_CF(3)	V91X7052X	LOB ELEVON FDBK 3 COMMFAULT	FCOS		BD		79556D	
LOB_FBK_CF(4)	V91X7053X	LOB ELEVON FDBK 4 COMMFAULT	FCOS		BD		79556D	
RIB_FBK_CF(1)	V91X7100X	RIB ELEVON FDBK 1 COMMFAULT	FCOS		BD		79556D	
RIB_FBK_CF(2)	V91X7101X	RIB ELEVON FDBK 2 COMMFAULT	FCOS		BD		79556D	
RIB_FBK_CF(3)	V91X7102X	RIB ELEVON FDBK 3 COMMFAULT	FCOS		BD		79556D	
RIB_FBK_CF(4)	V91X7103X	RIB ELEVON FDBK 4 COMMFAULT	FCOS		BD		79556D	
ROB_FBK_CF(1)	V91X7150X	ROB ELEVON FDBK 1 COMMFAULT	FCOS		BD		79556D	
ROB_FBK_CF(2)	V91X7151X	ROB ELEVON FDBK 2 COMMFAULT	FCOS		BD		79556D	
ROB_FBK_CF(3)	V91X7152X	ROB ELEVON FDBK 3 COMMFAULT	FCOS		BD		79556D	
ROB_FBK_CF(4)	V91X7153X	ROB ELEVON FDBK 4 COMMFAULT	FCOS		BD		79556D	
	V93X4761XA	FCS FDBK XDUCER 1 DES CMD	CNTLS DISP				93017G	*
	V93X4761XB	FCS FDBK XDUCER 1 DES CMD	RM SWITCH/SURF FB DISP				93017G	*
	V93X4763XA	FCS FDBK XDUCER 2 DES CMD	CNTLS DISP				93017G	*
	V93X4763XB	FCS FDBK XDUCER 2 DES CMD	RM SWITCH/SURF FB DISP				93017G	*
	V93X4765XA	FCS FDBK XDUCER 3 DES CMD	CNTLS DISP				93017G	*
	V93X4765XB	FCS FDBK XDUCER 3 DES CMD	RM SWITCH/SURF FB DISP				93017G	*
	V93X4767XA	FCS FDBK XDUCER 4 DES CMD	CNTLS DISP				93017G	*
	V93X4767XB	FCS FDBK XDUCER 4 DES CMD	RM SWITCH/SURF FB DISP				93017G	*

TABLE 4.7.1.3-1. INPUT FUNCTIONAL PARAMETERS FOR ELEVON POSITION FEEDBACK FDIR (G4.81)

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 4.7.1.3-2. OUTPUT FUNCTIONAL PARAMETERS FROM ELEVON POSITION FEEDBACK FDIR (G4.81)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90M2907P	CGRB STATUS 1 (1)	DL FMT 23/1				93017G	*
	V90M2908P	CGRB STATUS 1 (2)	DL FMT 23/1				93017G	*
	V90M2909P	CGRB STATUS 1 (3)	DL FMT 23/1				93017G	*
	V90M2910P	CGRB STATUS 1 (4)	DL FMT 23/1				93017G	*
	V90U7515C	LIB ELEVON FDBK SF CMD	SF					
	V90U7535C	LOB ELEVON FDBK SF CMD	SF					
	V90U7565C	RIB ELEVON FDBK SF CMD	SF					
	V90U7585C	ROB ELEVON FDBK SF CMD	SF					
	V90X7510X	LIB ELEVON FDBK 1 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X7511X	LIB ELEVON FDBK 2 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X7512X	LIB ELEVON FDBK 3 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X7513X	LIB ELEVON FDBK 4 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X7530X	LOB ELEVON FDBK 1 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X7531X	LOB ELEVON FDBK 2 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X7532X	LOB ELEVON FDBK 3 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X7533X	LOB ELEVON FDBK 4 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X7560X	RIB ELEVON FDBK 1 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X7561X	RIB ELEVON FDBK 2 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X7562X	RIB ELEVON FDBK 3 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X7563X	RIB ELEVON FDBK 4 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X7580X	ROB ELEVON FDBK 1 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X7581X	ROB ELEVON FDBK 2 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X7582X	ROB ELEVON FDBK 3 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X7583X	ROB ELEVON FDBK 4 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					

TABLE 4.7.1.3-2. OUTPUT FUNCTIONAL PARAMETERS FROM ELEVON POSITION FEEDBACK FDIR (G4.81)

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 4.7.1.3-3. ELEVON POSITION FEEDBACK FDIR (G4.81) 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 4.7.1.3-4. ELEVON POSITION FEEDBACK FDIR (G4.81) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
LIMIT(06)	V97U3032C	00	+2.38	E+00 DEG	F	S	P	G4.81	90109D	
LIMIT(07)	V97U3033C	00	+2.38	E+00 DEG	F	S	P	G4.81	90109D	
LIMIT(08)	V97U3034C	00	+2.38	E+00 DEG	F	S	P	G4.81	90109D	
LIMIT(09)	V97U3035C	00	+2.38	E+00 DEG	F	S	P	G4.81	90109D	
N_ELVN_FBK ELVN PFB N COUNTER	V97U3027C	00	+3	ND	I	S	P	G4.81	90109D	

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

TABLE 4.7.1.3-5. ELEVON POSITION FEEDBACK FDIR (G4.81) 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.

4.7.2 RUD PFB FDIR (PF 4.82)

RUD PFB FDIR will operate on the four rudder–position–feedback transducers. The four outputs from the transducers will be processed as outlined in paragraph 4.0.2 for the four–parameter case (without BITE). FDIR shall be performed on the three LRU’s in use by the selection filter whenever there are four LRU’s and shall be terminated if one or more units are not usable.

4.7.2.1 Functional Requirements.

The limits for the rudder differencing test are K–loads (see paragraph 4.7.2.3).

4.7.2.2 Processing Requirements.

RUD PFB FDIR shall be processed at the rates shown in Table 4.0–2 during the entry phase (OPS 3) and RTLS (MM602 and 603).

4.7.2.3 Parameter Tables for RUD PFB FDIR.

The IDD inputs and outputs are listed in Tables 4.7.2.3–1 and 4.7.2.3–2 respectively. K–loads are listed in Table 4.7.2.3–4. There are no I–load or constants requirements for RUD PFB FDIR.

TABLE 4.7.2.3-1. INPUT FUNCTIONAL PARAMETERS FOR RUDDER POSITION FEEDBACK FDIR (G4.82)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
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	*
RUD_FBK_CF(1)	V91X3850X	RUDDER FDBK 1 COMMFAULT	FCOS		BD			
RUD_FBK_CF(2)	V91X3860X	RUDDER FDBK 2 COMMFAULT	FCOS		BD			
RUD_FBK_CF(3)	V91X3870X	RUDDER FDBK 3 COMMFAULT	FCOS		BD			
RUD_FBK_CF(4)	V91X3880X	RUDDER FDBK 4 COMMFAULT	FCOS		BD			
	V93X4761XA	FCS FDBK XDUCER 1 DES CMD	CNTLS DISP				93017G	*
	V93X4761XB	FCS FDBK XDUCER 1 DES CMD	RM SWITCH/SURF FB DISP				93017G	*
	V93X4763XA	FCS FDBK XDUCER 2 DES CMD	CNTLS DISP				93017G	*
	V93X4763XB	FCS FDBK XDUCER 2 DES CMD	RM SWITCH/SURF FB DISP				93017G	*
	V93X4765XA	FCS FDBK XDUCER 3 DES CMD	CNTLS DISP				93017G	*
	V93X4765XB	FCS FDBK XDUCER 3 DES CMD	RM SWITCH/SURF FB DISP				93017G	*
	V93X4767XA	FCS FDBK XDUCER 4 DES CMD	CNTLS DISP				93017G	*
	V93X4767XB	FCS FDBK XDUCER 4 DES CMD	RM SWITCH/SURF FB DISP				93017G	*

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

TABLE 4.7.2.3-2. OUTPUT FUNCTIONAL PARAMETERS FROM RUDDER POSITION FEEDBACK FDIR (G4.82)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90M2906P	CGRB STATUS 1 (5)	DL FMT 23/1				93017G	*
	V90U7013C	RUDDER FDBK SF COMMAND	SF					
	V90X7015X	RUDDER FDBK 1 FAIL	CNTL SPEC		BD		93017G	*
	V90X7016X	RUDDER FDBK 2 FAIL	DL FMT 23/1					
	V90X7017X	RUDDER FDBK 3 FAIL	CNTL SPEC		BD		93017G	*
	V90X7018X	RUDDER FDBK 4 FAIL	DL FMT 23/1					
			CNTL SPEC		BD		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 4.7.2.3-3. RUDDER POSITION FEEDBACK FDIR (G4.82) 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 4.7.2.3-4. RUDDER POSITION FEEDBACK FDIR (G4.82) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
LIMIT(11)	V97U3036C	00	+2.22	E+00 DEG	F	S	P	G4.82	90109D	
N_RUD_FBK RUD PFB N COUNTER	V97U3243C	00	+3	ND	I	S	P	G4.82	90109D	

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

TABLE 4.7.2.3-5. RUDDER POSITION FEEDBACK FDIR (G4.82) 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.

4.7.3 SB PFB FDIR (PF 4.83)

SB PFB FDIR will operate on the four speed brake–position transducers. The four outputs from the transducers will be processed as outlined in paragraph 4.0.2 for the four–parameter case (without BITE). FDIR shall be performed on the three LRU’s in use by the selection filter whenever there are four LRU’s and shall be terminated if one or more units are not usable.

4.7.3.1 Functional Requirements.

The limits for the SB PFB differencing test are K–loads (see paragraph 4.7.3.3).

4.7.3.2 Processing Requirements.

SB PFB FDIR shall be processed at the rates shown in Table 4.0–2 during the entry phase (OPS 3) and RTLS (MM601 at MECO Confirmed, MM602 and 603).

4.7.3.3 Parameter Tables for SB PFB FDIR.

The IDD inputs and outputs are listed in Tables 4.7.3.3–1 and 4.7.3.3–2 respectively. K–loads are listed in Table 4.7.3.3–4. There are no I–load or constants requirements for SB PFB FDIR.

TABLE 4.7.3.3-1. INPUT FUNCTIONAL PARAMETERS FOR SPEEDBRAKE POSITION FEEDBACK FDIR (G4.83)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
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	*
SB_FBK_CF(1)	V91X3800X	SPEEDBRAKE FDBK 1 COMMFAULT	FCOS		BD			
SB_FBK_CF(2)	V91X3810X	SPEEDBRAKE FDBK 2 COMMFAULT	FCOS		BD			
SB_FBK_CF(3)	V91X3820X	SPEEDBRAKE FDBK 3 COMMFAULT	FCOS		BD			
SB_FBK_CF(4)	V91X3830X	SPEEDBRAKE FDBK 4 COMMFAULT	FCOS		BD			
	V93X4761XA	FCS FDBK XDUCER 1 DES CMD	CNTLS DISP				93017G	*
	V93X4761XB	FCS FDBK XDUCER 1 DES CMD	RM SWITCH/SURF FB DISP				93017G	*
	V93X4763XA	FCS FDBK XDUCER 2 DES CMD	CNTLS DISP				93017G	*
	V93X4763XB	FCS FDBK XDUCER 2 DES CMD	RM SWITCH/SURF FB DISP				93017G	*
	V93X4765XA	FCS FDBK XDUCER 3 DES CMD	CNTLS DISP				93017G	*
	V93X4765XB	FCS FDBK XDUCER 3 DES CMD	RM SWITCH/SURF FB DISP				93017G	*
	V93X4767XA	FCS FDBK XDUCER 4 DES CMD	CNTLS DISP				93017G	*
	V93X4767XB	FCS FDBK XDUCER 4 DES CMD	RM SWITCH/SURF FB DISP				93017G	*

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

TABLE 4.7.3.3-2. OUTPUT FUNCTIONAL PARAMETERS FROM SPEEDBRAKE POSITION FEEDBACK FDIR (G4.83)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90M2901P	CGRB STATUS 1 (6)	DL FMT 23/1				93017G	*
	V90U6713C	SPEEDBRAKE FDBK SF COMMAND	SF					
	V90X6715X	SPEEDBRAKE FDBK 1 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X6716X	SPEEDBRAKE FDBK 2 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X6717X	SPEEDBRAKE FDBK 3 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X6718X	SPEEDBRAKE FDBK 4 FAIL	CNTL SPEC		BD		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 4.7.3.3-3. SPEEDBRAKE POSITION FEEDBACK FDIR (G4.83) 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 4.7.3.3-4. SPEEDBRAKE POSITION FEEDBACK FDIR (G4.83) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
LIMIT(29)	V97U3052C	00	+4.04	E+00 DEG	F	S	P	G4.83	90109D	
N_SBKE_FBK SB PFB N COUNTER	V97U3244C	00	+3	ND	I	S	P	G4.83	90109D	

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

TABLE 4.7.3.3-5. SPEEDBRAKE POSITION FEEDBACK FDIR (G4.83) 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.

4.7.4 BF PFB FDIR (PF 4.84)

BF PFB FDIR will operate on the four body flap–position feedback transducers. The outputs from the four transducers will be processed according to paragraph 4.0.2 for the BF PFB QMVS four–parameter case (without BITE). FDIR shall be performed on all four LRU’s whenever there are four LRU’s and shall be terminated if one or more units are not usable.

4.7.4.1 Functional Requirements.

The limits for the BF PFB differencing test are K–loads (see paragraph 4.7.4.3).

4.7.4.2 Processing Requirements.

BF PFB FDIR shall be processed at the rates shown in Table 4.0–2 during the entry phase (OPS 3), ascent phase (OPS 1), and RTLS (OPS 6).

4.7.4.3 Parameter Tables for BF PFB FDIR.

The IDD inputs and outputs are listed in Tables 4.7.4.3–1 and 4.7.4.3–2 respectively. K–loads are listed in Table 4.7.4.3–4. There are no I–load or constants requirements for BF PFB FDIR.

TABLE 4.7.4.3-1. INPUT FUNCTIONAL PARAMETERS FOR BODY FLAP POSITION FEEDBACK FDI (G4.84)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
BF_FBK_CF(1)	V91X7900X	BODY FLAP FDBK 1 COMMFAULT	FCOS		BD		79556D	
BF_FBK_CF(2)	V91X7901X	BODY FLAP FDBK 2 COMMFAULT	FCOS		BD		79556D	
BF_FBK_CF(3)	V91X7902X	BODY FLAP FDBK 3 COMMFAULT	FCOS		BD		79556D	
BF_FBK_CF(4)	V91X7904X	BODY FLAP FDBK 4 COMMFAULT	FCOS		BD		79556D	
DBFM(1)	V57H0065C	BODY FLAP POSN FDBK-1	ASA 1	VDC	AMB		93017G	*
DBFM(2)	V57H0066C	BODY FLAP POSN FDBK-2	ASA 2	VDC	AMB		93017G	*
DBFM(3)	V57H0067C	BODY FLAP POSN FDBK-3	ASA 3	VDC	AMB		93017G	*
DBFM(4)	V57H0068C	BODY FLAP POSN FDBK-4	ASA 4	VDC	AMB		93017G	*
	V90H6410C	SELECTED BODY FLAP FDBK	SF	VDC	SPL		93017G	*
	V93X4761XA	FCS FDBK XDUCER 1 DES CMD	CNTLS DISP				93017G	*
	V93X4761XB	FCS FDBK XDUCER 1 DES CMD	RM SWITCH/SURF FB DISP				93017G	*
	V93X4763XA	FCS FDBK XDUCER 2 DES CMD	CNTLS DISP				93017G	*
	V93X4763XB	FCS FDBK XDUCER 2 DES CMD	RM SWITCH/SURF FB DISP				93017G	*
	V93X4765XA	FCS FDBK XDUCER 3 DES CMD	CNTLS DISP				93017G	*
	V93X4765XB	FCS FDBK XDUCER 3 DES CMD	RM SWITCH/SURF FB DISP				93017G	*
	V93X4767XA	FCS FDBK XDUCER 4 DES CMD	CNTLS DISP				93017G	*
	V93X4767XB	FCS FDBK XDUCER 4 DES CMD	RM SWITCH/SURF FB DISP				93017G	*

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

TABLE 4.7.4.3-2. OUTPUT FUNCTIONAL PARAMETERS FROM BODY FLAP POSITION FEEDBACK FDI (G4.84)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90M2900P	CGRB STATUS 1 (7)	DL FMT 23/1				93017G	*
	V90U6413C	BODY FLAP FDBK SF COMMAND	SF					
	V90X6415X	BODY FLAP FDBK 1 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X6416X	BODY FLAP FDBK 2 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X6417X	BODY FLAP FDBK 3 FAIL	CNTL SPEC		BD		93017G	*
			DL FMT 23/1					
	V90X6418X	BODY FLAP FDBK 4 FAIL	CNTL SPEC		BD		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 4.7.4.3-3. BODY FLAP POSITION FEEDBACK FDI (G4.84) 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 4.7.4.3-4. BODY FLAP POSITION FEEDBACK FDI (G4.84) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
BFQC	V96U8448C	00	+0	ND	I	S	P	G4.84	90109D	
LIMIT(12)	V97U3037C	00	+1.76	E+00 DEG	F	S	P	G4.84	90109D	
N_BF_FBK BF PFB N COUNTER	V97U3006C	00	+3	ND	I	S	P	G4.84	90109D	

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

TABLE 4.7.4.3-5. BODY FLAP POSITION FEEDBACK FDI (G4.84) 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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4.8 CONTROLLERS

4.8.1 RHC FDIR (PF 4.87)

The rotation hand controllers (RHC's) output triply-redundant signals from each crew station. The candidate elements for FDIR will be those currently selected as data candidates for the selection filter. FDIR will be processed as described in paragraph 4.0.2 (without BITE).

4.8.1.1 Functional Requirements.

The limits for the RHC FDI differencing test are I-loads (see paragraph 4.8.1.3).

4.8.1.2 Processing Requirements.

RHC FDIR will be processed at the rates listed in Table 4.0-2 during the ascent (OPS1), RTLS (OPS6) on-orbit (OPS 2), on-orbit checkout (OPS 8), and entry (OPS 3) phases.

4.8.1.3 Parameter Tables for RHC FDIR.

The IDD inputs and outputs are listed in Tables 4.8.1.3-1 and 4.8.1.3-2 respectively. Values for the I-loads are contained in the I-load requirements document (JSC-19350); however, I-load definitions applicable to this principal function are listed in Table 4.8.1.3-3. There are no K-load or constants requirements for RHC FDIR.

TABLE 4.8.1.3-1. INPUT FUNCTIONAL PARAMETERS FOR ROTATIONAL HAND CONTROLLER FDIR (G4.87)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
DACC(1)	V72K1155C	LH RHC ROLL CMD-A	RHC 1	VDC	AMB		93017G	*
DACC(2)	V72K1170C	LH RHC ROLL CMD-B	RHC 1	VDC	AMB		93017G	*
DACC(3)	V72K1185C	LH RHC ROLL CMD-C	RHC 1	VDC	AMB		93017G	*
DACP(1)	V72K1205C	RH RHC ROLL CMD-A	RHC 2	VDC	AMB		93017G	*
DACP(2)	V72K1220C	RH RHC ROLL CMD-B	RHC 2	VDC	AMB		93017G	*
DACP(3)	V72K1235C	RH RHC ROLL CMD-C	RHC 2	VDC	AMB		93017G	*
DECC(1)	V72K1156C	LH RHC PITCH CMD-A	RHC 1	VDC	AMB		93017G	*
DECC(2)	V72K1171C	LH RHC PITCH CMD-B	RHC 1	VDC	AMB		93017G	*
DECC(3)	V72K1186C	LH RHC PITCH CMD-C	RHC 1	VDC	AMB		93017G	*
DECP(1)	V72K1206C	RH RHC PITCH CMD-A	RHC 2	VDC	AMB		93017G	*
DECP(2)	V72K1221C	RH RHC PITCH CMD-B	RHC 2	VDC	AMB		93017G	*
DECP(3)	V72K1236C	RH RHC PITCH CMD-C	RHC 2	VDC	AMB		93017G	*
LRHCP_CF(1)	V91X6525X	LH RHC PITCH CMD A COMMFAULT	FCOS					
LRHCP_CF(2)	V91X6526X	LH RHC PITCH CMD B COMMFAULT	FCOS					
LRHCP_CF(3)	V91X6527X	LH RHC PITCH CMD C COMMFAULT	FCOS					
LRHCR_CF(1)	V91X6500X	LH RHC ROLL CMD A COMMFAULT	FCOS					
LRHCR_CF(2)	V91X6501X	LH RHC ROLL CMD B COMMFAULT	FCOS					
LRHCR_CF(3)	V91X6502X	LH RHC ROLL CMD C COMMFAULT	FCOS					
LRHCY_CF(1)	V91X6540X	LH RHC YAW CMD A COMMFAULT	FCOS					
LRHCY_CF(2)	V91X6541X	LH RHC YAW CMD B COMMFAULT	FCOS					
LRHCY_CF(3)	V91X6542X	LH RHC YAW CMD C COMMFAULT	FCOS					
RRHCP_CF(1)	V91X6575X	RH RHC PITCH CMD A COMMFAULT	FCOS					
RRHCP_CF(2)	V91X6576X	RH RHC PITCH CMD B COMMFAULT	FCOS					
RRHCP_CF(3)	V91X6577X	RH RHC PITCH CMD C COMMFAULT	FCOS					
RRHCR_CF(1)	V91X6550X	RH RHC ROLL CMD A COMMFAULT	FCOS					
RRHCR_CF(2)	V91X6551X	RH RHC ROLL CMD B COMMFAULT	FCOS					
RRHCR_CF(3)	V91X6552X	RH RHC ROLL CMD C COMMFAULT	FCOS					
RRHCY_CF(1)	V91X6590X	RH RHC YAW CMD A COMMFAULT	FCOS					
RRHCY_CF(2)	V91X6591X	RH RHC YAW CMD B COMMFAULT	FCOS					
RRHCY_CF(3)	V91X6592X	RH RHC YAW CMD C COMMFAULT	FCOS					
	V72K1157C	LH RHC YAW CMD-A	RHC 1	VDC	AMB		93017G	*
	V72K1172C	LH RHC YAW CMD-B	RHC 1	VDC	AMB		93017G	*
	V72K1187C	LH RHC YAW CMD-C	RHC 1	VDC	AMB		93017G	*
	V72K1207C	RH RHC YAW CMD-A	RHC 2	VDC	AMB		93017G	*
	V72K1222C	RH RHC YAW CMD-B	RHC 2	VDC	AMB		93017G	*
	V72K1237C	RH RHC YAW CMD-C	RHC 2	VDC	AMB		93017G	*
	V72K1245C	AFT RHC ROLL CMD-A	RHC AFT	VDC	AMB		93017G	*
	V72K1246C	AFT RHC PITCH CMD-A	RHC AFT	VDC	AMB		93017G	*
	V72K1247C	AFT RHC YAW CMD-A	RHC AFT	VDC	AMB		93017G	*
	V72K1255C	AFT RHC ROLL CMD-B	RHC AFT	VDC	AMB		93017G	*
	V72K1256C	AFT RHC PITCH CMD-B	RHC AFT	VDC	AMB		93017G	*
	V72K1257C	AFT RHC YAW CMD-B	RHC AFT	VDC	AMB		93017G	*
	V72K1265C	AFT RHC ROLL CMD-C	RHC AFT	VDC	AMB		93017G	*
	V72K1266C	AFT RHC PITCH CMD-C	RHC AFT	VDC	AMB		93017G	*
	V72K1267C	AFT RHC YAW CMD-C	RHC AFT	VDC	AMB		93017G	*
	V91X7772X	AFT RHC YAW CMD-A COMMFAULT	FCOS					

TABLE 4.8.1.3-1. INPUT FUNCTIONAL PARAMETERS FOR ROTATIONAL HAND CONTROLLER FDIR (G4.87)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V91X7778X	AFT RHC PITCH CMD-B COMMFAULT	FCOS					
	V91X7780X	AFT RHC YAW CMD-B COMMFAULT	FCOS					
	V91X7782X	AFT RHC PITCH CMD-A COMMFAULT	FCOS					
	V91X7783X	AFT RHC ROLL CMD-B COMMFAULT	FCOS					
	V91X7784X	AFT RHC PITCH CMD-C COMMFAULT	FCOS					
	V91X7788X	AFT RHC ROLL CMD-C COMMFAULT	FCOS					
	V91X7791X	AFT RHC YAW CMD-C COMMFAULT	FCOS					
	V91X7792X	AFT RHC ROLL CMD-A COMMFAULT	FCOS					
	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	*
	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	*
	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	*

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

TABLE 4.8.1.3-2. OUTPUT FUNCTIONAL PARAMETERS FROM ROTATIONAL HAND CONTROLLER FDIR (G4.87)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
FAILLHRHC1	V90X6201X	LEFT RHC 1 FAIL	DL FMT 23/1 GAX RM ORB DIP VU		BD		93017G	*
FAILLHRHC2	V90X6231X	LEFT RHC 2 FAIL	DL FMT 23/1 GAX RM ORB DIP VU		BD		93017G	*
FAILLHRHC3	V90X6261X	LEFT RHC 3 FAIL	DL FMT 23/1 GAX RM ORB DIP VU		BD		93017G	*
FAILRHRHC1	V90X6301X	RIGHT RHC 1 FAIL	DL FMT 23/1 GAX RM ORB DIP VU		BD		93017G	*
FAILRHRHC2	V90X6331X	RIGHT RHC 2 FAIL	DL FMT 23/1 GAX RM ORB DIP VU		BD		93017G	*
FAILRHRHC3	V90X6361X	RIGHT RHC 3 FAIL	DL FMT 23/1 GAX RM ORB DIP VU		BD		93017G	*
	V90M2893P	CGRB_STATUS_1\$(16:)	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1				93017G	*
	V90M2894P	CGRB_STATUS_1\$(15:)	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1				93017G	*
	V90M2895P	CGRB_STATUS_1\$(17:)	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1				93017G	*
	V90M2896P	CGRB_STATUS_1\$(13:)	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1				93017G	*
	V90M2897P	CGRB_STATUS_1\$(12:)	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1				93017G	*
	V90M2898P	CGRB_STATUS_1\$(19:)	DL FMT 22/1 DL FMT 32/1				93017G	*
	V90M2899P	CGRB_STATUS_1\$(14:)	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1				93017G	*
	V90M2912P	CGRB_STATUS_1\$(20:)	DL FMT 22/1 DL FMT 32/1				93017G	*

TABLE 4.8.1.3-2. OUTPUT FUNCTIONAL PARAMETERS FROM ROTATIONAL HAND CONTROLLER FDIR (G4.87)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90M2921P	CGRB_STATUS_1\$(18:)	DL FMT 22/1				93017G	*
	V90U6000C	LEFT RHC CMD SF COMMAND	DL FMT 32/1					
	V90U6100C	RIGHT RHC CMD SF COMMAND	SF					
	V90X6005X	LEFT RHC ROLL DISAGREE	TLM					
			SF					
			GAX					
			RM ORB DIP					
			VU					
	V90X6020X	LH RHC ROLL CMD 1 FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 23/1					
	V90X6021X	LH RHC ROLL CMD 2 FAIL	DL FMT 32/1				93017G	*
			DL FMT 22/1		BD			
			DL FMT 23/1					
			DL FMT 32/1					
	V90X6022X	LH RHC ROLL CMD 3 FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 23/1					
			DL FMT 32/1					
	V90X6035X	LEFT RHC PITCH DISAGREE	GAX					
			RM ORB DIP					
			VU					
	V90X6050X	LH RHC PITCH CMD 1 FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 23/1					
			DL FMT 32/1					
	V90X6051X	LH RHC PITCH CMD 2 FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 23/1					
			DL FMT 32/1					
	V90X6052X	LH RHC PITCH CMD 3 FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 23/1					
			DL FMT 32/1					
	V90X6065X	LEFT RHC YAW DISAGREE	GAX					
			RM ORB DIP					
			VU					
	V90X6070X	LH RHC YAW CMD 1 FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 23/1					
			DL FMT 32/1					
	V90X6071X	LH RHC YAW CMD 2 FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 23/1					
			DL FMT 32/1					
	V90X6072X	LH RHC YAW CMD 3 FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 23/1					
			DL FMT 32/1					
	V90X6105X	RIGHT RHC ROLL DISAGREE	GAX					
			RM ORB DIP					
			VU					

TABLE 4.8.1.3-2. OUTPUT FUNCTIONAL PARAMETERS FROM ROTATIONAL HAND CONTROLLER FDIR (G4.87)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X6120X	RH RHC ROLL CMD 1 FAIL	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V90X6121X	RH RHC ROLL CMD 2 FAIL	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V90X6122X	RH RHC ROLL CMD 3 FAIL	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V90X6135X	RIGHT RHC PITCH DISAGREE	GAX RM ORB DIP VU					
	V90X6150X	RH RHC PITCH CMD 1 FAIL	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V90X6151X	RH RHC PITCH CMD 2 FAIL	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V90X6152X	RH RHC PITCH CMD 3 FAIL	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V90X6165X	RIGHT RHC YAW DISAGREE	GAX RM ORB DIP VU					
	V90X6170X	RH RHC YAW CMD 1 FAIL	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V90X6171X	RH RHC YAW CMD 2 FAIL	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V90X6172X	RH RHC YAW CMD 3 FAIL	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		BD		93017G	*
	V90X6205X	AFT RHC ROLL DISAGREE	GAX RM ORB DIP VU					
	V90X6220X	AFT RHC ROLL CMD 1 FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X6221X	AFT RHC ROLL CMD 2 FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X6222X	AFT RHC ROLL CMD 3 FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X6235X	AFT RHC PITCH DISAGREE	DL FMT 22/1 GAX RM ORB DIP VU		BD		93017G	*

TABLE 4.8.1.3-2. OUTPUT FUNCTIONAL PARAMETERS FROM ROTATIONAL HAND CONTROLLER FDIR (G4.87)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X6240X	AFT RHC YAW CMD 1 FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X6241X	AFT RHC YAW CMD 2 FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X6242X	AFT RHC YAW CMD 3 FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X6250X	AFT RHC PITCH CMD 1 FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X6251X	AFT RHC PITCH CMD 2 FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X6252X	AFT RHC PITCH CMD 3 FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X6265X	AFT RHC YAW DISAGREE	GAX RM ORB DIP VU					
	V90X6311X	AFT RHC SELECTION FILTER CMD	SF					
	V90X6362X	AFT RHC 1 FAIL	GAX RM ORB DIP TLM VU					
	V90X6363X	AFT RHC 2 FAIL	GAX RM ORB DIP TLM VU					
	V90X6364X	AFT RHC 3 FAIL	GAX RM ORB DIP TLM VU					

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 4.8.1.3-3. ROTATIONAL HAND CONTROLLER FDIR (G4.87) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
LIMIT(13)	V97U3038C	DEG	F	S	D	P	G4.87	00	ZFO	DC0599	
LIMIT(14)	V97U3039C	DEG	F	S	D	P	G4.87	00	ZFO	DC0599	
LIMIT(15)	V97U3040C	DEG	F	S	D	P	G4.87	00	ZFO	DC0599	
LIMIT(16)	V97U3041C	DEG	F	S	D	P	G4.87	00	ZFO	DC0599	
LIMIT(27)	V97U3050C	DEG	F	S	D	P	G4.87	00	ZFO	DC0599	
LIMIT(28)	V97U3051C	DEG	F	S	D	P	G4.87	00	ZFO	DC0599	
LIMIT(30)	V98U9731C	DEG	F	S	D	P	G4.87	00	ZFO	DC0599	
LIMIT(31)	V98U9732C	DEG	F	S	D	P	G4.87	00	ZFO	DC0599	
LIMIT(32)	V98U9733C	DEG	F	S	D	P	G4.87	00	ZFO	DC0599	
RHC_COUNT	V97U3232C	ND	I	S	D	P	G4.87	00	ZSO	DC0813	

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

TABLE 4.8.1.3-4. ROTATIONAL HAND CONTROLLER FDIR (G4.87) 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 4.8.1.3-5. ROTATIONAL HAND CONTROLLER FDIR (G4.87) 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.

4.8.2 SBTC FDIR (PF 4.88)

The speed brake thrust controllers (SBTC) output triply-redundant signals from each crew station. The candidate elements for FDIR will be those currently selected as data candidates for the selection filter. FDIR for the redundant set of two or three elements will be as described in paragraph 4.0.2 (without BITE).

4.8.2.1 Functional Requirements.

The limits for the SBTC differencing test are I-loads (see paragraph 4.8.2.3).

4.8.2.2 Processing Requirements.

SBTC FDIR will be processed at the rates indicated in Table 4.0-2 during the entry phase Major Mode 304 and Major Mode 305 and RTLS (MM602 and MM603).

4.8.2.3 Parameter Tables for SBTC FDIR.

The IDD inputs and outputs are listed in Tables 4.8.2.3-1 and 4.8.2.3-2 respectively. Values for the I-loads are contained in the I-load requirements document (JSC-19350); however, I-load definitions applicable to this principal function are listed in Table 4.8.2.3-3. There are no K-load or constants requirements for SBTC FDIR.

TABLE 4.8.2.3-1. INPUT FUNCTIONAL PARAMETERS FOR SPEEDBRAKE THRUST CONTROLLER FDIR (G4.88)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
DSBCC(1)	V72K1575C	LH SBTC CMD-A	SBTC 1	VDC	AMB		93017G	*
DSBCC(2)	V72K1578C	LH SBTC CMD-B	SBTC 1	VDC	AMB		93017G	*
DSBCC(3)	V72K1581C	LH SBTC CMD-C	SBTC 1	VDC	AMB		93017G	*
DSBCP(1)	V72K1585C	RH SBTC CMD-A	SBTC 2	VDC	AMB		93017G	*
DSBCP(2)	V72K1588C	RH SBTC CMD-B	SBTC 2	VDC	AMB		93017G	*
DSBCP(3)	V72K1591C	RH SBTC CMD-C	SBTC 2	VDC	AMB		93017G	*
LSBTC_CF(1)	V91X6800X	LH SBTC CMD A COMMFAULT	FCOS		BD			
LSBTC_CF(2)	V91X6801X	LH SBTC CMD B COMMFAULT	FCOS		BD			
LSBTC_CF(3)	V91X6802X	LH SBTC CMD C COMMFAULT	FCOS		BD			
RSBTC_CF(1)	V91X6850X	RH SBTC CMD A COMMFAULT	FCOS		BD			
RSBTC_CF(2)	V91X6851X	RH SBTC CMD B COMMFAULT	FCOS		BD			
RSBTC_CF(3)	V91X6852X	RH SBTC CMD C COMMFAULT	FCOS		BD			
	V93X4211X	LH SPD BRK 1 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4213X	LH SPD BRK 2 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4215X	LH SPD BRK 3 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4241X	RH SPD BRK 1 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4243X	RH SPD BRK 2 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4245X	RH SPD BRK 3 DES CMD	RM/CNTLR DISP		BD		93017G	*

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

TABLE 4.8.2.3-2. OUTPUT FUNCTIONAL PARAMETERS FROM SPEEDBRAKE THRUST CONTROLLER FDIR (G4.88)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
LSBTC_D	V90X6805X	LEFT SPEEDBRAKE CMD DISAGREE	DL FMT 23/1 GAX		BD		93017G	*
RSBTC_D	V90X6905X	RIGHT SPEEDBRAKE CMD DISAGREE	DL FMT 23/1 GAX		BD		93017G	*
	V90M2902P	CGRB_STATUS_1\$(9:)	DL FMT 23/1				93017G	*
	V90M2903P	CGRB_STATUS_1\$(11:)	DL FMT 23/1				93017G	*
	V90U6833C	LEFT SPEEDBRAKE CMD SF COMMAND	SF					
	V90U6933C	RIGHT SPEEDBRAKE CMD SF COMMAND	SF					
	V90X6830X	LEFT SPEEDBRAKE COMMAND A FAIL	DL FMT 23/1 GAX		BD		93017G	*
	V90X6831X	LEFT SPEEDBRAKE COMMAND B FAIL	DL FMT 23/1 GAX		BD		93017G	*
	V90X6832X	LEFT SPEEDBRAKE COMMAND C FAIL	DL FMT 23/1 GAX		BD		93017G	*
	V90X6930X	RIGHT SPEEDBRAKE COMMAND A FAIL	DL FMT 23/1 GAX		BD		93017G	*
	V90X6931X	RIGHT SPEEDBRAKE COMMAND B FAIL	DL FMT 23/1 GAX		BD		93017G	*
	V90X6932X	RIGHT SPEEDBRAKE COMMAND C FAIL	DL FMT 23/1 GAX		BD		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 4.8.2.3-3. SPEEDBRAKE THRUST CONTROLLER FDIR (G4.88) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
LIMIT(17)	V97U3042C	DEG	F	S	D	P	G4.88	00	ZFO	DC0599	
LIMIT(18)	V97U3043C	DEG	F	S	D	P	G4.88	00	ZFO	DC0599	
N_SBTC	V97U3245C	ND	I	S	D	P	G4.88	00	ZSO	DC0813	

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

TABLE 4.8.2.3-4. SPEEDBRAKE THRUST CONTROLLER FDIR (G4.88) 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 4.8.2.3-5. SPEEDBRAKE THRUST CONTROLLER FDIR (G4.88) 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.

4.8.3 RPTA FDIR (PF 4.89)

The rudder pedal transducer assembly (RPTA) outputs triply-redundant signals from each crew station. The RPTA FDIR will be handled as a dual set of triply-redundant sensors. The FDIR will operate on both left- and right- side RPTA data simultaneously. The candidate elements for FDIR will be those currently selected as data candidates for the selection filter. FDIR for a redundant set of two or three elements will be as described in paragraph 4.0.2 (without BITE).

4.8.3.1 Functional Requirements.

The limits for the RPTA differencing test are I-loads (see paragraph 4.8.3.3).

4.8.3.2 Processing Requirements.

RPTA FDIR shall be processed at the rates indicated in Table 4.0-2 during the entry phase (OPS 3) and RTLS (MM602 and 603).

4.8.3.3 Parameter Tables for RPTA FDIR.

The IDD inputs and outputs are listed in Tables 4.8.3.3-1 and 4.8.3.3-2 respectively. Values for the I-loads are contained in the I-load requirements document (JSC-19350); however, I-load definitions applicable to this principal function are listed in Table 4.8.3.3-3. There are no K-load or constants requirements for RPTA FDIR.

TABLE 4.8.3.3-1. INPUT FUNCTIONAL PARAMETERS FOR RUDDER PEDAL TRANSDUCER ASSEMBLY FDIR (G4.89)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
DRCC(1)	V72K1530C	LEFT RUDDER PEDAL CMD-A	RPTA 1	VDC	AMB		93017G	*
DRCC(2)	V72K1531C	LEFT RUDDER PEDAL CMD-B	RPTA 1	VDC	AMB		93017G	*
DRCC(3)	V72K1532C	LEFT RUDDER PEDAL CMD-C	RPTA 1	VDC	AMB		93017G	*
DRCP(1)	V72K1540C	RIGHT RUDDER PEDAL CMD-A	RPTA 2	VDC	AMB		93017G	*
DRCP(2)	V72K1541C	RIGHT RUDDER PEDAL CMD-B	RPTA 2	VDC	AMB		93017G	*
DRCP(3)	V72K1542C	RIGHT RUDDER PEDAL CMD C	RPTA 2	VDC	AMB		93017G	*
LRPTA_CF(1)	V91X6700X	LH RPTA CMD A COMMFault	FCOS		BD			
LRPTA_CF(2)	V91X6701X	LH RPTA CMD B COMMFault	FCOS		BD			
LRPTA_CF(3)	V91X6702X	LH RPTA CMD C COMMFault	FCOS		BD			
RRPTA_CF(1)	V91X6750X	RH RPTA CMD A COMMFault	FCOS		BD			
RRPTA_CF(2)	V91X6751X	RH RPTA CMD B COMMFault	FCOS		BD			
RRPTA_CF(3)	V91X6752X	RH RPTA CMD C COMMFault	FCOS		BD			
	V93X4221X	LH RPTA 1 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4223X	LH RPTA 2 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4225X	LH RPTA 3 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4251X	RH RPTA 1 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4253X	RH RPTA 2 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4255X	RH RPTA 3 DES CMD	RM/CNTLR DISP		BD		93017G	*

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

TABLE 4.8.3.3-2. OUTPUT FUNCTIONAL PARAMETERS FROM RUDDER PEDAL TRANSDUCER ASSEMBLY FDIR (G4.89)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90M2890P	CGRB_STATUS_1\$(8:)	DL FMT 23/1				93017G	*
	V90M2891P	CGRB_STATUS_1\$(10:)	DL FMT 23/1				93017G	*
	V90U4400C	LEFT RPTA CMD SF COMMAND	SF					
	V90U4500C	RIGHT RPTA CMD SF COMMAND	SF					
	V90X4403X	LEFT RPTA CMD DISAGREE	DL FMT 23/1		BD		93017G	*
	V90X4405X	LEFT RPTA CMD 1 FAIL	DL FMT 23/1		BD		93017G	*
	V90X4406X	LEFT RPTA CMD 2 FAIL	DL FMT 23/1		BD		93017G	*
	V90X4407X	LEFT RPTA CMD 3 FAIL	DL FMT 23/1		BD		93017G	*
	V90X4503X	RIGHT RPTA CMD DISAGREE	DL FMT 23/1		BD		93017G	*
	V90X4505X	RIGHT RPTA CMD 1 FAIL	DL FMT 23/1		BD		93017G	*
	V90X4506X	RIGHT RPTA CMD 2 FAIL	DL FMT 23/1		BD		93017G	*
	V90X4507X	RIGHT RPTA CMD 3 FAIL	DL FMT 23/1		BD		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 4.8.3.3-3. RUDDER PEDAL TRANSDUCER ASSEMBLY FDIR (G4.89) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
LIMIT(19)	V97U3044C	DEG	F	S	D	P	G4.89	00	ZFO	DC0599	
LIMIT(20)	V97U3045C	DEG	F	S	D	P	G4.89	00	ZFO	DC0599	
N_RPTA	V97U3242C	ND	I	S	D	P	G4.89	00	ZSO	DC0813	

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

TABLE 4.8.3.3-4. RUDDER PEDAL TRANSDUCER ASSEMBLY FDIR (G4.89) 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 4.8.3.3-5. RUDDER PEDAL TRANSDUCER ASSEMBLY FDIR (G4.89) 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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4.9 RCS RM PROCESSING (PF 4.91)

RCS RM performs fault detection, identification, and reconfiguration of the reaction control subsystem (RCS) jets.

The following subparagraphs contain the detailed requirements and formulations for these functions.

4.9.1 RCS RM Functional Requirements

Figure 4.9-1 is an overall functional block diagram of the RCS RM function and its interface.

The RCS RM function consists of seven functional modules:

1. AVAILABLE JET STATUS TABLE
2. JET-FAILED-OFF MONITOR
3. JET-FAILED-ON MONITOR
4. JET-LEAK MONITOR
5. MANIFOLD STATUS MONITOR
6. JET FAULT LIMIT
7. JET PRIORITY STATUS TABLE

There is no requirement to design software modules on a one-to-one basis with the functional modules so long as the requirements are met. Flags and counters are defined as a means of depicting detail requirements, and are not in any way intended to constrain software design by implying a one-to-one correspondence between these flags and the flags and/or indicators actually utilized in the software implementation.

Commfaults are included in the RCS RM requirements to help prevent the redundant GPC's from moding to dissimilar software, to optimize the number of jets available for use, and to prevent the RCS RM from generating additional alerts (i.e., detected failures) to those FCOS-generated alerts associated with commfaults. To this end, RCS RM has special requirements involving the characteristics of commfaults (LRU-CF's) and BCE bypass discrettes and their interrelationship. These characteristics (which are currently Level A requirements) will be described here to help ensure proper mechanization of requirements.

1. Whenever the FCOS detects a problem with an I/O transaction, the FCOS will set a commfault for every BCE element involved in that transaction.
2. When an I/O problem persists for two or more consecutive cycles, FCOS will attempt to isolate and bypass the problem element. An isolated element will have its BCE bypass discrete set and be dropped from subsequent I/O transactions.

3. On the first cycle when no more I/O problems are present, the commfaults for the good elements will be reset.
4. An element will experience a transient commfault if its commfault flag is set for one or more passes, but its bypass is not set. The commfault is reset automatically when the I/O problem stops or the problem element is bypassed.
5. BCE bypass discrettes will be reset when a manual (e.g., I/O reset) or automatic (e.g., OPS transitions) reset of the I/O path is invoked.

Whenever applicable, RCS RM will reconfigure for commfault regardless of whether the commfault is permanent, permanent and subsequently removed, or transient. Note, that for the latter two cases the RCS RM will reconfigure twice (once on setting the commfault and once again on clearing the commfault).

It is required that all signal inputs to RCS RM (on a given flight-critical data path) are all in the same BCE. That is to say, it is required that all input signals associated with any one jet and its associated manifold be within the same BCE. It is also required that a BCE indication (flag) be set for a BCE if the FCOS determines an I/O problem at the BCE level. This flag will be used by the RCS RM in determining the commfault state of an RCS LRU and/or input signal for an RCS LRU. The input signals associated with each RCS engine are chamber pressure discrete, fuel and oxidizer injector temperatures, and jet commanded feedback; the input signals for each manifold are the open and close discrettes for the fuel and oxidizer manifold isolation valves.

With respect to this requirement, two liberties will be taken in this write-up for convenience in presenting requirements related to commfaults:

1. For the text, the requirements hereunder imply that there are separate LRU-CF flags for each LRU (i.e., 44 jet LRU-CF's and 15 manifold LRU-CF's), each LRU-CF flag having been set if its associated BCE has had an I/O problem.
2. For I/O tables, a separate commfault flag for each input signal shall be documented, again each of these separate input signal commfault flags having been set if its associated BCE has had an I/O problem. This has been done for completeness in the IDD tables and for consistency with other sections of the RM FSSR.

4.9.1.1 AVAILABLE JET STATUS TABLE Functional Requirements.

This paragraph defines the detailed software requirements for the AVAILABLE JET STATUS TABLE module.

4.9.1.1.1 Control Requirements.

The AVAILABLE JET STATUS TABLE module shall be dispatched at the rates indicated in the major modes specified in paragraph 4.9.2.

4.9.1.1.2 Input Data.

The following list of input signals constitutes the input interface requirements for the AVAILABLE JET STATUS TABLE module:

1. MANIFOLD OPEN/CLOSE STATUS discretes (15)
2. JET DESELECT discretes (44)

The MANIFOLD OPEN/CLOSE STATUS discretes are output by the MANIFOLD STATUS monitor. The JET DESELECT discretes are output by the JET FAULT LIMIT module (refer to paragraph 4.9.1.6). Detailed input requirements for this module are specified in the interface requirement tables listed under paragraph 4.9.3.

4.9.1.1.3 Process Description.

The AVAILABLE JET STATUS TABLE module provides a list of jets available for use by the flight control subsystem.

A jet shall be statused as available if its associated JET DESELECT discrete indicates SELECT and if its associated MANIFOLD OPEN/CLOSE STATUS discrete indicates OPEN.

Mapping each manifold into its associated jets is required to determine which jets are affected by the opening or closing of any particular manifold. Table 4.9–1 provides the necessary mapping information.

If there has been any change in jet status since the last time the AVAILABLE JET STATUS TABLE was computed, then the JET STATUS CHANGE discrete shall be set true. This allows a reduction in CPU utilization since FCS need only examine the entire table when this discrete is set true.

4.9.1.1.4 Output Data.

1. JET AVAILABLE discretes (44)
2. JET STATUS CHANGE discretes (1)

A JET AVAILABLE discrete shall be output by the AVAILABLE JET STATUS TABLE module to the DAP for each jet and to GAX for each vernier jet which meets the availability requirements given in paragraph 4.9.1.1.3. A FORWARD YAW JET AVAILABLE discrete shall also be output by the AVAILABLE JET STATUS TABLE to the PTI driver for each forward yaw jet which meets the availability requirements given in paragraph 4.9.1.1.3. Also, select JET AVAILABLE discretes shall be output by the AVAILABLE JET STATUS TABLE to the RCS command SOP's for each of these select jets which meets the availability requirements given in paragraph 4.9.1.1.3.

A JET STATUS CHANGE discrete shall be output by the AVAILABLE JET STATUS TABLE module to the DAP if there has been any change in jet availability status since the last time the AVAILABLE JET STATUS table was computed. This discrete shall be reset by the user (FCS) whenever it uses this signal. Detailed I/O requirements for these output signals are presented in paragraph 4.9.4.

Table 4.9-1. MDM/Manifold/Jet Association		
MDM	Manifold	JETS
FA1	Aft 1 left	L1A, L1L, L1U
FA3	Aft 2 left	L2L, L2U, L2D
FA2	Aft 3 left	L3A, L3L, L3D
FA4	Aft 4 left	L4L, L4U, L4D
FA1	Aft 5 left	L5D, L5L
FA1	Aft 1 right	R1A, R1R, R1U
FA3	Aft 2 right	R2R, R2U, R2D
FA2	Aft 3 right	R3A, R3R, R3D
FA4	Aft 4 right	R4R, R4U, R4D
FA2	Aft 5 right	R5D, R5R
FF1	Fwd 1	F1F, F1L, F1U, F1D
FF2	Fwd 2	F2F, F2R, F2U, F2D
FF4	Fwd 3	F3F, F3L, F3U, F3D
FF3	Fwd 4	F4R, F4D
FF3	Fwd 5	F5L, F5R

4.9.1.1.5 Constraints and Assumptions.

None.

4.9.1.2 JET-FAILED-OFF-MONITOR.

This paragraph defines the detailed software requirements for the JET-FAILED-OFF-MONITOR.

4.9.1.2.1 Control Requirements.

1. The JET-FAILED-OFF-MONITOR module shall be dispatched at a 12.5-Hz rate in the major modes specified in paragraph 4.9.2.
2. The JET-FAILED-OFF-MONITOR module and the DAP functions shall not be dispatched in the same 40-millisecond minor cycle (i.e., 25-Hz period).

4.9.1.2.2 Input Data.

The following list of input signals constitute the input interface requirement for the JET-FAILED-OFF-MONITOR module.

1. JET FIRE COMMAND B discrettes (44).
2. JET CHAMBER PRESSURE discrettes (44).
3. JET DES INHIBIT discrettes (44).
4. JET LRU-COMMFAULT discrettes (44).
5. JET RESET discrete (1).

The JET FIRE COMMAND B discrettes are output by the various RCS command SOP's, the JET CHAMBER PRESSURE discrettes are provided by the reaction jet drivers (RJD), the JET DES INHIBIT discrettes and the JET_RESET discrete come from the RCS SPEC FUNCTION, and the JET LRU COMMFAULT discrettes are output by FCOS.

Detailed input requirements for this module are specified in paragraph 4.9.4, interface requirements.

4.9.1.2.3 Process Description.

The JET-FAILED-OFF-MONITOR will use the JET FIRE COMMAND B discrettes provided by the RCS COMMAND SOP and the JET CHAMBER PRESSURE feedback discrettes provided by the RJD's to detect and isolate jets failed off. JET-FAILED-OFF status will be computed on an individual jet basis by ANDing the JET FIRE COMMAND B with the complement of the JET CHAMBER PRESSURE feedback discrete (P_c), i.e.:

$$\text{JET-FAILED-OFF} = \overline{P_c} \text{ AND (JET FIRE CMD B)}$$

Where the JET CHAMBER PRESSURE discrete (P_c) is sampled during the present minor cycle and is compared to the JET FIRE CMD B, which was output during the third 40-millisecond minor cycle prior to the present (this allows $\cong 105$ milliseconds for the chamber pressure to reach threshold).

If a jet is commanded to fire and if its associated JET CHAMBER PRESSURE feedback discrete does not indicate that the jet has fired as defined, and if this condition exists for an I-loaded number of consecutive passes (maximum = 6), then the jet shall be declared failed off, and JET-FAILED-OFF INDICATOR shall be set and latched.

Passes in which commfaults are detected will be excluded from the count of consecutive passes, and passes in which there are no jet fire commands shall be excluded from the count of consecutive passes for the associated jet. However, consecutive passes leading to a fail-off indicator must begin anew if, prior to reaching the predetermined I-load number, the fire command, and its associated pressure, indicates the jet has fired.

A JET-FAILED-OFF INDICATOR and the associated JET-FAILED-OFF COUNTER will be reset whenever the jet's associated inhibit discrete transitions from true to false (i.e., from DES INH to not DES INH). Additionally, the JET-FAIL-OFF INDICATOR will be reset upon receipt of the JET RESET discrete if the JET DES is not set and the JET-FAILED-OFF COUNTER will be reset upon receipt of the JET RESET discrete.

A jet with an LRU commfault will not have its FAIL-OFF status nor FAIL OFF counters modified as long as the commfaults exist, except by subsequent crew action (with the JET DES INHIBIT flag or the JET RESET).

All calculations that use data that are subject to commfault variations will be made insensitive to such data variations when FCOS-generated commfault indications (MDM and BCE) are present.

4.9.1.2.4 Output Data.

JET-FAILED-OFF INDICATORS (44) shall be output by the JET-FAILED-OFF MONITOR module to the JET FAULT LIMIT module and to the crew displays.

Detailed I/O requirements for these output signals are specified in paragraph 4.9.4, interface requirements.

4.9.1.2.5 Constraints and Assumptions.

The FCS SOP is designed to be compatible with a minimum jet fire pulse width of 80 milliseconds on and 80 milliseconds off. This then makes the JET-FAILED-OFF MONITOR design valid for a minimum jet fire command pulse mode of 80 milliseconds on and 80 milliseconds off.

4.9.1.3 JET-FAILED-ON MONITOR Functional Requirements.

This paragraph defines the detailed software requirements for the JET-FAILED-ON MONITOR.

4.9.1.3.1 Control Requirements.

The JET-FAILED-ON MONITOR module will be dispatched at the rates indicated in the major modes specified in paragraph 4.9.2.

The JET-FAILED-ON MONITOR module and the DAP functions shall not be dispatched in the same 40-millisecond minor cycle.

4.9.1.3.2 Input Data.

The following list of input signals constitutes the input interface requirement for the JET-FAILED-ON MONITOR module:

1. JET (FIRE) COMMAND B discrettes (44)
2. RJD OUTPUT discrettes (44)
3. JET DES INHIBIT discrettes (44)

4. JET-LRU-COMMFAULT discretetes (44)
5. JET RESET discrete (1)
6. AUTO_MANF_CLOSE discrete (1)
7. AUTO_MANF_CL_ENA discrete (1)

The JET FIRE COMMAND B discretetes are output by the RCS CMD SOP, the REACTION JET DRIVER (RJD) OUTPUT discretetes are output by the RJD, the JET DES INHIBIT discretetes and JET RESET discrete come from the RCS SPEC FUNCTION, the AUTO_MANF_CLOSE discrete is output by the ORBIT DAP, and the JET LRU COMMFAULT discretetes are output by the FCOS. The AUTO_MANF_CL_ENA discrete is output by the RCS display (SPEC 23).

Detailed input requirements for this module are specified under paragraph 4.9.4, interface requirements.

4.9.1.3.3 Process Description.

The JET-FAILED-ON MONITOR shall use the RJD OUTPUT discretetes and the JET FIRE COMMAND B discretetes provided by the RCS CMD SOP to detect and isolate the jets failed on.

JET-FAILED-ON status shall be computed on an individual jet basis by ANDing the RJD output with the complement of the JET FIRE COMMAND, i.e., $JET\ FAILED\ ON = (RJD\ OUTPUT)\ \underline{AND}\ (\overline{JET\ FIRE\ CMD\ B})$, where the RJD OUTPUT is sampled on the FAIL-ON MONITOR'S computation cycle and the JET FIRE COMMAND is computed by the DAP in the 40 milliseconds minor cycle preceding the FAIL-ON MONITOR'S computation cycle.

If a jet is not commanded to fire by the RCS CMD SOP and if the RJD OUTPUT discrete indicates that this jet should be firing, and if this condition exists for an I-loaded number of consecutive passes (maximum = 6), then this jet will be declared failed ON, and a JET-FAILED-ON INDICATOR will be set and latched.

During OPS 2 and 8, if AUTO_MANF_CL_ENA is ON and a JET-FAILED-ON INDICATOR is set and the JET-FAILED-ON INDICATOR for that jet was not previously set then:

- a) issue the associated RCS manifold isolation valve close command
- b) set the AUTO_MANF_CLOSE discrete to ON
- c) In OPS 2 or 8, terminate all manifold close commands at least 1.50 seconds and no more than 2.0 seconds after the most recent close command is issued. If a manifold close command is present during a transition to OPS 3, terminate all manifold close commands at least 1.50 seconds and no more than 7.0 seconds after the most recent close command is issued.

Note: The 2.0 or 7.0 second upper limit does not include any time spent during an OPS transition.

AUTO_MANF_CL_ENA is initialized to the value of the K-load (AUTO_MANF_CL_ENA_INIT). The AUTO_MANF_CL_ENA flag may be toggled (from ON to OFF or from OFF to ON) via an item entry on SPEC 23. If AUTO_MANF_CL_ENA is ON, then the automatic RCS manifold isolation valve closure

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logic is enabled. If AUTO_MANF_CL_ENA is OFF, then the automatic RCS manifold isolation valve closure logic is disabled. The setting of the AUTO_MANF_CL_ENA discrete does not impact jet fail-on fault detection and annunciation.

Table 4.9-7 shows the mapping from the JET-FAILED-ON-INDICATOR to the manifold close commands.

The AUTO_MANF_CLOSE discrete is used by the Orbit DAP (PF 4.35) to mode the DAP to FREE drift. The AUTO_MANF_CLOSE discrete is reset by the Orbit DAP.

Passes in which commfaults are detected will be excluded from the count of consecutive passes, and passes in which there are jet fire commands shall be excluded from the count of consecutive passes for the associated jet. However, consecutive passes leading to a FAIL-ON INDICATOR must begin anew if prior to the predetermined I-load number the noncommanded jet has its RJD OUTPUT discrete set indicating the jet is not firing.

The JET-FAILED-ON INDICATOR and the associated JET-FAILED-ON COUNTER will be reset whenever the associated jet's DES INH flag transitions from true to false (i.e., from DES INH to not DES INH). Additionally, the JET-FAILED-ON INDICATOR will be reset upon receipt of the JET RESET discrete if the JET DES is not set and the JET-FAILED-ON COUNTER will be reset upon receipt of the JET RESET discrete.

A jet with an LRU commfault will not have its FAIL-ON STATUS or FAIL-ON COUNTERS modified as long as the commfault exists, except by subsequent crew action (with the JET DES INHIBIT flag or JET RESET). All calculations that use data that are subject to commfault variations will be made insensitive to such data variations when FCOS-generated commfault indications (MDM and BCE) are present.

4.9.1.3.4 Output Data.

JET-FAILED-ON INDICATORS (44) will be output by the JET-FAILED-ON MONITOR module to the crew displays.

The AUTO_MANF_CLOSE discrete will be output to the Orbit DAP (PF 4.35). RCS manifold isolation valve close commands (33) will be output to the Motor Control Assemblies (Primary RCS manifolds) and to the Load Control Assemblies/Power Control Assemblies (Vernier RCS manifolds) during OPS 2 and 8.

The AUTO_MANF_CL_ENA discrete will be output to the RCS display (SPEC 23).

Detailed I/O requirements for these output signals are specified under paragraph 4.9.4.

4.9.1.3.5 Constraints and Assumptions.

This JET-FAILED-ON MONITOR design is valid for a minimum jet fire command pulse mode of 80 milliseconds on and 80 milliseconds off.

For major modes in which the FCS SOP's do not run, but the JET-FAILED-ON MONITOR does, the JET FIRE COMMAND B for each jet will be set to the not commanded-to-fire state.

4.9.1.4 JET-LEAK MONITOR Functional Requirements.

This paragraph defines the detailed software requirements for the JET-LEAK MONITOR.

4.9.1.4.1 Control Requirements.

The JET-LEAK MONITOR module will be dispatched at a 0.52-Hz rate in the major modes specified in paragraph 4.9.2.

4.9.1.4.2 Input Data.

The following list of input signals constitutes the input interface requirement for the JET-LEAK MONITOR module:

1. JET FUEL INJECTOR TEMPERATURES (44)
2. JET OXIDIZER INJECTOR TEMPERATURES (44)
3. JET DES INHIBIT discretes (44)
4. JET-LRU-COMMFAULT discrete (44)
5. JET RESET discretes (1)

The JET FUEL and OXIDIZER INJECTOR temperatures are output by the JET FUEL and OXIDIZER INJECTOR TEMPERATURE transducers, the JET DES INHIBIT discretes and JET RESET discrete come from the RCS SPEC FUNCTION, and the JET-LRU-COMMFAULT discretes are output by the FCOS.

Detailed input requirements for this module are specified in paragraph 4.9.4, interface requirements.

4.9.1.4.3 Process Description.

The JET-LEAK MONITOR shall use the JET FUEL and OXIDIZER INJECTOR TEMPERATURE transducer outputs of each jet to detect and isolate a leaking jet.

JET LEAK STATUS for the Primary jets will be computed on an individual jet basis by comparing the JET FUEL INJECTOR temperature measurement and the JET OXIDIZER INJECTOR temperature measurement with specified temperature limits, i.e.:

$$\text{JET-FAILED-LEAK} = (\text{FUEL INJ TEMP}) < \text{RCS_FU_LEAK_TEMP_LT}$$
$$\text{OR } (\text{OXIDIZER INJ TEMP}) < \text{RCS_OX_LEAK_TEMP_LT}$$

where RCS_FU_LEAK_TEMP_LT and RCS_OX_LEAK_TEMP_LT are both I-Loaded values.

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JET LEAK STATUS for the Vernier jets will be computed on an individual jet basis by comparing the Vernier JET FUEL INJECTOR temperature measurement and the Vernier JET OXIDIZER INJECTOR temperature measurement with specified temperature limits per POD, i.e.:

JET-FAILED-LEAK (F5L, F5R) = (Vernier FUEL INJ TEMP) < FVRCS_FU_LEAK_TEMP_LT
OR (Vernier OXIDIZER INJ TEMP) < FVRCS_OX_LEAK_TEMP_LT

or

JET-FAILED-LEAK (L5L, L5D) = (Vernier FUEL INJ TEMP) < LVRCS_FU_LEAK_TEMP_LT
OR (Vernier OXIDIZER INJ TEMP) < LVRCS_OX_LEAK_TEMP_LT

or

JET-FAILED-LEAK (R5R, R5D) = (Vernier FUEL INJ TEMP) < RVRCS_FU_LEAK_TEMP_LT
OR (Vernier OXIDIZER INJ TEMP) < RVRCS_OX_LEAK_TEMP_LT

During OPS 1, 3, and 6 and prior to Vernier jet selection during orbit OPS, the pod-specific Vernier leak detection limits shall be the ascent/entry values:

FVRCS_FU_LEAK_TEMP_LT = FVRCS_FU_LEAK_TEMP_LT_AE
FVRCS_OX_LEAK_TEMP_LT = FVRCS_OX_LEAK_TEMP_LT_AE
LVRCS_FU_LEAK_TEMP_LT = LVRCS_FU_LEAK_TEMP_LT_AE
LVRCS_OX_LEAK_TEMP_LT = LVRCS_OX_LEAK_TEMP_LT_AE
RVRCS_FU_LEAK_TEMP_LT = RVRCS_FU_LEAK_TEMP_LT_AE
RVRCS_OX_LEAK_TEMP_LT = RVRCS_OX_LEAK_TEMP_LT_AE

During OPS 2 and 8, the first crew selection of Vernier mode operation (i.e., V72X2856X = 1) after an OPS transition from OPS 1 or 3 shall cause the above pod-specific Vernier leak detection limits to be updated to the corresponding orbit values. Transition from OPS 2 or 8 to OPS 3 shall reset the Vernier leak limits to the ascent/entry values. The current limit values shall carry across transitions between OPS 2 and 8.

FVRCS_FU_LEAK_TEMP_LT = FVRCS_FU_LEAK_TEMP_LT_ORB
FVRCS_OX_LEAK_TEMP_LT = FVRCS_OX_LEAK_TEMP_LT_ORB
LVRCS_FU_LEAK_TEMP_LT = LVRCS_FU_LEAK_TEMP_LT_ORB
LVRCS_OX_LEAK_TEMP_LT = LVRCS_OX_LEAK_TEMP_LT_ORB
RVRCS_FU_LEAK_TEMP_LT = RVRCS_FU_LEAK_TEMP_LT_ORB
RVRCS_OX_LEAK_TEMP_LT = RVRCS_OX_LEAK_TEMP_LT_ORB

If a JET-FAILED-LEAK condition exists, as determined by either the JET FUEL TEMPERATURE or the JET OXIDIZER TEMPERATURE or both, for an I-Loaded number of consecutive passes (maximum = 6) for any particular jet, then this jet shall be declared failed leaking, and a JET-FAILED-LEAK INDICATOR shall be set and latched.

Passes in which commfaults are detected will be excluded from the count of consecutive passes for the associated jet. However, consecutive passes leading to a failed-leak indicator must begin anew if prior to reaching the predetermined I-load number, the fuel and oxidizer injector temperatures are both greater than the I-load temperature limit values.

A JET-FAILED-LEAK INDICATOR and the associated JET-FAILED-LEAK COUNTER shall be reset whenever the associated JET DES INHIBIT flag transitions from true to false (i.e., from DES INHIBIT to not DES INHIBIT). Additionally, the JET-FAILED-LEAK INDICATOR will be reset upon receipt of the JET RESET discrete if the JET DES is not set, and the JET-FAILED-LEAK COUNTER will be reset upon receipt of the JET RESET discrete.

A jet with an LRU commfault shall not have its fail-leaking status or fail-leaking counters modified as long as the commfault exists, except by subsequent crew action (through the JET DES INHIBIT flag or JET RESET).

All calculations that use data subject to commfault variations shall be made insensitive to such data variations when FCOS-generated commfault indications (MDM and BCE) are present.

4.9.1.4.4 Output Data.

JET-FAILED LEAK indicators (44) shall be output by the JET-LEAK MONITOR module to the JET FAULT LIMIT MODULE and to the crew displays.

Detailed I/O requirements for these output signals are specified in paragraph 4.9.4, interface requirements.

4.9.1.4.5 Constraints and Assumptions.

None.

4.9.1.5 MANIFOLD STATUS MONITOR Functional Requirements.

This paragraph defines detailed software requirements for the MANIFOLD STATUS MONITOR.

4.9.1.5.1 Control Requirements.

The MANIFOLD STATUS MONITOR will be dispatched at a 3.125-Hz rate in the major modes specified in paragraph 4.9.2.

4.9.1.5.2 Input Data.

The following list of input signals constitutes the input interface requirements for the MANIFOLD STATUS MODULE:

1. FUEL-MANIFOLD-VALVE-OPEN discrettes (15)
2. OXIDIZER-MANIFOLD-VALVE-OPEN discrettes (15)
3. FUEL-MANIFOLD-VALVE-CLOSE discrettes (15)

4. OXIDIZER–MANIFOLD–VALVE–CLOSE discretes (15)
5. RCS MANIFOLD OPEN/CLOSE STATUS OVERRIDE discrete (1)
6. RCS MANIFOLD XX OPEN/CLOSE STATUS OVERRIDE discretes (15)
7. MANIFOLD LRU COMMFAULT discretes (15)
8. LRU BCE BYPASS discretes (8)

The FUEL/OXIDIZER MANIFOLD VALVE OPEN/CLOSE discretes are outputs of the motor control assemblies; the RCS MANIFOLD OPEN/CLOSE STATUS OVERRIDE discrete comes from the override display; the 15 RCS MANIFOLD XX OPEN/CLOSE STATUS OVERRIDE discretes come from the RCS SPEC FUNCTION, the MANIFOLD LRU COMMFAULT, and BCE BYPASS discretes are output by the FCOS.

Detailed input requirements for this module are specified in paragraph 4.9.4, interface requirements.

4.9.1.5.3 Process Requirements.

The MANIFOLD STATUS MONITOR will use the open and close discretes of the oxidizer and fuel manifold isolation valves (provided by the motor control assembly(s)) to determine the open/close status for each jet manifold.

The MANIFOLD STATUS MONITOR MODULE will, for each manifold, monitor the four associated open and close discretes for any change of state with respect to their status during the previous pass. A change of state in any one or more of the four discretes or an LRU BCE bypass being reset will cause redetermination of the open/close status for that manifold. Note that this redetermination of status is independent of any previous status change by the crew. If no discrete changes state, then the manifold status from the previous pass will be maintained unless the status is changed by the crew which includes I/O resets.

When it is necessary to redetermine a manifold's status, all four of its open and close discretes will be considered. In some cases, it will also be necessary to consider the open and close discretes of a companion manifold to establish whether a power failure has been experienced. Table 4.9–2 specifies the status that is required for each logical combination of the four open and close discretes.

A power–failure condition shall exist whenever the open and close discretes of all manifolds in a set are all false. Each manifold set shall have (make) its own power failure indication. Table 4.9–3 identifies the different manifold sets that require power failure determination. Manifolds (forward) not listed in this table do not require power failure determination.

Note that a power failure condition shall be used to establish a manifold's status only when there has been a change in state in the manifold's open/close discretes.

Whenever a power–failure condition on a given manifold set persists for an N number of consecutive cycles (where N is an I–load value), the MANIFOLD STATUS MONITOR shall set an RM POWER FAIL flag. This flag shall remain set until after it has been honored by the GAX, at which time it will be reset. There

is only one RM POWER FAIL flag. All manifold sets will be capable of setting the flag, but each will be allowed to set it only once.

When a power fail condition has occurred and a subsequent commfault condition occurs, the manifold experiencing the commfault shall be subject to the commfault requirements. In a like manner, a power-failed manifold, subsequently overridden by the crew, shall be subject to the override requirements.

The MANIFOLD STATUS MONITOR will, for each manifold, determine whether the four open and close discrettes are in a dilemma state. Whenever a dilemma state exists for an I-load number of consecutive passes, the manifold status module will set and latch an RCS MANIFOLD RM DILEMMA flag for that manifold. The logical combinations for which a dilemma state exists are specified in Table 4.9-2.

The DILEMMA PASS COUNTER and DILEMMA flag shall be reset whenever any of its four open and close discrettes change state or the LRU BCE BYPASS is reset, as described below.

The transition of a LRU BCE BYPASS discrete from false to true will cause the status of all affected manifolds to be set to CLOSE. The manifold status shall be re-determined and the DILEMMA PASS COUNTER and DILEMMA flag reset whenever the LRU BCE BYPASS indicator transitions from true to false and the MANIFOLD LRU COMMFAULT is also false. If the MANIFOLD LRU COMMFAULT indicator is true when the LRU BCE BYPASS is cleared then the manifold status re-determination and dilemma resets will occur when the MANIFOLD LRU COMMFAULT indicator transitions from true to false. This requirement applies to all memory configurations. Mapping of each flight-critical MDM into its associated jet manifold is required to determine which jet manifolds are affected by a particular LRU BCE BYPASS. Table 4.9-1 provides this mapping information.

All calculations that use data subject to commfault variations will be made insensitive to such data variations when FCOS-generated commfault indications are present.

The crew will have the ability to overrule the status of all manifolds on an individual basis via the keyboard-initiated RCS MANFXX OP/CL STATUS OVRD discrete. Whenever the crew inputs an RCS MANFXX OP/CL STATUS OVRD discrete for a particular manifold (i.e., the discrete is set to true), the status for that manifold will be changed to its complementary state, and the discrete will be reset to false. It is noted that invoking the override feature does not inhibit or modify any of the other requirements of the MANIFOLD STATUS MONITOR. That is, this module will continue to honor subsequent changes in the affected manifold's input signals (open/close discrettes, commfaults, override discrete) in accord with the requirements specified herein.

In memory configurations 1 and 3, the crew will have the ability to override some closed statuses via the one keyboard-initiated RCS MANF OP/CL STATUS OVRD discrete. Whenever such a discrete is set true, the MANIFOLD STATUS MODULE will set the status to OPEN of all manifolds whose status is CLOSE and whose input open/close discrettes are in dilemma (RCS MANIFOLD RM DILEMMA FLAG = true). Note that this one keyboard number, while available in memory configurations 1 and 3, will most probably be used only in memory configuration 1. The override discrettes of the above paragraph are available for use in memory configurations 1, 6, 2, 3, and 8.

The MANIFOLD STATUS MONITOR will cause the RCS MANF OP/CL STATUS OVRD discrete to be reset to false after it acts upon the discrete.

It is noted that invoking the close-status override feature does not inhibit or modify any of the other requirements of the MANIFOLD STATUS MONITOR. That is, this module will continue to honor subsequent changes in input signals of all affected manifolds in accord with the requirements specified herein.

4.9.1.5.4 Output Data.

1. MANIFOLD OPEN/CLOSE STATUS discretes (15)
2. RCS MANIFOLD RM DILEMMA discretes (15)
3. RM POWER FAIL discrete (1)

A MANIFOLD OPEN/CLOSE STATUS discrete for each manifold will be output to the JET FAULT LIMIT MODULE, to the crew interface, and to the AVAILABLE JET STATUS TABLE MODULE. The RCS MANIFOLD RM DILEMMA discretes and the RM POWER FAIL discretes are sent to the crew interface.

Detailed input/output requirements for these output signals are specified in paragraph 4.9.4, interface requirements.

4.9.1.5.5 Constraints and Assumptions.

None.

4.9.1.6 Jet Fault Limit Functional Requirements.

This module will apply limits to the number of jets that the RCS RM function may automatically remove from the AVAILABLE JET STATUS TABLE in response to declared failures. The limits are modifiable by crew inputs. This module will also reconfigure a jet's availability status in response to crew inputs (JET DES INHIBITS, JET SELECT/DESELECT, and JET RESET).

This section defines the detailed software requirements for the JET FAULT LIMIT software module.

4.9.1.6.1 Control Requirements.

The jet fault limit module will be dispatched at the rates indicated in the major modes specified in paragraph 4.9.2.

4.9.1.6.2 Input Data.

The following list of input signals constitutes the input interface requirements for the jet fault limit module:

1. JET-FAILED-OFF-INDICATION discretes (44)
2. JET-LEAK-INDICATION discretes (44)
3. JET-DES-INHIBIT discretes (44)

4. JET DESELECT discrettes (44)
5. RCS-LEFT-JET-FAIL-LIMIT integer (1)
6. RCS-RIGHT-JET-FAIL-LIMIT integer (1)
7. RCS-FORWARD-JET-FAIL-LIMIT integer(1)
8. MANIFOLD OPEN/CLOSE statuses (15)
9. JET RESET discrete (1)

The JET-FAILED-OFF-INDICATION and JET-LEAK-INDICATION discrettes are output from the JET-FAILED-OFF MONITOR AND JET-LEAK MONITOR, respectively. The JET DES INHIBIT discrettes, the JET DESELECT discrettes, the JET RESET, and the RCS left, right, and forward JET-FAIL-LIMITS are output from the RCS SPEC FUNCTION. The MANIFOLD OPEN/CLOSE STATUS discrettes are output from the MANIFOLD STATUS MODULE.

4.9.1.6.3 Process Requirements.

On a pod basis (forward, left aft, and right aft jet pods), the JET FAULT LIMIT MODULE (JFLM) shall limit the number of jets that can be automatically deselected in response to failures detected by the RCS RM. Each jet has an individual status flag to indicate whether the jet is selected or deselected (true indicates deselected). The term reselect refers to changing the status of a deselected jet to select.

All jet failures detected by the RCS RM fault detection modules shall be announced to the crew regardless of whether they cause automatic deselections.

Manual Jet Selection. The crew can manually toggle these statuses to either state via the deselect item entries on the RCS SPEC PAGE. There is no limit on the number of jets that may be manually deselected. Jet “reselection” may be accomplished via the jet reset item for any jet which does not have its JET DES discrete set.

Automatic Jet Deselection. The JFLM causes automatic deselection (i.e., sets the deselect/select status flag to true) of jets which are failed-off or failed-leaking under the conditions and requirements specified hereunder. Jets that are declared failed-on shall not be automatically deselected.

Whenever a JET FAILURE discrete exists which is neither inhibited nor overridden, an automatic deselection of the jet will occur, whenever the following three conditions are all satisfied:

1. The status of the jet’s manifold is “open.”
2. The jet’s deselect/select status is “select.”
3. The number of automatic deselections of primary jets (for primary jets only) does not exceed the associated jet-fail limit.

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Jet Fault Limit Counter. In presenting these requirements, it is assumed there is a dedicated counter for each pod that will keep track of the number of jets on that pod that have been automatically deselected. The counter will be incremented by one for each jet that is automatically deselected and it will be decremented by one for each automatically deselected jet that is reselected. The counter will neither be incremented by manually deselected jets nor decremented by reselection of jets that were manually deselected.

It is important to note this counter is to keep track of jets and not jet failures. That is, an individual jet will be allowed to increment (or decrement) the counter by only one, regardless of the number of sequential or simultaneous failures it experiences (i.e., fail OFF and/or fail ON and/or fail LEAK).

At no time will the JFLM automatically deselect more primary jets on a pod than is specified by its JET-FAIL-LIMIT. Any number of vernier jets may be automatically deselected, and these deselections (of vernier jets) will not count toward the JET-FAIL-LIMIT.

The POD-JET-FAULT LIMITS are individually changeable via the jet failure limit item entry on the RCS SPEC page. An increase in the limit(s) will allow automatic deselection of previously failed, but not yet deselected, jets (provided that other requirements are also met). However, a decrease in the limit(s) will cause no change in the status of any jet.

It is noted that the RCS RM can be effectively inhibited by setting the JET-FAIL-LIMITS either equal to or less than the number of jets that have been automatically deselected. The counter will not be decremented by a reduction in the JET-FAIL-LIMIT.

Manual Reselects. A jet's status can be upmoded from "deselect" to "select," but it will be upmoded only through its individual deselect/select item entry on the RCS SPEC PAGE, or the JET RESET, if the JET DES discrete is not set for that jet.

Upmoding to "select" will not occur as a result of any other action (such as a failure reset or a reduction in the POD-JET-FAULT LIMIT).

Failure Overrides. The deselect/select item entries also serve to override failures. "Override" is invoked whenever the crew changes the jet's status from "deselect" to "select" for a failed jet that has been automatically deselected or is a candidate for automatic deselection. The override does not reset the failure(s); it makes the failure(s) nonoperational in the JFLM. The override affects only failures that have been declared prior to the time that the override is invoked; it has no effect on subsequent failures (although these too may be subsequently overridden). It is required that an overridden failure remain overridden until the applicable failure is reset.

JET DES Inhibit. The crew can prevent automatic deselection of each individual jet via the inhibit item entries on the RCS SPEC page. The JFLM will ignore all failures on a jet that are declared whenever its inhibit discrete is set "TRUE." Failures declared prior to setting the inhibit are not affected by the true state of the inhibit discrete.

Failure Resets/Failures Beyond the Limit. The crew can also reset a jet's failures by changing its inhibit discrete to "false" (i.e., "not inhibited" or by the JET RESET function if the JET DES is not set; refer to the fault detection modules for details). The reset of a failure via the DES INHIBIT function that caused automatic deselection will neither upmode the jet's status nor decrement the automatic deselect counter. The reset of a failure that has been overridden will reset (remove) the override. A jet that is a candidate for automatic deselection will become a noncandidate when its failure(s) are reset. (The fault detection module must declare a subsequent failure before the jet can again become a candidate for automatic deselection.) "Candidate," in this case, refers to a jet that has experienced a failure, but that has not been automatically deselected because its manifold was closed or the number of automatic deselection had already reached the POD-JET-FAULT LIMIT.

There is no requirement to order jet failures in any fashion. That is if there are more candidates for automatic deselection than permitted by this POD-JET-FAULT LIMIT, there is no preference as to which of the candidates should be deselected.

4.9.1.6.4 Output Data.

JET DESELECT discrettes for each of the 44 jets will be output from the JFLM. These discrettes are made available to the RCS SPEC FUNCTION and to the AVAILABLE JET STATUS TABLE MODULE.

4.9.1.6.5 Constraints and Assumptions.

None.

4.9.1.7 JET PRIORITY STATUS TABLE Functional Requirements.

This paragraph defines the detailed software requirements for the JET PRIORITY STATUS TABLE module.

4.9.1.7.1 Control Requirements.

The JET PRIORITY STATUS TABLE module shall be dispatched at a 12.5-Hz rate in the major modes specified in paragraph 4.9.2.

4.9.1.7.2 Input Data.

The following input signal constitutes the input interface requirements of the JET PRIORITY STATUS TABLE module:

1. JET DES inhibit discrettes (44)

4.9.1.7.3 Process Description.

The JET PRIORITY STATUS TABLE module provides a list of the RCS jets arranged in the order of priority as determined most desirable by original I-loading or as modified by manual inputs.

JET PRIORITY shall be initialized in OPS 9 via I-load parameter JET MAP. JET_MAP format is shown in Table 4.9-4. Table 4.9-5 presents additional information on RCS jet grouping. Thereafter, JET

PRIORITY within its group shall respond to the DES INHIBIT INPUT discretes such that when the discrete goes from “not set” to “set,” the corresponding jet will be put into the last position (lowest priority) within its group, and each jet which was previously located in a lower priority within that group will be incremented by one to a higher priority, thereby establishing a new priority list for that group.

If there has been a change in jet priority since the last time the JET PRIORITY STATUS TABLE was computed, then the JET STATUS CHANGE discrete shall be set true.

Transition of the DES INHIBIT discrete from the “set” to the “not set” state will not affect the JET PRIORITY STATUS TABLE.

4.9.1.7.4 Output Data.

1. JET PRIORITY STATUS TABLE (38)
2. JET STATUS CHANGE discrete (1)

The JET PRIORITY STATUS TABLE shall be made available to the FCS DAP’s and to the crew displays to reflect current priority within each jet group as established by the requirements of paragraph 4.9.1.7.3.

A JET STATUS CHANGE discrete shall be output by the JET PRIORITY STATUS TABLE module to the DAP if there has been any change in jet priority status since the last time the JET PRIORITY STATUS TABLE was computed. This discrete shall be reset by the user (FSC) whenever it uses this signal. Detailed I/O requirements for these output signals are presented in paragraph 4.9.3.

4.9.1.7.5 Constraints and Assumptions.

None.

4.9.2 Processing Requirements

The processing requirements for the RCS RM principal function are given in Table 4.9–6.

4.9.3 Initialization Requirements

1. Upon initial entry into OPS 1:
 - a. All jets will be initialized selected.
 - b. The jet inhibit discretes for each jet will be initialized to the enable state.
 - c. All failure statuses will be set to the nonfailed state, and all failure counters and fault–limit counters (not fault–limit values) will be reset to zero.
 - d. The flag (AUTO_MANF_CL_ENA) to enable/disable the logic for the automatic RCS manifold isolation valve closure (active only in OPS 2 and 8) will be initialized to a K-load (AUTO_MANF_CL_ENA_INIT) value.

2. The AUTO_MANF_CLOSE discrete will be initialized to OFF.
3. Upon transition into a different OPS, all statuses, availability tables, failures, and counters will be initialized to the status/state last established in the OPS that is being left.

4.9.4 Parameter Tables for RCS RM

The IDD inputs and outputs are listed in Tables 4.9.4-1 and 4.9.4-2 respectively. Values for the I-loads are contained in the I-load requirements document (JSC-19350); however, I-load definitions applicable to this principal function are listed in Table 4.9.4-3. K-loads are listed in Table 4.9.4-4. There are no RCS RM requirements for constants.

Table 4.9-2. Required Manifold Status						
Logical State						RCS Manifold
Input Discretes						
Open		Close				Power Failure
Fuel	Ox	Fuel	Ox			
0	0	0	0	Yes	(Previous) ¹	No ²
0	0	0	0	No	Close	Yes
0	0	0	1	N/A	Close	No
0	0	1	0	N/A	Close	No
0	0	1	1	N/A	Close	No
0	1	0	0	N/A	Close	Yes
0	1	0	1	N/A	Close	Yes
0	1	1	0	N/A	Close	Yes
0	1	1	1	N/A	Close	No
1	0	0	0	N/A	Close	Yes
1	0	0	1	N/A	Close	Yes
1	0	1	0	N/A	Close	Yes
1	0	1	1	N/A	Close	No
1	1	0	0	N/A	Open	No
1	1	0	1	N/A	Open	No
1	1	1	0	N/A	Open	No
1	1	1	1	N/A	Close	Yes

¹ The manifold status from the previous pass is to be maintained.

² Except for an all discretes zero dilemma case that occurs prior to a power failure condition.

N/A: Not applicable

Table 4.9-3. Manifold Sets for Power Failure Determination	
	Aft left No. 1 and Aft right No. 1 Aft left No. 2 and Aft right No. 2 Aft left No. 3 and Aft right No. 3 Aft left No. 4 and Aft right No. 4 Aft left No. 5 and Aft right No. 5

Table 4.9-4. Jet Priorities			
Jet-Map Elements	Associated Primary RCS Jet Group	Priority of RCS Jet Within Group	I-Load MSID
1	1	1	V97U2677C
2	1	2	V97U2678C
3	1	3	V97U2679C
4	2	1	V97U2680C
5	2	2	V97U2681C
6	3	1	V97U2682C
7	3	2	V97U2683C
8	4	1	V97U2684C
9	4	2	V97U2685C
10	4	3	V97U2686C
11	5	1	V97U2687C
12	5	2	V97U2688C
13	6	1	V97U2689C
14	6	2	V97U2690C
15	7	1	V97U2691C
16	7	2	V97U2692C
17	8	1	V97U2693C
18	8	2	V97U2694C
19	9	1	V97U2695C
20	9	2	V97U2696C
21	9	3	V97U2697C
22	9	4	V97U2698C
23	10	1	V97U2699C
24	10	2	V97U2700C
25	10	3	V97U2701C
26	10	4	V97U2702C
27	11	1	V97U2703C
28	11	2	V97U2704C
29	11	3	V97U2705C

Jet-Map Elements	Associated Primary RCS Jet Group	Priority of RCS Jet Within Group	I-Load MSID
30	12	1	V97U2706C
31	12	2	V97U2707C
32	12	3	V97U2708C
33	13	1	V97U2709C
34	13	2	V97U2710C
35	13	3	V97U2711C
36	14	1	V97U2712C
37	14	2	V97U2713C
38	14	3	V97U2714C

RCS RM Output MSID	JET_MAP_ELEMENT	Jet Group	Priority of RCS Jet Within Group	Principal Thrust Direction	Associated JET_MAP_ELEMENT Values (Each MSID in a Group Will Have one of These Values, Mapping That MSID To a Particular Jet)
V90J5727C	1	1*	1	-X	1(F1F), 5(F2F), 13(F3F)
V90J5728C	2		2		
V90J5729C	3		3		
V90J5730C	4	2	1	+Y	2(F1L), 14(F3L)
V90J5731C	5		2		
V90J5732C	6	3	1	-Y	6(F2R), 9(F4R)
V90J5733C	7		2		
V90J5734C	8	4	1	+Z	3(F1U), 7(F2U), 15(F3U)
V90J5735C	9		2		
V90J5736C	10		3		
V90J5737C	11	5	1	-Z	8(F2D), 10(F4D)
V90J5738C	12		2		
V90J5739C	13	6	1	-Z	4(F1D), 16(F3D)
V90J5740C	14		2		
V90J5741C	15	7*	1	+X	4(R1A), 12(R3A)
V90J5742C	16		2		
V90J5743C	17	8*	1	+X	1(L1A), 9(L3A)
V90J5744C	18		2		
V90J5745C	19	9	1	+Y	2(L1L), 17(L2L), 10(L3L), 23(L4L)
V90J5746C	20		2		
V90J5747C	21		3		
V90J5748C	22		4		
V90J5749C	23	10	1	-Y	5(R1R), 20(R2R), 13(R3R), 26(R4R)
V90J5750C	24		2		
V90J5751C	25		3		
V90J5752C	26		4		
V90J5753C	27	11	1	+Z	3(L1U), 18(L2U), 24(L4U)
V90J5754C	28		2		

Jet ID	Group	Count	Priority	Notes
V90J5755C	29	3		
V90J5756C	30	1	+Z	6(R1U), 21(R2U), 27(R4U)
V90J5757C	31	2		
V90J5758C	32	3		
V90J5759C	33	1	-Z	19(L2D), 11(L3D), 25(L4D)
V90J5760C	34	2		
V90J5761C	35	3		
V90J5762C	36	1	-Z	22(R2D), 14(R3D), 28(R4D)
V90J5763C	37	2		
V90J5764C	38	3		

*Note: These jet groups are not used during GRTLS for flight control.

Module	Rate (Hz)				
	MM 101	MM 102-106	OPS-6	OPS-2: GN&C 8	OPS-3
Available jet status table	0.52	12.5	12.5	12.5	12.5
Jet-failed-off monitor	0.0	12.5	12.5	12.5	12.5
Jet-failed-on monitor	0.52	0.52	3.125	12.5	3.125
Jet-leak monitor	0.52	0.52	0.52	0.52	0.52
Manifold status	3.125	3.125	3.125	3.125	3.125
Jet fault limit	0.52	12.5	12.5	12.5	12.5
Jet priority status table	12.5	12.5	12.5	12.5	12.5

JET-FAILED-ON	Manifold Close Commands		
	MSID	Nomenclature	Destination
F1F, F1U, F1D, F1L	V42K1372X	RCS-F MANF ISO VLV 1 CL CMD A	MCA F1 / FF3
	V42K1373X	RCS-F MANF ISO VLV 1 CL CMD B	MCA F1 / FF3
F2F, F2U, F2D, F2R	V42K1374X	RCS-F MANF ISO VLV 2 CL CMD A	MCA F2 / FF4
	V42K1375X	RCS-F MANF ISO VLV 2 CL CMD B	MCA F2 / FF4
F3F, F3U, F3L, F3D	V42K1376X	RCS-F MANF ISO VLV 3 CL CMD A	MCA F3 / FF2
	V42K1377X	RCS-F MANF ISO VLV 3 CL CMD B	MCA F3 / FF2
F4R, F4D	V42K1378X	RCS-F MANF ISO VLV 4 CL CMD A	MCA F3 / FF1
	V42K1379X	RCS-F MANF ISO VLV 4 CL CMD B	MCA F3 / FF1
L1L, L1U, L1A	V42K2372X	RCS-L MANF ISO VLV 1 CL CMD A	MCA A2 / FA2
	V42K2373X	RCS-L MANF ISO VLV 1 CL CMD B	MCA A2 / FA2

Table 4.9-7. Mapping from JET-FAIL-ON Indicators to Manifold Close Commands			
JET-FAILED-ON	Manifold Close Commands		
	MSID	Nomenclature	Destination
L2L, L2U, L2D	V42K2374X	RCS-L MANF ISO VLV 2 CL CMD A	MCA A1 / FA4
	V42K2375X	RCS-L MANF ISO VLV 2 CL CMD B	MCA A1 / FA4
L3L, L3D, L3A	V42K2376X	RCS-L MANF ISO VLV 3 CL CMD A	MCA A3 / FA1
	V42K2377X	RCS-L MANF ISO VLV 3 CL CMD B	MCA A3 / FA1
L4L, L4U, L4D	V42K2378X	RCS-L MANF ISO VLV 4 CL CMD A	MCA A3 / FA3
	V42K2379X	RCS-L MANF ISO VLV 4 CL CMD B	MCA A3 / FA3
R1R, R1U, R1A	V42K3372X	RCS-R MANF ISO VLV 1 CL CMD A	MCA A2 / FA2
	V42K3373X	RCS-R MANF ISO VLV 1 CL CMD B	MCA A2 / FA2
R2R, R2U, R2D	V42K3374X	RCS-R MANF ISO VLV 2 CL CMD A	MCA A1 / FA4
	V42K3375X	RCS-R MANF ISO VLV 2 CL CMD B	MCA A1 / FA4
R3R, R3D, R3A	V42K3376X	RCS-R MANF ISO VLV 3 CL CMD A	MCA A3 / FA1
	V42K3377X	RCS-R MANF ISO VLV 3 CL CMD B	MCA A3 / FA1
R4R, R4U, R4D	V42K3378X	RCS-R MANF ISO VLV 4 CL CMD A	MCA A3 / FA3
	V42K3379X	RCS-R MANF ISO VLV 4 CL CMD B	MCA A3 / FA3
F5L, F5R	V42K1380X	RCS-F MANF ISO VLV 5 CL CMD A	LCA F3 / FF1
	V42K1471X	RCS-F MANF ISO VLV 5 CL CMD B	PCA F3 / FF3
	V42K1481X	RCS-F MANF ISO VLV 5 CL CMD C	PCA F3 / FF2
L5L, L5D	V42K2380X	RCS-L MANF ISO VLV 5 CL CMD A	LCA A3 / FA2
	V42K2471X	RCS-L MANF ISO VLV 5 CL CMD B	PCA A3 / FA3
	V42K2481X	RCS-L MANF ISO VLV 5 CL CMD C	PCA A3 / FA4
R5R, R5D	V42K3380X	RCS-R MANF ISO VLV 5 CL CMD A	LCA A3 / FA1
	V42K3471X	RCS-R MANF ISO VLV 5 CL CMD B	PCA A3 / FA3
	V42K3481X	RCS-R MANF ISO VLV 5 CL CMD C	PCA A3 / FA4

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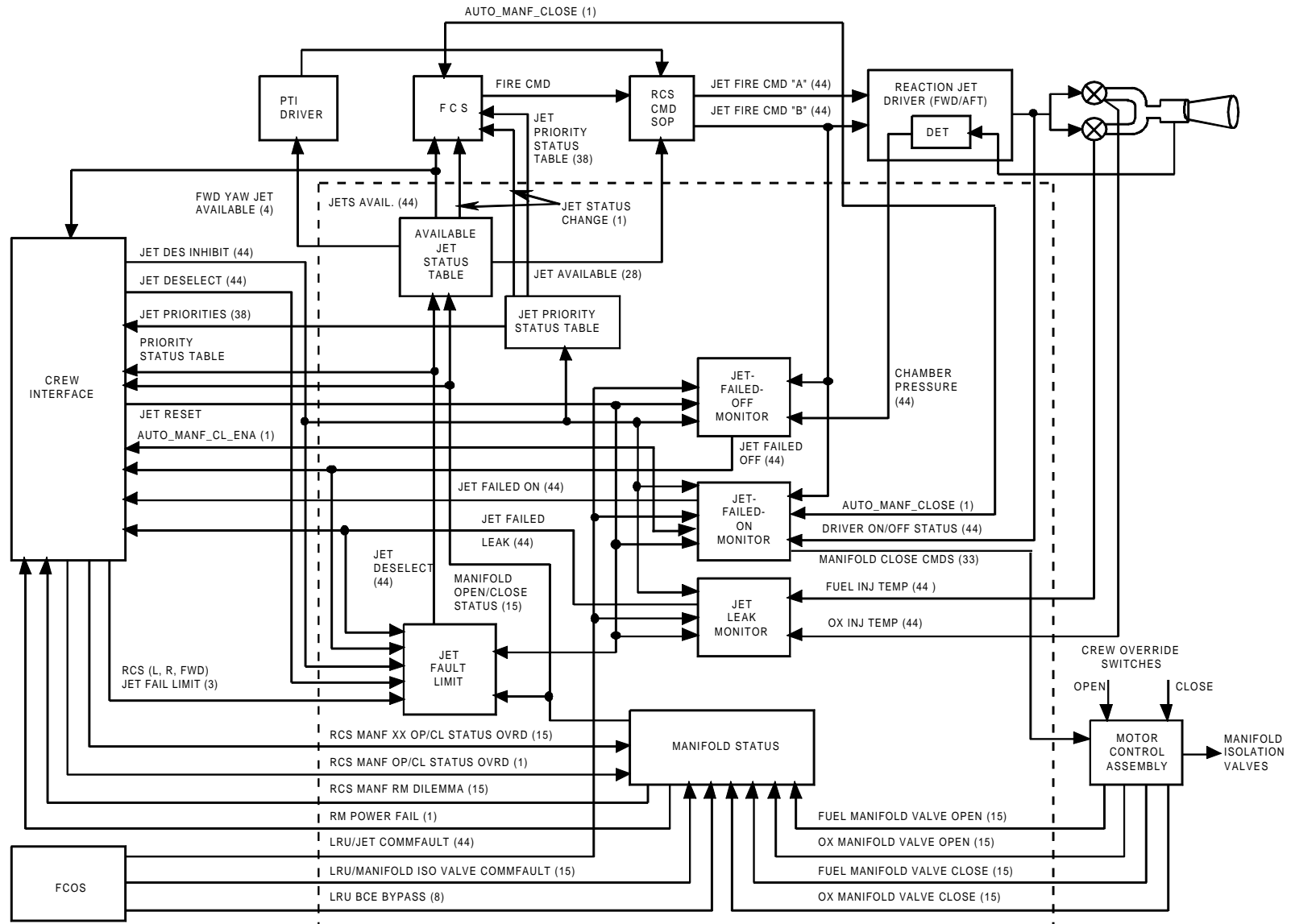


FIGURE 4.9-1. RCS RM Block Diagram (For Clarity MDM's Not Shown)

TABLE 4.9.4-1. INPUT FUNCTIONAL PARAMETERS FOR REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT (G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
AUTO_MANF_CLOSE	V90X0434XA	RCS AUTO MANIFOLD CLOSE FLAG	ORB DAP		BD		92871C	
AUTO_MANF_CL_ENA	V93X1068XA	AUTO MANF CLOSE ENABLE	RM RCS DISP		BD		92887A	
LAMP_VERNIER	V72X2856X	FWD RCS JETS VERNIER (LIGHT)	ORB DAP		BD		93017G	*
RCS_FFU_MIV_CL_CF(1)	V91X5181X	RCS F FU MAN IS VLV 1 CL COM FLT	FCOS					
RCS_FFU_MIV_CL_CF(2)	V91X5183X	RCS F FU MAN IS VLV 2 CL COM FLT	FCOS					
RCS_FFU_MIV_CL_CF(3)	V91X5185X	RCS F FU MAN IS VLV 3 CL COM FLT	FCOS					
RCS_FFU_MIV_CL_CF(4)	V91X5187X	RCS F FU MAN IS VLV 4 CL COM FLT	FCOS					
RCS_FFU_MIV_CL_CF(5)	V91X2585X	RCS F FU MAN IS VLV 5 CL COM FLT	FCOS					
RCS_FOX_MIV_CL_CF(1)	V91X5180X	RCS F OX MAN IS VLV 1 CL COM FLT	FCOS					
RCS_FOX_MIV_CL_CF(2)	V91X5182X	RCS F OX MAN IS VLV 2 CL COM FLT	FCOS					
RCS_FOX_MIV_CL_CF(3)	V91X5184X	RCS F OX MAN IS VLV 3 CL COM FLT	FCOS					
RCS_FOX_MIV_CL_CF(4)	V91X5186X	RCS F OX MAN IS VLV 4 CL COM FLT	FCOS					
RCS_FOX_MIV_CL_CF(5)	V91X2584X	RCS F OX MAN IS VLV 5 CL COM FLT	FCOS					
RCS_FWD_JET_FAIL_LT	V90J4452CA	RCS FWD JET FAIL LIMIT	RM RCS DIP					
RCS_LFU_MIV_CL_CF(1)	V91X5189X	RCS L FU MAN IS VLV 1 CL COM FLT	FCOS					
RCS_LFU_MIV_CL_CF(2)	V91X5191X	RCS L FU MAN IS VLV 2 CL COM FLT	FCOS					
RCS_LFU_MIV_CL_CF(3)	V91X5193X	RCS L FU MAN IS VLV 3 CL COM FLT	FCOS					
RCS_LFU_MIV_CL_CF(4)	V91X5195X	RCS L FU MAN IS VLV 4 CL COM FLT	FCOS					
RCS_LFU_MIV_CL_CF(5)	V91X2597X	RCS L FU MAN IS VLV 5 CL COM FLT	FCOS					
RCS_LOX_MIV_CL_CF(1)	V91X5188X	RCS L OX MAN IS VLV 1 CL COM FLT	FCOS					
RCS_LOX_MIV_CL_CF(2)	V91X5190X	RCS L OX MAN IS VLV 2 CL COM FLT	FCOS					
RCS_LOX_MIV_CL_CF(3)	V91X5192X	RCS L OX MAN IS VLV 3 CL COM FLT	FCOS					
RCS_LOX_MIV_CL_CF(4)	V91X5194X	RCS L OX MAN IS VLV 4 CL COM FLT	FCOS					
RCS_LOX_MIV_CL_CF(5)	V91X2596X	RCS L OX MAN IS VLV 5 CL COM FLT	FCOS					
RCS_L_JET_FAIL_LT	V90J4453CA	RCS L JET FAIL LIMIT	RM RCS DIP					
RCS_ON_B(1)	V79K2505XA	RJDF 1 JET F2F CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(1)	V79K2505XB	RJDF 1 JET F2F CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(10)	V79K2503XA	RJDF 1 JET F1U CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(10)	V79K2503XB	RJDF 1 JET F1U CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(11)	V79K2508XA	RJDF 1 JET F2D CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(11)	V79K2508XB	RJDF 1 JET F2D CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(12)	V79K2504XA	RJDF 1 JET F1D CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(12)	V79K2504XB	RJDF 1 JET F1D CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(13)	V79K2514XA	RJDF 2 JET F4D CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(13)	V79K2514XB	RJDF 2 JET F4D CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(14)	V79K2512XA	RJDF 2 JET F3D CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(14)	V79K2512XB	RJDF 2 JET F3D CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(15)	V79K2537XA	RJDA 2 JET R3A CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(15)	V79K2537XB	RJDA 2 JET R3A CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(15)	V79K2537XC	RJDA 2 JET R3A CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(16)	V79K2531XA	RJDA 1 JET R1A CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(16)	V79K2531XB	RJDA 1 JET R1A CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(16)	V79K2531XC	RJDA 1 JET R1A CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(17)	V79K2523XA	RJDA 2 JET L3A CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(17)	V79K2523XB	RJDA 2 JET L3A CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(17)	V79K2523XC	RJDA 2 JET L3A CMD B	E/L RCS CMD SOP				93017G	*

TABLE 4.9.4-1. INPUT FUNCTIONAL PARAMETERS FOR REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT (G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
RCS_ON_B(18)	V79K2517XA	RJDA 1 JET L1A CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(18)	V79K2517XB	RJDA 1 JET L1A CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(18)	V79K2517XC	RJDA 1 JET L1A CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(19)	V79K2526XA	RJDA 2 JET L4L CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(19)	V79K2526XB	RJDA 2 JET L4L CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(19)	V79K2526XC	RJDA 2 JET L4L CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(2)	V79K2509XA	RJDF 2 JET F3F CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(2)	V79K2509XB	RJDF 2 JET F3F CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(20)	V79K2520XA	RJDA 1 JET L2L CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(20)	V79K2520XB	RJDA 1 JET L2L CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(20)	V79K2520XC	RJDA 1 JET L2L CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(21)	V79K2524XB	RJDA 2 JET L3L CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(21)	V79K2524XC	RJDA 2 JET L3L CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(22)	V79K2518XA	RJDA 1 JET L1L CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(22)	V79K2518XB	RJDA 1 JET L1L CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(22)	V79K2518XC	RJDA 1 JET L1L CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(23)	V79K2540XA	RJDA 2 JET R4R CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(23)	V79K2540XB	RJDA 2 JET R4R CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(23)	V79K2540XC	RJDA 2 JET R4R CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(24)	V79K2534XA	RJDA 1 JET R2R CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(24)	V79K2534XB	RJDA 1 JET R2R CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(24)	V79K2534XC	RJDA 1 JET R2R CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(25)	V79K2538XA	RJDA 2 JET R3R CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(25)	V79K2538XB	RJDA 2 JET R3R CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(25)	V79K2538XC	RJDA 2 JET R3R CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(26)	V79K2532XA	RJDA 1 JET R1R CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(26)	V79K2532XB	RJDA 1 JET R1R CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(26)	V79K2532XC	RJDA 1 JET R1R CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(27)	V79K2527XA	RJDA 2 JET L4U CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(27)	V79K2527XB	RJDA 2 JET L4U CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(27)	V79K2527XC	RJDA 2 JET L4U CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(28)	V79K2521XA	RJDA 1 JET L2U CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(28)	V79K2521XB	RJDA 1 JET L2U CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(28)	V79K2521XC	RJDA 1 JET L2U CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(29)	V79K2519XA	RJDA 1 JET L1U CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(29)	V79K2519XB	RJDA 1 JET L1U CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(29)	V79K2519XC	RJDA 1 JET L1U CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(3)	V79K2501XA	RJDF 1 JET F1F CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(3)	V79K2501XB	RJDF 1 JET F1F CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(30)	V79K2541XA	RJDA 2 JET R4U CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(30)	V79K2541XB	RJDA 2 JET R4U CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(30)	V79K2541XC	RJDA 2 JET R4U CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(31)	V79K2535XA	RJDA 1 JET R2U CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(31)	V79K2535XB	RJDA 1 JET R2U CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(31)	V79K2535XC	RJDA 1 JET R2U CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(32)	V79K2533XA	RJDA 1 JET R1U CMD B	E/L RCS CMD SOP				93017G	*

TABLE 4.9.4-1. INPUT FUNCTIONAL PARAMETERS FOR REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT (G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
RCS_ON_B(32)	V79K2533XB	RJDA 1 JET R1U CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(32)	V79K2533XC	RJDA 1 JET R1U CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(33)	V79K2528XA	RJDA 2 JET L4D CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(33)	V79K2528XB	RJDA 2 JET L4D CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(33)	V79K2528XC	RJDA 2 JET L4D CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(34)	V79K2522XA	RJDA 1 JET L2D CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(34)	V79K2522XB	RJDA 1 JET L2D CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(34)	V79K2522XC	RJDA 1 JET L2D CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(35)	V79K2525XB	RJDA 2 JET L3D CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(35)	V79K2525XC	RJDA 2 JET L3D CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(36)	V79K2542XA	RJDA 2 JET R4D CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(36)	V79K2542XB	RJDA 2 JET R4D CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(36)	V79K2542XC	RJDA 2 JET R4D CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(37)	V79K2536XA	RJDA 1 JET R2D CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(37)	V79K2536XB	RJDA 1 JET R2D CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(37)	V79K2536XC	RJDA 1 JET R2D CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(38)	V79K2539XA	RJDA 2 JET R3D CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(38)	V79K2539XB	RJDA 2 JET R3D CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(38)	V79K2539XC	RJDA 2 JET R3D CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(39)	V79K2515X	RJDF 2 JET F5L CMD B	ORB RCS CMD SOP		BD		93017G	*
RCS_ON_B(4)	V79K2502XA	RJDF 1 JET F1L CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(4)	V79K2502XB	RJDF 1 JET F1L CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(4)	V79K2502XC	RJDF 1 JET F1L CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(40)	V79K2516X	RJDF 2 JET F5R CMD B	ORB RCS CMD SOP		BD		93017G	*
RCS_ON_B(41)	V79K2530X	RJDA 1 JET L5L CMD B	ORB RCS CMD SOP		BD		93017G	*
RCS_ON_B(42)	V79K2543X	RJDA 2 JET R5R CMD B	ORB RCS CMD SOP		BD		93017G	*
RCS_ON_B(43)	V79K2529X	RJDA 1 JET L5D CMD B	ORB RCS CMD SOP		BD		93017G	*
RCS_ON_B(44)	V79K2544X	RJDA 2 JET R5D CMD B	ORB RCS CMD SOP		BD		93017G	*
RCS_ON_B(5)	V79K2510XA	RJDF 2 JET F3L CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(5)	V79K2510XB	RJDF 2 JET F3L CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(5)	V79K2510XC	RJDF 2 JET F3L CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(6)	V79K2506XA	RJDF 1 JET F2R CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(6)	V79K2506XB	RJDF 1 JET F2R CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(6)	V79K2506XC	RJDF 1 JET F2R CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(7)	V79K2513XA	RJDF 2 JET F4R CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(7)	V79K2513XB	RJDF 2 JET F4R CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(7)	V79K2513XC	RJDF 2 JET F4R CMD B	E/L RCS CMD SOP				93017G	*
RCS_ON_B(8)	V79K2507XA	RJDF 1 JET F2U CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(8)	V79K2507XB	RJDF 1 JET F2U CMD B	ORB RCS CMD SOP				93017G	*
RCS_ON_B(9)	V79K2511XA	RJDF 2 JET F3U CMD B	ASC RCS CMD SOP				93017G	*
RCS_ON_B(9)	V79K2511XB	RJDF 2 JET F3U CMD B	ORB RCS CMD SOP				93017G	*
RCS_RFU_MIV_CL_CF(1)	V91X5197X	RCS R FU MAN IS VLV 1 CL COM FLT	FCOS					
RCS_RFU_MIV_CL_CF(2)	V91X5199X	RCS R FU MAN IS VLV 2 CL COM FLT	FCOS					
RCS_RFU_MIV_CL_CF(3)	V91X5201X	RCS R FU MAN IS VLV 3 CL COM FLT	FCOS					
RCS_RFU_MIV_CL_CF(4)	V91X5202X	RCS R FU MAN IS VLV 4 CL COM FLT	FCOS					
RCS_RFU_MIV_CL_CF(5)	V91X2599X	RCS R FU MAN IS VLV 5 CL COM FLT	FCOS					

TABLE 4.9.4-1. INPUT FUNCTIONAL PARAMETERS FOR REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT (G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
RCS_ROX_MIV_CL_CF(1)	V91X5196X	RCS R OX MAN IS VLV 1 CL COM FLT	FCOS					
RCS_ROX_MIV_CL_CF(2)	V91X5198X	RCS R OX MAN IS VLV 2 CL COM FLT	FCOS					
RCS_ROX_MIV_CL_CF(3)	V91X5200X	RCS R OX MAN IS VLV 3 CL COM FLT	FCOS					
RCS_ROX_MIV_CL_CF(4)	V91X5203X	RCS R OX MAN IS VLV 4 CL COM FLT	FCOS					
RCS_ROX_MIV_CL_CF(5)	V91X2598X	RCS R OX MAN IS VLV 5 CL COM FLT	FCOS					
RCS_R_JET_FAIL_LT	V90J4454CA	RCS R JET FAIL LIMIT	RM RCS DIP					
	V42T1501C	RCS-FWD OX THRUST INJ TEMP-F1F	DSC F4	VDC	AMU		93017G	*
	V42T1502C	RCS-FWD FU THRUST INJ TEMP-F1F	DSC F4	VDC	AMU		93017G	*
	V42T1503C	RCS-FWD OX THRUST INJ TEMP-F2F	DSC F4	VDC	AMU		93017G	*
	V42T1504C	RCS-FWD FU THRUST INJ TEMP-F2F	DSC F4	VDC	AMU		93017G	*
	V42T1505C	RCS-FWD OX THRUST INJ TEMP-F3F	DSC F2	VDC	AMU		93017G	*
	V42T1506C	RCS-FWD FU THRUST INJ TEMP-F3F	DSC F2	VDC	AMU		93017G	*
	V42T1507C	RCS-FWD OX THRUST INJ TEMP-F1L	DSC F4	VDC	AMU		93017G	*
	V42T1508C	RCS-FWD FU THRUST INJ TEMP-F1L	DSC F4	VDC	AMU		93017G	*
	V42T1509C	RCS-FWD OX THRUST INJ TEMP-F2R	DSC F4	VDC	AMU		93017G	*
	V42T1510C	RCS-FWD FU THRUST INJ TEMP-F2R	DSC F4	VDC	AMU		93017G	*
	V42T1511C	RCS-FWD OX THRUST INJ TEMP-F3L	DSC F2	VDC	AMU		93017G	*
	V42T1512C	RCS-FWD FU THRUST INJ TEMP-F3L	DSC F2	VDC	AMU		93017G	*
	V42T1513C	RCS-FWD OX THRUST INJ TEMP-F4R	DSC F2	VDC	AMU		93017G	*
	V42T1514C	RCS-FWD FU THRUST INJ TEMP-F4R	DSC F2	VDC	AMU		93017G	*
	V42T1515C	RCS-FWD OX THRUST INJ TEMP-F1U	DSC F4	VDC	AMU		93017G	*
	V42T1516C	RCS-FWD FU THRUST INJ TEMP-F1U	DSC F4	VDC	AMU		93017G	*
	V42T1517C	RCS-FWD OX THRUST INJ TEMP-F2U	DSC F4	VDC	AMU		93017G	*
	V42T1518C	RCS-FWD FU THRUST INJ TEMP-F2U	DSC F4	VDC	AMU		93017G	*
	V42T1519C	RCS-FWD OX THRUST INJ TEMP-F3U	DSC F2	VDC	AMU		93017G	*
	V42T1520C	RCS-FWD FU THRUST INJ TEMP-F3U	DSC F2	VDC	AMU		93017G	*
	V42T1521C	RCS-FWD OX THRUST INJ TEMP-F1D	DSC F4	VDC	AMU		93017G	*
	V42T1522C	RCS-FWD FU THRUST INJ TEMP-F1D	DSC F4	VDC	AMU		93017G	*
	V42T1523C	RCS-FWD OX THRUST INJ TEMP-F2D	DSC F4	VDC	AMU		93017G	*
	V42T1524C	RCS-FWD FU THRUST INJ TEMP-F2D	DSC F4	VDC	AMU		93017G	*
	V42T1525C	RCS-FWD OX THRUST INJ TEMP-F3D	DSC F2	VDC	AMU		93017G	*
	V42T1526C	RCS-FWD FU THRUST INJ TEMP-F3D	DSC F2	VDC	AMU		93017G	*
	V42T1527C	RCS-FWD OX THRUST INJ TEMP-F4D	DSC F2	VDC	AMU		93017G	*
	V42T1528C	RCS-FWD FU THRUST INJ TEMP-F4D	DSC F2	VDC	AMU		93017G	*
	V42T1529C	RCS-FWD OX THRUST INJ TEMP-F5L	DSC F2	VDC	AMU		93017G	*
	V42T1530C	RCS-FWD FU THRUST INJ TEMP-F5L	DSC F2	VDC	AMU		93017G	*
	V42T1531C	RCS-FWD OX THRUST INJ TEMP-F5R	DSC F2	VDC	AMU		93017G	*
	V42T1532C	RCS-FWD FU THRUST INJ TEMP-F5R	DSC F2	VDC	AMU		93017G	*
	V42T2501C	RCS-L AFT OX THRUST INJ TEMP-L1A	DSC OL1	VDC	AMU		93017G	*
	V42T2502C	RCS-L AFT FU THRUST INJ TEMP-L1A	DSC OL1	VDC	AMU		93017G	*
	V42T2503C	RCS-L AFT OX THRUST INJ TEMP-L3A	DSC OL2	VDC	AMU		93017G	*
	V42T2504C	RCS-L AFT FU THRUST INJ TEMP-L3A	DSC OL2	VDC	AMU		93017G	*
	V42T2505C	RCS-L AFT OX THRUST INJ TEMP-L1L	DSC OL1	VDC	AMU		93017G	*
	V42T2506C	RCS-L AFT FU THRUST INJ TEMP-L1L	DSC OL1	VDC	AMU		93017G	*
	V42T2507C	RCS-L AFT OX THRUST INJ TEMP-L2L	DSC OL1	VDC	AMU		93017G	*
	V42T2508C	RCS-L AFT FU THRUST INJ TEMP-L2L	DSC OL1	VDC	AMU		93017G	*

TABLE 4.9.4-1. INPUT FUNCTIONAL PARAMETERS FOR REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT (G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V42T2509C	RCS-L AFT OX THRUST INJ TEMP-L3L	DSC OL2	VDC	AMU		93017G	*
	V42T2510C	RCS-L AFT FU THRUST INJ TEMP-L3L	DSC OL2	VDC	AMU		93017G	*
	V42T2511C	RCS-L AFT OX THRUST INJ TEMP-L4L	DSC OL2	VDC	AMU		93017G	*
	V42T2512C	RCS-L AFT FU THRUST INJ TEMP-L4L	DSC OL2	VDC	AMU		93017G	*
	V42T2513C	RCS-L AFT OX THRUST INJ TEMP-L1U	DSC OL1	VDC	AMU		93017G	*
	V42T2514C	RCS-L AFT FU THRUST INJ TEMP-L1U	DSC OL1	VDC	AMU		93017G	*
	V42T2515C	RCS-L AFT OX THRUST INJ TEMP-L2U	DSC OL1	VDC	AMU		93017G	*
	V42T2516C	RCS-L AFT FU THRUST INJ TEMP-L2U	DSC OL1	VDC	AMU		93017G	*
	V42T2517C	RCS-L AFT OX THRUST INJ TEMP-L4U	DSC OL2	VDC	AMU		93017G	*
	V42T2518C	RCS-L AFT FU THRUST INJ TEMP-L4U	DSC OL2	VDC	AMU		93017G	*
	V42T2519C	RCS-L AFT OX THRUST INJ TEMP-L2D	DSC OL1	VDC	AMU		93017G	*
	V42T2520C	RCS-L AFT FU THRUST INJ TEMP-L2D	DSC OL1	VDC	AMU		93017G	*
	V42T2521C	RCS-L AFT OX THRUST INJ TEMP-L3D	DSC OL2	VDC	AMU		93017G	*
	V42T2522C	RCS-L AFT FU THRUST INJ TEMP-L3D	DSC OL2	VDC	AMU		93017G	*
	V42T2523C	RCS-L AFT OX THRUST INJ TEMP-L4D	DSC OL2	VDC	AMU		93017G	*
	V42T2524C	RCS-L AFT FU THRUST INJ TEMP-L4D	DSC OL2	VDC	AMU		93017G	*
	V42T2525C	RCS-L AFT OX THRUST INJ TEMP-L5D	DSC OL1	VDC	AMU		93017G	*
	V42T2526C	RCS-L AFT FU THRUST INJ TEMP-L5D	DSC OL1	VDC	AMU		93017G	*
	V42T2527C	RCS-L AFT OX THRUST INJ TEMP-L5L	DSC OL1	VDC	AMU		93017G	*
	V42T2528C	RCS-L AFT FU THRUST INJ TEMP-L5L	DSC OL1	VDC	AMU		93017G	*
	V42T3501C	RCS-R AFT OX THRUST INJ TEMP-R1A	DSC OR1	VDC	AMU		93017G	*
	V42T3502C	RCS-R AFT FU THRUST INJ TEMP-R1A	DSC OR1	VDC	AMU		93017G	*
	V42T3503C	RCS-R AFT OX THRUST INJ TEMP-R3A	DSC OR2	VDC	AMU		93017G	*
	V42T3504C	RCS-R AFT FU THRUST INJ TEMP-R3A	DSC OR2	VDC	AMU		93017G	*
	V42T3505C	RCS-R AFT OX THRUST INJ TEMP-R1R	DSC OR1	VDC	AMU		93017G	*
	V42T3506C	RCS-R AFT FU THRUST INJ TEMP-R1R	DSC OR1	VDC	AMU		93017G	*
	V42T3507C	RCS-R AFT OX THRUST INJ TEMP-R2R	DSC OR1	VDC	AMU		93017G	*
	V42T3508C	RCS-R AFT FU THRUST INJ TEMP-R2R	DSC OR1	VDC	AMU		93017G	*
	V42T3509C	RCS-R AFT OX THRUST INJ TEMP-R3R	DSC OR2	VDC	AMU		93017G	*
	V42T3510C	RCS-R AFT FU THRUST INJ TEMP-R3R	DSC OR2	VDC	AMU		93017G	*
	V42T3511C	RCS-R AFT OX THRUST INJ TEMP-R4R	DSC OR2	VDC	AMU		93017G	*
	V42T3512C	RCS-R AFT FU THRUST INJ TEMP-R4R	DSC OR2	VDC	AMU		93017G	*
	V42T3513C	RCS-R AFT OX THRUST INJ TEMP-R1U	DSC OR1	VDC	AMU		93017G	*
	V42T3514C	RCS-R AFT FU THRUST INJ TEMP-R1U	DSC OR1	VDC	AMU		93017G	*
	V42T3515C	RCS-R AFT OX THRUST INJ TEMP-R2U	DSC OR1	VDC	AMU		93017G	*
	V42T3516C	RCS-R AFT FU THRUST INJ TEMP-R2U	DSC OR1	VDC	AMU		93017G	*
	V42T3517C	RCS-R AFT OX THRUST INJ TEMP-R4U	DSC OR2	VDC	AMU		93017G	*
	V42T3518C	RCS-R AFT FU THRUST INJ TEMP-R4U	DSC OR2	VDC	AMU		93017G	*
	V42T3519C	RCS-R AFT OX THRUST INJ TEMP-R2D	DSC OR1	VDC	AMU		93017G	*
	V42T3520C	RCS-R AFT FU THRUST INJ TEMP-R2D	DSC OR1	VDC	AMU		93017G	*
	V42T3521C	RCS-R AFT OX THRUST INJ TEMP-R3D	DSC OR2	VDC	AMU		93017G	*
	V42T3522C	RCS-R AFT FU THRUST INJ TEMP-R3D	DSC OR2	VDC	AMU		93017G	*
	V42T3523C	RCS-R AFT OX THRUST INJ TEMP-R4D	DSC OR2	VDC	AMU		93017G	*
	V42T3524C	RCS-R AFT FU THRUST INJ TEMP-R4D	DSC OR2	VDC	AMU		93017G	*
	V42T3525C	RCS-R AFT OX THRUST INJ TEMP-R5D	DSC OR1	VDC	AMU		93017G	*
	V42T3526C	RCS-R AFT FU THRUST INJ TEMP-R5D	DSC OR1	VDC	AMU		93017G	*

TABLE 4.9.4-1. INPUT FUNCTIONAL PARAMETERS FOR REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT (G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V42T3527C	RCS-R AFT OX THRUST INJ TEMP-R5R	DSC OR1	VDC	AMU		93017G	*
	V42T3528C	RCS-R AFT FU THRUST INJ TEMP-R5R	DSC OR1	VDC	AMU		93017G	*
	V42X1224X	RCS FWD OX MANF ISLN VLV-1 OP	MCA F1		BD		93017G	*
	V42X1225X	RCS FWD OX MANF ISLN VLV-1 CL	MCA F1		BD		93017G	*
	V42X1226X	RCS FWD OX MANF ISLN VLV-2 OP	MCA F2		BD		93017G	*
	V42X1227X	RCS FWD OX MANF ISLN VLV-2 CL	MCA F2		BD		93017G	*
	V42X1228X	RCS FWD OX MANF ISLN VLV-3 OP	MCA F3		BD		93017G	*
	V42X1229X	RCS FWD OX MANF ISLN VLV-3 CL	MCA F3		BD		93017G	*
	V42X1230X	RCS FWD OX MANF ISLN VLV-4 OP	MCA F3		BD		93017G	*
	V42X1231X	RCS FWD OX MANF ISLN VLV-4 CL	MCA F3		BD		93017G	*
	V42X1232X	RCS FWD OX MANF ISLN VLV-5 OP	LCA F3		BD		93017G	*
	V42X1233X	RCS FWD OX MANF ISLN VLV-5 CL	LCA F3		BD		93017G	*
	V42X1324X	RCS FWD FU MANF ISLN VLV-1 OP	MCA F1		BD		93017G	*
	V42X1325X	RCS FWD FU MANF ISLN VLV-1 CL	MCA F1		BD		93017G	*
	V42X1326X	RCS FWD FU MANF ISLN VLV 2 OP	MCA F2		BD		93017G	*
	V42X1327X	RCS FWD FU MANF ISLN VLV-2 CL	MCA F2		BD		93017G	*
	V42X1328X	RCS FWD FU MANF ISLN VLV 3 OP	MCA F3		BD		93017G	*
	V42X1329X	RCS FWD FU MANF ISLN VLV-3 CL	MCA F3		BD		93017G	*
	V42X1330X	RCS FWD FU MANF ISLN VLV 4 OP	MCA F3		BD		93017G	*
	V42X1331X	RCS FWD FU MANF ISLN VLV-4 CL	MCA F3		BD		93017G	*
	V42X1332X	RCS FWD FU MANF ISLN VLV-5 OP	LCA F3		BD		93017G	*
	V42X1333X	RCS FWD FU MANF ISLN VLV-5 CL	LCA F3		BD		93017G	*
	V42X2226X	RCS L AFT OX MANF ISLN VLV-1 OP	MCA A2		BD		93017G	*
	V42X2227X	RCS-L AFT OX MANF ISLN VLV-1 CL	MCA A2		BD		93017G	*
	V42X2228X	RCS L AFT OX MANF ISLN VLV-2 OP	MCA A1		BD		93017G	*
	V42X2229X	RCS-L AFT OX MANF ISLN VLV-2 CL	MCA A1		BD		93017G	*
	V42X2230X	RCS L AFT OX MANF ISLN VLV-3 OP	MCA A3		BD		93017G	*
	V42X2231X	RCS-L AFT OX MANF ISLN VLV-3 CL	MCA A3		BD		93017G	*
	V42X2232X	RCS L AFT OX MANF ISLN VLV-4 OP	MCA A3		BD		93017G	*
	V42X2233X	RCS-L AFT OX MANF ISLN VLV-4 CL	MCA A3		BD		93017G	*
	V42X2234X	RCS L AFT OX MANF ISLN VLV-5 OP	LCA A3		BD		93017G	*
	V42X2235X	RCS-L AFT OX MANF ISLN VLV-5 CL	LCA A3		BD		93017G	*
	V42X2326X	RCS L AFT FU MANF ISLN VLV-1 OP	MCA A2		BD		93017G	*
	V42X2327X	RCS-L AFT FU MANF ISLN VLV-1 CL	MCA A2		BD		93017G	*
	V42X2328X	RCS L AFT FU MANF ISLN VLV-2 OP	MCA A1		BD		93017G	*
	V42X2329X	RCS-L AFT FU MANF ISLN VLV-2 CL	MCA A1		BD		93017G	*
	V42X2330X	RCS L AFT FU MANF ISLN VLV-3 OP	MCA A3		BD		93017G	*
	V42X2331X	RCS-L AFT FU MANF ISLN VLV-3 CL	MCA A3		BD		93017G	*
	V42X2332X	RCS L AFT FU MANF ISLN VLV-4 OP	MCA A3		BD		93017G	*
	V42X2333X	RCS-L AFT FU MANF ISLN VLV-4 CL	MCA A3		BD		93017G	*
	V42X2334X	RCS L AFT FU MANF ISLN VLV-5 OP	LCA A3		BD		93017G	*
	V42X2335X	RCS-L AFT FU MANF ISLN VLV 5 CL	LCA A3		BD		93017G	*
	V42X3226X	RCS R AFT OX MANF ISLN VLV-1 OP	MCA A2		BD		93017G	*
	V42X3227X	RCS-R AFT OX MANF ISLN VLV-1 CL	MCA A2		BD		93017G	*
	V42X3228X	RCS R AFT OX MANF ISLN VLV-2 OP	MCA A1		BD		93017G	*
	V42X3229X	RCS-R AFT OX MANF ISLN VLV-2 CL	MCA A1		BD		93017G	*

TABLE 4.9.4-1. INPUT FUNCTIONAL PARAMETERS FOR REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT (G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
V42X3230X	RCS R	AFT OX MANF ISLN VLV-3 OP	MCA A3		BD		93017G	*
V42X3231X	RCS-R	AFT OX MANF ISLN VLV-3 CL	MCA A3		BD		93017G	*
V42X3232X	RCS R	AFT OX MANF ISLN VLV-4 OP	MCA A3		BD		93017G	*
V42X3233X	RCS-R	AFT OX MANF ISLN VLV-4 CL	MCA A3		BD		93017G	*
V42X3234X	RCS R	AFT OX MANF ISLN VLV-5 OP	LCA A3		BD		93017G	*
V42X3235X	RCS-R	AFT OX MANF ISLN VLV-5 CL	LCA A3		BD		93017G	*
V42X3326X	RCS R	AFT FU MANF ISLN VLV-1 OP	MCA A2		BD		93017G	*
V42X3327X	RCS-R	AFT FU MANF ISLN VLV-1 CL	MCA A2		BD		93017G	*
V42X3328X	RCS R	AFT FU MANF ISLN VLV-2 OP	MCA A1		BD		93017G	*
V42X3329X	RCS-R	AFT FU MANF ISLN VLV-2 CL	MCA A1		BD		93017G	*
V42X3330X	RCS R	AFT FU MANF ISLN VLV-3 OP	MCA A3		BD		93017G	*
V42X3331X	RCS-R	AFT FU MANF ISLN VLV-3 CL	MCA A3		BD		93017G	*
V42X3332X	RCS R	AFT FU MANF ISLN VLV-4 OP	MCA A3		BD		93017G	*
V42X3333X	RCS-R	AFT FU MANF ISLN VLV-4 CL	MCA A3		BD		93017G	*
V42X3334X	RCS R	AFT FU MANF ISLN VLV-5 OP	LCA A3		BD		93017G	*
V42X3335X	RCS-R	AFT FU MANF ISLN VLV-5 CL	LCA A3		BD		93017G	*
V79X2601X	RJDF 1	JET F1F DRIVER	RJDF 1		BD		93017G	*
V79X2602X	RJDF 1	JET F1L DRIVER	RJDF 1		BD		93017G	*
V79X2603X	RJDF 1	JET F1U DRIVER	RJDF 1		BD		93017G	*
V79X2604X	RJDF 1	JET F1D DRIVER	RJDF 1		BD		93017G	*
V79X2605X	RJDF 1	JET F2F DRIVER	RJDF 1		BD		93017G	*
V79X2606X	RJDF 1	JET F2R DRIVER	RJDF 1		BD		93017G	*
V79X2607X	RJDF 1	JET F2U DRIVER	RJDF 1		BD		93017G	*
V79X2608X	RJDF 1	JET F2D DRIVER	RJDF 1		BD		93017G	*
V79X2609X	RJDF 2	JET F3F DRIVER	RJDF 2		BD		93017G	*
V79X2610X	RJDF 2	JET F3L DRIVER	RJDF 2		BD		93017G	*
V79X2611X	RJDF 2	JET F3U DRIVER	RJDF 2		BD		93017G	*
V79X2612X	RJDF 2	JET F3D DRIVER	RJDF 2		BD		93017G	*
V79X2613X	RJDF 2	JET F4R DRIVER	RJDF 2		BD		93017G	*
V79X2614X	RJDF 2	JET F4D DRIVER	RJDF 2		BD		93017G	*
V79X2615X	RJDF 2	JET F5L DRIVER	RJDF 2		BD		93017G	*
V79X2616X	RJDF 2	JET F5R DRIVER	RJDF 2		BD		93017G	*
V79X2617X	RJDA 1	JET L1A DRIVER	RJDA 1		BD		93017G	*
V79X2618X	RJDA 1	JET L1L DRIVER	RJDA 1		BD		93017G	*
V79X2619X	RJDA 1	JET L1U DRIVER	RJDA 1		BD		93017G	*
V79X2620X	RJDA 1	JET L2L DRIVER	RJDA 1		BD		93017G	*
V79X2621X	RJDA 1	JET L2U DRIVER	RJDA 1		BD		93017G	*
V79X2622X	RJDA 1	JET L2D DRIVER	RJDA 1		BD		93017G	*
V79X2623X	RJDA 2	JET L3A DRIVER	RJDA 2		BD		93017G	*
V79X2624X	RJDA 2	JET L3L DRIVER	RJDA 2		BD		93017G	*
V79X2625X	RJDA 2	JET L3D DRIVER	RJDA 2		BD		93017G	*
V79X2626X	RJDA 2	JET L4L DRIVER	RJDA 2		BD		93017G	*
V79X2627X	RJDA 2	JET L4U DRIVER	RJDA 2		BD		93017G	*
V79X2628X	RJDA 2	JET L4D DRIVER	RJDA 2		BD		93017G	*
V79X2629X	RJDA 1	JET L5D DRIVER	RJDA 1		BD		93017G	*
V79X2630X	RJDA 1	JET L5L DRIVER	RJDA 1		BD		93017G	*

TABLE 4.9.4-1. INPUT FUNCTIONAL PARAMETERS FOR REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT (G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V79X2631X	RJDA 1 JET R1A DRIVER	RJDA 1		BD		93017G	*
	V79X2632X	RJDA 1 JET R1R DRIVER	RJDA 1		BD		93017G	*
	V79X2633X	RJDA 1 JET R1U DRIVER	RJDA 1		BD		93017G	*
	V79X2634X	RJDA 1 JET R2R DRIVER	RJDA 1		BD		93017G	*
	V79X2635X	RJDA 1 JET R2U DRIVER	RJDA 1		BD		93017G	*
	V79X2636X	RJDA 1 JET R2D DRIVER	RJDA 1		BD		93017G	*
	V79X2637X	RJDA 2 JET R3A DRIVER	RJDA 2		BD		93017G	*
	V79X2638X	RJDA 2 JET R3R DRIVER	RJDA 2		BD		93017G	*
	V79X2639X	RJDA 2 JET R3D DRIVER	RJDA 2		BD		93017G	*
	V79X2640X	RJDA 2 JET R4R DRIVER	RJDA 2		BD		93017G	*
	V79X2641X	RJDA 2 JET R4U DRIVER	RJDA 2		BD		93017G	*
	V79X2642X	RJDA 2 JET R4D DRIVER	RJDA 2		BD		93017G	*
	V79X2643X	RJDA 2 JET R5R DRIVER	RJDA 2		BD		93017G	*
	V79X2644X	RJDA 2 JET R5D DRIVER	RJDA 2		BD		93017G	*
	V79X2701X	RJDF 1 JET F1F CHAMBER PRESS IND	RJDF 1		BD		93017G	*
	V79X2702X	RJDF 1 JET F1L CHAMBER PRESS IND	RJDF 1		BD		93017G	*
	V79X2703X	RJDF 1 JET F1U CHAMBER PRESS IND	RJDF 1		BD		93017G	*
	V79X2704X	RJDF 1 JET F1D CHAMBER PRESS IND	RJDF 1		BD		93017G	*
	V79X2705X	RJDF 1 JET F2F CHAMBER PRESS IND	RJDF 1		BD		93017G	*
	V79X2706X	RJDF 1 JET F2R CHAMBER PRESS IND	RJDF 1		BD		93017G	*
	V79X2707X	RJDF 1 JET F2U CHAMBER PRESS IND	RJDF 1		BD		93017G	*
	V79X2708X	RJDF 1 JET F2D CHAMBER PRESS IND	RJDF 1		BD		93017G	*
	V79X2709X	RJDF 2 JET F3F CHAMBER PRESS IND	RJDF 2		BD		93017G	*
	V79X2710X	RJDF 2 JET F3L CHAMBER PRESS IND	RJDF 2		BD		93017G	*
	V79X2711X	RJDF 2 JET F3U CHAMBER PRESS IND	RJDF 2		BD		93017G	*
	V79X2712X	RJDF 2 JET F3D CHAMBER PRESS IND	RJDF 2		BD		93017G	*
	V79X2713X	RJDF 2 JET F4R CHAMBER PRESS IND	RJDF 2		BD		93017G	*
	V79X2714X	RJDF 2 JET F4D CHAMBER PRESS IND	RJDF 2		BD		93017G	*
	V79X2715X	RJDF 2 JET F5L CHAMBER PRESS IND	RJDF 2		BD		93017G	*
	V79X2716X	RJDF 2 JET F5R CHAMBER PRESS IND	RJDF 2		BD		93017G	*
	V79X2717X	RJDA 1 JET L1A CHAMBER PRESS IND	RJDA 1		BD		93017G	*
	V79X2718X	RJDA 1 JET L1L CHAMBER PRESS IND	RJDA 1		BD		93017G	*
	V79X2719X	RJDA 1 JET L1U CHAMBER PRESS IND	RJDA 1		BD		93017G	*
	V79X2720X	RJDA 1 JET L2L CHAMBER PRESS IND	RJDA 1		BD		93017G	*
	V79X2721X	RJDA 1 JET L2U CHAMBER PRESS IND	RJDA 1		BD		93017G	*
	V79X2722X	RJDA 1 JET L2D CHAMBER PRESS IND	RJDA 1		BD		93017G	*
	V79X2723X	RJDA 2 JET L3A CHAMBER PRESS IND	RJDA 2		BD		93017G	*
	V79X2724X	RJDA 2 JET L3L CHAMBER PRESS IND	RJDA 2		BD		93017G	*
	V79X2725X	RJDA 2 JET L3D CHAMBER PRESS IND	RJDA 2		BD		93017G	*
	V79X2726X	RJDA 2 JET L4L CHAMBER PRESS IND	RJDA 2		BD		93017G	*
	V79X2727X	RJDA 2 JET L4U CHAMBER PRESS IND	RJDA 2		BD		93017G	*
	V79X2728X	RJDA 2 JET L4D CHAMBER PRESS IND	RJDA 2		BD		93017G	*
	V79X2729X	RJDA 1 JET L5D CHAMBER PRESS IND	RJDA 1		BD		93017G	*
	V79X2730X	RJDA 1 JET L5L CHAMBER PRESS IND	RJDA 1		BD		93017G	*
	V79X2731X	RJDA 1 JET R1A CHAMBER PRESS IND	RJDA 1		BD		93017G	*
	V79X2732X	RJDA 1 JET R1R CHAMBER PRESS IND	RJDA 1		BD		93017G	*

TABLE 4.9.4-1. INPUT FUNCTIONAL PARAMETERS FOR REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT (G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
V79X2733X	RJDA 1	JET R1U CHAMBER PRESS IND	RJDA 1		BD		93017G	*
V79X2734X	RJDA 1	JET R2R CHAMBER PRESS IND	RJDA 1		BD		93017G	*
V79X2735X	RJDA 1	JET R2U CHAMBER PRESS IND	RJDA 1		BD		93017G	*
V79X2736X	RJDA 1	JET R2D CHAMBER PRESS IND	RJDA 1		BD		93017G	*
V79X2737X	RJDA 2	JET R3A CHAMBER PRESS IND	RJDA 2		BD		93017G	*
V79X2738X	RJDA 2	JET R3R CHAMBER PRESS IND	RJDA 2		BD		93017G	*
V79X2739X	RJDA 2	JET R3D CHAMBER PRESS IND	RJDA 2		BD		93017G	*
V79X2740X	RJDA 2	JET R4R CHAMBER PRESS IND	RJDA 2		BD		93017G	*
V79X2741X	RJDA 2	JET R4U CHAMBER PRESS IND	RJDA 2		BD		93017G	*
V79X2742X	RJDA 2	JET R4D CHAMBER PRESS IND	RJDA 2		BD		93017G	*
V79X2743X	RJDA 2	JET R5R CHAMBER PRESS IND	RJDA 2		BD		93017G	*
V79X2744X	RJDA 2	JET R5D CHAMBER PRESS IND	RJDA 2		BD		93017G	*
V91X2246X	FF1	INPUT PROM SEG 2,6 BYPASS(MFE)	FCOS				93017G	*
V91X2247X	FF2	INPUT PROM SEG 2,6 BYPASS(MFE)	FCOS				93017G	*
V91X2248X	FF3	INPUT PROM SEG 2,6 BYPASS(MFE)	FCOS				93017G	*
V91X2249X	FF4	INPUT PROM SEG 2,6 BYPASS(MFE)	FCOS				93017G	*
V91X2288X	FF1	INPUT PROM SEG 2,6 STATUS(HFE)	FCOS				89598A	
V91X2289X	FF2	INPUT PROM SEG 2,6 STATUS(HFE)	FCOS				89598A	
V91X2290X	FF3	INPUT PROM SEG 2,6 STATUS(HFE)	FCOS				89598A	
V91X2291X	FF4	INPUT PROM SEG 2,6 STATUS(HFE)	FCOS				89598A	
V91X2806X	FA1	INPUT PROM SEG3,10 BYPASS(HFE)	FCOS				93017G	*
V91X2807X	FA2	INPUT PROM SEG3,10 BYPASS(HFE)	FCOS				93017G	*
V91X2808X	FA3	INPUT PROM SEG3,10 BYPASS(HFE)	FCOS				93017G	*
V91X2809X	FA4	INPUT PROM SEG3,10 BYPASS(HFE)	FCOS				93017G	*
V91X2845X	FA1	INPUT PROM SEG3,10 STATUS(HFE)	FCOS				89991E	
V91X2846X	FA2	INPUT PROM SEG3,10 STATUS(HFE)	FCOS				90007G	
V91X2847X	FA3	INPUT PROM SEG3,10 STATUS(HFE)	FCOS				90007G	
V91X2848X	FA4	INPUT PROM SEG3,10 STATUS(HFE)	FCOS				92316B	
V91X5890X	RJDF1	JET F1F CHAMBER PRESS CF	FCOS					
V91X5891X	RJDF1	JET F1L CHAMBER PRESS CF	FCOS					
V91X5892X	RJDF1	JET F1U CHAMBER PRESS CF	FCOS					
V91X5893X	RJDF1	JET F1D CHAMBER PRESS CF	FCOS					
V91X5894X	RJDF1	JET F2F CHAMBER PRESS CF	FCOS					
V91X5895X	RJDF1	JET F2R CHAMBER PRESS CF	FCOS					
V91X5896X	RJDF1	JET F2U CHAMBER PRESS CF	FCOS					
V91X5897X	RJDF1	JET F2D CHAMBER PRESS CF	FCOS					
V91X5898X	RJDF2	JET F3F CHAMBER PRESS CF	FCOS					
V91X5899X	RJDF2	JET F3L CHAMBER PRESS CF	FCOS					
V91X5900X	RJDF2	JET F3U CHAMBER PRESS CF	FCOS					
V91X5901X	RJDF2	JET F3D CHAMBER PRESS CF	FCOS					
V91X5902X	RJDF2	JET F4R CHAMBER PRESS CF	FCOS					
V91X5903X	RJDF2	JET F4D CHAMBER PRESS CF	FCOS					
V91X5904X	RJDF2	JET F5L CHAMBER PRESS CF	FCOS					
V91X5905X	RJDF2	JET F5R CHAMBER PRESS CF	FCOS					
V91X5915X	RCS FWD FU THRUST INJ TEMP F3L CF		FCOS					
V91X5916X	RCS FWD FU THRUST INJ TEMP F3U CF		FCOS					

TABLE 4.9.4-1. INPUT FUNCTIONAL PARAMETERS FOR REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT (G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V91X5917X	RCS FWD FU THRUST INJ TEMP F5L CF	FCOS					
	V91X5918X	RCS FWD FU THRUST INJ TEMP F5R CF	FCOS					
	V91X5919X	RCS FWD OX THRUST INJ TEMP F1F CF	FCOS					
	V91X5920X	RCS FWD OX THRUST INJ TEMP F1L CF	FCOS					
	V91X5921X	RCS FWD OX THRUST INJ TEMP F1U CF	FCOS					
	V91X5922X	RCS FWD OX THRUST INJ TEMP F1D CF	FCOS					
	V91X5923X	RCS FWD OX THRUST INJ TEMP F2F CF	FCOS					
	V91X5924X	RCS FWD OX THRUST INJ TEMP F2R CF	FCOS					
	V91X5925X	RCS FWD OX THRUST INJ TEMP F2U CF	FCOS					
	V91X5926X	RCS FWD OX THRUST INJ TEMP F2D CF	FCOS					
	V91X5927X	RCS FWD OX THRUST INJ TEMP F3F CF	FCOS					
	V91X5928X	RCS FWD OX THRUST INJ TEMP F3L CF	FCOS					
	V91X5929X	RCS FWD OX THRUST INJ TEMP F3U CF	FCOS					
	V91X5930X	RCS FWD OX THRUST INJ TEMP F3D CF	FCOS					
	V91X5931X	RCS FWD OX THRUST INJ TEMP F4R CF	FCOS					
	V91X5932X	RCS FWD OX THRUST INJ TEMP F4D CF	FCOS					
	V91X5933X	RCS FWD OX THRUST INJ TEMP F5L CF	FCOS					
	V91X5934X	RCS FWD OX THRUST INJ TEMP F5R CF	FCOS					
	V91X5935X	L AFT OX THRUST INJ TEMP L1A CF	FCOS					
	V91X5936X	L AFT OX THRUST INJ TEMP L1L CF	FCOS					
	V91X5937X	L AFT OX THRUST INJ TEMP L1U CF	FCOS					
	V91X5938X	RJDF1 JET F1F DRIVER CF	FCOS					
	V91X5939X	RJDF1 JET F1L DRIVER CF	FCOS					
	V91X5940X	RJDF1 JET F1U DRIVER CF	FCOS					
	V91X5941X	RJDF1 JET F1D DRIVER CF	FCOS					
	V91X5942X	RJDF1 JET F2F DRIVER CF	FCOS					
	V91X5943X	RJDF1 JET F2R DRIVER CF	FCOS					
	V91X5944X	RJDF1 JET F2U DRIVER CF	FCOS					
	V91X5945X	RJDF1 JET F2D DRIVER CF	FCOS					
	V91X5946X	RJDF2 JET F3F DRIVER CF	FCOS					
	V91X5947X	RJDF2 JET F3L DRIVER CF	FCOS					
	V91X5948X	RJDF2 JET F3U DRIVER CF	FCOS					
	V91X5949X	RJDF2 JET F3D DRIVER CF	FCOS					
	V91X5950X	RJDF2 JET F4R DRIVER CF	FCOS					
	V91X5951X	RJDF2 JET F4D DRIVER CF	FCOS					
	V91X5952X	RJDF2 JET F5L DRIVER CF	FCOS					
	V91X5974X	RJDA1 JET L1A CHAMBER PRESS CF	FCOS					
	V91X5975X	RJDA1 JET L1L CHAMBER PRESS CF	FCOS					
	V91X5976X	RJDA1 JET L1U CHAMBER PRESS CF	FCOS					
	V91X5977X	RJDA1 JET L2L CHAMBER PRESS CF	FCOS					
	V91X5978X	RJDA1 JET L2U CHAMBER PRESS CF	FCOS					
	V91X5979X	RJDA1 JET L2D CHAMBER PRESS CF	FCOS					
	V91X5980X	RJDA2 JET L3A CHAMBER PRESS CF	FCOS					
	V91X5981X	RJDA2 JET L3L CHAMBER PRESS CF	FCOS					
	V91X5982X	RJDA2 JET L3D CHAMBER PRESS CF	FCOS					
	V91X5983X	RJDA2 JET L4L CHAMBER PRESS CF	FCOS					

TABLE 4.9.4-1. INPUT FUNCTIONAL PARAMETERS FOR REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT (G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
V91X5984X	RJDA2	JET L4U CHAMBER PRESS CF	FCOS					
V91X5985X	RJDA2	JET L4D CHAMBER PRESS CF	FCOS					
V91X5986X	RJDA1	JET L5D CHAMBER PRESS CF	FCOS					
V91X5987X	RJDA1	JET L5L CHAMBER PRESS CF	FCOS					
V91X5988X	RJDA1	JET R1A CHAMBER PRESS CF	FCOS					
V91X5989X	RJDA1	JET R1R CHAMBER PRESS CF	FCOS					
V91X5990X	RJDA1	JET R1U CHAMBER PRESS CF	FCOS					
V91X5991X	RJDA1	JET R2R CHAMBER PRESS CF	FCOS					
V91X5992X	RJDA1	JET R2U CHAMBER PRESS CF	FCOS					
V91X5993X	RJDA1	JET R2D CHAMBER PRESS CF	FCOS					
V91X5994X	RJDA2	JET R3A CHAMBER PRESS CF	FCOS					
V91X5995X	RJDA2	JET R3R CHAMBER PRESS CF	FCOS					
V91X5996X	RJDA2	JET R3D CHAMBER PRESS CF	FCOS					
V91X5997X	RJDA2	JET R4R CHAMBER PRESS CF	FCOS					
V91X5998X	RJDA2	JET R4U CHAMBER PRESS CF	FCOS					
V91X6004X	RJDA2	JET R4D CHAMBER PRESS CF	FCOS					
V91X6005X	RJDA2	JET R5R CHAMBER PRESS CF	FCOS					
V91X6006X	RJDA2	JET R5D CHAMBER PRESS CF	FCOS					
V91X6007X	L AFT	FU THRUST INJ TEMP L1A CF	FCOS					
V91X6008X	L AFT	FU THRUST INJ TEMP L1L CF	FCOS					
V91X6009X	L AFT	FU THRUST INJ TEMP L1U CF	FCOS					
V91X6010X	L AFT	FU THRUST INJ TEMP L2L CF	FCOS					
V91X6011X	L AFT	FU THRUST INJ TEMP L2U CF	FCOS					
V91X6012X	L AFT	FU THRUST INJ TEMP L2D CF	FCOS					
V91X6013X	L AFT	FU THRUST INJ TEMP L3A CF	FCOS					
V91X6014X	L AFT	FU THRUST INJ TEMP L3L CF	FCOS					
V91X6015X	L AFT	FU THRUST INJ TEMP L3D CF	FCOS					
V91X6016X	L AFT	FU THRUST INJ TEMP L4L CF	FCOS					
V91X6017X	L AFT	FU THRUST INJ TEMP L4U CF	FCOS					
V91X6018X	L AFT	FU THRUST INJ TEMP L4D CF	FCOS					
V91X6019X	L AFT	FU THRUST INJ TEMP L5D CF	FCOS					
V91X6020X	L AFT	FU THRUST INJ TEMP L5L CF	FCOS					
V91X6037X	R AFT	FU THRUST INJ TEMP R1A CF	FCOS					
V91X6038X	R AFT	FU THRUST INJ TEMP R1R CF	FCOS					
V91X6039X	R AFT	FU THRUST INJ TEMP R1U CF	FCOS					
V91X6040X	R AFT	FU THRUST INJ TEMP R2R CF	FCOS					
V91X6041X	R AFT	FU THRUST INJ TEMP R2U CF	FCOS					
V91X6042X	R AFT	FU THRUST INJ TEMP R2D CF	FCOS					
V91X6043X	R AFT	FU THRUST INJ TEMP R3A CF	FCOS					
V91X6044X	R AFT	FU THRUST INJ TEMP R3R CF	FCOS					
V91X6045X	R AFT	FU THRUST INJ TEMP R3D CF	FCOS					
V91X6046X	R AFT	FU THRUST INJ TEMP R4R CF	FCOS					
V91X6047X	R AFT	FU THRUST INJ TEMP R4U CF	FCOS					
V91X6048X	R AFT	FU THRUST INJ TEMP R4D CF	FCOS					
V91X6049X	R AFT	FU THRUST INJ TEMP R5R CF	FCOS					
V91X6050X	R AFT	FU THRUST INJ TEMP R5D CF	FCOS					

TABLE 4.9.4-1. INPUT FUNCTIONAL PARAMETERS FOR REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT (G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V91X6067X	L AFT OX THRUST INJ TEMP L2L CF	FCOS					
	V91X6068X	L AFT OX THRUST INJ TEMP L2U CF	FCOS					
	V91X6069X	L AFT OX THRUST INJ TEMP L2D CF	FCOS					
	V91X6070X	L AFT OX THRUST INJ TEMP L3A CF	FCOS					
	V91X6071X	L AFT OX THRUST INJ TEMP L3L CF	FCOS					
	V91X6072X	L AFT OX THRUST INJ TEMP L3D CF	FCOS					
	V91X6073X	L AFT OX THRUST INJ TEMP L4L CF	FCOS					
	V91X6074X	L AFT OX THRUST INJ TEMP L4U CF	FCOS					
	V91X6075X	L AFT OX THRUST INJ TEMP L4D CF	FCOS					
	V91X6076X	L AFT OX THRUST INJ TEMP L5D CF	FCOS					
	V91X6077X	L AFT OX THRUST INJ TEMP L5L CF	FCOS					
	V91X6078X	R AFT OX THRUST INJ TEMP R1A CF	FCOS					
	V91X6079X	R AFT OX THRUST INJ TEMP R1R CF	FCOS					
	V91X6080X	R AFT OX THRUST INJ TEMP R1U CF	FCOS					
	V91X6087X	R AFT OX THRUST INJ TEMP R2R CF	FCOS					
	V91X6088X	R AFT OX THRUST INJ TEMP R2U CF	FCOS					
	V91X6089X	R AFT OX THRUST INJ TEMP R2D CF	FCOS					
	V91X6090X	R AFT OX THRUST INJ TEMP R3A CF	FCOS					
	V91X6091X	R AFT OX THRUST INJ TEMP R3R CF	FCOS					
	V91X6092X	R AFT OX THRUST INJ TEMP R3D CF	FCOS					
	V91X6093X	R AFT OX THRUST INJ TEMP R4R CF	FCOS					
	V91X6094X	R AFT OX THRUST INJ TEMP R4U CF	FCOS					
	V91X6095X	R AFT OX THRUST INJ TEMP R4D CF	FCOS					
	V91X6096X	R AFT OX THRUST INJ TEMP R5R CF	FCOS					
	V91X6097X	R AFT OX THRUST INJ TEMP R5D CF	FCOS					
	V91X6098X	RCS FWD FU THRUST INJ TEMP F3D CF	FCOS					
	V91X6099X	RCS FWD FU THRUST INJ TEMP F4R CF	FCOS					
	V91X6100X	RCS FWD FU THRUST INJ TEMP F4D CF	FCOS					
	V91X6101X	RJDF2 JET F5R DRIVER CF	FCOS					
	V91X6102X	RJDA1 JET L1A DRIVER CF	FCOS					
	V91X6103X	RJDA1 JET L1L DRIVER CF	FCOS					
	V91X6104X	RJDA1 JET L1U DRIVER CF	FCOS					
	V91X6105X	RJDA1 JET L2L DRIVER CF	FCOS					
	V91X6106X	RJDA1 JET L2U DRIVER CF	FCOS					
	V91X6107X	RJDA1 JET L2D DRIVER CF	FCOS					
	V91X6108X	RJDA2 JET L3A DRIVER CF	FCOS					
	V91X6109X	RJDA2 JET L3L DRIVER CF	FCOS					
	V91X6110X	RJDA2 JET L3D DRIVER CF	FCOS					
	V91X6111X	RJDA2 JET L4L DRIVER CF	FCOS					
	V91X6112X	RJDA2 JET L4U DRIVER CF	FCOS					
	V91X6113X	RJDA2 JET L4D DRIVER CF	FCOS					
	V91X6114X	RJDA1 JET L5D DRIVER CF	FCOS					
	V91X6115X	RJDA1 JET L5L DRIVER CF	FCOS					
	V91X6116X	RJDA1 JET R1A DRIVER CF	FCOS					
	V91X6117X	RJDA1 JET R1R DRIVER CF	FCOS					
	V91X6118X	RJDA1 JET R1U DRIVER CF	FCOS					

TABLE 4.9.4-1. INPUT FUNCTIONAL PARAMETERS FOR REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT (G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
V91X6119X	RJDA1	JET R2R DRIVER CF	FCOS					
V91X6120X	RJDA1	JET R2U DRIVER CF	FCOS					
V91X6121X	RJDA1	JET R2D DRIVER CF	FCOS					
V91X6122X	RJDA2	JET R3A DRIVER CF	FCOS					
V91X6123X	RJDA2	JET R3R DRIVER CF	FCOS					
V91X6124X	RJDA2	JET R3D DRIVER CF	FCOS					
V91X6125X	RJDA2	JET R4R DRIVER CF	FCOS					
V91X6126X	RJDA2	JET R4U DRIVER CF	FCOS					
V91X6127X	RJDA2	JET R4D DRIVER CF	FCOS					
V91X6128X	RJDA2	JET R5D DRIVER CF	FCOS					
V91X6129X	RJDA2	JET R5R DRIVER CF	FCOS					
V91X6130X	L AFT	FU MANF ISLN VLV - 1 OP CF	FCOS					
V91X6131X	L AFT	FU MANF ISLN VLV - 2 OP CF	FCOS					
V91X6132X	L AFT	FU MANF ISLN VLV - 3 OP CF	FCOS					
V91X6133X	L AFT	FU MANF ISLN VLV - 4 OP CF	FCOS					
V91X6134X	L AFT	FU MANF ISLN VLV - 5 OP CF	FCOS					
V91X6135X	L AFT	OX MANF ISLN VLV - 1 OP CF	FCOS					
V91X6136X	L AFT	OX MANF ISLN VLV - 2 OP CF	FCOS					
V91X6137X	L AFT	OX MANF ISLN VLV - 3 OP CF	FCOS					
V91X6138X	L AFT	OX MANF ISLN VLV - 4 OP CF	FCOS					
V91X6139X	L AFT	OX MANF ISLN VLV - 5 OP CF	FCOS					
V91X6140X	R AFT	FU MANF ISLN VLV - 1 OP CF	FCOS					
V91X6141X	R AFT	FU MANF ISLN VLV - 2 OP CF	FCOS					
V91X6142X	R AFT	FU MANF ISLN VLV - 3 OP CF	FCOS					
V91X6143X	R AFT	FU MANF ISLN VLV - 4 OP CF	FCOS					
V91X6144X	R AFT	FU MANF ISLN VLV - 5 OP CF	FCOS					
V91X6145X	R AFT	OX MANF ISLN VLV - 1 OP CF	FCOS					
V91X6146X	R AFT	OX MANF ISLN VLV - 2 OP CF	FCOS					
V91X6147X	R AFT	OX MANF ISLN VLV - 3 OP CF	FCOS					
V91X6148X	R AFT	OX MANF ISLN VLV - 4 OP CF	FCOS					
V91X6149X	R AFT	OX MANF ISLN VLV - 5 OP CF	FCOS					
V91X6150X	FWD	FU MANF ISLN VLV - 1 OP CF	FCOS					
V91X6151X	FWD	FU MANF ISLN VLV - 2 OP CF	FCOS					
V91X6152X	FWD	FU MANF ISLN VLV - 3 OP CF	FCOS					
V91X6153X	FWD	FU MANF ISLN VLV - 4 OP CF	FCOS					
V91X6154X	FWD	FU MANF ISLN VLV - 5 OP CF	FCOS					
V91X6155X	FWD	OX MANF ISLN VLV - 1 OP CF	FCOS					
V91X6156X	FWD	OX MANF ISLN VLV - 2 OP CF	FCOS					
V91X6157X	FWD	OX MANF ISLN VLV - 3 OP CF	FCOS					
V91X6158X	FWD	OX MANF ISLN VLV - 4 OP CF	FCOS					
V91X6159X	FWD	OX MANF ISLN VLV - 5 OP CF	FCOS					
V91X6906X	RCS FWD	FU THRUST INJ TEMP F1F CF	FCOS					
V91X6907X	RCS FWD	FU THRUST INJ TEMP F1L CF	FCOS					
V91X6908X	RCS FWD	FU THRUST INJ TEMP F1U CF	FCOS					
V91X6909X	RCS FWD	FU THRUST INJ TEMP F1D CF	FCOS					
V91X6910X	RCS FWD	FU THRUST INJ TEMP F2F CF	FCOS					

TABLE 4.9.4-1. INPUT FUNCTIONAL PARAMETERS FOR REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT (G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V91X6911X	RCS FWD FU THRUST INJ TEMP F2R CF	FCOS					
	V91X6912X	RCS FWD FU THRUST INJ TEMP F2U CF	FCOS					
	V91X6913X	RCS FWD FU THRUST INJ TEMP F2D CF	FCOS					
	V91X6914X	RCS FWD FU THRUST INJ TEMP F3F CF	FCOS					
	V93X5347X	RCS MANF OP/CL STATUS OVRD	VERRIDE DISP		BD			
	V95X8400XA	JET F1F DESELECT	RM RCS DIP					
	V95X8401XA	JET F1L DESELECT	RM RCS DIP					
	V95X8402XA	JET F1U DESELECT	RM RCS DIP					
	V95X8403XA	JET F1D DESELECT	RM RCS DIP					
	V95X8404XA	JET F2F DESELECT	RM RCS DIP					
	V95X8405XA	JET F2R DESELECT	RM RCS DIP					
	V95X8406XA	JET F2U DESELECT	RM RCS DIP					
	V95X8407XA	JET F2D DESELECT	RM RCS DIP					
	V95X8408XA	JET F3F DESELECT	RM RCS DIP					
	V95X8409XA	JET F3L DESELECT	RM RCS DIP					
	V95X8410XA	JET F3U DESELECT	RM RCS DIP					
	V95X8411XA	JET F3D DESELECT	RM RCS DIP					
	V95X8412XA	JET F4R DESELECT	RM RCS DIP					
	V95X8413XA	JET F4D DESELECT	RM RCS DIP					
	V95X8414XA	JET F5L DESELECT	RM RCS DIP					
	V95X8415XA	JET F5R DESELECT	RM RCS DIP					
	V95X8416XA	JET L1A DESELECT	RM RCS DIP					
	V95X8417XA	JET L1L DESELECT	RM RCS DIP					
	V95X8418XA	JET L1U DESELECT	RM RCS DIP					
	V95X8419XA	JET L2L DESELECT	RM RCS DIP					
	V95X8420XA	JET L2U DESELECT	RM RCS DIP					
	V95X8421XA	JET L2D DESELECT	RM RCS DIP					
	V95X8422XA	JET L3A DESELECT	RM RCS DIP					
	V95X8423XA	JET L3L DESELECT	RM RCS DIP					
	V95X8424XA	JET L3D DESELECT	RM RCS DIP					
	V95X8425XA	JET L4L DESELECT	RM RCS DIP					
	V95X8426XA	JET L4U DESELECT	RM RCS DIP					
	V95X8427XA	JET L4D DESELECT	RM RCS DIP					
	V95X8428XA	JET L5D DESELECT	RM RCS DIP					
	V95X8429XA	JET L5L DESELECT	RM RCS DIP					
	V95X8430XA	JET R1A DESELECT	RM RCS DIP					
	V95X8431XA	JET R1R DESELECT	RM RCS DIP					
	V95X8432XA	JET R1U DESELECT	RM RCS DIP					
	V95X8433XA	JET R2R DESELECT	RM RCS DIP					
	V95X8434XA	JET R2U DESELECT	RM RCS DIP					
	V95X8435XA	JET R2D DESELECT	RM RCS DIP					
	V95X8436XA	JET R3A DESELECT	RM RCS DIP					
	V95X8437XA	JET R3R DESELECT	RM RCS DIP					
	V95X8438XA	JET R3D DESELECT	RM RCS DIP					
	V95X8439XA	JET R4R DESELECT	RM RCS DIP					
	V95X8440XA	JET R4U DESELECT	RM RCS DIP					

TABLE 4.9.4-1. INPUT FUNCTIONAL PARAMETERS FOR REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT (G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
V95X8441XA	JET	R4D DESELECT	RM	RCS	DIP			
V95X8442XA	JET	R5D DESELECT	RM	RCS	DIP			
V95X8443XA	JET	R5R DESELECT	RM	RCS	DIP			
V95X8450X	JET	F1F INHIBIT	RM	RCS	DIP			
V95X8451X	JET	F1L INHIBIT	RM	RCS	DIP			
V95X8452X	JET	F1U INHIBIT	RM	RCS	DIP			
V95X8453X	JET	F1D INHIBIT	RM	RCS	DIP			
V95X8454X	JET	F2F INHIBIT	RM	RCS	DIP			
V95X8455X	JET	F2R INHIBIT	RM	RCS	DIP			
V95X8456X	JET	F2U INHIBIT	RM	RCS	DIP			
V95X8457X	JET	F2D INHIBIT	RM	RCS	DIP			
V95X8458X	JET	F3F INHIBIT	RM	RCS	DIP			
V95X8459X	JET	F3L INHIBIT	RM	RCS	DIP			
V95X8460X	JET	F3U INHIBIT	RM	RCS	DIP			
V95X8461X	JET	F3D INHIBIT	RM	RCS	DIP			
V95X8462X	JET	F4R INHIBIT	RM	RCS	DIP			
V95X8463X	JET	F4D INHIBIT	RM	RCS	DIP			
V95X8464X	JET	F5L INHIBIT	RM	RCS	DIP			
V95X8465X	JET	F5R INHIBIT	RM	RCS	DIP			
V95X8466X	JET	L1A INHIBIT	RM	RCS	DIP			
V95X8467X	JET	L1L INHIBIT	RM	RCS	DIP			
V95X8468X	JET	L1U INHIBIT	RM	RCS	DIP			
V95X8469X	JET	L2L INHIBIT	RM	RCS	DIP			
V95X8470X	JET	L2U INHIBIT	RM	RCS	DIP			
V95X8471X	JET	L2D INHIBIT	RM	RCS	DIP			
V95X8472X	JET	L3A INHIBIT	RM	RCS	DIP			
V95X8473X	JET	L3L INHIBIT	RM	RCS	DIP			
V95X8474X	JET	L3D INHIBIT	RM	RCS	DIP			
V95X8475X	JET	L4L INHIBIT	RM	RCS	DIP			
V95X8476X	JET	L4U INHIBIT	RM	RCS	DIP			
V95X8477X	JET	L4D INHIBIT	RM	RCS	DIP			
V95X8478X	JET	L5D INHIBIT	RM	RCS	DIP			
V95X8479X	JET	L5L INHIBIT	RM	RCS	DIP			
V95X8480X	JET	R1A INHIBIT	RM	RCS	DIP			
V95X8481X	JET	R1R INHIBIT	RM	RCS	DIP			
V95X8482X	JET	R1U INHIBIT	RM	RCS	DIP			
V95X8483X	JET	R2R INHIBIT	RM	RCS	DIP			
V95X8484X	JET	R2U INHIBIT	RM	RCS	DIP			
V95X8485X	JET	R2D INHIBIT	RM	RCS	DIP			
V95X8486X	JET	R3A INHIBIT	RM	RCS	DIP			
V95X8487X	JET	R3R INHIBIT	RM	RCS	DIP			
V95X8488X	JET	R3D INHIBIT	RM	RCS	DIP			
V95X8489X	JET	R4R INHIBIT	RM	RCS	DIP			
V95X8490X	JET	R4U INHIBIT	RM	RCS	DIP			
V95X8491X	JET	R4D INHIBIT	RM	RCS	DIP			
V95X8492X	JET	R5D INHIBIT	RM	RCS	DIP			

TABLE 4.9.4-1. INPUT FUNCTIONAL PARAMETERS FOR REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT (G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V95X8493X	JET R5R INHIBIT						
	V95X8747X	RCS MANF F1 OP/CL STAT OVRD	RM	RCS	DIP			
	V95X8748X	RCS MANF F2 OP/CL STAT OVRD	RM	RCS	DIP			
	V95X8749X	RCS MANF F3 OP/CL STAT OVRD	RM	RCS	DIP			
	V95X8750X	RCS MANF F4 OP/CL STAT OVRD	RM	RCS	DIP			
	V95X8751X	RCS MANF F5 OP/CL STAT OVRD	RM	RCS	DIP			
	V95X8752X	RCS MANF L1 OP/CL STAT OVRD	RM	RCS	DIP			
	V95X8753X	RCS MANF L2 OP/CL STAT OVRD	RM	RCS	DIP			
	V95X8754X	RCS MANF L3 OP/CL STAT OVRD	RM	RCS	DIP			
	V95X8755X	RCS MANF L4 OP/CL STAT OVRD	RM	RCS	DIP			
	V95X8756X	RCS MANF L5 OP/CL STAT OVRD	RM	RCS	DIP			
	V95X8757X	RCS MANF R1 OP/CL STAT OVRD	RM	RCS	DIP			
	V95X8758X	RCS MANF R2 OP/CL STAT OVRD	RM	RCS	DIP			
	V95X8759X	RCS MANF R3 OP/CL STAT OVRD	RM	RCS	DIP			
	V95X8760X	RCS MANF R4 OP/CL STAT OVRD	RM	RCS	DIP			
	V95X8761X	RCS MANF R5 OP/CL STAT OVRD	RM	RCS	DIP			
	V95X8775X	RCS RM JET FAIL RESET	RM	RCS	DIP			

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

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
AUTO_MANF_CLOSE	V90X0434X	RCS AUTO MANIFOLD CLOSE FLAG	ORB DAP		BD		92871C	
AUTO_MANF_CL_ENA	V93X1068X	AUTO MANF CLOSE ENABLE	RM RCS DISP		BD		92887A	
AVAILABLE_JET_AFT(01)	V90X4520X	JET L1A AVAILABLE	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_AFT(02)	V90X4521X	JET L1L AVAILABLE	AEROJET DAP ASC DAP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_AFT(03)	V90X4522X	JET L1U AVAILABLE	AEROJET DAP ASC DAP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_AFT(04)	V90X4534X	JET R1A AVAILABLE	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
AVAILABLE_JET_AFT(05)	V90X4535X	JET R1R AVAILABLE	AEROJET DAP ASC DAP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_AFT(06)	V90X4536X	JET R1U AVAILABLE	AEROJET DAP ASC DAP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_AFT(07)	V90X4532X	JET L5D AVAILABLE	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 GAX ORB DAP RM RCS DIP		BD		93017G	*
AVAILABLE_JET_AFT(08)	V90X4533X	JET L5L AVAILABLE	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 GAX ORB DAP RM RCS DIP		BD		93017G	*
AVAILABLE_JET_AFT(09)	V90X4526X	JET L3A AVAILABLE	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
AVAILABLE_JET_AFT(10)	V90X4527X	JET L3L AVAILABLE	AEROJET DAP ASC DAP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_AFT(11)	V90X4528X	JET L3D AVAILABLE	AEROJET DAP ASC DAP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_AFT(12)	V90X4540X	JET R3A AVAILABLE	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_AFT(13)	V90X4541X	JET R3R AVAILABLE	AEROJET DAP ASC DAP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
AVAILABLE_JET_AFT(14)	V90X4542X	JET R3D AVAILABLE	AEROJET DAP ASC DAP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_AFT(15)	V90X4547X	JET R5R AVAILABLE	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 GAX ORB DAP RM RCS DIP		BD		93017G	*
AVAILABLE_JET_AFT(16)	V90X4546X	JET R5D AVAILABLE	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 GAX ORB DAP RM RCS DIP		BD		93017G	*
AVAILABLE_JET_AFT(17)	V90X4523X	JET L2L AVAILABLE	AEROJET DAP ASC DAP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
AVAILABLE_JET_AFT(18)	V90X4524X	JET L2U AVAILABLE	AEROJET DAP ASC DAP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_AFT(19)	V90X4525X	JET L2D AVAILABLE	AEROJET DAP ASC DAP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_AFT(20)	V90X4537X	JET R2R AVAILABLE	AEROJET DAP ASC DAP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_AFT(21)	V90X4538X	JET R2U AVAILABLE	AEROJET DAP ASC DAP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
AVAILABLE_JET_AFT(22)	V90X4539X	JET R2D AVAILABLE	AEROJET DAP ASC DAP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_AFT(23)	V90X4529X	JET L4L AVAILABLE	AEROJET DAP ASC DAP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_AFT(24)	V90X4530X	JET L4U AVAILABLE	AEROJET DAP ASC DAP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_AFT(25)	V90X4531X	JET L4D AVAILABLE	AEROJET DAP ASC DAP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
AVAILABLE_JET_AFT(26)	V90X4543X	JET R4R AVAILABLE	AEROJET DAP ASC DAP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_AFT(27)	V90X4544X	JET R4U AVAILABLE	AEROJET DAP ASC DAP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_AFT(28)	V90X4545X	JET R4D AVAILABLE	AEROJET DAP ASC DAP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_FWD(01)	V90X4548X	JET F1F AVAILABLE	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
AVAILABLE_JET_FWD(02)	V90X4549X	JET F1L AVAILABLE	ASC DAP ASC RCS CMD SOP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP PTI RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_FWD(03)	V90X4550X	JET F1U AVAILABLE	ASC DAP ASC RCS CMD SOP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_FWD(04)	V90X4551X	JET F1D AVAILABLE	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_FWD(05)	V90X4552X	JET F2F AVAILABLE	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
AVAILABLE_JET_FWD(06)	V90X4553X	JET F2R AVAILABLE	ASC DAP ASC RCS CMD SOP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP PTI RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_FWD(07)	V90X4554X	JET F2U AVAILABLE	ASC DAP ASC RCS CMD SOP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_FWD(08)	V90X4555X	JET F2D AVAILABLE	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_FWD(09)	V90X4560X	JET F4R AVAILABLE	ASC DAP ASC RCS CMD SOP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP PTI RM RCS DIP TRANS DAP		BD		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
AVAILABLE_JET_FWD(10)	V90X4561X	JET F4D AVAILABLE	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_FWD(11)	V90X4562X	JET F5L AVAILABLE	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 GAX ORB DAP RM RCS DIP		BD		93017G	*
AVAILABLE_JET_FWD(12)	V90X4563X	JET F5R AVAILABLE	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 GAX ORB DAP RM RCS DIP		BD		93017G	*
AVAILABLE_JET_FWD(13)	V90X4566X	JET F3F AVAILABLE	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_FWD(14)	V90X4557X	JET F3L AVAILABLE	ASC DAP ASC RCS CMD SOP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 E/L RCS CMD SOP GRTLS DAP ORB DAP PTI RM RCS DIP TRANS DAP		BD		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
AVAILABLE_JET_FWD(15)	V90X4558X	JET F3U AVAILABLE	ASC DAP ASC RCS CMD SOP DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
AVAILABLE_JET_FWD(16)	V90X4559X	JET F3D AVAILABLE	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1 GRTLS DAP ORB DAP RM RCS DIP TRANS DAP		BD		93017G	*
JET_FAIL_CHANGE_FLAG	V90X4619X	JET STATUS CHANGED	AEROJET DAP ORB DAP TRANS DAP				89688A	
JET_MAP(01)	V90J5727C	1ST PRIORITY JET IN GROUP 1	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(02)	V90J5728C	2ND PRIORITY JET IN GROUP 1	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(03)	V90J5729C	3RD PRIORITY JET IN GROUP 1	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(04)	V90J5730C	1ST PRIORITY JET IN GROUP 2	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(05)	V90J5731C	2ND PRIORITY JET IN GROUP 2	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(06)	V90J5732C	1ST PRIORITY JET IN GROUP 3	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
JET_MAP(07)	V90J5733C	2ND PRIORITY JET IN GROUP 3	AEROJET DAP GRTLS DAP ORB DAP					
JET_MAP(08)	V90J5734C	1ST PRIORITY JET IN GROUP 4	TRANS DAP AEROJET DAP GRTLS DAP ORB DAP					
JET_MAP(09)	V90J5735C	2ND PRIORITY JET IN GROUP 4	TRANS DAP AEROJET DAP GRTLS DAP ORB DAP					
JET_MAP(10)	V90J5736C	3RD PRIORITY JET IN GROUP 4	TRANS DAP AEROJET DAP GRTLS DAP ORB DAP					
JET_MAP(11)	V90J5737C	1ST PRIORITY JET IN GROUP 5	TRANS DAP AEROJET DAP GRTLS DAP ORB DAP					
JET_MAP(12)	V90J5738C	2ND PRIORITY JET IN GROUP 5	TRANS DAP AEROJET DAP GRTLS DAP ORB DAP					
JET_MAP(13)	V90J5739C	1ST PRIORITY JET IN GROUP 6	TRANS DAP AEROJET DAP GRTLS DAP ORB DAP					
JET_MAP(14)	V90J5740C	2ND PRIORITY JET IN GROUP 6	TRANS DAP AEROJET DAP GRTLS DAP ORB DAP					
JET_MAP(15)	V90J5741C	1ST PRIORITY JET IN GROUP 7	TRANS DAP AEROJET DAP GRTLS DAP ORB DAP					
JET_MAP(16)	V90J5742C	2ND PRIORITY JET IN GROUP 7	TRANS DAP AEROJET DAP GRTLS DAP ORB DAP					
JET_MAP(17)	V90J5743C	1ST PRIORITY JET IN GROUP 8	TRANS DAP AEROJET DAP GRTLS DAP ORB DAP					

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
JET_MAP(18)	V90J5744C	2ND PRIORITY JET IN GROUP 8	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(19)	V90J5745C	1ST PRIORITY JET IN GROUP 9	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(20)	V90J5746C	2ND PRIORITY JET IN GROUP 9	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(21)	V90J5747C	3RD PRIORITY JET IN GROUP 9	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(22)	V90J5748C	4TH PRIORITY JET IN GROUP 9	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(23)	V90J5749C	1ST PRIORITY JET IN GROUP 10	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(24)	V90J5750C	2ND PRIORITY JET IN GROUP 10	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(25)	V90J5751C	3RD PRIORITY JET IN GROUP 10	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(26)	V90J5752C	4TH PRIORITY JET IN GROUP 10	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(27)	V90J5753C	1ST PRIORITY JET IN GROUP 11	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(28)	V90J5754C	2ND PRIORITY JET IN GROUP 11	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
JET_MAP(29)	V90J5755C	3RD PRIORITY JET IN GROUP 11	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(30)	V90J5756C	1ST PRIORITY JET IN GROUP 12	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(31)	V90J5757C	2ND PRIORITY JET IN GROUP 12	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(32)	V90J5758C	3RD PRIORITY JET IN GROUP 12	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(33)	V90J5759C	1ST PRIORITY JET IN GROUP 13	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(34)	V90J5760C	2ND PRIORITY JET IN GROUP 13	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(35)	V90J5761C	3RD PRIORITY JET IN GROUP 13	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(36)	V90J5762C	1ST PRIORITY JET IN GROUP 14	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(37)	V90J5763C	2ND PRIORITY JET IN GROUP 14	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
JET_MAP(38)	V90J5764C	3RD PRIORITY JET IN GROUP 14	AEROJET DAP GRTLS DAP ORB DAP TRANS DAP					
RCS_FWD_JET_FAIL_LT	V90J4452CB	RCS FWD JET FAIL LIMIT	RM RCS DIP					
RCS_L_JET_FAIL_LT	V90J4453CB	RCS L JET FAIL LIMIT	RM RCS DIP					
RCS_R_JET_FAIL_LT	V90J4454CB	RCS R JET FAIL LIMIT	RM RCS DIP					
	V42K1372X	RCS-F MANF ISO VLV 1 CL CMD A	MCA F1		BD		92871C	
	V42K1373X	RCS-F MANF ISO VLV 1 CL CMD B	MCA F1		BD		92871C	

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V42K1374X	RCS-F MANF ISO VLV 2 CL CMD A	MCA F2		BD		92871C	
	V42K1375X	RCS-F MANF ISO VLV 2 CL CMD B	MCA F2		BD		92871C	
	V42K1376X	RCS-F MANF ISO VLV 3 CL CMD A	MCA F3		BD		92871C	
	V42K1377X	RCS-F MANF ISO VLV 3 CL CMD B	MCA F3		BD		92871C	
	V42K1378X	RCS-F MANF ISO VLV 4 CL CMD A	MCA F3		BD		92871C	
	V42K1379X	RCS-F MANF ISO VLV 4 CL CMD B	MCA F3		BD		92871C	
	V42K1380X	RCS-F MANF ISO VLV 5 CL CMD A	LCA F3		BD		92871C	
	V42K1471X	RCS-F MANF ISO VLV 5 CL CMD B	PCA F3		BD		92871C	
	V42K1481X	RCS-F MANF ISO VLV 5 CL CMD C	PCA F3		BD		92871C	
	V42K2372X	RCS-L MANF ISO VLV 1 CL CMD A	MCA A2		BD		92871C	
	V42K2373X	RCS-L MANF ISO VLV 1 CL CMD B	MCA A2		BD		92871C	
	V42K2374X	RCS-L MANF ISO VLV 2 CL CMD A	MCA A1		BD		92871C	
	V42K2375X	RCS-L MANF ISO VLV 2 CL CMD B	MCA A1		BD		92871C	
	V42K2376X	RCS-L MANF ISO VLV 3 CL CMD A	MCA A3		BD		92871C	
	V42K2377X	RCS-L MANF ISO VLV 3 CL CMD B	MCA A3		BD		92871C	
	V42K2378X	RCS-L MANF ISO VLV 4 CL CMD A	MCA A3		BD		92871C	
	V42K2379X	RCS-L MANF ISO VLV 4 CL CMD B	MCA A3		BD		92871C	
	V42K2380X	RCS-L MANF ISO VLV 5 CL CMD A	LCA A3		BD		92871C	
	V42K2471X	RCS-L MANF ISO VLV 5 CL CMD B	PCA A3		BD		92871C	
	V42K2481X	RCS-L MANF ISO VLV 5 CL CMD C	PCA A3		BD		92871C	
	V42K3372X	RCS-R MANF ISO VLV 1 CL CMD A	MCA A2		BD		92871C	
	V42K3373X	RCS-R MANF ISO VLV 1 CL CMD B	MCA A2		BD		92871C	
	V42K3374X	RCS-R MANF ISO VLV 2 CL CMD A	MCA A1		BD		92871C	
	V42K3375X	RCS-R MANF ISO VLV 2 CL CMD B	MCA A1		BD		92871C	
	V42K3376X	RCS-R MANF ISO VLV 3 CL CMD A	MCA A3		BD		92871C	
	V42K3377X	RCS-R MANF ISO VLV 3 CL CMD B	MCA A3		BD		92871C	
	V42K3378X	RCS-R MANF ISO VLV 4 CL CMD A	MCA A3		BD		92871C	
	V42K3379X	RCS-R MANF ISO VLV 4 CL CMD B	MCA A3		BD		92871C	
	V42K3380X	RCS-R MANF ISO VLV 5 CL CMD A	LCA A3		BD		92871C	
	V42K3471X	RCS-R MANF ISO VLV 5 CL CMD B	PCA A3		BD		92871C	
	V42K3481X	RCS-R MANF ISO VLV 5 CL CMD C	PCA A3		BD		92871C	
	V90J4456C	JET L1A PRIORITY	DL FMT 22/1		HXS		93017G	*
			DL FMT 23/1					
			DL FMT 32/1					
	V90J4457C	JET L1L PRIORITY	DL FMT 22/1		HXS		93017G	*
			DL FMT 23/1					
			DL FMT 32/1					
	V90J4458C	JET L1U PRIORITY	DL FMT 22/1		HXS		93017G	*
			DL FMT 23/1					
			DL FMT 32/1					
	V90J4459C	JET L2L PRIORITY	DL FMT 22/1		HXS		93017G	*
			DL FMT 23/1					
			DL FMT 32/1					

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90J4460C	JET L2U PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4461C	JET L2D PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4462C	JET L3A PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4463C	JET L3L PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4464C	JET L3D PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4465C	JET L4L PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4466C	JET L4U PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4467C	JET L4D PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4470C	JET R1A PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4471C	JET R1R PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4472C	JET R1U PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4473C	JET R2R PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4474C	JET R2U PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4475C	JET R2D PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4476C	JET R3A PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90J4477C	JET R3R PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4478C	JET R3D PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4479C	JET R4R PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4480C	JET R4U PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4481C	JET R4D PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4486C	JET F1F PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4487C	JET F1L PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4488C	JET F1U PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4489C	JET F1D PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4490C	JET F2F PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4491C	JET F2R PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4492C	JET F2U PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4493C	JET F2D PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4494C	JET F3F PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4495C	JET F3L PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90J4496C	JET F3U PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4497C	JET F3D PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4498C	JET F4R PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90J4499C	JET F4D PRIORITY	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1		HXS		93017G	*
	V90M2913P	CGRB_FAIL_OFF_FWD_HFE	DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A				93017G	*
	V90M2914P	CGRB_FAIL_OFF_AFT_HFE	DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A				93017G	*
	V90M2915P	CGRB_FAIL_ON_FWD_HFE	DL FMT 22/A DL FMT 23/1 DL FMT 32/A				93017G	*
	V90M2916P	CGRB_FAIL_LEAK_FWD_HFE	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1				93017G	*
	V90M2917P	CGRB_FAIL_LEAK_AFT_HFE	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1				93017G	*
	V90M2918P	CGRB_FAIL_ON_AFT_HFE	DL FMT 22/A DL FMT 23/1 DL FMT 32/A				93017G	*
	V90M2919P	CGRB_JET_AVAILABLE_FWD	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1				93017G	*
	V90M2920P	CGRB_JET_AVAILABLE_AFT	DL FMT 21/A DL FMT 22/A DL FMT 23/A DL FMT 32/1				93017G	*
	V90M3171P	RCS RM MANF STATUS	DL FMT 21/1 DL FMT 22/A DL FMT 23/A DL FMT 32/A				93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X4420X	RCS MANIFOLD F1 OP/CL STATUS	DL FMT 21/1 DL FMT 22/A DL FMT 23/A DL FMT 32/A GNC SYS SUMM1 DISP GNC SYS SUMM2 DISP RM RCS DIP	EVENT	BD		93017G	*
	V90X4421X	RCS MANIFOLD F2 OP/CL STATUS	DL FMT 21/1 DL FMT 22/A DL FMT 23/A DL FMT 32/A GNC SYS SUMM1 DISP GNC SYS SUMM2 DISP RM RCS DIP	EVENT	BD		93017G	*
	V90X4422X	RCS MANIFOLD F3 OP/CL STATUS	DL FMT 21/1 DL FMT 22/A DL FMT 23/A DL FMT 32/A GNC SYS SUMM1 DISP GNC SYS SUMM2 DISP RM RCS DIP	EVENT	BD		93017G	*
	V90X4423X	RCS MANIFOLD F4 OP/CL STATUS	DL FMT 21/1 DL FMT 22/A DL FMT 23/A DL FMT 32/A GNC SYS SUMM1 DISP GNC SYS SUMM2 DISP RM RCS DIP	EVENT	BD		93017G	*
	V90X4424X	RCS MANIFOLD F5 OP/CL STATUS	DL FMT 21/1 DL FMT 22/A DL FMT 23/A DL FMT 32/A GNC SYS SUMM1 DISP GNC SYS SUMM2 DISP RM RCS DIP	EVENT	BD		93017G	*
	V90X4425X	RCS MANIFOLD L1 OP/CL STATUS	DL FMT 21/1 DL FMT 22/A DL FMT 23/A DL FMT 32/A GNC SYS SUMM1 DISP GNC SYS SUMM2 DISP RM RCS DIP	EVENT	BD		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X4426X	RCS MANIFOLD L2 OP/CL STATUS	DL FMT 21/1 DL FMT 22/A DL FMT 23/A DL FMT 32/A GNC SYS SUMM1 DISP GNC SYS SUMM2 DISP RM RCS DIP	EVENT	BD		93017G	*
	V90X4427X	RCS MANIFOLD L3 OP/CL STATUS	DL FMT 21/1 DL FMT 22/A DL FMT 23/A DL FMT 32/A GNC SYS SUMM1 DISP GNC SYS SUMM2 DISP RM RCS DIP	EVENT	BD		93017G	*
	V90X4428X	RCS MANIFOLD L4 OP/CL STATUS	DL FMT 21/1 DL FMT 22/A DL FMT 23/A DL FMT 32/A GNC SYS SUMM1 DISP GNC SYS SUMM2 DISP RM RCS DIP	EVENT	BD		93017G	*
	V90X4429X	RCS MANIFOLD L5 OP/CL STATUS	DL FMT 21/1 DL FMT 22/A DL FMT 23/A DL FMT 32/A GNC SYS SUMM1 DISP GNC SYS SUMM2 DISP RM RCS DIP	EVENT	BD		93017G	*
	V90X4430X	RCS MANIFOLD R1 OP/CL STATUS	DL FMT 21/1 DL FMT 22/A DL FMT 23/A DL FMT 32/A GNC SYS SUMM1 DISP GNC SYS SUMM2 DISP RM RCS DIP	EVENT	BD		93017G	*
	V90X4431X	RCS MANIFOLD R2 OP/CL STATUS	DL FMT 21/1 DL FMT 22/A DL FMT 23/A DL FMT 32/A GNC SYS SUMM1 DISP GNC SYS SUMM2 DISP RM RCS DIP	EVENT	BD		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X4432X	RCS MANIFOLD R3 OP/CL STATUS	DL FMT 21/1 DL FMT 22/A DL FMT 23/A DL FMT 32/A GNC SYS SUMM1 DISP GNC SYS SUMM2 DISP RM RCS DIP	EVENT	BD		93017G	*
	V90X4433X	RCS MANIFOLD R4 OP/CL STATUS	DL FMT 21/1 DL FMT 22/A DL FMT 23/A DL FMT 32/A GNC SYS SUMM1 DISP GNC SYS SUMM2 DISP RM RCS DIP	EVENT	BD		93017G	*
	V90X4434X	RCS MANIFOLD R5 OP/CL STATUS	DL FMT 21/1 DL FMT 22/A DL FMT 23/A DL FMT 32/A GNC SYS SUMM1 DISP GNC SYS SUMM2 DISP RM RCS DIP	EVENT	BD		93017G	*
	V90X4435X	RCS MANF F1 RM DILEMMA FLAG	GAX RM RCS DIP					
	V90X4436X	RCS MANF F2 RM DILEMMA FLAG	GAX RM RCS DIP					
	V90X4437X	RCS MANF F3 RM DILEMMA FLAG	GAX RM RCS DIP					
	V90X4438X	RCS MANF F4 RM DILEMMA FLAG	GAX RM RCS DIP					
	V90X4439X	RCS MANF F5 RM DILEMMA FLAG	GAX RM RCS DIP					
	V90X4440X	RCS MANF L1 RM DILEMMA FLAG	GAX RM RCS DIP					
	V90X4441X	RCS MANF L2 RM DILEMMA FLAG	GAX RM RCS DIP					
	V90X4442X	RCS MANF L3 RM DILEMMA FLAG	GAX RM RCS DIP					
	V90X4443X	RCS MANF L4 RM DILEMMA FLAG	GAX RM RCS DIP					
	V90X4444X	RCS MANF L5 RM DILEMMA FLAG	GAX RM RCS DIP					
	V90X4445X	RCS MANF R1 RM DILEMMA FLAG	GAX RM RCS DIP					
	V90X4446X	RCS MANF R2 RM DILEMMA FLAG	GAX RM RCS DIP					

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X4447X	RCS MANF R3 RM DILEMMA FLAG	GAX					
			RM RCS DIP					
	V90X4448X	RCS MANF R4 RM DILEMMA FLAG	GAX					
			RM RCS DIP					
	V90X4449X	RCS MANF R5 RM DILEMMA FLAG	GAX					
			RM RCS DIP					
	V90X4450X	RCS MANF RM DILEMMA FLAG	GAX					
	V90X4451X	RCS PWR FAIL FLAG	GAX					
	V90X4564X	JET F2U LEAKING	DL FMT 22/1		BD		93017G	*
			DL FMT 23/1					
			DL FMT 32/1					
			GAX					
			RM RCS DIP					
	V90X4565X	JET F2D LEAKING	DL FMT 22/1		BD		93017G	*
			DL FMT 23/1					
			DL FMT 32/1					
			GAX					
			RM RCS DIP					
	V90X4566X	JET F3F LEAKING	DL FMT 22/1		BD		93017G	*
			DL FMT 23/1					
			DL FMT 32/1					
			GAX					
			RM RCS DIP					
	V90X4567X	JET F3L LEAKING	DL FMT 22/1		BD		93017G	*
			DL FMT 23/1					
			DL FMT 32/1					
			GAX					
			RM RCS DIP					
	V90X4568X	JET F3U LEAKING	DL FMT 22/1		BD		93017G	*
			DL FMT 23/1					
			DL FMT 32/1					
			GAX					
			RM RCS DIP					
	V90X4569X	JET F3D LEAKING	DL FMT 22/1		BD		93017G	*
			DL FMT 23/1					
			DL FMT 32/1					
			GAX					
			RM RCS DIP					
	V90X4570X	JET L1A FAILED OFF	DL FMT 21/1		BD		93017G	*
			DL FMT 22/A					
			DL FMT 23/1					
			DL FMT 32/A					
			GAX					
			RM RCS DIP					

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X4571X	JET L1L FAILED OFF	DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4572X	JET L1U FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4573X	JET L2L FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4574X	JET L2U FAILED OFF	RM RCS DIP DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4575X	JET L2D FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4576X	JET L3A FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4577X	JET L3L FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X4578X	JET L3D FAILED OFF	DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4579X	JET L4L FAILED OFF	DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4580X	JET L4U FAILED OFF	DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4581X	JET L4D FAILED OFF	DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4582X	JET L5D FAILED OFF	DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4583X	JET L5L FAILED OFF	DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4584X	JET R1A FAILED OFF	DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X4585X	JET R1R FAILED OFF	DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4586X	JET R1U FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4587X	JET R2R FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4588X	JET R2U FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4589X	JET R2D FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4590X	JET R3A FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4591X	JET R3R FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
			RM RCS DIP					

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X4592X	JET R3D FAILED OFF	DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4593X	JET R4R FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4594X	JET R4U FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4595X	JET R4D FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4596X	JET R5D FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4597X	JET R5R FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4598X	JET F1F FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
			RM RCS DIP					

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X4599X	JET F1L FAILED OFF	DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4601X	JET F1U FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4602X	JET F1D FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4603X	JET F2F FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4604X	JET F2R FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4605X	JET F2U FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4606X	JET F2D FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
			RM RCS DIP					

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X4607X	JET F3F FAILED OFF	DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4608X	JET F3L FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4609X	JET F3U FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4610X	JET F3D FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4611X	JET F4R FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4612X	JET F4D FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4613X	JET F5L FAILED OFF	RM RCS DIP DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X4614X	JET F5R FAILED OFF	DL FMT 21/1 DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4615X	JET F4R LEAKING	RM RCS DIP DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX		BD		93017G	*
	V90X4616X	JET F4D LEAKING	RM RCS DIP DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX		BD		93017G	*
	V90X4617X	JET F5L LEAKING	RM RCS DIP DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX		BD		93017G	*
	V90X4618X	JET F5R LEAKING	RM RCS DIP DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX		BD		93017G	*
	V90X4620X	JET L1A FAILED ON	RM RCS DIP DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4621X	JET L1L FAILED ON	RM RCS DIP DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4622X	JET L1U FAILED ON	RM RCS DIP DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X4623X	JET L2L FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4624X	JET L2U FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4625X	JET L2D FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4626X	JET L3A FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4627X	JET L3L FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4628X	JET L3D FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4629X	JET L4L FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4630X	JET L4U FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4631X	JET L4D FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X4632X	JET L5D FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4633X	JET L5L FAILED ON	RM RCS DIP DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4634X	JET R1A FAILED ON	RM RCS DIP DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4635X	JET R1R FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4636X	JET R1U FAILED ON	RM RCS DIP DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4637X	JET R2R FAILED ON	RM RCS DIP DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4638X	JET R2U FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4639X	JET R2D FAILED ON	RM RCS DIP DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4641X	JET R3A FAILED ON	RM RCS DIP DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
			RM RCS DIP					

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X4642X	JET R3R FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4643X	JET R3D FAILED ON	RM RCS DIP DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4644X	JET R4R FAILED ON	RM RCS DIP DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4645X	JET R4U FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4646X	JET R4D FAILED ON	RM RCS DIP DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4647X	JET R5D FAILED ON	RM RCS DIP DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4648X	JET R5R FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4649X	JET F1F FAILED ON	RM RCS DIP DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4650X	JET F1L FAILED ON	RM RCS DIP DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
			RM RCS DIP					

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X4651X	JET F1U FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4652X	JET F1D FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4653X	JET F2F FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4654X	JET F2R FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4655X	JET F2U FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4656X	JET F2D FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4657X	JET F3F FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4658X	JET F3L FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*
	V90X4659X	JET F3U FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX RM RCS DIP		BD		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X4660X	JET F3D FAILED ON	DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4661X	JET F4R FAILED ON	RM RCS DIP DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4662X	JET F4D FAILED ON	RM RCS DIP DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4663X	JET F5L FAILED ON	RM RCS DIP DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4664X	JET F5R FAILED ON	RM RCS DIP DL FMT 22/A DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X4665X	JET L1A LEAKING	RM RCS DIP DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX		BD		93017G	*
	V90X4666X	JET L1L LEAKING	RM RCS DIP DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX		BD		93017G	*
	V90X4667X	JET L1U LEAKING	RM RCS DIP DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX		BD		93017G	*
	V90X4668X	JET L2L LEAKING	RM RCS DIP DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX		BD		93017G	*
			RM RCS DIP					

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X4669X	JET L2U LEAKING	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX RM RCS DIP		BD		93017G	*
	V90X4670X	JET L2D LEAKING	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX RM RCS DIP		BD		93017G	*
	V90X4671X	JET L3A LEAKING	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX RM RCS DIP		BD		93017G	*
	V90X4672X	JET L3L LEAKING	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX RM RCS DIP		BD		93017G	*
	V90X4673X	JET L3D LEAKING	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX RM RCS DIP		BD		93017G	*
	V90X4674X	JET L4L LEAKING	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX RM RCS DIP		BD		93017G	*
	V90X4675X	JET L4U LEAKING	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX RM RCS DIP		BD		93017G	*
	V90X4676X	JET L4D LEAKING	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX RM RCS DIP		BD		93017G	*
	V90X4677X	JET L5D LEAKING	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX RM RCS DIP		BD		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X4678X	JET L5L LEAKING	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX		BD		93017G	*
	V90X4679X	JET R1A LEAKING	RM RCS DIP DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX		BD		93017G	*
	V90X4681X	JET R1R LEAKING	RM RCS DIP DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX		BD		93017G	*
	V90X4682X	JET R1U LEAKING	RM RCS DIP DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX		BD		93017G	*
	V90X4683X	JET R2R LEAKING	RM RCS DIP DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX		BD		93017G	*
	V90X4684X	JET R2U LEAKING	RM RCS DIP DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX		BD		93017G	*
	V90X4685X	JET R2D LEAKING	RM RCS DIP DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX		BD		93017G	*
	V90X4686X	JET R3A LEAKING	RM RCS DIP DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX		BD		93017G	*
	V90X4687X	JET R3R LEAKING	RM RCS DIP DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX		BD		93017G	*
			RM RCS DIP					

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X4688X	JET R3D LEAKING	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX RM RCS DIP		BD		93017G	*
	V90X4689X	JET R4R LEAKING	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX RM RCS DIP		BD		93017G	*
	V90X4690X	JET R4U LEAKING	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX RM RCS DIP		BD		93017G	*
	V90X4691X	JET R4D LEAKING	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX RM RCS DIP		BD		93017G	*
	V90X4692X	JET R5D LEAKING	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX RM RCS DIP		BD		93017G	*
	V90X4693X	JET R5R LEAKING	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX RM RCS DIP		BD		93017G	*
	V90X4694X	JET F1F LEAKING	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX RM RCS DIP		BD		93017G	*
	V90X4695X	JET F1L LEAKING	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX RM RCS DIP		BD		93017G	*
	V90X4696X	JET F1U LEAKING	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX RM RCS DIP		BD		93017G	*

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X4697X	JET F1D LEAKING	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX		BD		93017G	*
	V90X4698X	JET F2F LEAKING	RM RCS DIP DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX		BD		93017G	*
	V90X4699X	JET F2R LEAKING	RM RCS DIP DL FMT 22/1 DL FMT 23/1 DL FMT 32/1 GAX		BD		93017G	*
	V95X8400XB	JET F1F DESELECT	RM RCS DIP					
	V95X8401XB	JET F1L DESELECT	RM RCS DIP					
	V95X8402XB	JET F1U DESELECT	RM RCS DIP					
	V95X8403XB	JET F1D DESELECT	RM RCS DIP					
	V95X8404XB	JET F2F DESELECT	RM RCS DIP					
	V95X8405XB	JET F2R DESELECT	RM RCS DIP					
	V95X8406XB	JET F2U DESELECT	RM RCS DIP					
	V95X8407XB	JET F2D DESELECT	RM RCS DIP					
	V95X8408XB	JET F3F DESELECT	RM RCS DIP					
	V95X8409XB	JET F3L DESELECT	RM RCS DIP					
	V95X8410XB	JET F3U DESELECT	RM RCS DIP					
	V95X8411XB	JET F3D DESELECT	RM RCS DIP					
	V95X8412XB	JET F4R DESELECT	RM RCS DIP					
	V95X8413XB	JET F4D DESELECT	RM RCS DIP					
	V95X8414XB	JET F5L DESELECT	RM RCS DIP					
	V95X8415XB	JET F5R DESELECT	RM RCS DIP					
	V95X8416XB	JET L1A DESELECT	RM RCS DIP					
	V95X8417XB	JET L1L DESELECT	RM RCS DIP					
	V95X8418XB	JET L1U DESELECT	RM RCS DIP					
	V95X8419XB	JET L2L DESELECT	RM RCS DIP					
	V95X8420XB	JET L2U DESELECT	RM RCS DIP					
	V95X8421XB	JET L2D DESELECT	RM RCS DIP					
	V95X8422XB	JET L3A DESELECT	RM RCS DIP					
	V95X8423XB	JET L3L DESELECT	RM RCS DIP					
	V95X8424XB	JET L3D DESELECT	RM RCS DIP					
	V95X8425XB	JET L4L DESELECT	RM RCS DIP					
	V95X8426XB	JET L4U DESELECT	RM RCS DIP					
	V95X8427XB	JET L4D DESELECT	RM RCS DIP					
	V95X8428XB	JET L5D DESELECT	RM RCS DIP					
	V95X8429XB	JET L5L DESELECT	RM RCS DIP					

TABLE 4.9.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT
(G4.91)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V95X8430XB	JET R1A DESELECT	RM RCS DIP					
	V95X8431XB	JET R1R DESELECT	RM RCS DIP					
	V95X8432XB	JET R1U DESELECT	RM RCS DIP					
	V95X8433XB	JET R2R DESELECT	RM RCS DIP					
	V95X8434XB	JET R2U DESELECT	RM RCS DIP					
	V95X8435XB	JET R2D DESELECT	RM RCS DIP					
	V95X8436XB	JET R3A DESELECT	RM RCS DIP					
	V95X8437XB	JET R3R DESELECT	RM RCS DIP					
	V95X8438XB	JET R3D DESELECT	RM RCS DIP					
	V95X8439XB	JET R4R DESELECT	RM RCS DIP					
	V95X8440XB	JET R4U DESELECT	RM RCS DIP					
	V95X8441XB	JET R4D DESELECT	RM RCS DIP					
	V95X8442XB	JET R5D DESELECT	RM RCS DIP					
	V95X8443XB	JET R5R DESELECT	RM RCS DIP					

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 4.9.4-3. REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT (G4.91) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
FVRCS_FU_LEAK_TEMP_LT_AE	V96U8501C	VDC	F	S	L	P	G4.91	00	QFL	92509C	
FVRCS_FU_LEAK_TEMP_LT_ORB	V96U8549C	VDC	F	S	L	P	G4.91	00	QFL	92509C	
FVRCS_OX_LEAK_TEMP_LT_AE	V96U8502C	VDC	F	S	L	P	G4.91	00	QFL	92509C	
FVRCS_OX_LEAK_TEMP_LT_ORB	V96U8550C	VDC	F	S	L	P	G4.91	00	QFL	92509C	
JET_MAP(01)	V97U2677C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(02)	V97U2678C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(03)	V97U2679C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(04)	V97U2680C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(05)	V97U2681C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(06)	V97U2682C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(07)	V97U2683C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(08)	V97U2684C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(09)	V97U2685C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(10)	V97U2686C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(11)	V97U2687C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(12)	V97U2688C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(13)	V97U2689C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(14)	V97U2690C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(15)	V97U2691C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(16)	V97U2692C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(17)	V97U2693C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(18)	V97U2694C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(19)	V97U2695C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(20)	V97U2696C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(21)	V97U2697C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(22)	V97U2698C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(23)	V97U2699C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(24)	V97U2700C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(25)	V97U2701C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(26)	V97U2702C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(27)	V97U2703C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(28)	V97U2704C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(29)	V97U2705C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(30)	V97U2706C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(31)	V97U2707C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(32)	V97U2708C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(33)	V97U2709C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(34)	V97U2710C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(35)	V97U2711C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(36)	V97U2712C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(37)	V97U2713C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
JET_MAP(38)	V97U2714C	ND	I	S	M	P	G4.91	00	FSW	DC0599	
LVRCS_FU_LEAK_TEMP_LT_AE	V96U8503C	VDC	F	S	L	P	G4.91	00	QFL	92509C	
LVRCS_FU_LEAK_TEMP_LT_ORB	V96U8551C	VDC	F	S	L	P	G4.91	00	QFL	92509C	
LVRCS_OX_LEAK_TEMP_LT_AE	V96U8504C	VDC	F	S	L	P	G4.91	00	QFL	92509C	
LVRCS_OX_LEAK_TEMP_LT_ORB	V96U8552C	VDC	F	S	L	P	G4.91	00	QFL	92509C	
MANF_DILEM_PASS_CONT_LT	V98U7162C	ND	I	S	D	P	G4.91	00	QSL	DC0691	

TABLE 4.9.4-3. REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT (G4.91) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
PWR_FAIL_PASS_CNT_LT	V98U7161C	ND	I	S	D	P	G4.91	00	QSL	DC0691	
RCS_FU_LEAK_TEMP_LT	V99U7507C	VDC	F	S	D	P	G4.91	00	QFL	DC0691	
RCS_FWD_JET_FAIL_LT	V90J4452CA	ND	I	S	D	P	G4.91	00	QSL	DC0691	
RCS_F_OFF_CNT	V97U3227C	ND	I	S	D	P	G4.91	00	QSL	DC0691	
RCS_F_ON_CNT	V97U3228C	ND	I	S	D	P	G4.91	00	QSL	DC0691	
RCS_LK_COUNT	V97U3229C	ND	I	S	D	P	G4.91	00	QSL	DC0691	
RCS_L_JET_FAIL_LT	V90J4453CA	ND	I	S	D	P	G4.91	00	QSL	DC0691	
RCS_OX_LEAK_TEMP_LT	V99U7508C	VDC	F	S	D	P	G4.91	00	QFL	DC0691	
RCS_R_JET_FAIL_LT	V90J4454CA	ND	I	S	D	P	G4.91	00	QSL	DC0691	
RVRCS_FU_LEAK_TEMP_LT_AE	V96U8505C	VDC	F	S	L	P	G4.91	00	QFL	92509C	
RVRCS_FU_LEAK_TEMP_LT_ORB	V96U8553C	VDC	F	S	L	P	G4.91	00	QFL	92509C	
RVRCS_OX_LEAK_TEMP_LT_AE	V96U8506C	VDC	F	S	L	P	G4.91	00	QFL	92509C	
RVRCS_OX_LEAK_TEMP_LT_ORB	V96U8554C	VDC	F	S	L	P	G4.91	00	QFL	92509C	

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

TABLE 4.9.4-4. REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT (G4.91) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
AUTO_MANF_CL_ENA_INIT INITIALIZATION VALUE FOR AUTO_MANF_CL_ENA	V97U0120C	00	ON	NONE	D		P	G4.91	92887A	

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

TABLE 4.9.4-5. REACTION CONTROL SYSTEM REDUNDANCY MANAGEMENT (G4.91) 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.

4.10 OMS RM (PF 4.92)

The OMS RM function includes the OMS engine FDI function, which monitors OMS engine thrust performance, and the OMS actuator FDI function, which monitors OMS gimbal actuator performance.

Figure 4.10–1 is an overview block diagram of the OMS RM functional module.

4.10.1 OMS Functional Requirements

The OMS RM functional requirements are composed of two subfunctions: OMS engine FDI and OMS actuator FDI.

4.10.1.1 OMS Engine FDI Functional Requirements.

The objective of the OMS engine FDI algorithm is to detect and identify performance of the OMS engine that is below a predetermined value. The algorithm utilizes independent measurements of engine chamber pressure and vehicle velocity to perform the FDI function. Engine chamber pressure is monitored continuously; however, monitoring is inhibited if a commfault is indicated. Velocity measurements are used after the main engines are shut down and the external tank is separated. The velocity measurements are used to determine the number of engines actually firing by comparing the measured velocity increment over 0.96 second to the appropriate threshold value.

The OMS Left and Right ON Command Indicators specify which engine(s) should be firing and when they should be firing.

Failures are defined as follows:

1. An off–failure is defined as the case in which an engine is providing thrust below a threshold value when commanded on.
2. An on–failure is defined as the case in which the engine chamber pressure is above a threshold value when the engine is commanded off.

The output of the OMS engine FDI is a notification to the crew of an on/off failure condition.

Reconfiguration is accomplished by crew operation of the OMS arm/press, arm switch.

Figure 4.10–2 is a flow chart of the OMS Engine FDI. The processor is scheduled by the MSC (see CPDS Vol. V, Book 1, Level B) and will perform the following functions.

1. Initialize variables (refer to paragraph 4.10.3) upon receipt of initialization signal from MSC.
2. Establish an arm status based on the OMS arm or arm/press signal from switch RM.
3. Monitor the OMS Left and Right ON Command Indicators from the OMS Fire Sequence to determine which OMS engine should fire (left or right, both or neither) and when the engine(s) should fire.
4. Monitor the status of the MECO flag. If the main engine is operating, proceed with Step 6.

5. Compare the delta velocity (DVB_SEC_X) to the appropriate threshold (one engine or two engines) and determine if the velocity is greater or less than the threshold.
6. Compare the left and right chamber pressure values to the PC threshold. Determine if the chamber pressures are greater or less than the threshold and if the engine(s) should be firing or not firing.
7. If the velocity is less than or equal to the threshold (Step 5), increment a counter. When the counter equals a predetermined number, a velocity failure condition is declared. If the velocity is greater than the threshold, zero the counter and update the two engine threshold.
8. Monitor the status of the left OMS chamber pressure commfault. If the commfault exists, proceed with Step 10.
9. If the left chamber pressure is in violation of the threshold (Step 6), increment a counter. When the counter equals a predetermined number, a chamber pressure failure condition is declared. If the left chamber pressure is not in violation of the threshold, zero the counter.
10. Monitor the status of the right OMS chamber pressure commfault. If the commfault does not exist, repeat Step 9 for the right chamber pressure; then proceed with Step 11 if commfault exists.
11. Set a L_OMS_ALERT signal if the left chamber pressure is failed and the velocity is failed. Set an R_OMS_ALERT signal if the right chamber pressure is failed and the velocity is failed.
12. Set and latch the appropriate OMS_SHUTDOWN_FLAG if an OMS_ALERT signal (Step 11) is on and the corresponding OMS_ARM_STATUS (Step 2) is off.

4.10.1.2 OMS Actuator FDI.

The objective of the OMS actuator FDI algorithm is to detect and identify off-nominal performance of the pitch and yaw gimbal actuators for the two OMS engines, and generate OMS fail status indications. Since inputs for performance monitoring of the four actuators are made available and processed separately for each actuator, the failure detection and identification problem reduces to one of detection only. Failures are detected by testing the actuator position feedback versus the actuator commanded position and comparing the result to a K-load threshold. A specified number of successive failure indications are necessary to set an OMS actuator failure flag.

The four OMS actuator failure status indications are generated for display to the crew.

The following assumptions apply to the OMS actuator FDI algorithm:

1. Whenever an actuator DATA_GOOD flag indicates the zero state (bad data), the OMS actuator FDI function shall not be processed on that actuator channel data, and an "M" shall be displayed.
2. The OMS actuator FDI algorithm is capable of detecting and identifying full-off failures only.

3. An unfailed OMS actuator achieves a steady-state nominal extension rate within two minor cycles in response to an applied voltage.
4. The OMS actuator FDI algorithm is not capable of detecting failures downstream of the actuator output, i.e., in the gimbal mounting structure.

4.10.1.2.1 OMS ACTUATOR FDI Functional Requirements.

Each of the OMS engines is equipped with two gimbal actuators, which are used to control nozzle deflections in pitch and yaw. The pitch and yaw actuators are identical in design, except for the stroke length, and contain redundant channels, which couple to a common drive assembly.

The OMS gimbal actuator servo loop is described in more detail in CSDL MEMO 75-10C-39. Familiarity with its operation will aid in understanding the OMS actuator FDI procedure. Figure 4.10-3 is a simplified block diagram of an OMS gimbal actuator servo loop. The gimbal deflection command is differenced with the measured gimbal deflection to obtain the gimbal deflection error. The deflection error is then supplied to a servo amplifier, which is a bangbang amplifier with dead zone and hysteresis. The output of the servo amplifier is the actuator input voltage, which drives the actuator motor. The output of the actuator motor is the actuator extension measured from null. A linear voltage differential transformer (LVDT) position transducer senses the actuator output extension and converts it to the measured gimbal deflection.* Note that the actual gimbal deflection is the output of the OMS gimbal mounting structure dynamics, while the measured gimbal deflection is inferred from the actuator output extension.

- * The actuator extension length (measured from null), rather than the OMS gimbal angle itself, is the sensed quantity.

If the gimbal deflection error is outside the servo amplifier dead zone, the actuator is being commanded to extend or retract. If the gimbal deflection error is within the servo amplifier dead zone, the actuator may or may not be commanded to extend or retract, depending upon the history of the gimbal deflection error. For OMS actuator failure detection, the actuator is assumed to be continuously extending or retracting only if the gimbal deflection error remains outside the servo amplifier dead zone.

The OMS actuator FDI algorithm determines whether an actuator has failed by testing the actuator position feedback versus the actuator commanded position. If the difference between the position feedback and the commanded position exceeds a K-Loaded threshold, a failure is detected. Before an actuator failure flag is set to ON, O_A_COUNT successive failed tests must have occurred.

The OMS actuator FDI algorithm detects full-off failures, monitors OMS TVC actuator DATA_GOOD indications, and generates OMS actuator fail status indications on an actuator basis for the channels selected by the crew for display to the crew. Full-on failures will also be detected, but not directly. For instance, if a full-on extension failure occurs, the gimbal actuator servo loop will eventually sense that the gimbal has extended too far and will command it to retract. At this point, a test under commanded retraction will be performed and failed. In other words, a full-on failure in gimbal extension becomes a full-off failure in gimbal retraction through the actions of the gimbal actuator servo loop. If the actuator has failed, the failure counter will be incremented. After O_A_COUNT successive failures, the OMS_ACTUATOR_FAIL flag will be set to ON ("1" state). The associated ACTUATOR_FAIL_CTR's

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for a given set of gimbals (left pitch/yaw or right pitch/yaw) shall be set to ZERO whenever the crew changes the status of the active gimbal drive system (e.g., PRI → SEC, SEC → PRI, PRI/SEC → OFF, OFF → PRI/SEC) via keyboard entry. The associated FAIL FLAGS for the active gimbal drive system shall be set to ZERO whenever the crew reselects the active system (e.g., PRI → PRI, SEC → SEC) or selects a new active drive system, i.e., PRI → SEC, SEC → PRI, OFF → PRI/SEC (processed in XXXXX MNVR YYYYYY P.F.6.35 – Ref. STS 83–0020). Figure 4.10–4 shows a functional flow diagram for the OMS actuator FDI.

The OMS actuator fail status indications shall be generated as follows:

1. If the OMS actuator DATA_GOOD flag indicates the “zero” state (data bad), the OMS actuator fail status indication for that actuator shall be set to the “1” state (missing data –M).
2. If the OMS actuator DATA_GOOD flag indicates the “1” state (DATA_GOOD) and the OMS_ACTUATOR_FAIL flag indicates the “1” state (failed), the OMS actuator fail status indication shall be set to the “2” state (actuator fail = ↓).
3. If the OMS actuator DATA_GOOD flag indicates the “1” state (DATA_GOOD) and the OMS_ACTUATOR_FAIL flag indicates the “zero” state (good), the OMS actuator fail status indication shall be set to the “zero” state (good blank).

4.10.2 Processing Requirements

The OMS RM processing requirements are as follows:

Module	Rate	Major Mode Applicability											
		102	103	104	105	106	202	301	302	303	304	601	602
OMS engine FDI	1.04 Hz	X	X	X	X		X		X		X	X	X
OMS ACTUATOR FDI	6.25 Hz			X	X	X	X	X	X	X	X		

4.10.3 Initialization Requirements

The following variables in the OMS RM processing will be set to the indicated value in the initial program load (IPL).

Variable	MC1	MC2	MC3
OMS_L_ON_CMD_IND	off	off	off
MECO confirmed flag	off	on	on
OMS_R_ON_CMD_IND	off	off	off

The following variables will be initialized when the OMS_ENGINE_FDI_INIT_FLAG is on.

Variable	Initial Value
ONE_ENGINE_THRESH	C1/vehicle mass
TWO_ENGINE_THRESH	C2/vehicle mass
FAIL_COUNTER ₁	0
FAIL_COUNTER ₂	0
FAIL_COUNTER ₃	0
L_OMS_ALERT	Off
L_OMS_SHUTDOWN_FLAG	Off
R_OMS_ALERT	Off
R_OMS_SHUTDOWN_FLAG	Off
K	C2
VEL_PREFAIL	Off
L_CHAMB_PRESS_PREFAIL	Off
R_CHAMB_PRESS_PREFAIL	Off
VEL_FAIL_FLAG	Off
L_CHAMB_PRESS_FAIL_FLAG	Off
R_CHAMB_PRESS_FAIL_FLAG	Off

After the initialization of the OMS engine FDI, the OMS_ENGINE_FDI_INIT_RESET_FLAG is set true. On subsequent passes, this flag is set false.

The following variables will be initialized when the OMS_ACT_FDI_INIT_FLAG is set true:

Variable	Initial Value
REF_EXT_I (array of 4)	0
ACTUATOR_FAIL_COUNTER_I (array of 4)	0
OMS_ACTUATOR_FAIL_I (array of 4)	0

After initialization of OMS ACT FDI, the OMS_ACT_FDI_INIT_RESET_FLAG is set true: On subsequent passes, this flag is set false.

4.10.4 Parameter Tables for OMS RM

The IDD inputs and outputs are listed in Tables 4.10.4-1 and 4.10.4-2 respectively. K-loads are listed in Table 4.10.4-4. There are no I-load or constants requirements for OMS RM.

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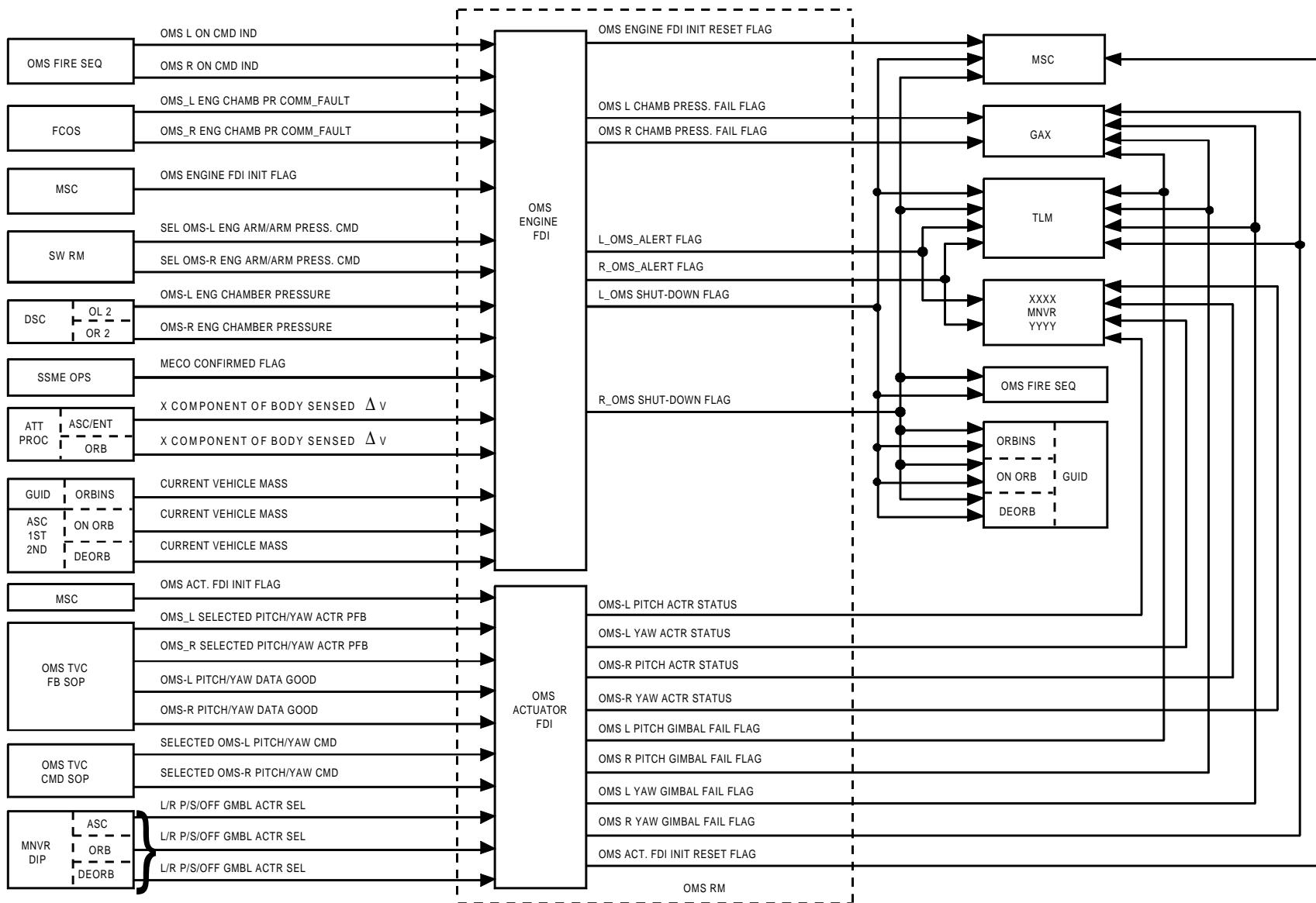


FIGURE 4.10-1. OMS RM Overall Block Diagram

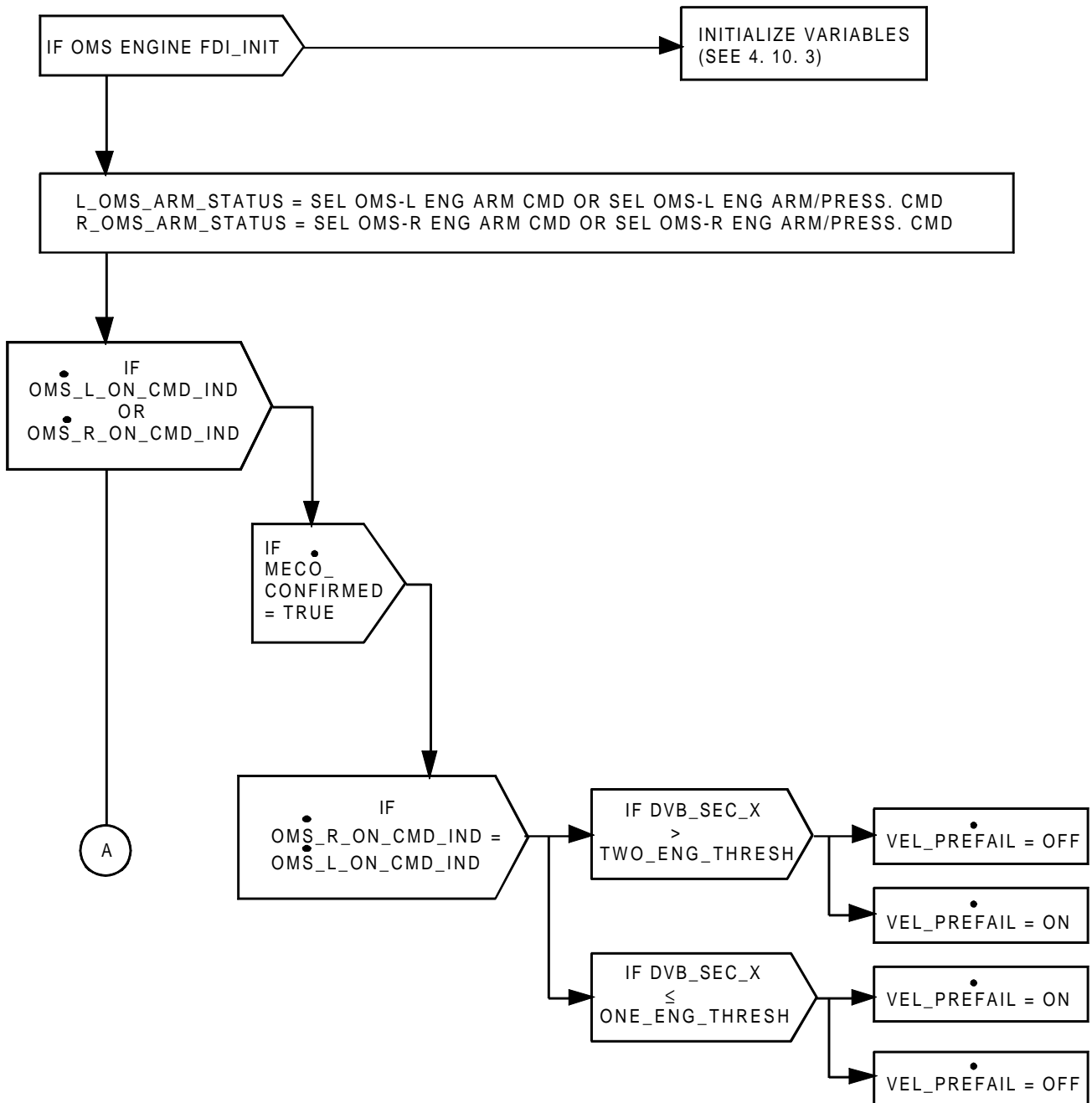


FIGURE 4.10-2.(1) OMS_ENGINE_FDI Functional Flow (Sheet 1 of 3)

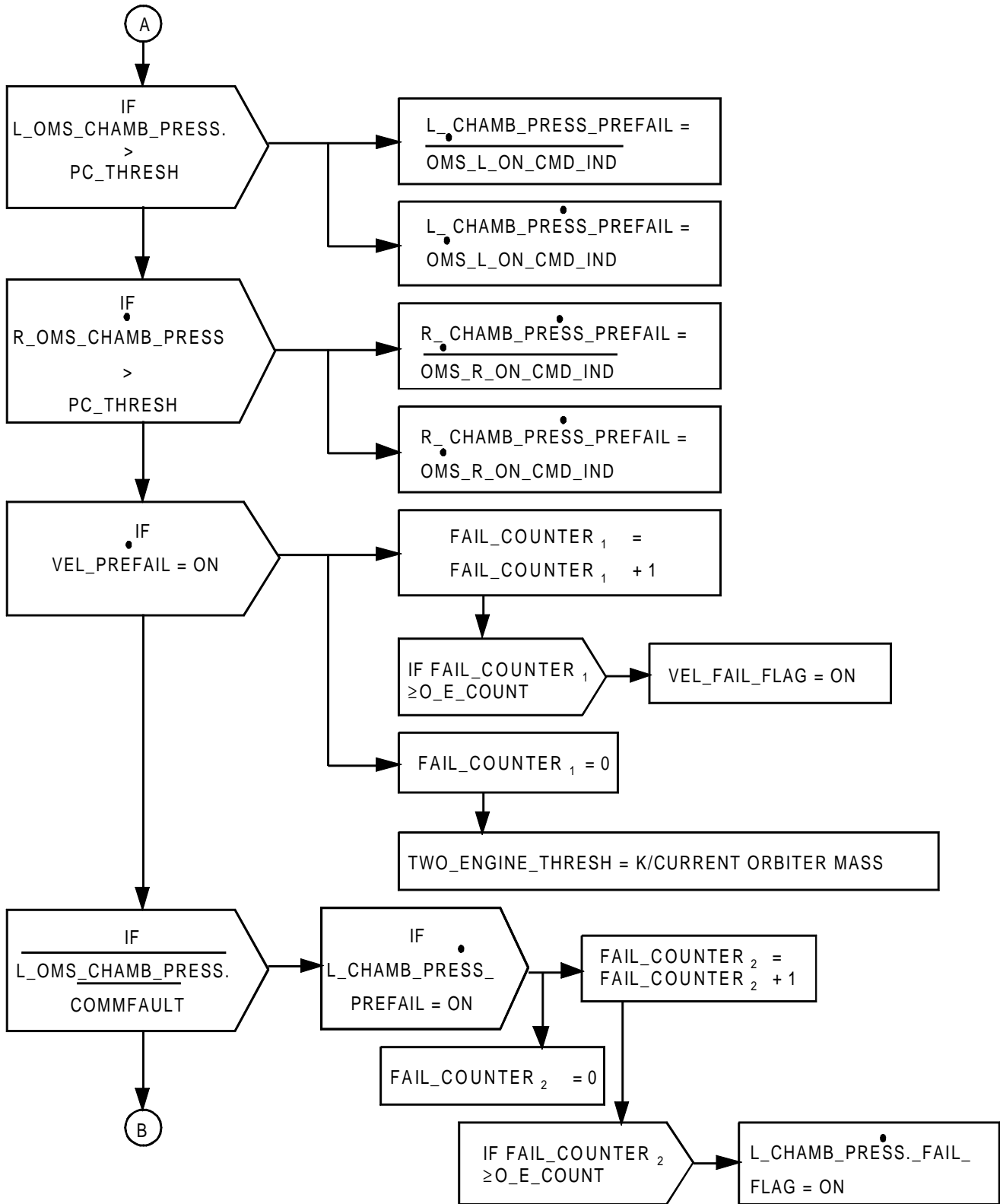


FIGURE 4.10-2.(2) OMS_ENGINE_FDI Functional Flow (Sheet 2 of 3)

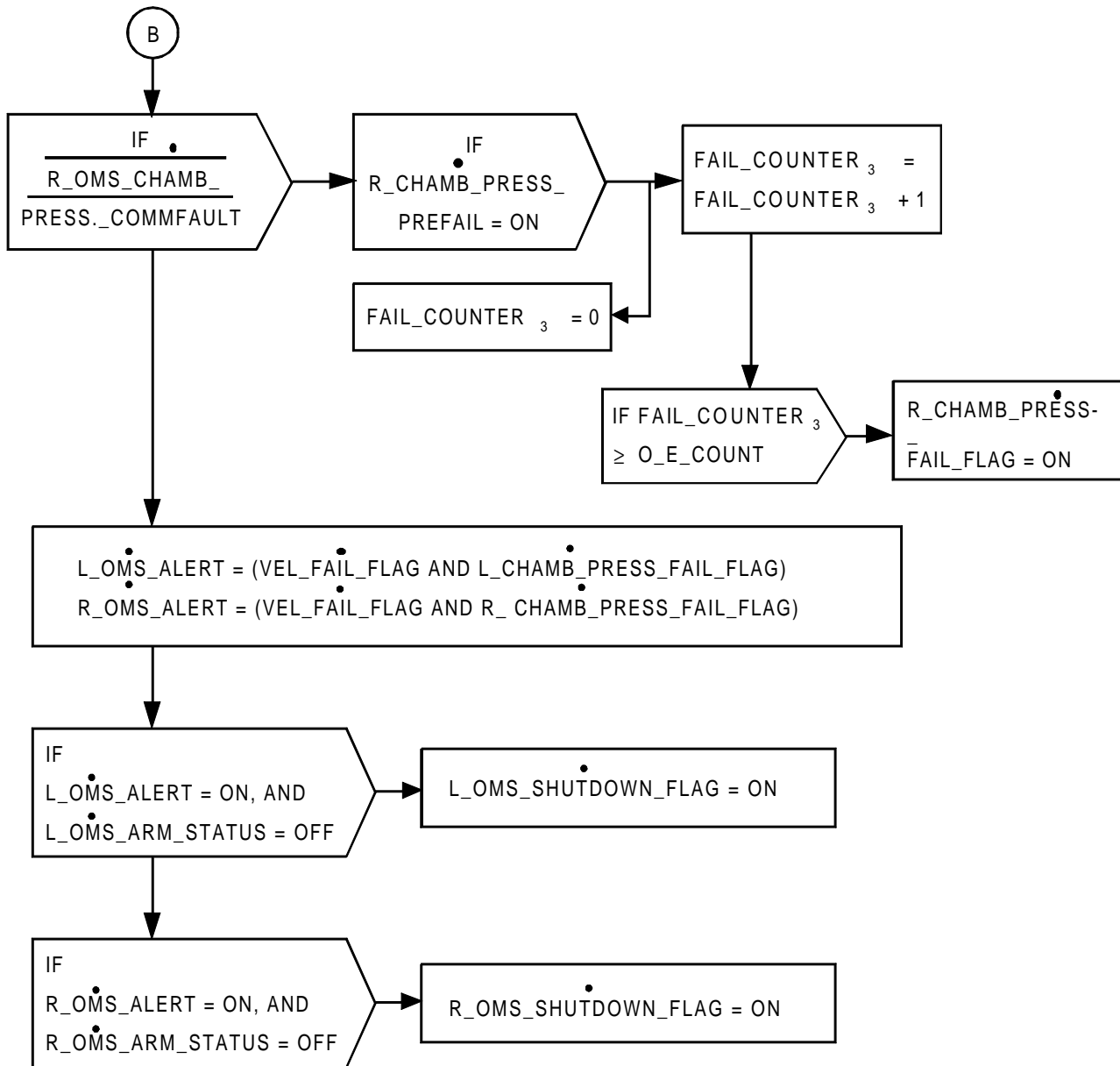


FIGURE 4.10-2.(3) OMS_ENGINE_FDI Functional Flow (Sheet 3 of 3)

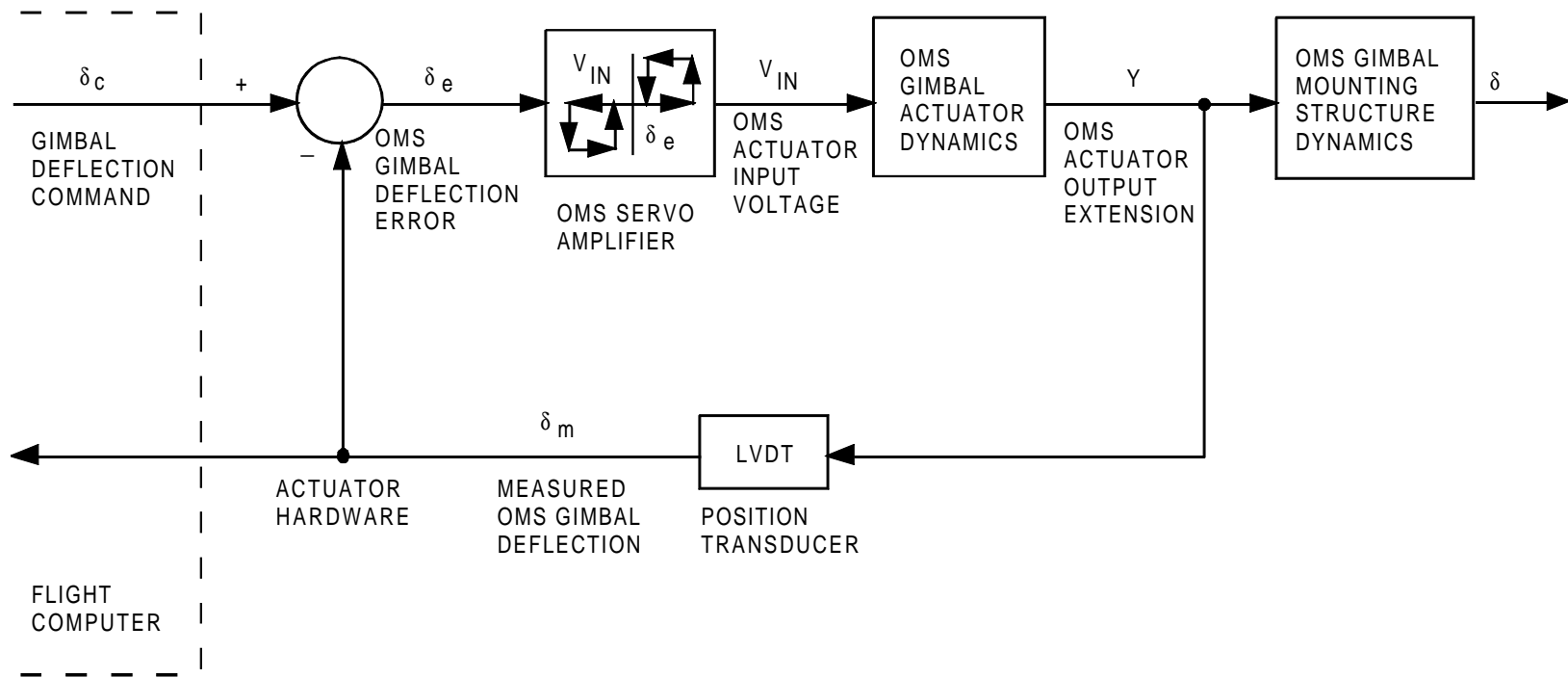


FIGURE 4.10-3. Simplified Block Diagram of OMS Gimbal Actuator Servo Loop

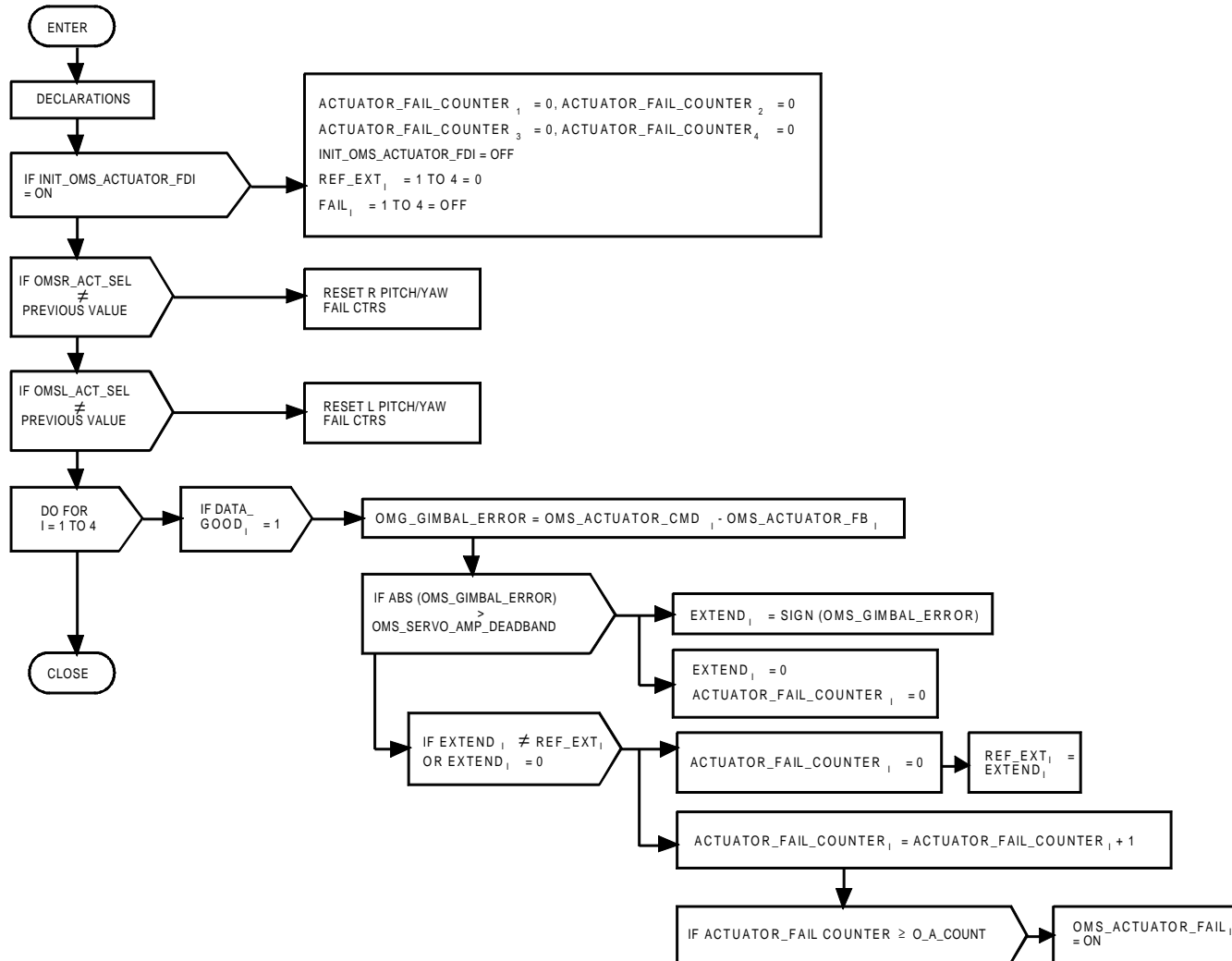


FIGURE 4.10-4. OMS_ACTUATOR_FDI Functional Flow

TABLE 4.10.4-1. INPUT FUNCTIONAL PARAMETERS FOR ORBITAL MANEUVERING SYSTEM FDIR (G4.92)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
BAILOUT_FLAG	V90X8654X	BAILOUT FLAG	MSC				89599C	
DVB_SEC(1)	V90L2696C	1 SEC VEL INC-X	ORB ATT PROC	FT/S	SPL		93017G	*
DVB_SEC(1)	V90U2307C	BODY VEL INCREMENT LO RATE X AXIS	A/E ATT PROC	FT/S			89688A	
DVB_SEC(2)	V90L2697C	1 SEC VEL INC-Y	ORB ATT PROC	FT/S	SPL		93017G	*
DVB_SEC(2)	V90U2308C	BODY VEL INCREMENT LO RATE Y AXIS	A/E ATT PROC	FT/S			89688A	
DVB_SEC(3)	V90L2698C	1 SEC VEL INC-Z	ORB ATT PROC	FT/S	SPL		93017G	*
DVB_SEC(3)	V90U2309C	BODY VEL INCREMENT LO RATE Z AXIS	A/E ATT PROC	FT/S			89688A	
GUIDED_DELTA_V_BURN	V90X8647X	GUIDED DELTA V BURN IND	MSC				89599C	
LOMSPDG	V95X1606X	L OMS PITCH DATA GOOD	OMS TVC FB SOP					
LOMSYDG	V95X1607X	L OMS YAW DATA GOOD	OMS TVC FB SOP					
M	V90U1961CD	CURRENT VEHICLE MASS	ORB GUID	SLUGS			89648A	
M/CURR_ORB_MASS/MASS	V90U1961CC	CURRENT VEHICLE MASS	DEORB GUID	SLUGS			93090E	
M/CURR_ORB_MASS/WEIGHT	V90U1961CA	CURRENT VEHICLE MASS	ORB INS GUID	SLUGS			93017G	*
M/CURR_ORB_MASS/WEIGHT	V90U1961CF	CURRENT VEHICLE MASS	ASC 1STG GUID	SLUGS			93017G	*
M/CURR_ORB_MASS/WEIGHT	V90U1961CG	CURRENT VEHICLE MASS	ASC 2STG GUID	SLUGS			93017G	*
MECO_CMD	V90X8569XA	MECO COMMAND FLAG	SSME OPS		BD		93017G	*
MECO_CONFIRMED	V90X8561X	MECO CONFIRMED FLAG	SSME OPS		BD		93017G	*
MM_CODE_102/MM_102	V90X8158X	MAJOR MODE 102 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_201/MM_201	V90X8189X	MAJOR MODE 201 FLAG	MSC				92355B	
MM_CODE_602/MM_602	V90X8174X	MAJOR MODE 602 FLAG	MSC				92355B	
OMSL_ACT_SEL	V93J6904CA	L P/S/OFF GMBL ACTR SEL	XXXXX MNVR DISP					
OMSL_ACT_SEL	V93J6904CB	L P/S/OFF GMBL ACTR SEL	ASC MNVR DIP					
OMSL_ACT_SEL	V93J6904CC	L P/S/OFF GMBL ACTR SEL	ORB MNVR DIP					
OMSL_ACT_SEL	V93J6904CD	L P/S/OFF GMBL ACTR SEL	DEORB MNVR DIP					
OMSR_ACT_SEL	V93J6906CA	R P/S/OFF GMBL ACTR SEL	XXXXX MNVR DISP					
OMSR_ACT_SEL	V93J6906CB	R P/S/OFF GMBL ACTR SEL	ASC MNVR DIP					
OMSR_ACT_SEL	V93J6906CC	R P/S/OFF GMBL ACTR SEL	ORB MNVR DIP					
OMSR_ACT_SEL	V93J6906CD	R P/S/OFF GMBL ACTR SEL	DEORB MNVR DIP					
OMS_L_ON_CMD_IND	V90X8271X	OMS-L ON CMD IND	OMS FIRE SEQ				90120B	
OMS_R_ON_CMD_IND	V90X8272X	OMS-R ON CMD IND	OMS FIRE SEQ				90120B	
ROMSPDG	V95X1608X	R OMS PITCH DATA GOOD	OMS TVC FB SOP					
ROMSYDG	V95X1609X	R OMS YAW DATA GOOD	OMS TVC FB SOP					
SEL_OMS_LP_CMD	V95H1564C	SELECTED OMS-L PITCH CMD	OMS TVC CMD SOP	DEG				
SEL_OMS_LY_CMD	V95H1562C	SELECTED OMS-L YAW CMD	OMS TVC CMD SOP	DEG				
SEL_OMS_RP_CMD	V95H1565C	SELECTED OMS-R PITCH CMD	OMS TVC CMD SOP	DEG				
SEL_OMS_RY_CMD	V95H1563C	SELECTED OMS-R YAW CMD	OMS TVC CMD SOP	DEG				
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			
	V43P4649C	OMS-L ENG CHAMBER PRESSURE	DSC OL2		AMU		93017G	*
	V43P5649C	OMS-R ENG CHAMBER PRESSURE	DSC OR2		AMU		93017G	*
	V90X7539XA	SEL OMS-L ENG ARM CMD	GN&C SW RM				90182	
	V90X7540XA	SEL OMS-L ENG ARM/PRESS CMD	GN&C SW RM				90182	

TABLE 4.10.4-1. INPUT FUNCTIONAL PARAMETERS FOR ORBITAL MANEUVERING SYSTEM FDIR (G4.92)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X7541XA	SEL OMS-R ENG ARM CMD	GN&C SW RM				90182	
	V90X7542XA	SEL OMS-R ENG ARM/PRESS CMD	GN&C SW RM				90182	
	V90X8627X	OMS ENGINE FDI INIT FLAG	MSC				89599C	
	V90X8641X	OMS ACT FDI INIT FLAG	MSC					
	V91X2605X	OMS ENGINE CHAMBER PRESS LEFT CF	FCOS					
	V91X2608X	OMS ENGINE CHAMBER PRESS RIGHT CF	FCOS					

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

TABLE 4.10.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM ORBITAL MANEUVERING SYSTEM FDIR (G4.92)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
OMSL_PITCH_FAIL	V90X7677XA	OMS L PITCH GIMBAL FAIL FLAG	DL FMT 21/A DL FMT 22/A DL FMT 23/A GAX		BD		93017G	*
OMSL_PITCH_STATUS	V94J4065C	OMS-L PITCH ACTR STATUS	XXXXX MNVR DISP		VAR			
OMSL_YAW_FAIL	V90X7679XA	OMS L YAW GIMBAL FAIL FLAG	DL FMT 21/A DL FMT 22/A DL FMT 23/A GAX		BD		93017G	*
OMSL_YAW_STATUS	V94J4066C	OMS-L YAW ACTR STATUS	XXXXX MNVR DISP		VAR			
OMSR_PITCH_FAIL	V90X7678XA	OMS R PITCH GIMBAL FAIL FLAG	DL FMT 21/A DL FMT 22/A DL FMT 23/A GAX		BD		93017G	*
OMSR_PITCH_STATUS	V94J4067C	OMS-R PITCH ACTR STATUS	XXXXX MNVR DISP		VAR			
OMSR_YAW_FAIL	V90X7680XA	OMS R YAW GIMBAL FAIL FLAG	DL FMT 21/A DL FMT 22/A DL FMT 23/A GAX		BD		93017G	*
OMSR_YAW_STATUS	V94J4068C	OMS-R YAW ACTR STATUS	XXXXX MNVR DISP		VAR			
S_LOMS_FAIL	V90X7670X	LEFT OMS ENGINE SHUTDOWN FLAG	DL FMT 21/A DL FMT 22/1 DL FMT 23/1 MSC		BD		93017G	*
S_ROMS_FAIL	V90X7671X	RIGHT OMS ENGINE SHUTDOWN FLAG	DL FMT 21/A DL FMT 22/1 DL FMT 23/1 MSC		BD		93017G	*
	V90M2926P	CGEB_FLT_LG1_FLAG2_MFE	OMS FIRE SEQ DL FMT 21/A DL FMT 22/1 DL FMT 23/1				93017G	*
	V90M2959PA	CGRB_OMS_FDI_FLAGS_HFE	DL FMT 21/A DL FMT 22/A DL FMT 23/A				93017G	*
	V90X7685X	OMS L CHAMB PRESS FAIL FLAG	GAX					
	V90X7686X	OMS R CHAMB PRESS FAIL FLAG	GAX					
	V90X7687X	OMS ENGINE FDI INIT RESET FLAG	MSC					
	V90X7688X	OMS ACT FDI INIT RESET FLAG	MSC					
	V94M3056P	LEFT AND RIGHT OMS ALERT FLAGS	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1				93017G	*

TABLE 4.10.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM ORBITAL MANEUVERING SYSTEM FDIR (G4.92)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V94X4681X	LEFT OMS ALERT FLAG	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 XXXXX MNVR DISP		BD		93017G	*
	V94X4682X	RIGHT OMS ALERT FLAG	DL FMT 21/1 DL FMT 22/1 DL FMT 23/1 XXXXX MNVR DISP		BD		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 4.10.4-3. ORBITAL MANEUVERING SYSTEM FDIR (G4.92) 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 4.10.4-4. ORBITAL MANEUVERING SYSTEM FDIR (G4.92) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
C(1)	V97U3017C	00	+4.118	E+03	SLUG*FT/SEC/CYCLE	F	S	P G4.92	59956	
C(1)										
C(2)	V97U3018C	00	+9.896	E+03	SLUG*FT/SEC/CYCLE	F	S	P G4.92	59956	
C(2)										
OMS_SER_D_Z	V97U3077C	00	+2.0	E+00	DEG	F	S	C G4.92	90109D	
OMS SERVO AMP DEAD ZONE										
O_A_COUNT	V97U3061C	00	+24		ND	I	S	C G4.92	90109D	
O_E_COUNT	V97U3062C	00	+4		ND	I	S	P G4.92	90203A	
OMS ENG FAILURE COUNTER										
PC_THRESH	V97U4208C	00	+2.50	E+00	VDC	F	S	P G4.92	90204A	
OMS ENG PRESSURE THRESHOLD										

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

TABLE 4.10.4-5. ORBITAL MANEUVERING SYSTEM FDIR (G4.92) 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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4.11 BF CMD RM (PF 4.95)

BF CMD RM assesses the operational health of the body flap subsystem. BF CMD RM performs necessary enable pilot valve selection functions and body flap subsystem fault detection functions.

4.11.1 BF CMD RM Functional Requirements

BF CMD RM shall perform: nominal selection of the body flap enable pilot valves (PV's) and maintain position change and rate status of the body flap; body flap limit cycle failure detection and correction; and body flap position command tracking failure detection. Once BF CMD RM functions have been performed, the current DAP command shall be maintained for the subsequent processing cycle logic (i.e., BFFC = DBFRC). These functions shall be described in the following subsections. Figure 4.11-1 shows a suggested flow chart that satisfies the intent of these requirements.

4.11.1.1 Body Flap Enable Commands and Status Function.

The nominal commands to enable/disable body flap enable PV's are based on individual crew PV select/deselect inputs. Crew shall normally select all three channels. The nominal body flap enable PV commands shall be computed as follows:

$$\text{BFPVE}(I) = 1 \text{ when PV_SEL_DES}(I) \text{ indicates that pilot valve selected}$$

where

BFPVE = Body flap pilot valve enable command

PV_SEL_DES = Pilot valve select/deselect

I = 1, 2, 3

The body flap position change status and position change rate shall be based on compensated position feedback inputs from BF PFB SOP and computed as follows:

$$\text{DBFPOS} = \text{DBFOFB} - \text{DBFOFB1}$$

and

$$\text{DBFOFB1} = \text{DBFOFB}$$

where

DBFPOS = Body flap position change

DBFOFB = Compensated body flap position feedback

DBFOFB1 = Previous RM compensated body flap position feedback

If $|\text{DBFPOS}| > \text{BFR_T}$, then $\text{BFR} = \text{SIGN}(\text{DBFPOS})$; else $\text{BFR} = 0$

where

BFR = Body flap position change rate

BFR_T = Body flap rate threshold

DBFPOS shall be utilized in the limit cycle detection function; BFR shall be used in position command tracking function.

Body flap manual command status shall be based on body flap AUTO/MAN mode and body flap manual command (DBFMAN) inputs. When a DBFMAN transition from +1 or -1 to 0 is detected, the body flap limit cycle counter (BFLCTR) shall be advanced to 5 and body flap position error (BFPER) shall be set to 0 as follows:

If AUTMANBF = MAN,

then if DBFMAN = 0,

then if DBFMANP = ON,

then

BFPER = 0

BFLCTR = 5

DBFMANP = Off

else

DBFMANP = On

where

AUTMANBF = BF mode AUTO/MAN

MAN = On

AUTO = Off

DBFMAN = Manual body flap command

DBFMANP = Past status of manual body flap command

Off = 0

On = ±1

4.11.1.2 Body Flap Limit Cycle Failure Detection and Correction.

The limit cycle failure detection and correction function shall be performed when the previous DAP Body Flap Command (BFCP) is zero. The accumulated Body Flap Position Error (BFPER) shall be computed until the Body Flap Limit Cycle Counter (BFLCTR) has reached its limit (N2). Once the counter reaches its limit, the accumulated Body Flap Position Error is compared to a threshold value (BFLC_T). If its magnitude is greater than the threshold value, the Pilot Valves on Body Flap Channel 2 are activated to arrest the uncommanded Body Flap Motion. The accumulated Body Flap Position Error is reset to zero

and recalculated until the Body Flap Limit Cycle Counter has again reached its limit. The recalculated accumulated Position Error is once more compared to the threshold value. If the threshold is not exceeded, an alarm to indicate Body Flap Channel 2 was used is announced. If the magnitude of the accumulated Body Flap Position Error again exceeds the threshold value, the Pilot Valves on Body Flap Channel 2 are deactivated and the Pilot Valves on Body Flap Channel 1 are activated. If this attempt is successful, an alarm to indicate Body Flap Channel 1 was used is announced. If neither attempt is able to arrest the uncommanded body flap motion, then a Body Flap Cycle alarm is announced.

If BFCP = 0, then
Do

BFPER = BFPER + DBFPOS
BFLCTR = BFLCTR + 1
If BFLCTR = N2 then
Do

If |BFPER| > BFLC_T then
Do

If BFALRT ≠ 1 and BFALRT ≠ 2 then
Do

If BFHLD(2) = 0 and BFHLD(1) = 0 then
Do

BFHLD(2) = 1
BFCH = -1*[sign (BFPER)]
J = 2

End

Else if BFHLD(2) = 1 then

Do

BFHLD(2) = 0
BFHLD(1) = 1
J = 1

End

Else

Do

BFHLD(1) = 0
BFALRT = 3
J = 0

End

End

Else

Do

BFALRT = 0
BFHLD(1) = 0

```

                                BFHLD(2) = 0
                                End
                                End
                                Else
                                Do
                                    If J > 0 then
                                    Do
                                        BFALRT = J
                                        J = 0
                                    End
                                    Else if BFALRT = 3 or 4 then
                                    Do
                                        BFALRT = 0
                                    End
                                End
                                End
                                BFLCTR = 0
                                BFPER = 0
                                End
                                End
                                End
```

Where:

BFCP = Previous RM value of DBFRC
BFPER = Body flap position error
DBFPOS = Body flap position change status
BFLC_T = Body flap position error threshold
BFLCTR = Body flap limit cycle counter
N2 = Body flap limit cycle check
BFCH = Body flap RM position hold command
BFHLD(2) = Body flap pilot valve 2 hold command enable
BFHLD(1) = Body flap pilot valve 1 hold command enable
BFALRT = Body flap alert flag
J = 0, 1, or 2

4.11.1.3 Body Flap Position Command Tracking.

The body flap RM position command tracking function shall be performed when BFCP, the past value of the DAP command (DBFRC), is not zero. This function shall perform the following:

1. Identify and remove any hold command which is causing a tracking failure.
2. Generate a body flap alert flag when the body flap command rate is not tracking the previous DAP command.

The tracking function shall first compare the present DAP BF command (DBFRC) and the past DAP body flap command (BFCP) to the computed body flap position change rate (BFR). BFCP or DBFRC equal to BFR shall indicate that the body flap is tracking the DAP commands, and the tracking failure counter shall be set to zero. If the body flap is not tracking the DAP command (i.e., $BFCP \neq BFR$ and $DBFRC \neq BFR$), the body flap hold command (BFCH) shall be compared to BFR. BFCH equal to BFR shall indicate that the body flap hold is causing the tracking failure, and the hold commands shall be removed by RM. If the body flap is not tracking the hold command, the appropriate crew alert shall be generated. The tracking function shall be processed as follows:

If $BFCP$ or $DBFRC = BFR$,

then $BFFC = 0$

If $BFCP$ and $DBFRC \neq BFR$ and $BFFC = N1$ and $BFHOLD(1) = 0$ and

$BFHOLD(2) = 0$,

then $BFALRT = 4$

If $BFCP$ and $DBFRC \neq BFR$ and $BFFC = N1$ and ($BFHOLD(1) = 1$, or

$BFHOLD(2) = 1$) and $BFCH = BFR$,

then

$BFHOLD(1) = 0$

$BFHOLD(2) = 0$

$BFFC = 0$

If $BFCP$ and $DBFRC \neq BFR$ and $BFFC = N1$ and ($BFHOLD(1) = 1$ or

$BFHOLD(2) = 1$) and $BFCH \neq BFR$,

then $BFALRT = 4$

If $BFCP$ and $DBFRC \neq BFR$ and $BFFC \neq N1$

then $BFFC = BFFC + 1$

where

BFR = Body flap position change rate
 BFFC = Body flap tracking failure counter
 N1 = Body flap tracking failure limit
 BFALRT = Body flap alert flag

4.11.2 Processing Requirements

The body flap command RM shall be processed in accordance with Table 4.0–2. The BF command RM shall be processed after the DAP outside the transport delay critical processing; i.e., in the same minor cycle, and before the Aerosurface Actuator Command SOP body flap command processing. The Aerosurface Actuator Command SOP body flap command shall be processed in the same minor cycle as the DAP, or within two minor cycles following the DAP.

4.11.3 Initialization Requirements

All pilot valves shall be selected in OPS 1; all pilot valves selected in OPS 8 shall be selected in OPS 3. All parameter states shall be maintained and carried over on the OPS 1 to OPS 6 transition.

Local body flap command RM data shall be initialized as follows, upon transition into OPS 1 and OPS 3:

Parameter	Value
Floating Point	
DBFPOS	0
DBFOFB1	DBF ϕ FB
BFPER	
Integer	
BFCP	0
BFCH	0
BFFC	0
BELCTR	0
BFALRT	0
J (indicator)	0
Discrete	
BFHLD1	0
BFHLD2	0

4.11.4 Parameter Tables for BF CMD RM

The IDD inputs and outputs are listed in Tables 4.11.4-1 and 4.11.4-2 respectively. BFALRT (body flap alert) shall be an integer indicating the following:

0 = No BF RM

1 = BF hold on PV1

2 = BF hold on PV2

3 = BF limit cycle

4 = BF stall/runaway

K-loads are listed in Table 4.11.4-4. There are no I-load or constants requirements for BF CMD RM.

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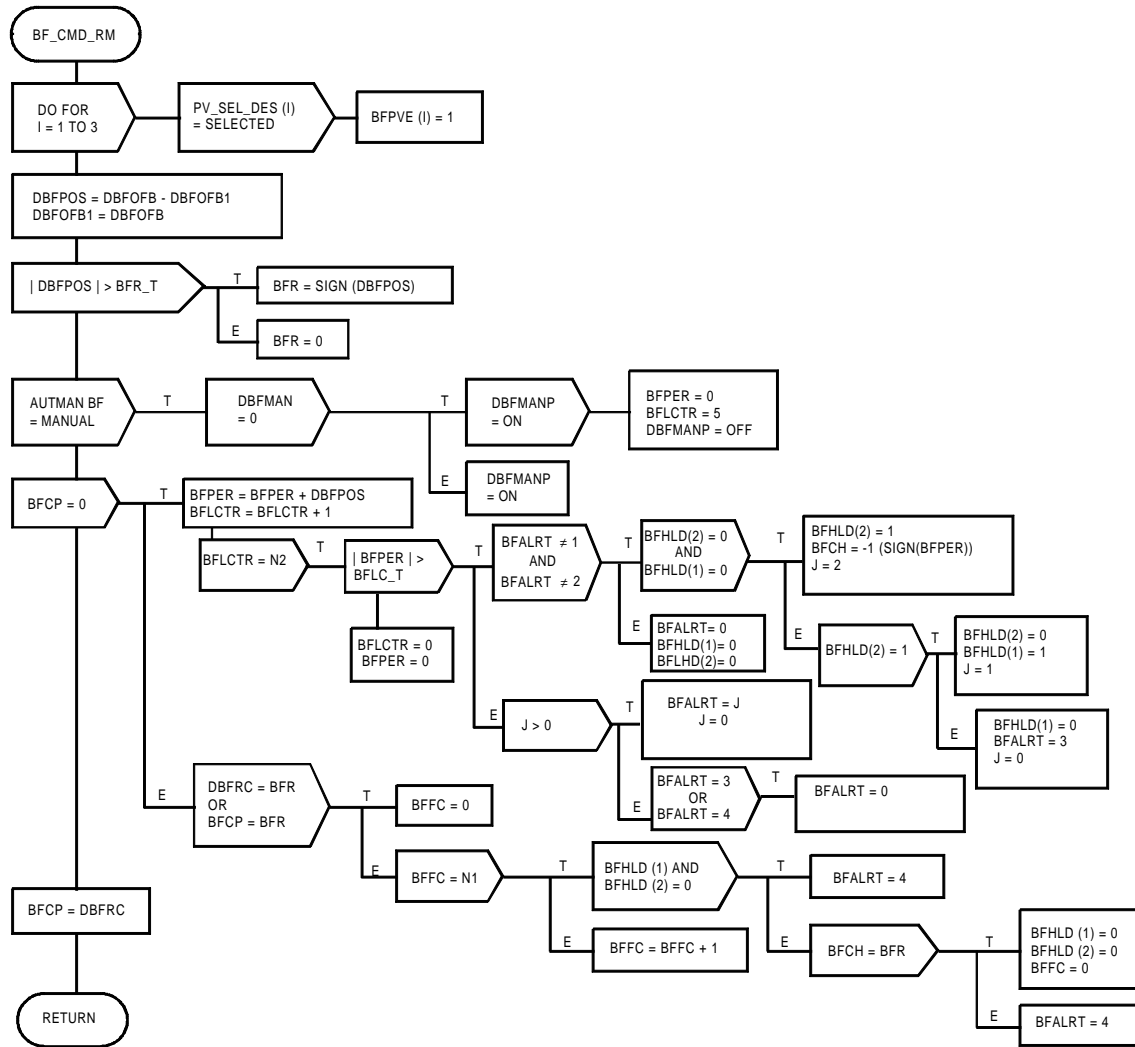


FIGURE 4.11-1. BF_CMD_RM Structural Flow - Mechanization Option (Information Only)

TABLE 4.11.4-1. INPUT FUNCTIONAL PARAMETERS FOR BODY FLAP COMMAND FDIR (G4.95)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
AUTMANBF	V96X1051X	STATION SELECTED AUT/MAN BODY FLAP	GN&C SW RM					
BF_VLV_1_SEL	V93X3978X	BF VALVE 1 DES CMD	FCS/DED DISP		BD		93017G	*
BF_VLV_2_SEL	V93X3983X	BF VALVE 2 DES CMD	FCS/DED DISP		BD		93017G	*
BF_VLV_3_SEL	V93X3987X	BF VALVE 3 DES CMD	FCS/DED DISP		BD		93017G	*
DBFMAN	V96J1021C	MANUAL BODY FLAP CMD	BF SLEW SOP					
DBFOFB	V95H8310C	COMP BODY FLAP POS	BF PFB SOP	DEG				
DBFRC	V90H1580CA	BODY FLAP DEFLECTION CMD	GRTLS DAP				93064D	
DBFRC	V90H1580CB	BODY FLAP DEFLECTION CMD	ASC DAP				93064D	
DBFRC	V90H1580CC	BODY FLAP DEFLECTION CMD	AEROJET DAP				93017G	*

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

TABLE 4.11.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM BODY FLAP COMMAND FDIR (G4.95)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
BFALRT	V90J6420C	BODY FLAP ALERT	GAX GNC SYS SUMM1 DISP TLM		VAR			
BFCH	V90J6421C	BODY FLAP HOLD COMMAND	AERO ACT SOP TLM					
BFHLD(1)	V90X6422X	BODY FLAP PILOT VLV 1 HOLD CMD ENA	AERO ACT SOP GNC SYS SUMM1 DISP TLM		BD			
BFHLD(2)	V90X6423X	BODY FLAP PILOT VLV 2 HOLD CMD ENA	AERO ACT SOP GNC SYS SUMM1 DISP TLM		BD			
BFPVE(1)	V90X6430XA	ENABLE BODY FLAP PILOT VALVE-1	AERO ACT SOP				92354	
BFPVE(2)	V90X6431XA	ENABLE BODY FLAP PILOT VALVE-2	AERO ACT SOP				92354	
BFPVE(3)	V90X6432XA	ENABLE BODY FLAP PILOT VALVE-3	AERO ACT SOP				92354	
	V90Q6403C	BODY FLAP RATE	DL FMT 23/1		HXS		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 4.11.4-3. BODY FLAP COMMAND FDIR (G4.95) 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 4.11.4-4. BODY FLAP COMMAND FDIR (G4.95) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
BFLC_T BODY FLAP LIMIT CYCLE THRESHOLD	V98U7997C	00	+1.5	E+00 DEG	F	S	P	G4.95	90109D	
BFRT_T BODY FLAP RATE THRESHOLD	V97U3012C	00	+2.4	E-01 DEG	F	S	P	G4.95	90109D	
N1 BODY FLAP TRACKING FAILURE LIMIT	V98U7999C	00	+3	ND	I	S	P	G4.95	90109D	
N2 BODY FLAP LIMIT CYCLE CHECK CYCLE	V98U7998C	00	+6	ND	I	S	P	G4.95	90109D	

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

TABLE 4.11.4-5. BODY FLAP COMMAND FDIR (G4.95) 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.

4.12 GN&C SWITCH RM (PF 4.180)

GN&C switch RM performs several functions associated with switch inputs:

1. Selection filtering and FDIR on multiple contact switches
2. Station selection on moding requests that may come from physically isolated switches
3. Default processing on multiple position switches
4. Special processing

4.12.1 Functional Requirements

4.12.1.1 Selection Filtering and FDIR.

Each switch position has one, two, three, or four contacts. Selection filtering is performed on the switch position contacts at the indicated processing rate for all switch positions listed in Table 4.12-1.

The processing requirements for the four contact switches are given in paragraph 4.12.1.4-5. The processing requirements for three contact and two contact switch positions are determined by the number of contacts available. A switch contact shall be available if:

1. The crew has not deselected the switch contact, and
2. The associated communication fault does not exist, and
3. The contact was not previously failed by FDIR.

Note: Item 1 applies only to switches whose contacts may be selected and deselected. Refer to the requirements for the RM Orb Disp, RM Cntrl Disp, and Switch/Surf FB Disp Specialist Functions.

The processing requirements for three contact switch positions shall be:

1. If three contacts are available, the selected output shall be the majority vote of the three input values.
2. If two contacts are available, the selected output shall be the logical “and” of the two input values.
3. If only one contact is available, its status shall be the selected output.
4. If there are no valid inputs, the output shall be zero (switch not depressed).

Two-level switches shall be processed the same as three-level switches with two or one available input (refer to Table 4.12-2).

FDIR shall be performed for the four-contact, three-contact, and two-contact switch positions shown in Table 4.12-1. Table 3.4-1 shows the memory configurations that require switch selection filtering and FDIR. Table 4.12-1 shows whether or not a switch is used in a particular memory configuration.

FDIR for four-contact switches shall consider all the contacts available for FDIR to be a redundant set. FDIR shall terminate if less than seven of the eight contacts are available, or if more than one contact is in the (+1) state. When FDIR runs, a single contact in the (+1) state while all other contacts are in the zero state shall be declared failed if the condition persists for three consecutive cycles.

FDIR for all other switches shall be performed on all “available” contacts where “available” is defined above. A contact shall be declared failed if it disagrees with the other two switch inputs for three consecutive FDIR cycles. Failures can be isolated only by using two-out-of-three voting. If only two contacts are available, then comparison tests can be done but no failure isolation is possible. Specifically, if a failure is detected for three consecutive FDIR cycles on a two-contact input, then a contact disagree condition shall be declared. The disagree condition shall not be considered a failure. FDIR shall not reset the failure counters when any contact is commfaulted. Failure of a contact shall not affect the other “same numbered” contacts.

All failure indications set by counters shall be latched whenever they are incremented to the third count. Unlatched failure counters shall be cleared by good comparisons. All failure indications shall be reset to their initial conditions whenever the crew selects (reselects) a contact set. All disagree indications set by counters shall be reset to their initial conditions whenever the number of available contacts is zero, one, or three. Switch FDIR shall be designed to minimize transport lag.

4.12.1.2 Station Selection.

Station selection shall be done on all switches identified with three or four asterisks in Table 4.12-1. The station select operation amounts to “OR”-ing the two selected outputs from the switch selection filter to generate a single output for user applications programs. Table 4.12-3 shows the requirements in truth table form. Station selection shall be active in OPS 1, 6, 2, and 3. Station selection shall be performed after each switch selection filter and updated at the same rate as the switch selection filter.

4.12.1.3 Default Processing.

4.12.1.3.1 Multiple Contact Switches.

Some switch failures can result in an indeterminate switch position. When they are detected, the last valid signal shall be output, and, after three consecutive cycles, the default position shall be output. After the default conditions are set and if the failure is removed, the selected position is output, and the normal detection is resumed. The conditions that are detectable are when more than one position is indicated or when no position is indicated. If either condition occurs, the default position shall be output. The default position is identified in Table 4.12-4. Default processing shall be done at the SF rates in OPS 1, 2, and 3.

4.12.1.3.2 Simplex Switches.

Some failures of simplex switches can be detected. When they are detected, after three consecutive cycles, a default position shall be output, and an invalid input indication shall be set. Following the setting of the default condition, if the failure is removed, the selected position is output, and failure detect, as stated before, begins anew. The conditions that are detectable are as follows: more than one position indicated or no position indicated. If either condition occurs, the default shall be output. In the event of a commfault, the default position shall be output. If the commfault is removed, the selected position is output. The default position is identified in Table 4.12-4. Default processing shall be done at the SF rate in OPS 1, 2, and 3.

Each switch discussed in this section occurs on more than one orbital panel. The following processing must be done for each switch location, and the notation (LOC) indicates left, right, or aft, as applicable:

1. HSI Switches

If the HSI ENTRY MODE SELECT = 1, and
The HSI TAEM MODE SELECT = 0, and
The HSI APPROACH MODE SELECT = 0,
Set MODE_(LOC) to 3

If the HSI ENTRY MODE SELECT = 0, and
The HSI TAEM MODE SELECT = 1, and
The HSI APPROACH MODE SELECT = 0,
Set MODE_(LOC) to 2

If the HSI ENTRY MODE SELECT = 0, and
The HSI TAEM MODE SELECT = 0, and
The HSI APPROACH MODE SELECT = 1,
Set MODE_(LOC) to +1

If the HSI TACAN SOURCE SELECT = 1, and
The HSI NAV SOURCE SELECT = 0, and
The HSI MSBLS SOURCE SELECT = 0,
Set the SOURCE_(LOC) to 1 and HUD_(LOC)_HSI_SEL = 1

If HSI TACAN SOURCE SELECT = 0, and
HSI NAV SOURCE SELECT = 1, and
HSI MSBLS SOURCE SELECT = 0,
Then set SOURCE_(LOC) to 2 and HUD_(LOC)_HSI_SEL = 2

If HSI TACAN SOURCE SELECT = 0, and
HSI NAV SOURCE SELECT = 0, and
HSI MSBLS SOURCE SELECT = 1,
Then set SOURCE_(LOC) to 3 and HUD_(LOC)_HSI_SEL = 3

If the HSI 1 STAT SELECT = 1, and
The HSI 2 STAT SELECT = 0, and
The HSI 3 STAT SELECT = 0,
Then set RCVR_(LOC) to 1

If the HSI 1 STAT SELECT = 0, and
The HSI 2 STAT SELECT = 1, and
The HSI 3 STAT SELECT = 0,
Then set the RCVR_(LOC) to 2

If the HSI 1 STAT SELECT = 0, and
The HSI 2 STAT SELECT = 0, and
The HSI 3 STAT SELECT = 1,
Then set the RCVR_(LOC) to 3

2. ADI Switches

If ADI ATTITUDE INRTL = 1, and
ADI ATTITUDE LVLH = 0 and
ADI ATTITUDE REF = 0
Set ADI ATTITUDE_(LOC) to 1

If ADI ATTITUDE INRTL = 0, and
ADI ATTITUDE LVLH = 1, and
ADI ATTITUDE REF = 0,
Set ADI ATTITUDE_(LOC) to 2

If ADI ATTITUDE INRTL = 0, and
ADI ATTITUDE LVLH = 0, and
ADI ATTITUDE REF = 1,
Set ADI ATTITUDE_(LOC) to 3

If ADI RATE SCALE LOW = 1, and
ADI RATE SCALE MED = 0, and
ADI RATE SCALE HIGH = 0,
Then set (LOC) ADI RATE SCALE SELECT to 3 and HUD_(LOC)_ADI_SCL = 3

If ADI RATE SCALE LOW = 0, and ADI RATE SCALE MED = 1, and
ADI RATE SCALE HIGH = 0,
Then set (LOC) ADI RATE SCALE SELECT to 2 and HUD_(LOC)_ADI_SCL = 2

If ADI RATE SCALE LOW = 0, and
ADI RATE SCALE MED = 0, and
ADI RATE SCALE HIGH = 1,
Then set (LOC) ADI RATE SCALE SELECT to 1 and HUD_(LOC)_ADI_SCL = 1

If ADI ERROR SCALE LOW = 1, and
ADI ERROR SCALE MED = 0, and
ADI ERROR SCALE HIGH = 0,
Then set ADI ERROR SCALE SELECT to 3

If ADI ERROR SCALE LOW = 0, and
ADI ERROR SCALE MED = 1, and
ADI ERROR SCALE HIGH = 0,
Then set ADI ERROR SCALE SELECT to 2

If ADI ERROR SCALE LOW = 0, and
ADI ERROR SCALE MED = 0, and
ADI ERROR SCALE HIGH = 1,
Then set ADI ERROR SCALE SELECT to 1

3. Air Data Switches

If AIR DATA SELECT LEFT = 1, and
AIR DATA SELECT NAV = 0, and
AIR DATA SELECT RIGHT = 0,
Then set SELECTED_(LOC) AIR DATA SELECT SWITCH POSITION to 2

If AIR DATA SELECT LEFT = 0, and
AIR DATA SELECT NAV = 1, and
AIR DATA SELECT RIGHT = 0,
Then set SELECTED_(LOC) AIR DATA SELECT SWITCH POSITION to 1

If AIR DATA SELECT LEFT = 0, and
AIR DATA SELECT NAV = 0, and
AIR DATA SELECT RIGHT = 1,
Then set SELECTED_(LOC) AIR DATA SELECT SWITCH POSITION to 3

4. Radar Altimeter Switches

If RADAR ALTIMETER (LOC) DISPLAY SELECT NO. 1 = 1, and
RADAR ALTIMETER (LOC) DISPLAY SELECT NO. 2 = 0,
Then set (LOC) RADAR ALTIMETER DISPLAY TO 1

If RADAR ALTIMETER (LOC) DISPLAY SELECT NO. 1 = 0, and
RADAR ALTIMETER (LOC) DISPLAY SELECT NO. 2 = 1,
Then set RADAR ALTIMETER DISPLAY TO 2

4.12.1.4 Special Processing.

Several unique GN&C requirements are listed in this processor. They are:

1. Continuous signal requirements. Some users require a continuous (latched) signal from a momentary contact-type switch. However, none are currently identified.
2. Switch RM inhibit. A keyboard-initiated software signal can be made by the crew via the RM orbit spec function. When this signal is received, the switch RM output should be frozen and processing suspended. The signal shall be removed by subsequent activation of the signal (flip-flop) and the GN&C switch RM activated with all past failure conditions retained. When Switch RM is re-enabled, the previous outputs (THC_APN, THC_APP, THC_FPN, and THC_FPP) from the THC selection filter truth table for the aft negative, aft positive, forward negative, and forward positive THC signals shall be initialized to zero.
3. Main engine shutdown switch processing. The inputs from the two contact main engine shutdown switches will generate two outputs to SSME OPS per engine:
 - a. Main engine safing command (ME-i Safing Cmd)
 - b. Main engine shutdown command (ME-i Shutdown Cmd)

The ME-i Safing Cmd will be set using identical logic as with other two contact switches as described in Section 4.12.1.1, Selection Filtering and FDIR.

ME-i Shutdown Cmd will be output true (shutdown) only if ME-i Safing Cmd is true, and no commfaults exist on either or both of the two associated contact inputs of the main engine shutdown switch, and no contact disagree has been previously set (defined by Section 4.12.1.1, FDIR).

4. ET SEP switches. The selection filter for the ET SEP mode switch and manual initiate PB switch shall be processed as described in Section 4.12.1.1. The default processing for the mode switch is described in Section 4.12.1.3 (note that the default position is different for the OPS 6 RTLS and TAL abort situations as compared to nominal ascent). If the default occurs during nominal ascent, the default position (manual) can be overridden by a keyboard entry (ET SEP AUTO SELECT). Once the default position is overridden, the override is in effect only while the default is selected.

When the default position is selected and ET SEP Override has not been entered, the appropriate GAX default message is requested. The request is made through V90X3432X for ET SEP Manual Default or V90X3438X for ET SEP Auto Default. When ET SEP Override has been entered, the GAX default message is not requested.

5. Entry roll mode control switch. The entry roll mode switch processing shall be as follows:
 - a. Selection filter – Figure 4.12-1 shows the selection filter output in matrix form. Determine contact availability as described in Section 4.12.1.1. Monitor the status of the available contacts from the L GAIN and the NO Y JET positions simultaneously. Nonavailable contacts shall be set to zero for the subsequent selection process. The selection process shall set the selected output equal to the position with the highest number of energized (+1) contacts, with the following exceptions:

- (1) If the number of contacts from either position is two while the other position is one (2/1), set the output from both positions to the non-energized state.
- (2) If one contact and only one contact from either position is (+1), set the output from both positions to the (0) state.

If the number of (+1) contacts from the two positions are equal, set both outputs to zero. Furthermore, set both outputs to zero if the Entry SW Override signal is (+1).

- b. FDIR–FDIR shall operate per Section 4.12.1.1.
- c. Annunciation – If the monitored contacts from both positions are in the zero state (0/0), or if all of the contacts from either position are in the (+1) state while all of the contacts from the other position are in the zero state (4/0), or if one contact and only one contact from either position is (+1), annunciation is not required. For all other conditions as shown in Figure 4.12–2, an Entry Roll Mode SW Fail signal shall be transmitted to GAX for annunciation.

6. THC signal selection and validation.

- a. During OPS 2 and 8, the selection filter for the forward and aft station THC shall be processed at 12.5 Hz using the Three Contact Truth Table (Table 4.12-2) and the current output of the truth table shall be “OR”d with the output of the truth table from the previous cycle to generate the selected signal:

$THC_ASN(axis) = THC_ACN(axis) \text{ or } THC_APN(axis)$

$THC_ASP(axis) = THC_ACP(axis) \text{ or } THC_APP(axis)$

$THC_FSN(axis) = THC_FCN(axis) \text{ or } THC_FPN(axis)$

$THC_FSP(axis) = THC_FCP(axis) \text{ or } THC_FPP(axis)$

where:

THC_ASN, THC_ASP, THC_FSN, and THC_FSP are the selected aft negative, selected aft positive, selected forward negative, and selected forward positive signals provided to the THC SOP.

THC_ACN, THC_ACP, THC_FCN, and THC_FCP are the current outputs from the selection filter truth table for the aft negative, aft positive, forward negative and forward positive THC signals.

THC_APN, THC_APP, THC_FPN, and THC_FPP are the previous outputs from the selection filter truth table for the aft negative, aft positive, forward negative and forward positive THC signals.

- b. During OPS 1 and 3, the selection filter for the forward and aft station THC shall be processed at 6.25 Hz using the Three Contact Truth Table (Table 4.12-2). No “OR”ing of the current and previous truth table outputs shall be performed.
- c. Power-up transients can cause both positive and negative commands from the THC simultaneously. The positive and negative select signals from the forward and aft station (THC_ASN and THC_ASP, THC_FSN and THC_FSP) shall be validated as follows:
 - (1) “AND” a positive signal with a negative signal from the same axis of a station to generate an INVALID flag as follows:

+ Input	– Input	Invalid Flag (X, Y, or Z)
0	0	0
0	1	0
1	0	0
1	1	1

- (2) “OR” the INVALID flags from all three axes of a station. If the resultant is “FALSE”, output the selected positive and negative signals. If the resultant is “TRUE”, set the selected positive and negative signals for all three axes of that station to zero for this processing cycle.
7. Head Up Display (HUD). All parameters sent to the HUD electronics units (HUDE) may be identified by the HUD–prefix to the HAL name. These parameters are equal to parameters sent to other software modules as shown below:
- HUD_L_HSI_SEL = source left
 HUD_R_HSI_SEL = source right
 HUD_L_ADI_SCL = LH HUD ADI rate scaling
 HUD_R_ADI_SCL = RH HUD ADI rate scaling
8. Beep trim derotation. Processing of the available left and right RHC beep trim switches will change after main gear touchdown to provide single fault tolerance in these switches for performing Orbiter derotation. Nonavailable contacts shall be set to zero for the subsequent selection process.
- a. On the first pass when weight-on-wheels is latched on (WOWLON_IND = 1), set and latch all selected left and right positive pitch, positive roll and negative roll RHC trim commands to zero. (V90X7232X, V90X7432X, V90X7222X, V90X7422X, V90X7242X, V90X7442X = 0).
 - b. On the first pass when weight-on-wheels is latched on (WOWLON_IND = 1), set and latch the left RHC negative pitch trim contact A output to zero (V72K1151X = 0) if it is

indicating one. If the left RHC negative pitch trim contact A output has not been latched to zero, set and latch the left RHC negative pitch trim contact B output to zero ($V72K1166X = 0$) if it is indicating one. On the same pass, latch the right RHC negative pitch trim contact A output to zero ($V72K1196X = 0$) if it is indicating one. If the right RHC negative pitch trim contact A output has not been latched to zero, latch the right RHC negative pitch trim contact B output to zero ($V72K1216X = 0$) if it is indicating one. If a contact is latched to zero by the above logic, ignore all future output from that contact. This logic is summarized in Table 4.12.1-1 for the left RHC negative pitch beep trim contacts. The same logic applies to the processing of the right RHC negative pitch beep trim contacts.

- c. After completing part b above and on each subsequent pass, perform the following if equivalent airspeed is greater than $EAS_DEROTATE$ ($V95L3145C > V97U0093C$). Set the selected left RHC negative pitch command to one ($V90X7252X = 1$) if both left RHC negative pitch contacts indicate one ($V72K1151X = 1$ and $V72K1166X = 1$); otherwise set the selected left RHC negative pitch command to zero ($V90X7252X = 0$). Set the selected right RHC negative pitch command to one ($V90X7452X = 1$) if both right RHC negative pitch contacts indicate one ($V72K1196X = 1$ and $V72K1216X = 1$); otherwise set the selected right RHC negative pitch command to zero ($V90X7452X = 0$). This logic is summarized in Table 4.12.1-2 below for the selected left RHC negative pitch trim command. The same logic applies to the processing of the selected right RHC negative pitch trim command.
- d. After completing part b above and on each subsequent pass, perform the following if equivalent airspeed is less than or equal to $EAS_DEROTATE$ ($V95L3145C \leq V97U0093C$). Set the selected left RHC negative pitch command to one ($V90X7252X = 1$) if either left RHC negative pitch trim contact indicates one ($V72K1151X = 1$ or $V72K1166X = 1$); otherwise set the selected left RHC negative pitch command to zero ($V90X7252X = 0$). Set the selected right RHC negative pitch command to one ($V90X7452X = 1$) if either right RHC negative pitch trim contact indicates one ($V72K1196X = 1$ or $V72K1216X = 1$); otherwise set the selected right RHC negative pitch command to zero ($V90X7452X = 0$). This logic is summarized in Table 4.12.1-2 below for the selected left RHC negative pitch trim command. The same logic applies to the processing of the selected right RHC negative pitch trim command.

Table 4.12.1-1. Left RHC Negative Pitch Trim Switch RM Logic at Main Gear Touchdown		
L RHC negative pitch trim contact A (V72K1151X) status at WOWLON IND = 1	L RHC negative pitch trim contact B (V72K1166X) status at WOWLON IND = 1	Action
0	0	none
1	0	Set and latch contact A to 0 (V72K1151X = 0). Ignore contact A outputs.
0	1	Set and latch contact B to 0 (V72K1166X = 0). Ignore contact B outputs.
1	1	Set and latch contact A to 0 (V72K1151X = 0). Ignore contact A outputs.

Table 4.12.1-2. Selection Logic for the Left RHC Negative Pitch Beep Trim Command After Main Gear Touchdown			
EAS (V95L3145C)	L RHC negative pitch trim contact A (V72K1151X) Status	L RHC Negative pitch trim contact B (V72K1166X) Status	Selected L RHC negative pitch command (V90X7252X)
> EAS_DEROTATE (V97U0093C)	0	0	0
> EAS_DEROTATE (V97U0093C)	1	0	0
> EAS_DEROTATE (V97U0093C)	0	1	0
> EAS_DEROTATE (V97U0093C)	1	1	1
≤ EAS_DEROTATE (V97U0093C)	0	0	0
≤ EAS_DEROTATE (V97U0093C)	1	0	1
≤ EAS_DEROTATE (V97U0093C)	0	1	1
≤ EAS_DEROTATE (V97U0093C)	1	1	1

4.12.2 Processing Requirements

The switch SF shall be processed according to Table 4.1–2. The switch FDIR shall be processed according to Table 4.0–2. See appropriate subsections for other processing requirements.

4.12.3 Initialization Requirements

On RM initialization, all contact failure flags and switch alarms flags shall be reset to the unfailed state, and miscompare counters shall be reset to the initial count state. Furthermore, on RM initialization and when RM is re-enabled from the RM Orbit Spec Function, the previous outputs (THC_APN, THC_APP, THC_FPN, and THC_FPP) from the THC selection filter truth table for the aft negative, aft positive, forward negative, and forward positive THC signals shall be initialized to zero. On contact set selection, all associated contact failure flags and switch alarm flags shall be reset to the unfailed state, and

miscompare counters shall be reset to the initial count state. In OPS 1, all parameters shall be initially selected.

4.12.4 MPS VIB Shutdown (FASCOS) Processing

GN&C switch SF shall ignore the previously used Flight Acceleration Safety Cutoff System (FASCOS) switch inputs and associated commfaults and shall always output a selected FASCOS switch position of “inhibit.” No default processing or FDIR shall be done on this switch.

4.12.5 Parameter Tables for GN&C Switch RM

The IDD inputs and outputs are listed in Tables 4.12.5–1 and 4.12.5–2 respectively. There are no K-load or constants requirements for Switch RM. I-load requirements are listed in Table 4.12.5-3.

Table 4.12-1. Switch Position Description				
Switch Description	Switch RM Processing Rate (Hz)			
	RL*	MC 1**	MC 2**	MC 3**
			MC 8**	
Entry roll mode, L GAIN	4	6.25		6.25
Entry roll mode, NO Y JET	4	6.25		6.25
Abort mode – TAL	3	6.25		
Abort mode – ATO	3	6.25		6.25
Abort mode – RTLS	3	6.25		
Aft manual free drift	3		6.25	
Aft manual mode LVLH	3		6.25	
Aft orbital DAP control, auto	3		6.25	
Aft orbital DAP control, man. INRTL	3		6.25	
Aft orbital DAP select A	3		6.25	
Aft orbital DAP select B	3		6.25	
Aft THC translation –X	3		FDIR 6.25 SF 12.5	
Aft THC translation +X	3		FDIR 6.25 SF 12.5	
Aft THC translation –Y	3		FDIR 6.25 SF 12.5	
Aft THC translation +Y	3		FDIR 6.25 SF 12.5	
Aft THC translation –Z	3		FDIR 6.25 SF 12.5	
Aft THC translation +Z	3		FDIR 6.25 SF 12.5	
ET sep auto mode	3	6.25		
ET sep manual mode	3	6.25		
ET sep initiate	3	6.25		6.25
FCS reset/override chan 1	3	6.25	6.25	6.25
FCS reset/override chan 2	3	6.25	6.25	6.25
FCS reset/override chan 3	3	6.25	6.25	6.25
FCS reset/override chan 4	3	6.25	6.25	6.25
Fwd manual free drift	3		6.25	

Table 4.12-1. Switch Position Description				
Switch Description	Switch RM Processing Rate (Hz)			
	RL*	MC 1**	MC 2**	MC 3**
			MC 8**	
Fwd manual mode LVLH	3		6.25	
Fwd orbital DAP control, auto	3	6.25	6.25	6.25
Fwd orbital DAP control, man.	3	6.25	6.25	6.25
Fwd orbital DAP select A	3		6.25	
Fwd orbital DAP select B	3		6.25	
Fwd THC translation -X	3	6.25	FDIR 6.25 SF 12.5	6.25
Fwd THC translation +X	3	6.25	FDIR 6.25 SF 12.5	6.25
Fwd THC translation -Y	3	6.25	FDIR 6.25 SF 12.5	6.25
Fwd THC translation +Y	3	6.25	FDIR 6.25 SF 12.5	6.25
Fwd THC translation -Z	3	6.25	FDIR 6.25 SF 12.5	6.25
Fwd THC translation +Z	3	6.25	FDIR 6.25 SF 12.5	6.25
LH body flap auto/man.****	3	6.25	6.25	6.25
LH pitch auto***	3	6.25		6.25
LH pitch CSS***	3	6.25		6.25
LH roll/yaw auto***	3	6.25		6.25
LH roll/yaw CSS***	3	6.25		6.25
LH spd bk/throt auto/man.****	3	6.25	6.25	6.25
LH SBTC takeover	3	6.25		6.25
MPS eng limit control auto	3	3.125		
MPS eng limit control enable	3	3.125		
MPS eng limit control inhibit	3	3.125		
RCS master crossfeed from left	3	1.04	1.04	1.04
RCS master crossfeed from right	3	1.04	1.04	1.04
RH body flap auto/man.***	3	6.25		6.25
RH pitch auto***	3	6.25		6.25
RH pitch CSS***	3	6.25		6.25
RH roll/yaw auto***	3	6.25		6.25
RH roll/yaw CSS***	3	6.25		6.25
RH spd bk/throt auto/man.****	3	6.25	6.25	6.25
RH SBTC takeover	3	6.25		6.25
Sense -X switch	3		3.125	
Sense -Z switch	3		3.125	
SRB sep auto	3	6.25		
SRB sep man./auto	3	6.25		
SRB sep initiate	3	6.25		6.25
Aft ADI attitude reference***	2		6.25	
Aft Alt PRCS DAP mode	2		6.25	
Aft Spare PBI	2		6.25	

Table 4.12-1. Switch Position Description				
Switch Description	Switch RM Processing Rate (Hz)			
	RL*	MC 1**	MC 2** MC 8**	MC 3**
Aft manual mode rotation pitch dr	2		6.25	
Aft manual mode rotation roll dr	2		6.25	
Aft manual mode rotation yaw dr	2		6.25	
Aft manual mode rotation pitch pulse	2		6.25	
Aft manual mode rotation roll pulse	2		6.25	
Aft manual mode rotation yaw pulse	2		6.25	
Aft manual mode translation LOWZ	2		6.25	
Aft manual mode translation Z high	2		6.25	
Aft manual mode translation X norm	2		6.25	
Aft manual mode translation Y norm	2		6.25	
Aft manual mode translation Z norm	2		6.25	
Aft manual mode translation X pulse	2		6.25	
Aft manual mode translation Y pulse	2		6.25	
Aft manual mode translation Z pulse	2		6.25	
Fwd Alt PRCS DAP mode	2		6.25	
Fwd Spare PBI	2		6.25	
Fwd manual mode rotation pitch dr	2	6.25	6.25	6.25
Fwd manual mode rotation roll dr	2	6.25	6.25	6.25
Fwd manual mode rotation yaw dr	2	6.25	6.25	6.25
Fwd manual mode rotation pitch pulse	2	6.25	6.25	6.25
Fwd manual mode rotation roll pulse	2	6.25	6.25	6.25
Fwd manual mode rotation yaw pulse	2	6.25	6.25	6.25
Fwd manual mode translation LOWZ	2		6.25	
Fwd manual mode translation Z high	2		6.25	
Fwd manual mode translation X norm	2		6.25	
Fwd manual mode translation Y norm	2		6.25	
Fwd manual mode translation Z norm	2		6.25	
Fwd manual mode translation X pulse	2		6.25	
Fwd manual mode translation Y pulse	2		6.25	
Fwd manual mode translation Z pulse	2		6.25	
LH ADI attitude reference***	2	6.25	6.25	6.25
LH manual body flap down	2	6.25		6.25
LH manual body flap up	2	6.25		6.25
LH panel pitch trim -	2	6.25		6.25
LH panel pitch trim +	2	6.25		6.25
LH panel roll trim -	2	6.25		6.25
LH panel roll trim +	2	6.25		6.25
LH RHC pitch rate trim down	2	6.25		6.25

Table 4.12-1. Switch Position Description

Switch Description	Switch RM Processing Rate (Hz)			
	RL*	MC 1**	MC 2**	MC 3**
			MC 8**	
LH RHC pitch rate trim up	2	6.25		6.25
LH RHC roll rate trim left	2	6.25		6.25
LH RHC roll rate trim right	2	6.25		6.25
LH RHC trim inhibit	2	6.25	6.25	6.25
LH yaw trim -	2	6.25		6.25
LH yaw trim +	2	6.25		6.25
MPS prplt dump bkup LH ₂ vlv open	2	1.04		
MPS prplt dump bkup LH ₂ vlv close	2	1.04		
MPS prplt dump sequence start	2	1.04		
MPS prplt dump sequence stop	2	1.04		
MPS main engine -1 shutdown	2	6.25		
MPS main engine -2 shutdown	2	6.25		
MPS main engine -3 shutdown	2	6.25		
OMS eng left ARM/PR	2	1.04	1.04	1.04
OMS eng left ARM	2	1.04	1.04	1.04
OMS eng right ARM/PR	2	1.04	1.04	1.04
OMS eng right ARM	2	1.04	1.04	1.04
Orbital DAP RCS jets normal aft	2		6.25	
Orbital DAP RCS jets vernier aft	2		6.25	
Orbital DAP RCS jets normal fwd	2		6.25	
Orbital DAP RCS jets vernier fwd	2		6.25	
RH ADI attitude reference***	2	6.25	6.25	6.25
RH manual body flap down	2	6.25		6.25
RH manual body flap up	2	6.25		6.25
RH panel pitch trim -	2	6.25		6.25
RH panel pitch trim +	2	6.25		6.25
RH panel roll trim -	2	6.25		6.25
RH panel roll trim +	2	6.25		6.25
RH RHC pitch rate trim up	2	6.25		6.25
RH RHC roll rate trim down	2	6.25		6.25
RH RHC roll rate trim left	2	6.25		6.25
RH RHC roll rate trim right	2	6.25		6.25
RH RHC trim inhibit	2	6.25	6.25	6.25
RH yaw trim -	2	6.25		6.25
RH yaw trim +	2	6.25		6.25
Aft ADI attitude select	1		1.04	
Aft ADI error	1		1.04	
Aft ADI rate	1		1.04	

Table 4.12-1. Switch Position Description				
Switch Description	Switch RM Processing Rate (Hz)			
	RL*	MC 1**	MC 2** MC 8**	MC 3**
Left ADI attitude select	1	1.04	1.04	1.04
Left ADI error	1	1.04	1.04	1.04
Left ADI rate	1	1.04	1.04	1.04
Left air data select	1	1.04		1.04
Left HSI mode select	1	1.04		1.04
Left HSI source select	1	1.04		1.04
Left HSI source STAT select	1	1.04		1.04
Left radar ALT select	1	1.04		1.04
Nose wheel steering	1	1.04		1.04
Right ADI attitude select	1	1.04	1.04	1.04
Right ADI error	1	1.04	1.04	1.04
Right ADI rate	1	1.04	1.04	1.04
Right AIR data select	1	1.04		1.04
Right HSI mode select	1	1.04		1.04
Right HSI source select	1	1.04		1.04
Right HSI source STAT select	1	1.04		1.04
Right radar ALT select	1	1.04		1.04

*Redundancy level
 **Memory configuration (see Table 3.3-1)
 ***Station selection processing required
 ****Station selection processing shall be performed only in MC1 and MC3

Table 4.12-2. Truth Table for Switch SF							
Three Contacts					Two Contacts		
1	2	3	Output		1	2	Output
0	0	0	0		0	0	0
1	0	0	0		0	1	0
0	1	0	0		1	0	0
0	0	1	0		1	1	1
0	1	1	1		Note: 1 = true (switch depressed) 0 = false (switch not depressed)		
1	0	1	1				
1	1	0	1				
1	1	1	1				

Table 4.12-3. Truth Table for Station Selection		
Switch Output		SS Output
L	R	
0	0	0
1	0	1
0	1	1
1	1	1

Table 4.12-4. Default Conditions		
Switch	Position	Default Condition
HSI mode	ENTRY TAEM approach	Entry
HSI source	TACAN NAV MLS	Nav
HSI transceiver	1 2 3	3
ADI rate	LOW MED HIGH	Med
ADI error	LOW MED HIGH	Med
ADI attitude	INRTL LVLH REF	LVLH
Air data select	LEFT NAV RIGHT	Nav
Right radar altimeter	1 2	1
Left radar altimeter	1 2	2
Aft sense switch	-X -Z	-Z
ET sep switch(1)	AUTO MANUAL	Manual
SRB sep switch	AUTO AUTO/MANUAL	Auto/Manual

Table 4.12-4. Default Conditions		
Switch	Position	Default Condition
RCS master crossfeed(2)	FEED FROM LEFT OFF FEED FROM RIGHT	Last valid signal
MPS limit control	ENABLE AUTO INHIBIT	Auto
<p>(1) ET sep switch defaulted to manual, except during OPS 6 or a TAL abort when default is to auto. (2) RCS Master Crossfeed switch shall not require a default counter, the default condition will be output immediately following the detection of an indeterminant switch position. The default condition shall be initialized to 'OFF' for the first pass in OPS 1.</p>		

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This matrix shows the switch RM output for the various state of contacts of the ENTRY ROLL MODE SWITCH. If the ENTRY_SW_OVERRIDE SIGNAL is = +1, the output is the same as if the contact state were 0/0.						
	NO. OF AVAILABLE CONTACTS ENERGIZED (+1)	LOW GAIN				
		0	1	2	3	4
N O Y J E T	0	SEL L GAIN = 0* SEL NO Y JET = 0 ENT SW FAIL = 0	SEL L GAIN = 0* SEL NO Y JET = 0 ENT SW FAIL = 0	SEL L GAIN = 1 SEL NO Y JET = 0 ENT SW FAIL = 1	SEL L GAIN = 1 SEL NO Y JET = 0 ENT SW FAIL = 1	SEL L GAIN = 1 SEL NO Y JET = 0 ENT SW FAIL = 0
	1	SEL L GAIN = 0* SEL NO Y JET = 0 ENT SW FAIL = 0	SEL L GAIN = 0 SEL NO Y JET = 0 ENT SW FAIL = 1	SEL L GAIN = 0 SEL NO Y JET = 0 ENT SW FAIL = 1	SEL L GAIN = 1 SEL NO Y JET = 0 ENT SW FAIL = 1	SEL L GAIN = 1 SEL NO Y JET = 0 ENT SW FAIL = 1
	2	SEL L GAIN = 0 SEL NO Y JET = 1 ENT SW FAIL = 1	SEL L GAIN = 0 SEL NO Y JET = 1 ENT SW FAIL = 1	SEL L GAIN = 0 SEL NO Y JET = 0 ENT SW FAIL = 1	SEL L GAIN = 1 SEL NO Y JET = 0 ENT SW FAIL = 1	SEL L GAIN = 1 SEL NO Y JET = 0 ENT SW FAIL = 1
	3	SEL L GAIN = 0 SEL NO Y JET = 1 ENT SW FAIL = 1	SEL L GAIN = 0 SEL NO Y JET = 1 ENT SW FAIL = 1	SEL L GAIN = 0 SEL NO Y JET = 1 ENT SW FAIL = 1	SEL L GAIN = 0 SEL NO Y JET = 0 ENT SW FAIL = 1	SEL L GAIN = 1 SEL NO Y JET = 0 ENT SW FAIL = 1
	4	SEL L GAIN = 0 SEL NO Y JET = 1 ENT SW FAIL = 0	SEL L GAIN = 0 SEL NO Y JET = 1 ENT SW FAIL = 1	SEL L GAIN = 0 SEL NO Y JET = 1 ENT SW FAIL = 1	SEL L GAIN = 0 SEL NO Y JET = 1 ENT SW FAIL = 1	SEL L GAIN = 0 SEL NO Y JET = 0 ENT SW FAIL = 1
* FDIR shall operate in this state if seven or more contacts are available.						

FIGURE 4.12-1. Entry Roll Mode Switch Selctions Filter Processing

TABLE 4.12.5-1. INPUT FUNCTIONAL PARAMETERS FOR GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
EAS	V95L3145C	GN&C EQUIVALENT AIRSPEED	ADTA SOP	FT/S	SPL		93017G	*
FCR0_CH1_C1	V72K3170X	FCS MON CHAN 1 RESET/OVERRIDE A	D&C PNL		BD		93017G	*
FCR0_CH1_C2	V72K3171X	FCS MON CHAN 1 RESET/OVERRIDE B	D&C PNL		BD		93017G	*
FCR0_CH2_C1	V72K3176X	FCS MON CHAN 2 RESET/OVERRIDE A	D&C PNL		BD		93017G	*
FCR0_CH2_C2	V72K3178X	FCS MON CHAN 2 RESET/OVERRIDE B	D&C PNL		BD		93017G	*
FCR0_CH3_C1	V72K3180X	FCS MON CHAN 3 RESET/OVERRIDE A	D&C PNL		BD		93017G	*
FCR0_CH4_C2	V72K3188X	FCS MON CHAN 4 RESET/OVERRIDE B	D&C PNL		BD		93017G	*
FCRO_CH1_C3	V72K3172X	FCS MON CHAN 1 RESET/OVERRIDE C	D&C PNL		BD		93017G	*
FCRO_CH2_C3	V72K3179X	FCS MON CHAN 2 RESET/OVERRIDE C	D&C PNL		BD		93017G	*
FCRO_CH3_C2	V72K3182X	FCS MON CHAN 3 RESET/OVERRIDE B	D&C PNL		BD		93017G	*
FCRO_CH3_C3	V72K3183X	FCS MON CHAN 3 RESET/OVERRIDE C	D&C PNL		BD		93017G	*
FCRO_CH4_C1	V72K3186X	FCS MON CHAN 4 RESET/OVERRIDE A	D&C PNL		BD		93017G	*
FCRO_CH4_C3	V72K3189X	FCS MON CHAN 4 RESET/OVERRIDE C	D&C PNL		BD		93017G	*
LADIERROR1	V72K8506X	LH ADI ERROR SCALE-LOW	D&C PNL		BD		93017G	*
LADIERROR20	V72K8504X	LH ADI ERROR SCALE-HIGH	D&C PNL		BD		93017G	*
LADIERROR5	V72K8505X	LH ADI ERROR SCALE-MEDIUM	D&C PNL		BD		93017G	*
LADIRATE1	V72K2011X	LH ADI RATE SCALE-LOW	D&C PNL		BD		93017G	*
LADIRATE10	V72K2008X	LH ADI RATE SCALE-HIGH	D&C PNL		BD		93017G	*
LADIRATE5	V72K2009X	LH ADI RATE SCALE-MEDIUM	D&C PNL		BD		93017G	*
LADSSCMPTR	V72K6382X	LH AIR DATA SOURCE SEL NAV	D&C PNL		BD		93017G	*
LADSSLEFT	V72K6381X	LH AIR DATA SOURCE SEL-LEFT	D&C PNL		BD		93017G	*
LADSSRIGHT	V72K6383X	LH AIR DATA SOURCE SEL-RIGHT	D&C PNL		BD		93017G	*
LAUTOBF_C1	V72K4993X	LH BODY FLAP AUTO/MANUAL A	D&C PNL		BD		93017G	*
LAUTOBF_C2	V72K4994X	LH BODY FLAP AUTO/MANUAL B	D&C PNL		BD		93017G	*
LAUTOBF_C3	V72K4995X	LH BODY FLAP AUTO/MANUAL C	D&C PNL		BD		93017G	*
LAUTOP_C1	V72K5251X	FCS LH PITCH AUTO MODE A	D&C PNL		BD		93017G	*
LAUTOP_C2	V72K5252X	FCS LH PITCH AUTO MODE B	D&C PNL		BD		93017G	*
LAUTOP_C3	V72K5253X	FCS LH PITCH AUTO MODE C	D&C PNL		BD		93017G	*
LAUTORY_C1	V72K5265X	FCS LH R-Y AUTO MODE A	D&C PNL		BD		93017G	*
LAUTORY_C2	V72K5266X	FCS LH R-Y AUTO MODE B	D&C PNL		BD		93017G	*
LAUTORY_C3	V72K5267X	FCS LH R-Y AUTO MODE C	D&C PNL		BD		93017G	*
LCSSP_C1	V72K5256X	FCS LH PITCH CSS MODE A	D&C PNL		BD		93017G	*
LCSSP_C2	V72K5257X	FCS LH PITCH CSS MODE B	D&C PNL		BD		93017G	*
LCSSP_C3	V72K5258X	FCS LH PITCH CSS MODE C	D&C PNL		BD		93017G	*
LCSSRY_C1	V72K5270X	FCS LH R-Y CSS MODE A	D&C PNL		BD		93017G	*
LCSSRY_C2	V72K5271X	FCS LH R-Y CSS MODE B	D&C PNL		BD		93017G	*
LCSSRY_C3	V72K5272X	FCS LH R-Y CSS MODE C	D&C PNL		BD		93017G	*
LHSIAPP	V72K8582X	LH HSI APPROACH MODE SELECT	D&C PNL		BD		93017G	*
LHSICMPTR	V72K8588X	LH HSI NAV SOURCE SELECT	D&C PNL		BD		93017G	*
LHSIENTRY	V72K8580X	LH HSI ENTRY MODE SELECT	D&C PNL		BD		93017G	*
LHSIMSBL5	V72K8589X	LH HSI MLS SOURCE SELECT	D&C PNL		BD		93017G	*
LHSITACAN	V72K8587X	LH HSI TACAN SOURCE SELECT	D&C PNL		BD		93017G	*
LHSITAEM	V72K8581X	LH HSI TAEM MODE SELECT	D&C PNL		BD		93017G	*
LHSITVR1	V72K8501X	LH HSI SOURCE SELECT-1	D&C PNL		BD		93017G	*
LHSITVR2	V72K8502X	LH HSI SOURCE SELECT-2	D&C PNL		BD		93017G	*

TABLE 4.12.5-1. INPUT FUNCTIONAL PARAMETERS FOR GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
LHSITVR3	V72K8503X	LH HSI SOURCE SELECT-3	D&C PNL		BD		93017G	*
LMANBF_DN_C1	V72K2079X	LH BODY FLAP DOWN A	D&C PNL		BD		93017G	*
LMANBF_DN_C2	V72K2080X	LH BODY FLAP DOWN B	D&C PNL		BD		93017G	*
LMANBF_UP_C1	V72K2077X	LH BODY FLAP UP A	D&C PNL		BD		93017G	*
LMANBF_UP_C2	V72K2078X	LH BODY FLAP UP B	D&C PNL		BD		93017G	*
LPPIT_NTRIM_C1	V72K1503X	LH - PITCH TRIM A	D&C PNL		BD		93017G	*
LPPIT_NTRIM_C2	V72K1504X	LH - PITCH TRIM B	D&C PNL		BD		93017G	*
LPPIT_PTRIM_C1	V72K1500X	LH + PITCH TRIM A	D&C PNL		BD		93017G	*
LPPIT_PTRIM_C2	V72K1501X	LH + PITCH TRIM B	D&C PNL		BD		93017G	*
LPROLL_NTRIM_C1	V72K1509X	LH - ROLL TRIM A	D&C PNL		BD		93017G	*
LPROLL_NTRIM_C2	V72K1510X	LH - ROLL TRIM B	D&C PNL		BD		93017G	*
LPROLL_PTRIM_C1	V72K1506X	LH + ROLL TRIM A	D&C PNL		BD		93017G	*
LPROLL_PTRIM_C2	V72K1507X	LH + ROLL TRIM B	D&C PNL		BD		93017G	*
LRALT1	V72K8585X	RADAR ALTM LH DISPLAY SEL NO 1	D&C PNL		BD		93017G	*
LRALT2	V72K8586X	RADAR ALTM LH DISPLAY SEL NO 2	D&C PNL		BD		93017G	*
LSBTO_C1	V72K1577X	LH SBTC TAKEOVER-A	SBTC 1		BD		93017G	*
LSBTO_C2	V72K1580X	LH SBTC TAKEOVER-B	SBTC 1		BD		93017G	*
LSBTO_C3	V72K1583X	LH SBTC TAKEOVER-C	SBTC 1		BD		93017G	*
LYAW_NTRIM_C1	V72K1149X	LH - YAW TRIM-A	D&C PNL		BD		93017G	*
LYAW_NTRIM_C2	V72K1164X	LH - YAW TRIM-B	D&C PNL		BD		93017G	*
LYAW_PTRIM_C1	V72K1148X	LH + YAW TRIM-A	D&C PNL		BD		93017G	*
LYAW_PTRIM_C2	V72K1163X	LH + YAW TRIM-B	D&C PNL		BD		93017G	*
NWS1	V72K1718XA	NOSE WHEEL STEERING 1	D&C PNL	EVENT	BD		93017G	*
NWS1_CF	V91X6331XA	NOSE WHEEL STEERING 1 CF	FCOS		BD		90182	
NWS2	V72K1719XA	NOSE WHEEL STEERING 2	D&C PNL	EVENT	BD		93017G	*
NWS2_CF	V91X6333XA	NOSE WHEEL STEERING 2 CF	FCOS		BD		90182	
OPS_6_INDICATOR	V90X8634X	OPS 6 IND	MSC				92578B	
RADIERROR1	V72K8606X	RH ADI ERROR SCALE-LOW	D&C PNL		BD		93017G	*
RADIERROR20	V72K8604X	RH ADI ERROR SCALE-HIGH	D&C PNL		BD		93017G	*
RADIERROR5	V72K8605X	RH ADI ERROR SCALE-MEDIUM	D&C PNL		BD		93017G	*
RADIRATE1	V72K2062X	RH ADI RATE SCALE-LOW	D&C PNL		BD		93017G	*
RADIRATE10	V72K2060X	RH ADI RATE SCALE-HIGH	D&C PNL		BD		93017G	*
RADIRATE5	V72K2061X	RH ADI RATE SCALE-MEDIUM	D&C PNL		BD		93017G	*
RADSSCMPTR	V72K6392X	RH AIR DATA SOURCE SEL NAV	D&C PNL		BD		93017G	*
RADSSLEFT	V72K6391X	RH AIR DATA SOURCE SEL-LEFT	D&C PNL		BD		93017G	*
RADSSRIGHT	V72K6393X	RH AIR DATA SOURCE SEL-RIGHT	D&C PNL		BD		93017G	*
RAUTOBF_C1	V72K4893X	RH BODY FLAP AUTO/MANUAL A	D&C PNL		BD		93017G	*
RAUTOBF_C2	V72K4894X	RH BODY FLAP AUTO/MANUAL B	D&C PNL		BD		93017G	*
RAUTOBF_C3	V72K4895X	RH BODY FLAP AUTO/MANUAL C	D&C PNL		BD		93017G	*
RAUTOP_C1	V72K5151X	FCS RH PITCH AUTO MODE A	D&C PNL		BD		93017G	*
RAUTOP_C2	V72K5152X	FCS RH PITCH AUTO MODE B	D&C PNL		BD		93017G	*
RAUTOP_C3	V72K5153X	FCS RH PITCH AUTO MODE C	D&C PNL		BD		93017G	*
RAUTORY_C1	V72K5165X	FCS RH R-Y AUTO MODE A	D&C PNL		BD		93017G	*
RAUTORY_C2	V72K5166X	FCS RH R-Y AUTO MODE B	D&C PNL		BD		93017G	*
RAUTORY_C3	V72K5167X	FCS RH R-Y AUTO MODE C	D&C PNL		BD		93017G	*

TABLE 4.12.5-1. INPUT FUNCTIONAL PARAMETERS FOR GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
RCSSP_C1	V72K5156X	FCS RH PITCH CSS MODE A	D&C PNL		BD		93017G	*
RCSSP_C2	V72K5157X	FCS RH PITCH CSS MODE B	D&C PNL		BD		93017G	*
RCSSP_C3	V72K5158X	FCS RH PITCH CSS MODE C	D&C PNL		BD		93017G	*
RCSSRY_C1	V72K5170X	FCS RH R-Y CSS MODE A	D&C PNL		BD		93017G	*
RCSSRY_C2	V72K5171X	FCS RH R-Y CSS MODE B	D&C PNL		BD		93017G	*
RCSSRY_C3	V72K5172X	FCS RH R-Y CSS MODE C	D&C PNL		BD		93017G	*
RHSIAPP	V72K8682X	RH HSI APPROACH MODE SELECT	D&C PNL		BD		93017G	*
RHSICMPTR	V72K8688X	RH HSI NAV SOURCE SELECT	D&C PNL		BD		93017G	*
RHSIENTRY	V72K8680X	RH HSI ENTRY MODE SELECT	D&C PNL		BD		93017G	*
RHSIMSBLs	V72K8689X	RH HSI MLS SOURCE SELECT	D&C PNL		BD		93017G	*
RHSITACAN	V72K8687X	RH HSI TACAN SOURCE SELECT	D&C PNL		BD		93017G	*
RHSITAEM	V72K8681X	RH HSI TAEM MODE SELECT	D&C PNL		BD		93017G	*
RHSITVR1	V72K8601X	RH HSI SOURCE SELECT-1	D&C PNL		BD		93017G	*
RHSITVR2	V72K8602X	RH HSI SOURCE SELECT-2	D&C PNL		BD		93017G	*
RHSITVR3	V72K8603X	RH HSI SOURCE SELECT-3	D&C PNL		BD		93017G	*
RMANBF_DN_C1	V72K2089X	RH BODY FLAP DOWN A	D&C PNL		BD		93017G	*
RMANBF_DN_C2	V72K2090X	RH BODY FLAP DOWN B	D&C PNL		BD		93017G	*
RMANBF_UP_C1	V72K2087X	RH BODY FLAP UP A	D&C PNL		BD		93017G	*
RMANBF_UP_C2	V72K2088X	RH BODY FLAP UP B	D&C PNL		BD		93017G	*
RPPIT_NTRIM_C1	V72K1515X	RH - PITCH TRIM A	D&C PNL		BD		93017G	*
RPPIT_NTRIM_C2	V72K1516X	RH - PITCH TRIM B	D&C PNL		BD		93017G	*
RPPIT_PTRIM_C1	V72K1512X	RH + PITCH TRIM A	D&C PNL		BD		93017G	*
RPPIT_PTRIM_C2	V72K1513X	RH + PITCH TRIM B	D&C PNL		BD		93017G	*
RPROLL_NTRIM_C1	V72K1521X	RH - ROLL TRIM A	D&C PNL		BD		93017G	*
RPROLL_NTRIM_C2	V72K1522X	RH - ROLL TRIM B	D&C PNL		BD		93017G	*
RPROLL_PTRIM_C1	V72K1518X	RH + ROLL TRIM A	D&C PNL		BD		93017G	*
RPROLL_PTRIM_C2	V72K1519X	RH + ROLL TRIM B	D&C PNL		BD		93017G	*
RRALT1	V72K8685X	RADAR ALTM RH DISPLAY SEL NO 1	D&C PNL		BD		93017G	*
RRALT2	V72K8686X	RADAR ALTM RH DISPLAY SEL NO 2	D&C PNL		BD		93017G	*
RSBTO_C1	V72K1587X	RH SBTC TAKEOVER-A	SBTC 2		BD		93017G	*
RSBTO_C2	V72K1590X	RH SBTC TAKEOVER-B	SBTC 2		BD		93017G	*
RSBTO_C3	V72K1593X	RH SBTC TAKEOVER-C	SBTC 2		BD		93017G	*
RYAW_NTRIM_C1	V72K1194X	RH - YAW TRIM-A	D&C PNL		BD		93017G	*
RYAW_NTRIM_C2	V72K1214X	RH - YAW TRIM-B	D&C PNL		BD		93017G	*
RYAW_PTRIM_C1	V72K1193X	RH + YAW TRIM-A	D&C PNL		BD		93017G	*
RYAW_PTRIM_C2	V72K1213X	RH + YAW TRIM-B	D&C PNL		BD		93017G	*
TAL_ABORT_DECLARED	V90X8658X	TAL ABORT DECLARED	MSC				93090E	
WOWLON_IND	V96X0050X	WEIGHT ON MAIN WHEELS INDICATOR	LANDING SOP		BD		93017G	*
	V43S4570X	OMS-L ENG ARM/PRESS CMD 1 OP	D&C PNL		BD		93017G	*
	V43S4571X	OMS-L ENG ARM/PRESS CMD 2 OP	D&C PNL		BD		93017G	*
	V43S4572X	OMS-L ENG ARM/CMD 1 OP	D&C PNL		BD		93017G	*
	V43S4573X	OMS-L ENG ARM CMD 2 OP	D&C PNL		BD		93017G	*
	V43S5570X	OMS-R ENG ARM/PRESS CMD 1 OP	D&C PNL		BD		93017G	*
	V43S5571X	OMS-R ENG ARM/PRESS CMD 2 OP	D&C PNL		BD		93017G	*
	V43S5572X	OMS-R ENG ARM CMD 1 OP	D&C PNL		BD		93017G	*

TABLE 4.12.5-1. INPUT FUNCTIONAL PARAMETERS FOR GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V43S5573X	OMS-R ENG ARM CMD 2 OP	D&C PNL		BD		93017G	*
	V72K0051X	MPS ENG LIMIT CONTROL NO 1 ENABLE	D&C PNL		BD		93017G	*
	V72K0052X	MPS ENG LIMIT CONTROL NO 2 ENABLE	D&C PNL		BD		93017G	*
	V72K0053X	MPS ENG LIMIT CONTROL NO 3 ENABLE	D&C PNL		BD		93017G	*
	V72K0061X	MPS ENG LIMIT CONTROL NO 1 INHIBIT	D&C PNL		BD		93017G	*
	V72K0062X	MPS ENG LIMIT CONTROL NO 2 INHIBIT	D&C PNL		BD		93017G	*
	V72K0063X	MPS ENG LIMIT CONTROL NO 3 INHIBIT	D&C PNL		BD		93017G	*
	V72K0071X	MPS ENG LIMIT CONTROL NO 1 AUTO	D&C PNL		BD		93017G	*
	V72K0072X	MPS ENG LIMIT CONTROL NO 2 AUTO	D&C PNL		BD		93017G	*
	V72K0073X	MPS ENG LIMIT CONTROL NO 3 AUTO	D&C PNL		BD		93017G	*
	V72K0081X	MPS PRPLT DUMP SEQ START A	D&C PNL		BD		93017G	*
	V72K0082X	MPS PRPLT DUMP SEQ START B	D&C PNL		BD		93017G	*
	V72K0083X	MPS PRPLT DUMP SEQ STOP A	D&C PNL		BD		93017G	*
	V72K0084X	MPS PRPLT DUMP SEQ STOP B	D&C PNL		BD		93017G	*
	V72K0085X	MPS PRPLT DUMP BU LH2 VLV OP A	D&C PNL		BD		93017G	*
	V72K0086X	MPS PRPLT DUMP BU LH2 VLV OP B	D&C PNL		BD		93017G	*
	V72K0087X	MPS PRPLT DUMP BU LH2 VLV CL A	D&C PNL		BD		93017G	*
	V72K0088X	MPS PRPLT DUMP BU LH2 VLV CL B	D&C PNL		BD		93017G	*
	V72K0091X	MPS ME-1 SHUT DOWN CMD A	D&C PNL		BD		93017G	*
	V72K0092X	MPS ME-1 SHUT DOWN CMD B	D&C PNL		BD		93017G	*
	V72K0093X	MPS ME-2 SHUT DOWN CMD A	D&C PNL		BD		93017G	*
	V72K0094X	MPS ME-2 SHUT DOWN CMD B	D&C PNL		BD		93017G	*
	V72K0095X	MPS ME-3 SHUT DOWN CMD A	D&C PNL		BD		93017G	*
	V72K0096X	MPS ME-3 SHUT DOWN CMD B	D&C PNL		BD		93017G	*
	V72K1150X	LH RHC + PITCH TRIM-A	RHC 1		BD		93017G	*
	V72K1151X	LH RHC - PITCH TRIM-A	RHC 1		BD		93017G	*
	V72K1152X	LH RHC + ROLL TRIM-A	RHC 1		BD		93017G	*
	V72K1153X	LH RHC - ROLL TRIM-A	RHC 1		BD		93017G	*
	V72K1160X	LH RHC TRIM INHIBIT A	D&C PNL		BD		93017G	*
	V72K1161X	LH RHC TRIM INHIBIT B	D&C PNL		BD		93017G	*
	V72K1165X	LH RHC + PITCH TRIM-B	RHC 1		BD		93017G	*
	V72K1166X	LH RHC - PITCH TRIM-B	RHC 1		BD		93017G	*
	V72K1167X	LH RHC + ROLL TRIM-B	RHC 1		BD		93017G	*
	V72K1168X	LH RHC - ROLL TRIM-B	RHC 1		BD		93017G	*
	V72K1195X	RH RHC + PITCH TRIM-A	RHC 2		BD		93017G	*
	V72K1196X	RH RHC - PITCH TRIM-A	RHC 2		BD		93017G	*
	V72K1197X	RH RHC + ROLL TRIM-A	RHC 2		BD		93017G	*
	V72K1198X	RH RHC - ROLL TRIM-A	RHC 2		BD		93017G	*
	V72K1210X	RH RHC TRIM INHIBIT A	D&C PNL		BD		93017G	*
	V72K1211X	RH RHC TRIM INHIBIT B	D&C PNL		BD		93017G	*
	V72K1215X	RH RHC + PITCH TRIM-B	RHC 2		BD		93017G	*
	V72K1216X	RH RHC - PITCH TRIM-B	RHC 2		BD		93017G	*
	V72K1217X	RH RHC + ROLL TRIM-B	RHC 2		BD		93017G	*
	V72K1218X	RH RHC - ROLL TRIM-B	RHC 2		BD		93017G	*
	V72K1315X	FWD THC POS X OUTPUT-A	THC FWD		BD		93017G	*

TABLE 4.12.5-1. INPUT FUNCTIONAL PARAMETERS FOR GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	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	*
	V72K1570X	LH SPD BK/THROT AUTO/MAN A	D&C PNL		BD		93017G	*
	V72K1571X	LH SPD BK/THROT AUTO/MAN B	D&C PNL		BD		93017G	*
	V72K1572X	LH SPD BK/THROT AUTO/MAN C	D&C PNL		BD		93017G	*
	V72K1600X	RH SPD BK/THROT AUTO/MAN A	D&C PNL		BD		93017G	*
	V72K1601X	RH SPD BK/THROT AUTO/MAN B	D&C PNL		BD		93017G	*
	V72K1602X	RH SPD BK/THROT AUTO/MAN C	D&C PNL		BD		93017G	*
	V72K2001X	RH ADI ATTITUDE REF PB-A	D&C PNL		BD		93017G	*
	V72K2002X	RH ADI ATTITUDE REF PB-B	D&C PNL		BD		93017G	*
	V72K2015X	LH ADI ATTITUDE SEL-INERTIAL	D&C PNL		BD		93017G	*
	V72K2016X	LH ADI ATTITUDE SEL-LV/LH	D&C PNL		BD		93017G	*

TABLE 4.12.5-1. INPUT FUNCTIONAL PARAMETERS FOR GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V72K2017X	LH ADI ATTITUDE SEL-REFERENCE	D&C PNL		BD		93017G	*
	V72K2051X	LH ADI ATTITUDE REF PB-A	D&C PNL		BD		93017G	*
	V72K2052X	LH ADI ATTITUDE REF PB-B	D&C PNL		BD		93017G	*
	V72K2065X	RH ADI ATTITUDE SEL-INERTIAL	D&C PNL		BD		93017G	*
	V72K2066X	RH ADI ATTITUDE SEL-LV/LH	D&C PNL		BD		93017G	*
	V72K2067X	RH ADI ATTITUDE SEL-REFERENCE	D&C PNL		BD		93017G	*
	V72K2091X	AFT ADI ATTITUDE REF PB-A	D&C PNL		BD		93017G	*
	V72K2092X	AFT ADI ATTITUDE REF PB-B	D&C PNL		BD		93017G	*
	V72K2093X	AFT ADI RATE SCALE-HIGH	D&C PNL		BD		93017G	*
	V72K2094X	AFT ADI RATE SCALE-MEDIUM	D&C PNL		BD		93017G	*
	V72K2095X	AFT ADI RATE SCALE-LOW	D&C PNL		BD		93017G	*
	V72K2097X	AFT ADI ERROR SCALE-HIGH	D&C PNL		BD		93017G	*
	V72K2098X	AFT ADI ERROR SCALE-MEDIUM	D&C PNL		BD		93017G	*
	V72K2099X	AFT ADI ERROR SCALE-LOW	D&C PNL		BD		93017G	*
	V72K2101X	AFT ADI ATTITUDE SEL-INERTIAL	D&C PNL		BD		93017G	*
	V72K2102X	AFT ADI ATTITUDE SEL-LV/LH	D&C PNL		BD		93017G	*
	V72K2103X	AFT ADI ATTITUDE SEL-REFERENCE	D&C PNL		BD		93017G	*
	V72K2801X	FWD DAP SELECT A-A	D&C PNL		BD		93017G	*
	V72K2802X	FWD DAP SELECT A-B	D&C PNL		BD		93017G	*
	V72K2803X	FWD DAP SELECT B-A	D&C PNL		BD		93017G	*
	V72K2804X	FWD DAP SELECT B-B	D&C PNL		BD		93017G	*
	V72K2805X	FWD DAP SELECT A - C	D&C PNL		BD		93017G	*
	V72K2806X	FWD DAP SELECT B - C	D&C PNL		BD		93017G	*
	V72K2812X	FWD ROTATION ROLL DISC RATE A	D&C PNL		BD		93017G	*
	V72K2813X	FWD ROTATION ROLL DISC RATE B	D&C PNL		BD		93017G	*
	V72K2816X	FWD ROTATION ROLL PULSE A	D&C PNL		BD		93017G	*
	V72K2817X	FWD ROTATION ROLL PULSE B	D&C PNL		BD		93017G	*
	V72K2822X	FWD ROTATION PITCH DISC RATE A	D&C PNL		BD		93017G	*
	V72K2823X	FWD ROTATION PITCH DISC RATE B	D&C PNL		BD		93017G	*
	V72K2826X	FWD ROTATION PITCH PULSE A	D&C PNL		BD		93017G	*
	V72K2827X	FWD ROTATION PITCH PULSE B	D&C PNL		BD		93017G	*
	V72K2832X	FWD ROTATION YAW DISC RATE A	D&C PNL		BD		93017G	*
	V72K2833X	FWD ROTATION YAW DISC RATE B	D&C PNL		BD		93017G	*
	V72K2836X	FWD ROTATION YAW PULSE A	D&C PNL		BD		93017G	*
	V72K2837X	FWD ROTATION YAW PULSE B	D&C PNL		BD		93017G	*
	V72K2840X	FWD DAP AUTO A	D&C PNL		BD		93017G	*
	V72K2841X	FWD DAP AUTO B	D&C PNL		BD		93017G	*
	V72K2842X	FWD DAP AUTO C	D&C PNL		BD		93017G	*
	V72K2845X	FWD DAP MAN INRTL HOLD A	D&C PNL		BD		93017G	*
	V72K2846X	FWD DAP MAN INRTL HOLD B	D&C PNL		BD		93017G	*
	V72K2847X	FWD DAP MAN INRTL HOLD C	D&C PNL		BD		93017G	*
	V72K2851X	FWD RCS JETS NORM A	D&C PNL		BD		93017G	*
	V72K2852X	FWD RCS JETS NORM B	D&C PNL		BD		93017G	*
	V72K2853X	FWD RCS JETS VERNIER A	D&C PNL		BD		93017G	*
	V72K2854X	FWD RCS JETS VERNIER B	D&C PNL		BD		93017G	*

TABLE 4.12.5-1. INPUT FUNCTIONAL PARAMETERS FOR GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V72K2860X	FWD TRANSLATION X NORM A	D&C PNL		BD		93017G	*
	V72K2861X	FWD TRANSLATION X NORM B	D&C PNL		BD		93017G	*
	V72K2862X	FWD TRANSLATION X PULSE A	D&C PNL		BD		93017G	*
	V72K2863X	FWD TRANSLATION X PULSE B	D&C PNL		BD		93017G	*
	V72K2864X	FWD MANUAL LVLH A	D&C PNL		BD		93017G	*
	V72K2865X	FWD MANUAL LVLH B	D&C PNL		BD		93017G	*
	V72K2870X	FWD TRANSLATION Y NORM A	D&C PNL		BD		93017G	*
	V72K2871X	FWD TRANSLATION Y NORM B	D&C PNL		BD		93017G	*
	V72K2872X	FWD TRANSLATION Y PULSE A	D&C PNL		BD		93017G	*
	V72K2873X	FWD TRANSLATION Y PULSE B	D&C PNL		BD		93017G	*
	V72K2874X	FWD TRANSLATION Y LOW Z A	D&C PNL		BD		93017G	*
	V72K2875X	FWD TRANSLATION Y LOW Z B	D&C PNL		BD		93017G	*
	V72K2880X	FWD TRANSLATION Z NORM A	D&C PNL		BD		93017G	*
	V72K2881X	FWD TRANSLATION Z NORM B	D&C PNL		BD		93017G	*
	V72K2882X	FWD TRANSLATION Z PULSE A	D&C PNL		BD		93017G	*
	V72K2883X	FWD TRANSLATION Z PULSE B	D&C PNL		BD		93017G	*
	V72K2884X	FWD TRANSLATION Z HIGH A	D&C PNL		BD		93017G	*
	V72K2885X	FWD TRANSLATION Z HIGH B	D&C PNL		BD		93017G	*
	V72K2890X	FWD ALT PRCS DAP MODE A	D&C PNL	EVENT	BD		93017G	*
	V72K2891X	FWD ALT PRCS DAP MODE B	D&C PNL	EVENT	BD		93017G	*
	V72K2892X	FWD MAN FREE DRIFT A	D&C PNL	EVENT	BD		93017G	*
	V72K2893X	FWD MAN FREE DRIFT B	D&C PNL	EVENT	BD		93017G	*
	V72K2894X	FWD MAN FREE DRIFT C	D&C PNL	EVENT	BD		93017G	*
	V72K2895X	FWD MANUAL LVLH C	D&C PNL	EVENT	BD		93017G	*
	V72K2898X	FWD SPARE PBI A	D&C PNL		BD		93017G	*
	V72K2899X	FWD SPARE PBI B	D&C PNL		BD		93017G	*
	V72K4510X	RCS-MASTER CROSSFEED FROM LEFT-1	D&C PNL		BD		93017G	*
	V72K4511X	RCS-MASTER CROSSFEED FROM LEFT-2	D&C PNL		BD		93017G	*
	V72K4512X	RCS-MASTER CROSSFEED FROM LEFT-3	D&C PNL		BD		93017G	*
	V72K4515X	RCS-MASTER CROSSFEED FROM RIGHT-1	D&C PNL		BD		93017G	*
	V72K4516X	RCS-MASTER CROSSFEED FROM RIGHT-2	D&C PNL		BD		93017G	*
	V72K4517X	RCS-MASTER CROSSFEED FROM RIGHT-3	D&C PNL		BD		93017G	*
	V72K4611X	SRB SEPARATION AUTO A CMD	D&C PNL		BD			
	V72K4612X	SRB SEPARATION AUTO B CMD	D&C PNL		BD			
	V72K4613X	SRB SEPN MANUAL/AUTO ENABLE A CMD	D&C PNL		BD			
	V72K4614X	SRB SEPN MANUAL/AUTO ENABLE B CMD	D&C PNL		BD			
	V72K4616X	SRB SEPARATION INITIATE A CMD	D&C PNL		BD		93017G	*
	V72K4617X	SRB SEPARATION INITIATE B CMD	D&C PNL		BD		93017G	*
	V72K4618X	SRB SEPARATION AUTO C CMD	D&C PNL		BD			
	V72K4619X	SRB SEPN MANUAL/AUTO ENABLE C CMD	D&C PNL		BD			
	V72K4620X	SRB SEP INITIATE C/WOW-WONG CMD	D&C PNL		BD			
	V72K5175X	SENSE SW -Z CON A	D&C PNL		BD		93017G	*
	V72K5176X	SENSE SW -Z CON B	D&C PNL		BD		93017G	*
	V72K5177X	SENSE SW -Z CON C	D&C PNL		BD		93017G	*
	V72K5180X	SENSE SW -X CON A	D&C PNL		BD		93017G	*

TABLE 4.12.5-1. INPUT FUNCTIONAL PARAMETERS FOR GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V72K5181X	SENSE SW -X CON B	D&C PNL		BD		93017G	*
	V72K5182X	SENSE SW -X CON C	D&C PNL		BD		93017G	*
	V72K6075X	ATO ABORT REQUEST SIGNAL A	D&C PNL		BD			
	V72K6076X	ATO ABORT REQUEST SIGNAL B	D&C PNL		BD			
	V72K6077X	ATO ABORT REQUEST SIGNAL C	D&C PNL		BD			
	V72K6080X	TAL ABORT REQUEST SIGNAL A	D&C PNL		BD		89245D	
	V72K6081X	TAL ABORT REQUEST SIGNAL B	D&C PNL		BD		89245D	
	V72K6082X	TAL ABORT REQUEST SIGNAL C	D&C PNL		BD		89245D	
	V72K6085X	RTLS ABORT REQUEST SIGNAL A	D&C PNL		BD			
	V72K6086X	RTLS ABORT REQUEST SIGNAL B	D&C PNL		BD			
	V72K6087X	RTLS ABORT REQUEST SIGNAL C	D&C PNL		BD			
	V72K6201X	ET SEP MNL ENABLE A	D&C PNL		BD		93017G	*
	V72K6202X	ET SEP MNL ENABLE B	D&C PNL		BD		93017G	*
	V72K6203X	ET SEPARATION MANUAL ENABLE C CMD	D&C PNL		BD			
	V72K6205X	ET SEP INITIATE A	D&C PNL		BD		93017G	*
	V72K6206X	ET SEP INITIATE B	D&C PNL		BD		93017G	*
	V72K6207X	ET SEP INITIATE C/WOW-WONG CMD	D&C PNL		BD			
	V72K6210X	ET SEP AUTO A	D&C PNL		BD		93017G	*
	V72K6211X	ET SEP AUTO B	D&C PNL		BD		93017G	*
	V72K6212X	ET SEPARATION AUTO C CMD	D&C PNL		BD			
	V72K6314X	ENTRY ROLL MODE L GAIN A	D&C PNL		BD		93017G	*
	V72K6315X	ENTRY ROLL MODE L GAIN B	D&C PNL		BD		93017G	*
	V72K6316X	ENTRY ROLL MODE L GAIN C	D&C PNL		BD		93017G	*
	V72K6317X	ENTRY ROLL MODE L GAIN D	D&C PNL		BD		93017G	*
	V72K6320X	ENTRY ROLL MODE NO Y JET A	D&C PNL		BD		93017G	*
	V72K6321X	ENTRY ROLL MODE NO Y JET B	D&C PNL		BD		93017G	*
	V72K6322X	ENTRY ROLL MODE NO Y JET C	D&C PNL		BD		93017G	*
	V72K6323X	ENTRY ROLL MODE NO Y JET D	D&C PNL		BD		93017G	*
	V72K6354X	CONTROL EFFECTORS NO Y JET B	D&C PNL		BD		93017G	*
	V72K6400X	AFT SPARE PBI A	D&C PNL		BD		93017G	*
	V72K6401X	AFT SPARE PBI B	D&C PNL		BD		93017G	*
	V72K6410X	AFT ALT PRCS DAP MODE A	D&C PNL	EVENT	BD		93017G	*
	V72K6411X	AFT ALT PRCS DAP MODE B	D&C PNL	EVENT	BD		93017G	*
	V72K6412X	AFT MAN FREE DRIFT A	D&C PNL	EVENT	BD		93017G	*
	V72K6413X	AFT MAN FREE DRIFT B	D&C PNL	EVENT	BD		93017G	*
	V72K6414X	AFT MAN FREE DRIFT C	D&C PNL	EVENT	BD		93017G	*
	V72K6415X	AFT MANUAL LVLH C	D&C PNL	EVENT	BD		93017G	*
	V72K6419X	AFT DAP SELECT A - C	D&C PNL		BD		93017G	*
	V72K6420X	AFT DAP SELECT B - C	D&C PNL		BD		93017G	*
	V72K6430X	AFT DAP SELECT A-A	D&C PNL		BD		93017G	*
	V72K6431X	AFT DAP SELECT A-B	D&C PNL		BD		93017G	*
	V72K6432X	AFT DAP SELECT B-A	D&C PNL		BD		93017G	*
	V72K6433X	AFT DAP SELECT B-B	D&C PNL		BD		93017G	*
	V72K6440X	AFT ROTATION ROLL DISC RATE A	D&C PNL		BD		93017G	*
	V72K6441X	AFT ROTATION ROLL DISC RATE B	D&C PNL		BD		93017G	*

TABLE 4.12.5-1. INPUT FUNCTIONAL PARAMETERS FOR GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V72K6448X	AFT ROTATION ROLL PULSE A	D&C PNL		BD		93017G	*
	V72K6449X	AFT ROTATION ROLL PULSE B	D&C PNL		BD		93017G	*
	V72K6460X	AFT ROTATION PITCH DISC RATE A	D&C PNL		BD		93017G	*
	V72K6461X	AFT ROTATION PITCH DISC RATE B	D&C PNL		BD		93017G	*
	V72K6468X	AFT ROTATION PITCH PULSE A	D&C PNL		BD		93017G	*
	V72K6469X	AFT ROTATION PITCH PULSE B	D&C PNL		BD		93017G	*
	V72K6480X	AFT ROTATION YAW DISC RATE A	D&C PNL		BD		93017G	*
	V72K6481X	AFT ROTATION YAW DISC RATE B	D&C PNL		BD		93017G	*
	V72K6488X	AFT ROTATION YAW PULSE A	D&C PNL		BD		93017G	*
	V72K6489X	AFT ROTATION YAW PULSE B	D&C PNL		BD		93017G	*
	V72K6490X	AFT DAP AUTO A	D&C PNL		BD		93017G	*
	V72K6491X	AFT DAP AUTO B	D&C PNL		BD		93017G	*
	V72K6492X	AFT DAP AUTO C	D&C PNL		BD		93017G	*
	V72K6495X	AFT DAP MAN INRTL HOLD A	D&C PNL		BD		93017G	*
	V72K6496X	AFT DAP MAN INRTL HOLD B	D&C PNL		BD		93017G	*
	V72K6497X	AFT DAP MAN INRTL HOLD C	D&C PNL		BD		93017G	*
	V72K6505X	AFT RCS JETS NORM A	D&C PNL		BD		93017G	*
	V72K6506X	AFT RCS JETS NORM B	D&C PNL		BD		93017G	*
	V72K6507X	AFT RCS JETS VERNIER A	D&C PNL		BD		93017G	*
	V72K6508X	AFT RCS JETS VERNIER B	D&C PNL		BD		93017G	*
	V72K6510X	AFT TRANSLATION X NORM A	D&C PNL		BD		93017G	*
	V72K6511X	AFT TRANSLATION X NORM B	D&C PNL		BD		93017G	*
	V72K6513X	AFT TRANSLATION X PULSE A	D&C PNL		BD		93017G	*
	V72K6514X	AFT TRANSLATION X PULSE B	D&C PNL		BD		93017G	*
	V72K6517X	AFT MANUAL LVLH A	D&C PNL		BD		93017G	*
	V72K6518X	AFT MANUAL LVLH B	D&C PNL		BD		93017G	*
	V72K6520X	AFT TRANSLATION Y NORM A	D&C PNL		BD		93017G	*
	V72K6521X	AFT TRANSLATION Y NORM B	D&C PNL		BD		93017G	*
	V72K6523X	AFT TRANSLATION Y PULSE A	D&C PNL		BD		93017G	*
	V72K6524X	AFT TRANSLATION Y PULSE B	D&C PNL		BD		93017G	*
	V72K6527X	AFT TRANSLATION Y LOWZ A	D&C PNL		BD		93017G	*
	V72K6528X	AFT TRANSLATION Y LOWZ B	D&C PNL		BD		93017G	*
	V72K6530X	AFT TRANSLATION Z NORM A	D&C PNL		BD		93017G	*
	V72K6531X	AFT TRANSLATION Z NORM B	D&C PNL		BD		93017G	*
	V72K6533X	AFT TRANSLATION Z PULSE A	D&C PNL		BD		93017G	*
	V72K6534X	AFT TRANSLATION Z PULSE B	D&C PNL		BD		93017G	*
	V72K6537X	AFT TRANSLATION Z HIGH A	D&C PNL		BD		93017G	*
	V72K6538X	AFT TRANSLATION Z HIGH B	D&C PNL		BD		93017G	*
	V91X2288X	FF1 INPUT PROM SEG 2,6 STATUS(HFE)	FCOS				89598A	
	V91X2289X	FF2 INPUT PROM SEG 2,6 STATUS(HFE)	FCOS				89598A	
	V91X2290X	FF3 INPUT PROM SEG 2,6 STATUS(HFE)	FCOS				89598A	
	V91X2291X	FF4 INPUT PROM SEG 2,6 STATUS(HFE)	FCOS				89598A	
	V91X5275XA	FCS MON CHAN 1 RESET/OVERRIDE A CF	FCOS				90182	
	V91X5276XA	FCS MON CHAN 1 RESET/OVERRIDE B CF	FCOS				90182	
	V91X5277XA	FCS MON CHAN 1 RESET/OVERRIDE C CF	FCOS				90182	

TABLE 4.12.5-1. INPUT FUNCTIONAL PARAMETERS FOR GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V91X5278XA	FCS MON CHAN 2 RESET/OVERRIDE A CF	FCOS				90182	
	V91X5279XA	FCS MON CHAN 2 RESET/OVERRIDE B CF	FCOS				90182	
	V91X5280XA	FCS MON CHAN 2 RESET/OVERRIDE C CF	FCOS				90182	
	V91X5281XA	FCS MON CHAN 3 RESET/OVERRIDE A CF	FCOS				90182	
	V91X5282XA	FCS MON CHAN 3 RESET/OVERRIDE B CF	FCOS				90182	
	V91X5283XA	FCS MON CHAN 3 RESET/OVERRIDE C CF	FCOS				90182	
	V91X5284XA	FCS MON CHAN 4 RESET/OVERRIDE A CF	FCOS				90182	
	V91X5285XA	FCS MON CHAN 4 RESET/OVERRIDE B CF	FCOS				90182	
	V91X5286XA	FCS MON CHAN 4 RESET/OVERRIDE C CF	FCOS				90182	
	V91X5287X	LH BODY FLAP AUTO/MANUAL A CF	FCOS		BD			
	V91X5288X	LH BODY FLAP AUTO/MANUAL B CF	FCOS		BD			
	V91X5289X	LH BODY FLAP AUTO/MANUAL C CF	FCOS		BD			
	V91X5291X	FCS LH R-Y CSS MODE A COMMFAULT	FCOS		BD			
	V91X5292X	FCS LH R-Y CSS MODE B COMMFAULT	FCOS		BD			
	V91X5293X	FCS LH R-Y CSS MODE C COMMFAULT	FCOS		BD			
	V91X5300X	FCS LH PITCH AUTO MODE A COMMFAULT	FCOS		BD			
	V91X5301X	FCS LH PITCH AUTO MODE B COMMFAULT	FCOS		BD			
	V91X5302X	FCS RH R-Y CSS MODE B COMMFAULT	FCOS		BD			
	V91X5303X	FCS RH R-Y CSS MODE C COMMFAULT	FCOS		BD			
	V91X5304X	TAL ABORT REQUEST SIGNAL A COM FLT	FCOS				89245D	
	V91X5305X	TAL ABORT REQUEST SIGNAL B COM FLT	FCOS				89245D	
	V91X5306X	TAL ABORT REQUEST SIGNAL C COM FLT	FCOS				89245D	
	V91X5307X	ATO ABORT REQUEST SIGNAL A COM FLT	FCOS					
	V91X5308X	ATO ABORT REQUEST SIGNAL B COM FLT	FCOS					
	V91X5309X	ATO ABORT REQUEST SIGNAL C COM FLT	FCOS					
	V91X5310X	FCS LH PITCH AUTO MODE C COMMFAULT	FCOS					
	V91X5311X	FCS LH PITCH CSS MODE A COMMFAULT	FCOS		BD			
	V91X5312X	FCS LH PITCH CSS MODE B COMMFAULT	FCOS		BD			
	V91X5313X	FCS LH PITCH CSS MODE C COMMFAULT	FCOS		BD			
	V91X5314X	FCS LH R-Y AUTO MODE A COMMFAULT	FCOS		BD			
	V91X5315X	FCS LH R-Y AUTO MODE B COMMFAULT	FCOS		BD			
	V91X5316X	FCS LH R-Y AUTO MODE C COMMFAULT	FCOS		BD			
	V91X5317X	LH SPD BK/THROT AUTO/MAN A CF	FCOS		BD			
	V91X5318X	LH SPD BK/THROT AUTO/MAN B CF	FCOS		BD			
	V91X5319X	LH SPD BK/THROT AUTO/MAN C CF	FCOS		BD			
	V91X5320X	LH SBTC TAKEOVER-A COMMFAULT	FCOS		BD			
	V91X5321X	LH SBTC TAKEOVER-B COMMFAULT	FCOS		BD			
	V91X5322X	LH SBTC TAKEOVER-C COMMFAULT	FCOS		BD			
	V91X5323X	RCS MASTER CROSSFD FROM LEFT-1 CF	FCOS					
	V91X5324X	RCS MASTER CROSSFD FROM LEFT-2 CF	FCOS					
	V91X5325X	RCS MASTER CROSSFD FROM LEFT-3 CF	FCOS					
	V91X5326X	RCS MASTER CROSSFD FROM RIGHT-1 CF	FCOS					
	V91X5327X	RCS MASTER CROSSFD FROM RIGHT-2 CF	FCOS					
	V91X5328X	RCS MASTER CROSSFD FROM RIGHT-3 CF	FCOS					
	V91X5329X	RH BODY FLAP AUTO/MANUAL A CF	FCOS		BD			

TABLE 4.12.5-1. INPUT FUNCTIONAL PARAMETERS FOR GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V91X5330X	RH BODY FLAP AUTO/MANUAL B CF	FCOS		BD			
	V91X5331X	RH BODY FLAP AUTO/MANUAL C CF	FCOS		BD			
	V91X5332X	FCS RH PITCH AUTO MODE A COMMFAULT	FCOS		BD			
	V91X5333X	FCS RH PITCH AUTO MODE B COMMFAULT	FCOS		BD			
	V91X5334X	FCS RH PITCH AUTO MODE C COMMFAULT	FCOS		BD			
	V91X5335X	FCS RH PITCH CSS MODE A COMMFAULT	FCOS		BD			
	V91X5336X	FCS RH PITCH CSS MODE B COMMFAULT	FCOS		BD			
	V91X5337X	FCS RH PITCH CSS MODE C COMMFAULT	FCOS		BD			
	V91X5338X	FCS RH R-Y AUTO MODE A COMMFAULT	FCOS		BD			
	V91X5339X	FCS RH R-Y AUTO MODE B COMMFAULT	FCOS		BD			
	V91X5340X	FCS RH R-Y AUTO MODE C COMMFAULT	FCOS		BD			
	V91X5341X	FCS RH R-Y CSS MODE A COMMFAULT	FCOS		BD			
	V91X5342X	RTLS ABORT REQUEST SIG A COM FLT	FCOS					
	V91X5343X	RTLS ABORT REQUEST SIG B COM FLT	FCOS					
	V91X5344X	RTLS ABORT REQUEST SIG C COM FLT	FCOS					
	V91X5345X	ET SEP AUTO A COMMFAULT	FCOS					
	V91X5346X	ET SEP AUTO B COMMFAULT	FCOS					
	V91X5347X	ET SEP INITIATE A/WOW-WONG CF	FCOS					
	V91X5348X	ET SEP INITIATE B/WOW-WONG CF	FCOS					
	V91X5349X	ET SEP MNL ENABLE A COMMFAULT	FCOS					
	V91X5350X	ET SEP MNL ENABLE B COMMFAULT	FCOS					
	V91X5354X	MPS ENG LIMIT CONTROL NO 1 AUTO CF	FCOS					
	V91X5355X	MPS ENG LIMIT CONTROL NO 2 AUTO CF	FCOS					
	V91X5356X	MPS ENG LIMIT CONTROL NO 3 AUTO CF	FCOS					
	V91X5357X	MPS ENG LIMIT CONTROL NO 1 ENBL CF	FCOS					
	V91X5358X	MPS ENG LIMIT CONTROL NO 2 ENBL CF	FCOS					
	V91X5359X	MPS ENG LIMIT CONTROL NO 3 ENBL CF	FCOS					
	V91X5360X	MPS ENG LIMIT CONTROL NO 1 INHB CF	FCOS					
	V91X5361X	MPS ENG LIMIT CONTROL NO 2 INHB CF	FCOS					
	V91X5362X	MPS ENG LIMIT CONTROL NO 3 INHB CF	FCOS					
	V91X5363X	MPS PRPLT DUMP BU LH2 VLV OP A CF	FCOS					
	V91X5364X	MPS PRPLT DUMP BU LH2 VLV OP B CF	FCOS					
	V91X5365X	MPS PRPLT DUMP BU LH2 VLV CL A CF	FCOS					
	V91X5366X	MPS PRPLT DUMP BU LH2 VLV CL B CF	FCOS					
	V91X5367X	RH SPD BK/THROT AUTO/MAN A CF	FCOS		BD			
	V91X5368X	RH SPD BK/THROT AUTO/MAN B CF	FCOS		BD			
	V91X5369X	RH SPD BK/THROT AUTO/MAN C-CF	FCOS		BD			
	V91X5370X	RH SBTC TAKEOVER-A COMMFAULT	FCOS		BD			
	V91X5371X	RH SBTC TAKEOVER-B COMMFAULT	FCOS		BD			
	V91X5372X	RH SBTC TAKEOVER-C COMMFAULT	FCOS		BD			
	V91X5373X	ET SEP AUTO C COMMFAULT	FCOS					
	V91X5374X	ET SEP INITIATE C/WOW-WONG CF	FCOS					
	V91X5375X	ET SEP MNL ENABLE C COMMFAULT	FCOS					
	V91X5380X	LH BODYFLAP DOWN A COMMFAULT	FCOS		BD			
	V91X5381X	LH BODYFLAP DOWN B COMMFAULT	FCOS		BD			

TABLE 4.12.5-1. INPUT FUNCTIONAL PARAMETERS FOR GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V91X5382X	LH BODYFLAP UP A COMMFAULT	FCOS		BD			
	V91X5383X	LH BODYFLAP UP B COMMFAULT	FCOS		BD			
	V91X5400X	LH-PITCH TRIM A COMMFAULT	FCOS		BD			
	V91X5401X	LH-PITCH TRIM B COMMFAULT	FCOS		BD			
	V91X5402X	LH+PITCH TRIM A COMMFAULT	FCOS		BD			
	V91X5403X	LH+PITCH TRIM B COMMFAULT	FCOS		BD			
	V91X5404X	LH-ROLL TRIM A COMMFAULT	FCOS		BD			
	V91X5405X	LH-ROLL TRIM B COMMFAULT	FCOS		BD			
	V91X5406X	LH+ROLL TRIM A COMMFAULT	FCOS		BD			
	V91X5407X	LH+ROLL TRIM B COMMFAULT	FCOS		BD			
	V91X5410X	LH RHC-PITCH TRIM-A COMMFAULT	FCOS		BD			
	V91X5411X	LH RHC-PITCH TRIM-B COMMFAULT	FCOS		BD			
	V91X5412X	LH RHC+PITCH TRIM-A COMMFAULT	FCOS		BD			
	V91X5413X	LH RHC+PITCH TRIM-B COMMFAULT	FCOS		BD			
	V91X5414X	LH RHC-ROLL TRIM-A COMMFAULT	FCOS		BD			
	V91X5415X	LH RHC-ROLL TRIM-B COMMFAULT	FCOS		BD			
	V91X5416X	LH RHC+ROLL TRIM-A COMMFAULT	FCOS		BD			
	V91X5417X	LH RHC+ROLL TRIM-B COMMFAULT	FCOS		BD			
	V91X5418XA	LH RHC TRIM INHIBIT A COMMFAULT	FCOS				90182	
	V91X5419XA	LH RHC TRIM INHIBIT B COMMFAULT	FCOS				90182	
	V91X5420X	LH-YAW TRIM-A COMMFAULT	FCOS		BD			
	V91X5421X	LH-YAW TRIM-B COMMFAULT	FCOS		BD			
	V91X5422X	LH+YAW TRIM-A COMMFAULT	FCOS		BD			
	V91X5423X	LH+YAW TRIM-B COMMFAULT	FCOS		BD			
	V91X5450X	RH BODY FLAP DOWN A COMMFAULT	FCOS		BD			
	V91X5451X	RH BODY FLAP DOWN B COMMFAULT	FCOS		BD			
	V91X5452X	RH BODY FLAP UP A COMMFAULT	FCOS		BD			
	V91X5453X	RH BODY FLAP UP B COMMFAULT	FCOS		BD			
	V91X5454X	RH-PITCH TRIM A COMMFAULT	FCOS		BD			
	V91X5455X	RH-PITCH TRIM B COMMFAULT	FCOS		BD			
	V91X5456X	RH+PITCH TRIM A COMMFAULT	FCOS		BD			
	V91X5457X	RH+PITCH TRIM B COMMFAULT	FCOS		BD			
	V91X5458X	RH-ROLL TRIM A COMMFAULT	FCOS		BD			
	V91X5459X	RH-ROLL TRIM B COMMFAULT	FCOS		BD			
	V91X5460X	RH+ROLL TRIM A COMMFAULT	FCOS		BD			
	V91X5461X	RH+ROLL TRIM B COMMFAULT	FCOS		BD			
	V91X5462X	RH RHC-PITCH TRIM-A COMMFAULT	FCOS		BD			
	V91X5463X	RH RHC-PITCH TRIM-B COMMFAULT	FCOS		BD			
	V91X5464X	RH RHC+PITCH TRIM-A COMMFAULT	FCOS		BD			
	V91X5465X	RH RHC+PITCH TRIM-B COMMFAULT	FCOS		BD			
	V91X5466X	RH RHC-ROLL TRIM-A COMMFAULT	FCOS		BD			
	V91X5467X	RH RHC-ROLL TRIM-B COMMFAULT	FCOS		BD			
	V91X5468X	RH RHC+ROLL TRIM-A COMMFAULT	FCOS		BD			
	V91X5469X	RH RHC+ROLL TRIM-B COMMFAULT	FCOS		BD			
	V91X5470XA	RH RHC TRIM INHIBIT A COMMFAULT	FCOS				90182	

TABLE 4.12.5-1. INPUT FUNCTIONAL PARAMETERS FOR GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V91X5471XA	RH RHC TRIM INHIBIT B COMMFAULT	FCOS				90182	
	V91X5472X	RH-YAW TRIM-A COMMFAULT	FCOS		BD			
	V91X5473X	RH-YAW TRIM-B COMMFAULT	FCOS		BD			
	V91X5474X	RH+YAW TRIM-A COMMFAULT	FCOS		BD			
	V91X5475X	RH+YAW TRIM-B COMMFAULT	FCOS		BD			
	V91X5480X	LH ADI ATTITUDE SEL-INERTIAL CF	FCOS					
	V91X5481X	LH ADI ATTITUDE SEL-LV/LH CF	FCOS					
	V91X5482X	LH ADI ATTITUDE SEL-REFERENCE CF	FCOS					
	V91X5483X	LH ADI ERROR SCALE-HIGH COMMFAULT	FCOS					
	V91X5484X	LH ADI ERROR SCALE-MED COMMFAULT	FCOS					
	V91X5485X	LH ADI ERROR SCALE-LOW COMMFAULT	FCOS					
	V91X5486X	LH ADI ATTITUDE REF PB-A CF	FCOS					
	V91X5487X	LH ADI ATTITUDE REF PB-B CF	FCOS					
	V91X5488X	LH ADI RATE SCALE-HIGH COMMFAULT	FCOS					
	V91X5489X	LH ADI RATE SCALE-MED COMMFAULT	FCOS					
	V91X5490X	LH ADI RATE SCALE-LOW COMMFAULT	FCOS					
	V91X5491X	LH AIR DATA SOURCE SEL-LEFT CF	FCOS					
	V91X5492X	LH AIR DATA SOURCE SEL-NAV CF	FCOS					
	V91X5493X	LH AIR DATA SOURCE SEL-RIGHT CF	FCOS					
	V91X5504X	ENTRY ROLL MODE L GAIN A CF	FCOS		BD			
	V91X5505X	ENTRY ROLL MODE L GAIN B CF	FCOS		BD			
	V91X5506X	ENTRY ROLL MODE L GAIN C CF	FCOS		BD			
	V91X5507X	ENTRY ROLL MODE L GAIN D CF	FCOS		BD			
	V91X5508X	ENTRY ROLL MODE NO Y JET A CF	FCOS		BD			
	V91X5509X	ENTRY ROLL MODE NO Y JET B CF	FCOS		BD			
	V91X5510X	ENTRY ROLL MODE NO Y JET C CF	FCOS		BD			
	V91X5511X	ENTRY ROLL MODE NO Y JET D CF	FCOS		BD			
	V91X6300X	LH HSI ENTRY MODE SELECT COMMFAULT	FCOS					
	V91X6301X	LH HSI TAEM MODE SELECT COMMFAULT	FCOS					
	V91X6302X	LH HSI APPROACH MODE SELECT CF	FCOS					
	V91X6303X	LH HSI TACAN SOURCE SELECT CF	FCOS					
	V91X6304X	LH HSI NAV SOURCE SELECT CF	FCOS					
	V91X6305X	LH HSI MSBLS SOURCE SELECT CF	FCOS					
	V91X6306X	LH HSI 1 STAT SELECT COMMFAULT	FCOS					
	V91X6307X	LH HSI 2 STAT SELECT COMMFAULT	FCOS					
	V91X6308X	LH HSI 3 STAT SELECT COMMFAULT	FCOS					
	V91X6309X	RADAR ALTM LH DISPLAY SEL NO 1 CF	FCOS					
	V91X6310X	RADAR ALTM LH DISPLAY SEL NO 2 CF	FCOS					
	V91X6320X	RH HSI ENTRY MODE SELECT COMMFAULT	FCOS					
	V91X6321X	RH HSI TAEM MODE SELECT COMMFAULT	FCOS					
	V91X6322X	RH HSI APPROACH MODE SELECT CF	FCOS					
	V91X6323X	RH HSI TACAN SOURCE SELECT CF	FCOS					
	V91X6324X	RH HSI NAV SOURCE SELECT CF	FCOS					
	V91X6325X	RH HSI MSBLS SOURCE SELECT CF	FCOS					
	V91X6326X	RH HSI 1 STAT SELECT COMMFAULT	FCOS					

TABLE 4.12.5-1. INPUT FUNCTIONAL PARAMETERS FOR GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V91X6327X	RH HSI 2 STAT SELECT COMMFAULT	FCOS					
	V91X6328X	RH HSI 3 STAT SELECT COMMFAULT	FCOS					
	V91X6329X	RADAR ALTM RH DISPLAY SEL NO 1 CF	FCOS					
	V91X6330X	RADAR ALTM RH DISPLAY SEL NO 2 CF	FCOS					
	V91X6340X	MPS PRPLT DUMP SEQ START A CF	FCOS					
	V91X6341X	MPS PRPLT DUMP SEQ START B CF	FCOS					
	V91X6342X	MPS PRPLT DUMP SEQ STOP A CF	FCOS					
	V91X6343X	MPS PRPLT DUMP SEQ STOP B CF	FCOS					
	V91X6344X	MPS ME-1 SHUTDOWN CMD A CF	FCOS					
	V91X6345X	MPS ME-1 SHUTDOWN CMD B CF	FCOS					
	V91X6346X	MPS ME-2 SHUTDOWN CMD A CF	FCOS					
	V91X6347X	MPS ME-2 SHUTDOWN CMD B CF	FCOS					
	V91X6348X	MPS ME-3 SHUTDOWN CMD A CF	FCOS					
	V91X6349X	MPS ME-3 SHUTDOWN CMD B CF	FCOS					
	V91X6350XA	OMS-L ENG ARM CMD 1 OP CF	FCOS				90182	
	V91X6351XA	OMS-L ENG ARM CMD 2 OP CF	FCOS				90182	
	V91X6352XA	OMS-L ENG ARM/PRESS CMD 1 OP CF	FCOS				90182	
	V91X6353XA	OMS-L ENG ARM/PRESS CMD 2 OP CF	FCOS				90182	
	V91X6354XA	OMS-R ENG ARM CMD 1 OP CF	FCOS				90182	
	V91X6355XA	OMS-R ENG ARM CMD 2 OP CF	FCOS				90182	
	V91X6356XA	OMS-R ENG ARM/PRESS CMD 1 OP CF	FCOS				90182	
	V91X6357XA	OMS-R ENG ARM/PRESS CMD 2 OP CF	FCOS				90182	
	V91X6360X	SRB SEPARATION AUTO A CMD CF	FCOS					
	V91X6361X	SRB SEPARATION AUTO B CMD CF	FCOS					
	V91X6362X	SRB SEPN MANUAL/AUTO ENBL A CMD CF	FCOS					
	V91X6363X	SRB SEPN MANUAL/AUTO ENBL B CMD CF	FCOS					
	V91X6364X	SRB SEP INITIATE A/WOW-WONG CF	FCOS					
	V91X6365X	SRB SEP INITIATE B/WOW-WONG CF	FCOS					
	V91X6366X	SRB SEPARATION AUTO C CMD CF	FCOS					
	V91X6367X	SRB SEPN MANUAL/AUTO ENBL C CMD CF	FCOS					
	V91X6368X	SRB SEP INITIATE C/WOW-WONG CF	FCOS					
	V91X6480X	RH ADI ATTITUDE SEL-INERTIAL CF	FCOS					
	V91X6481X	RH ADI ATTITUDE SEL-LV/LH CF	FCOS					
	V91X6482X	RH ADI ATTITUDE SEL-REFERENCE CF	FCOS					
	V91X6483X	RH ADI ERROR SCALE-HIGH COMMFAULT	FCOS					
	V91X6484X	RH ADI ERROR SCALE-MED COMMFAULT	FCOS					
	V91X6485X	RH ADI ERROR SCALE-LOW COMMFAULT	FCOS					
	V91X6486X	RH ADI ATTITUDE REF PB-A CF	FCOS					
	V91X6487X	RH ADI ATTITUDE REF PB-B CF	FCOS					
	V91X6488X	RH ADI RATE SCALE-HIGH COMMFAULT	FCOS					
	V91X6489X	RH ADI RATE SCALE-MED COMMFAULT	FCOS					
	V91X6490X	RH ADI RATE SCALE-LOW COMMFAULT	FCOS					
	V91X6491X	RH AIR DATA SOURCE SEL-LEFT CF	FCOS					
	V91X6492X	RH AIR DATA SOURCE SEL-NAV CF	FCOS					
	V91X6493X	RH AIR DATA SOURCE SEL-RIGHT CF	FCOS					

TABLE 4.12.5-1. INPUT FUNCTIONAL PARAMETERS FOR GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V91X6600X	AFT THC POS X OUTPUT-A COMMFAULT	FCOS					
	V91X6601X	AFT THC POS Y OUTPUT-A COMMFAULT	FCOS					
	V91X6602X	AFT THC POS Z OUTPUT-A COMMFAULT	FCOS					
	V91X6604X	AFT THC POS X OUTPUT-B COMMFAULT	FCOS					
	V91X6605X	AFT THC POS Y OUTPUT-B COMMFAULT	FCOS					
	V91X6606X	AFT THC POS Z OUTPUT-B COMMFAULT	FCOS					
	V91X6608X	AFT THC POS X OUTPUT-C COMMFAULT	FCOS					
	V91X6609X	AFT THC POS Y OUTPUT-C COMMFAULT	FCOS					
	V91X6610X	AFT THC POS Z OUTPUT-C COMMFAULT	FCOS					
	V91X6611X	AFT MAN FREE DRIFT A CF	FCOS		BD		89921C	
	V91X6612X	AFT MAN FREE DRIFT B CF	FCOS		BD		89921C	
	V91X6613X	AFT MAN FREE DRIFT C CF	FCOS		BD		89921C	
	V91X6615X	AFT THC NEG X OUTPUT-A COMMFAULT	FCOS					
	V91X6616X	AFT THC NEG Y OUTPUT-A COMMFAULT	FCOS					
	V91X6617X	AFT THC NEG Z OUTPUT-A COMMFAULT	FCOS					
	V91X6619X	AFT THC NEG X OUTPUT-B COMMFAULT	FCOS					
	V91X6620X	AFT THC NEG Y OUTPUT-B COMMFAULT	FCOS					
	V91X6621X	AFT THC NEG Z OUTPUT-B COMMFAULT	FCOS					
	V91X6623X	AFT THC NEG X OUTPUT-C COMMFAULT	FCOS					
	V91X6624X	AFT THC NEG Y OUTPUT-C COMMFAULT	FCOS					
	V91X6625X	AFT THC NEG Z OUTPUT-C COMMFAULT	FCOS					
	V91X6626X	AFT ALT PRCS DAP MODE A CF	FCOS		BD		89921C	
	V91X6627X	AFT ALT PRCS DAP MODE B CF	FCOS		BD		89921C	
	V91X6628X	AFT MAN LVLH C CF	FCOS		BD		89921C	
	V91X6629X	FWD MAN LVLH C CF	FCOS		BD		89921C	
	V91X6630X	FWD DAP SELECT A-A COMMFAULT	FCOS					
	V91X6631X	FWD DAP SELECT A-B COMMFAULT	FCOS					
	V91X6632X	FWD DAP SELECT A-C COMMFAULT	FCOS					
	V91X6633X	FWD DAP SELECT B-A COMMFAULT	FCOS					
	V91X6634X	FWD DAP SELECT B-B COMMFAULT	FCOS					
	V91X6635X	FWD DAP SELECT B-C COMMFAULT	FCOS					
	V91X6636X	FWD DAP AUTO A COMMFAULT	FCOS					
	V91X6637X	FWD DAP AUTO B COMMFAULT	FCOS					
	V91X6638X	FWD DAP AUTO C COMMFAULT	FCOS					
	V91X6639X	FWD DAP MAN INRTL A COMMFAULT	FCOS				89921C	
	V91X6640X	FWD DAP MAN INRTL B COMMFAULT	FCOS				89921C	
	V91X6641X	FWD DAP MAN INRTL C COMMFAULT	FCOS				89921C	
	V91X6642X	FWD ALT PRCS DAP MODE A CF	FCOS		BD		89921C	
	V91X6643X	FWD ALT PRCS DAP MODE B CF	FCOS		BD		89921C	
	V91X6644X	FWD THC NEG X OUTPUT-A COMMFAULT	FCOS					
	V91X6645X	FWD THC NEG Y OUTPUT-A COMMFAULT	FCOS					
	V91X6646X	FWD THC NEG Z OUTPUT-A COMMFAULT	FCOS					
	V91X6647X	FWD THC NEG X OUTPUT-B COMMFAULT	FCOS					
	V91X6648X	FWD THC NEG Y OUTPUT-B COMMFAULT	FCOS					
	V91X6649X	FWD THC NEG Z OUTPUT-B COMMFAULT	FCOS					

TABLE 4.12.5-1. INPUT FUNCTIONAL PARAMETERS FOR GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V91X6650X	FWD THC NEG X OUTPUT-C COMMFAULT	FCOS					
	V91X6651X	FWD THC NEG Y OUTPUT-C COMMFAULT	FCOS					
	V91X6652X	FWD THC NEG Z OUTPUT-C COMMFAULT	FCOS					
	V91X6653X	FWD THC POS X OUTPUT-A COMMFAULT	FCOS					
	V91X6654X	FWD THC POS Y OUTPUT-A COMMFAULT	FCOS					
	V91X6655X	FWD THC POS Z OUTPUT-A COMMFAULT	FCOS					
	V91X6656X	FWD THC POS X OUTPUT-B COMMFAULT	FCOS					
	V91X6657X	FWD THC POS Y OUTPUT-B COMMFAULT	FCOS					
	V91X6658X	FWD THC POS Z OUTPUT-B COMMFAULT	FCOS					
	V91X6659X	FWD THC POS X OUTPUT-C COMMFAULT	FCOS					
	V91X6660X	FWD THC POS Y OUTPUT-C COMMFAULT	FCOS					
	V91X6661X	FWD THC POS Z OUTPUT-C COMMFAULT	FCOS					
	V91X6662X	FWD MAN FREE DRIFT A CF	FCOS		BD		89921C	
	V91X6663X	FWD MAN FREE DRIFT B CF	FCOS		BD		89921C	
	V91X6664X	FWD MAN FREE DRIFT C CF	FCOS		BD		89921C	
	V91X6665X	SENSE -X 1 COMMFAULT	FCOS					
	V91X6666X	SENSE -X 2 COMMFAULT	FCOS					
	V91X6667X	SENSE -X 3 COMMFAULT	FCOS					
	V91X6668X	SENSE -Z 1 COMMFAULT	FCOS					
	V91X6669X	SENSE -Z 2 COMMFAULT	FCOS					
	V91X6670X	SENSE -Z 3 COMMFAULT	FCOS					
	V91X6675X	AFT ADI ATTITUDE REF PB-A CF	FCOS					
	V91X6676X	AFT ADI ATTITUDE REF PB-B CF	FCOS					
	V91X6677X	AFT RCS JETS NORM A CF	FCOS					
	V91X6678X	AFT RCS JETS NORM B CF	FCOS					
	V91X6679X	AFT RCS JETS VERNIER A CF	FCOS					
	V91X6680X	AFT RCS JETS VERNIER B CF	FCOS					
	V91X6687X	AFT ROTATION PITCH DISC RATE A CF	FCOS					
	V91X6688X	AFT ROTATION PITCH DISC RATE B CF	FCOS					
	V91X6689X	AFT ROTATION ROLL DISC RATE A CF	FCOS					
	V91X6690X	AFT ROTATION ROLL DISC RATE B CF	FCOS					
	V91X6691X	AFT ROTATION YAW DISC RATE A CF	FCOS					
	V91X6692X	AFT ROTATION YAW DISC RATE B CF	FCOS					
	V91X6693X	AFT ROTATION PITCH PULSE A CF	FCOS					
	V91X6694X	AFT ROTATION PITCH PULSE B CF	FCOS					
	V91X6695X	AFT ROTATION ROLL PULSE A CF	FCOS					
	V91X6696X	AFT ROTATION ROLL PULSE B CF	FCOS					
	V91X6697X	AFT ROTATION YAW PULSE A CF	FCOS					
	V91X6698X	AFT ROTATION YAW PULSE B CF	FCOS					
	V91X7601X	AFT MANUAL LVLH A CF	FCOS					
	V91X7602X	AFT MANUAL LVLH B CF	FCOS					
	V91X7603X	AFT TRANSLATION Z LOW A CF	FCOS					
	V91X7604X	AFT TRANSLATION Z LOW B CF	FCOS					
	V91X7605X	AFT TRANSLATION Z HIGH A CF	FCOS					
	V91X7606X	AFT TRANSLATION Z HIGH B CF	FCOS					

TABLE 4.12.5-1. INPUT FUNCTIONAL PARAMETERS FOR GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V91X7607X	AFT TRANSLATION X NORM A CF			FCOS			
	V91X7608X	AFT TRANSLATION X NORM B CF			FCOS			
	V91X7609X	AFT TRANSLATION Y NORM A CF			FCOS			
	V91X7610X	AFT TRANSLATION Y NORM B CF			FCOS			
	V91X7611X	AFT TRANSLATION Z NORM A CF			FCOS			
	V91X7612X	AFT TRANSLATION Z NORM B CF			FCOS			
	V91X7613X	AFT TRANSLATION X PULSE A CF			FCOS			
	V91X7614X	AFT TRANSLATION X PULSE B CF			FCOS			
	V91X7615X	AFT TRANSLATION Y PULSE A CF			FCOS			
	V91X7616X	AFT TRANSLATION Y PULSE B CF			FCOS			
	V91X7617X	AFT TRANSLATION Z PULSE A CF			FCOS			
	V91X7618X	AFT TRANSLATION Z PULSE B CF			FCOS			
	V91X7625X	FWD RCS JETS NORM A COMMFAULT			FCOS			
	V91X7626X	FWD RCS JETS NORM B COMMFAULT			FCOS			
	V91X7627X	FWD RCS JETS VERNIER A COMMFAULT			FCOS			
	V91X7628X	FWD RCS JETS VERNIER B COMMFAULT			FCOS			
	V91X7636X	FWD ROTATION PITCH DISC RATE A CF			FCOS			
	V91X7637X	FWD ROTATION PITCH DISC RATE B CF			FCOS			
	V91X7638X	FWD ROTATION ROLL DISC RATE A CF			FCOS			
	V91X7639X	FWD ROTATION ROLL DISC RATE B CF			FCOS			
	V91X7640X	FWD ROTATION YAW DISC RATE A CF			FCOS			
	V91X7641X	FWD ROTATION YAW DISC RATE B CF			FCOS			
	V91X7642X	FWD ROTATION PITCH PULSE A CF			FCOS			
	V91X7643X	FWD ROTATION PITCH PULSE B CF			FCOS			
	V91X7644X	FWD ROTATION ROLL PULSE A CF			FCOS			
	V91X7645X	FWD ROTATION ROLL PULSE B CF			FCOS			
	V91X7646X	FWD ROTATION YAW PULSE A CF			FCOS			
	V91X7647X	FWD ROTATION YAW PULSE B CF			FCOS			
	V91X7648X	FWD MANUAL LVLH A CF			FCOS			
	V91X7649X	FWD MANUAL LVLH B CF			FCOS			
	V91X7650X	FWD TRANSLATION Z LOW A CF			FCOS			
	V91X7651X	FWD TRANSLATION Z LOW B CF			FCOS			
	V91X7652X	FWD TRANSLATION Z HIGH A CF			FCOS			
	V91X7653X	FWD TRANSLATION Z HIGH B CF			FCOS			
	V91X7654X	FWD TRANSLATION X NORM A CF			FCOS			
	V91X7655X	FWD TRANSLATION X NORM B CF			FCOS			
	V91X7656X	FWD TRANSLATION Y NORM A CF			FCOS			
	V91X7657X	FWD TRANSLATION Y NORM B CF			FCOS			
	V91X7658X	FWD TRANSLATION Z NORM A CF			FCOS			
	V91X7659X	FWD TRANSLATION Z NORM B CF			FCOS			
	V91X7660X	FWD TRANSLATION X PULSE A CF			FCOS			
	V91X7661X	FWD TRANSLATION X PULSE B CF			FCOS			
	V91X7662X	FWD TRANSLATION Y PULSE A CF			FCOS			
	V91X7663X	FWD TRANSLATION Y PULSE B CF			FCOS			
	V91X7664X	FWD TRANSLATION Z PULSE A CF			FCOS			

TABLE 4.12.5-1. INPUT FUNCTIONAL PARAMETERS FOR GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V91X7665X	FWD TRANSLATION Z PULSE B CF	FCOS					
	V91X7670X	AFT ADI ATTITUDE SEL-INERTIAL CF	FCOS					
	V91X7671X	AFT ADI ATTITUDE SEL-LV/LH CF	FCOS					
	V91X7672X	AFT ADI ATTITUDE SEL-REFERENCE CF	FCOS					
	V91X7673X	AFT ADI ERROR SCALE-HIGH CF	FCOS					
	V91X7674X	AFT ADI ERROR SCALE-MED CF	FCOS					
	V91X7675X	AFT ADI ERROR SCALE-LOW CF	FCOS					
	V91X7676X	AFT ADI RATE SCALE-HIGH CF	FCOS					
	V91X7677X	AFT ADI RATE SCALE-MED CF	FCOS					
	V91X7678X	AFT ADI RATE SCALE-LOW CF	FCOS					
	V91X7696X	FWD SPARE PBI A CF	FCOS		BD		89921C	
	V91X7697X	FWD SPARE PBI B CF	FCOS		BD		89921C	
	V91X7698X	AFT SPARE PBI A CF	FCOS		BD		89921C	
	V91X7699X	AFT SPARE PBI B CF	FCOS		BD		89921C	
	V91X7770X	AFT DAP SELECT A-B COMMFAULT	FCOS					
	V91X7771X	AFT DAP SELECT A-C COMMFAULT	FCOS					
	V91X7774X	AFT DAP SELECT B-C COMMFAULT	FCOS					
	V91X7775X	AFT DAP MAN INRTL C COMMFAULT	FCOS				89921C	
	V91X7776X	AFT DAP SELECT A-A COMMFAULT	FCOS					
	V91X7777X	AFT DAP AUTO A COMMFAULT	FCOS					
	V91X7779X	AFT DAP SELECT B-A COMMFAULT	FCOS					
	V91X7781X	AFT DAP SELECT B-B COMMFAULT	FCOS					
	V91X7786X	AFT DAP MAN INRTL A COMMFAULT	FCOS				89921C	
	V91X7787X	AFT DAP MAN INRTL B COMMFAULT	FCOS				89921C	
	V91X7789X	AFT DAP AUTO C COMMFAULT	FCOS					
	V91X7790X	AFT DAP AUTO B COMMFAULT	FCOS					
	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	*
	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			
	V93X4276X	LH BF SLEW SW 1 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4277X	LH BF SLEW SW 2 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4278X	RH BF SLEW SW 1 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4279X	RH BF SLEW SW 2 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4287X	LH RHC TRIM 1 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4288X	LH RHC TRIM 2 DES CMD	RM/CNTLR DISP		BD		93017G	*

TABLE 4.12.5-1. INPUT FUNCTIONAL PARAMETERS FOR GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V93X4289X	RH RHC TRIM 1 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4290X	RH RHC TRIM 2 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4291X	LH PNL TRIM 1 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4292X	LH PNL TRIM 2 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4293X	RH PNL TRIM 1 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4294X	RH PNL TRIM 2 DES CMD	RM/CNTLR DISP		BD		93017G	*
	V93X4701X	LH SW CON 1 DES CMD	RM SWITCH/SURF FB DISP		BD		93017G	*
	V93X4703X	LH SW CON 2 DES CMD	RM SWITCH/SURF FB DISP		BD		93017G	*
	V93X4705X	LH SW CON 3 DES CMD	RM SWITCH/SURF FB DISP		BD		93017G	*
	V93X4711X	RH SW CON 1 DES CMD	RM SWITCH/SURF FB DISP		BD		93017G	*
	V93X4713X	RH SW CON 2 DES CMD	RM SWITCH/SURF FB DISP		BD		93017G	*
	V93X4715X	RH SW CON 3 DES CMD	RM SWITCH/SURF FB DISP		BD		93017G	*
	V93X4721X	FCS CH 1 SW CON 1 DES CMD	RM SWITCH/SURF FB DISP		BD		93017G	*
	V93X4723X	FCS CH 1 SW CON 2 DES CMD	RM SWITCH/SURF FB DISP		BD		93017G	*
	V93X4725X	FCS CH 1 SW CON 3 DES CMD	RM SWITCH/SURF FB DISP		BD		93017G	*
	V93X4731X	FCS CH 2 SW CON 1 DES CMD	RM SWITCH/SURF FB DISP		BD		93017G	*
	V93X4733X	FCS CH 2 SW CON 2 DES CMD	RM SWITCH/SURF FB DISP		BD		93017G	*
	V93X4735X	FCS CH 2 SW CON 3 DES CMD	RM SWITCH/SURF FB DISP		BD		93017G	*
	V93X4741X	FCS CH 3 SW CON 1 DES CMD	RM SWITCH/SURF FB DISP		BD		93017G	*
	V93X4743X	FCS CH 3 SW CON 2 DES CMD	RM SWITCH/SURF FB DISP		BD		93017G	*
	V93X4745X	FCS CH 3 SW CON 3 DES CMD	RM SWITCH/SURF FB DISP		BD		93017G	*
	V93X4751X	FCS CH 4 SW CON 1 DES CMD	RM SWITCH/SURF FB DISP		BD		93017G	*
	V93X4753X	FCS CH 4 SW CON 2 DES CMD	RM SWITCH/SURF FB DISP		BD		93017G	*
	V93X4755X	FCS CH 4 SW CON 3 DES CMD	RM SWITCH/SURF FB DISP		BD		93017G	*
	V93X4770X	ENTRY ROLL MODE 1 DES CMD	RM SWITCH/SURF FB DISP		BD		89281B	

TABLE 4.12.5-1. INPUT FUNCTIONAL PARAMETERS FOR GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V93X4771X	ENTRY ROLL MODE 2 DES CMD	RM SWITCH/SURF FB DISP		BD		89281B	
	V93X4772X	ENTRY ROLL MODE 3 DES CMD	RM SWITCH/SURF FB DISP		BD		89281B	
	V93X4773X	ENTRY ROLL MODE 4 DES CMD	RM SWITCH/SURF FB DISP		BD		89281B	
	V93X5340X	BACKUP ET SEP AUTO SEL	OVERRIDE DISP		BD		93064D	
	V93X5345X	ENTRY SW OVERRIDE	OVERRIDE DISP		BD			

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

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
AADIESW	V90X7745X	AFT ADI ERROR SCALE SELECT SW	ORB ADI PROC				93007B	
AADIRSW	V90X7746X	AFT ADI RATE SCALE SELECT SW	ORB ADI PROC				93007B	
AFT_ATT_REF_PB	V90X7701X	SEL AFT ADI ATT REF PB	DL FMT 22/1 DL FMT 32/A ORB ATT PROC STAR TRCK SOP		BD		93017G	*
ATT_SEL_SW(1)	V90J7503C	LH ADI ATTITUDE SELECT SW	A/E ATT PROC DL FMT 32/1 MEDS FC GNC XFER ORB ATT PROC		HXS		93017G	*
ATT_SEL_SW(2)	V90J7504C	RH ADI ATTITUDE SELECT SW	A/E ATT PROC DL FMT 32/1 MEDS FC GNC XFER ORB ATT PROC		HXS		93017G	*
ATT_SEL_SW(3)	V90J7744C	AFT ADI ATTITUDE SELECT SW	DL FMT 32/1 ORB ATT PROC		HXS		93017G	*
AUTMANBF	V96X1051X	STATION SELECTED AUT/MAN BODY FLAP	AEROJET DAP BF CMD RM GRTLS DAP TLM					
AUTOP	V96X1031X	STATION SELECTED AUTO-PITCH	AEROJET DAP ASC DAP GRTLS DAP TLM					
AUTORY	V96X1041X	STATION SELECTED AUTO-ROLL/YAW	AEROJET DAP ASC DAP GRTLS DAP TLM					
AUTOSB	V96X1052X	STATION SEL SPD BK/THROT AUTO/MAN	AEROJET DAP GRTLS DAP SBTC SOP TLM					
AUTO_REQUEST	V90X7692X	SEL FWD DAP AUTO	FC SWIT PROC TLM TRANS DAP				89688A	
BFDNS(1)	V90X6520X	SEL LH MANUAL BODY FLAP (DN) SW	BF SLEW SOP					
BFDNS(2)	V90X6620X	SEL RH MANUAL BODY FLAP (DN) SW	BF SLEW SOP					
BFUPS(1)	V90X6510X	SEL LH MANUAL BODY FLAP (UP) SW	BF SLEW SOP					
BFUPS(2)	V90X6610X	SEL RH MANUAL BODY FLAP (UP) SW	BF SLEW SOP					
CSSP	V96X1035X	STATION SELECTED CSS-PITCH	AEROJET DAP ASC DAP GRTLS DAP TLM					

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
CSSRY	V96X1045X	STATION SELECTED CSS-ROLL/YAW	AEROJET DAP ASC DAP GRTLS DAP TLM					
DETYMS(1)	V90X7271X	SELECTED LH YAW (-) TRIM SW	DL FMT 21/A DL FMT 23/A RPTA SOP		BD		93017G	*
DETYMS(2)	V90X7471X	SELECTED RH YAW (-) TRIM SW	DL FMT 21/A DL FMT 23/A RPTA SOP		BD		93017G	*
DETYPS(1)	V90X7261X	SELECTED LH YAW (+) TRIM SW	DL FMT 21/A DL FMT 23/A RPTA SOP		BD		93017G	*
DETYPS(2)	V90X7461X	SELECTED RH YAW (+) TRIM SW	DL FMT 21/A DL FMT 23/A RPTA SOP		BD		93017G	*
DISABL(1)	V90X7272XB	SEL LH RHC TRIM INHIBIT	2-AX RHC SOP DL FMT 21/A RPTA SOP				93017G	*
DISABL(2)	V90X7472XB	SEL RH RHC TRIM INHIBIT	2-AX RHC SOP DL FMT 21/A RPTA SOP				93017G	*
DISC_REQUEST(1)	V90X7727X	SEL FWD ROTATION PITCH DISC RATE	FC SWIT PROC TLM TRANS DAP				89688A	
DISC_REQUEST(2)	V90X7728X	SEL FWD ROTATION ROLL DISC RATE	FC SWIT PROC TLM TRANS DAP				89688A	
DISC_REQUEST(3)	V90X7729X	SEL FWD ROTATION YAW DISC RATE	FC SWIT PROC TLM TRANS DAP				89688A	
FWD_ATT_REF_PB	V90X7897X	STA SEL FWD ADI ATT REF PB	A/E ATT PROC ORB ATT PROC STAR TRCK SOP					
HUD_L_ADI_SCL	V72J4126C	LH HUD ADI RATE SCALING	HUDE1		BSU			
HUD_L_HSI_SEL	V72J4127C	LH HUD HSI SOURCE SELECT	HUDE1		BSU			
HUD_R_ADI_SCL	V72J4141C	RH HUD ADI RATE SCALING	HUDE2		BSU			
HUD_R_HSI_SEL	V72J4142C	RH HUD HSI SOURCE SELECT	HUDE2		BSU			
LADIESW	V90J7520C	LH ADI ERROR SCALE SELECT SW	ASC ADI PROC E/L ADI PROC ORB ADI PROC				90960E	
LADIRSW	V90J7507C	LH ADI RATE SCALE SELECT SW	ASC ADI PROC E/L ADI PROC ORB ADI PROC				90960E	

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
LADS	V96J2171C	SELECTED LEFT AIR DATA SELECT POS	ADTA SOP AVVI PROC		HXS		93017G	*
LH_AUTMANBF	V90X6501X	SELECTED LH AUTO/MAN BODY FLAP SW	DL FMT 23/1 DL FMT 23/A		BD		93017G	*
LH_AUTOSB	V90U6811C	SEL LH SPD BK/THROT AUTO/MAN	ORB DAP				90837G	
L_GAIN	V90X3321X	SEL ENTRY ROLL MODE L GAIN	TLM AEROJET DAP		BD		92157	
MANUAL_REQUEST	V90X7693X	SEL FWD DAP MAN/INRTL HOLD	GRTLS DAP OVERRIDE DISP				89688A	
NO_Y_JET	V90X3322X	SEL ENTRY ROLL MODE NO Y JET	FC SWIT PROC TLM TRANS DAP		BD		92157	
PANATDS(1)	V90X7231X	SEL LH PANEL ROLL TRIM (-) SW	AEROJET DAP GRTLS DAP OVERRIDE DISP		BD		93017G	*
PANATDS(2)	V90X7431X	SEL RH PANEL ROLL TRIM (-) SW	2-AX RHC SOP DL FMT 21/A		BD		93017G	*
PANATUS(1)	V90X7221X	SEL LH PANEL ROLL TRIM (+) SW	2-AX RHC SOP DL FMT 21/A		BD		93017G	*
PANATUS(2)	V90X7421X	SEL RH PANEL ROLL TRIM (+) SW	2-AX RHC SOP DL FMT 21/A		BD		93017G	*
PANETDS(1)	V90X7251X	SEL LH PANEL PITCH TRIM (-) SW	2-AX RHC SOP DL FMT 21/A		BD		93017G	*
PANETDS(2)	V90X7451X	SEL RH PANEL PITCH TRIM (-) SW	2-AX RHC SOP DL FMT 21/A		BD		93017G	*
PANETUS(1)	V90X7241X	SEL LH PANEL PITCH TRIM (+) SW	2-AX RHC SOP DL FMT 21/A		BD		93017G	*
PANETUS(2)	V90X7441X	SEL RH PANEL PITCH TRIM (+) SW	2-AX RHC SOP DL FMT 21/A		BD		93017G	*
PULSE_REQUEST(1)	V90X7730X	SEL FWD ROTATION PITCH PULSE	FC SWIT PROC TLM				89688A	
PULSE_REQUEST(2)	V90X7731X	SEL FWD ROTATION ROLL PULSE	TRANS DAP FC SWIT PROC TLM				89688A	
PULSE_REQUEST(3)	V90X7732X	SEL FWD ROTATION YAW PULSE	TRANS DAP FC SWIT PROC TLM				89688A	
RADIESW	V90J7506C	RH ADI ERROR SCALE SELECT SW	TRANS DAP ASC ADI PROC E/L ADI PROC ORB ADI PROC				90960E	

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
RADIRSW	V90J7508C	RH ADI RATE SCALE SELECT SW	ASC ADI PROC E/L ADI PROC ORB ADI PROC				90960E	
RADS	V96J2271C	SELECTED RIGHT AIR DATA SELECT POS	ADTA SOP AVVI PROC DL FMT 23/1		HXS		93017G	*
RCVR_LEFT	V96J2105C	LH HSI RECEIVER SELECT	ASC AREA NAV ENT AREA NAV TACAN SOP					
RCVR_RIGHT	V96J2205C	RH HSI RECEIVER SELECT	ASC AREA NAV ENT AREA NAV TACAN SOP					
RHCATDS(1)	V90X7232X	SEL LH RHC ROLL TRIM (-) SW	2-AX RHC SOP DL FMT 21/A		BD		93017G	*
RHCATDS(2)	V90X7432X	SEL RH RHC ROLL TRIM (-) SW	2-AX RHC SOP DL FMT 21/A		BD		93017G	*
RHCATUS(1)	V90X7222X	SEL LH RHC ROLL TRIM (+) SW	2-AX RHC SOP DL FMT 21/A		BD		93017G	*
RHCATUS(2)	V90X7422X	SEL RH RHC ROLL TRIM (+) SW	2-AX RHC SOP DL FMT 21/A		BD		93017G	*
RHCETDS(1)	V90X7252X	SEL LH RHC PITCH TRIM (-) SW	2-AX RHC SOP DL FMT 21/A		BD		93017G	*
RHCETDS(2)	V90X7452X	SEL RH RHC PITCH TRIM (-) SW	2-AX RHC SOP DL FMT 21/A		BD		93017G	*
RHCETUS(1)	V90X7242X	SEL LH RHC PITCH TRIM (+) SW	2-AX RHC SOP DL FMT 21/A		BD		93017G	*
RHCETUS(2)	V90X7442X	SEL RH RHC PITCH TRIM (+) SW	2-AX RHC SOP DL FMT 21/A		BD		93017G	*
RH_AUTMANBF	V90X6601X	SELECTED RH AUTO/MAN BODY FLAP SW	DL FMT 23/A		BD		93017G	*
RH_AUTOSB	V90U6911C	SEL RH SPD BK/THROT AUTO/MAN	ORB DAP TLM				90837G	
RSTSW(1)	V90X5201XB	SEL FCS RESET/OVERRIDE SW CHAN 1	AERO ACT SOP DL FMT 23/1 MPS TVC CMD SOP SRB TVC CMD SOP				93017G	*
RSTSW(2)	V90X5211XB	SEL FCS RESET/OVERRIDE SW CHAN 2	AERO ACT SOP DL FMT 23/1 MPS TVC CMD SOP SRB TVC CMD SOP				93017G	*
RSTSW(3)	V90X5221XB	SEL FCS RESET/OVERRIDE SW CHAN 3	AERO ACT SOP DL FMT 23/1 MPS TVC CMD SOP SRB TVC CMD SOP				93017G	*

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
RSTSW(4)	V90X5231XB	SEL FCS RESET/OVERRIDE SW CHAN 4	AERO ACT SOP DL FMT 23/1 MPS TVC CMD SOP SRB TVC CMD SOP				93017G	*
SBEV_LH_SEL	V90X6810X	SEL LH SBTC TAKEOVER	DL FMT 21/1 DL FMT 23/A DL FMT 32/A SBTC SOP		BD		93017G	*
SBEV_RH_SEL	V90X6910X	SEL RH SBTC TAKEOVER	DL FMT 21/1 DL FMT 23/A DL FMT 32/A SBTC SOP		BD		93017G	*
SENSE_SW	V90X7700X	SEL SENSE -X	DL FMT 32/A FC SWIT PROC ORB 3-AX RHC SOP ORB ADI PROC ORB ATT PROC THC SOP		BD		93017G	*
SOURCE_LEFT	V96X2111X	LH HSI SOURCE SELECT	ASC AREA NAV ENT AREA NAV TACAN SOP					
SOURCE_RIGHT	V96X2211X	RH HSI SOURCE SELECT	ASC AREA NAV ENT AREA NAV TACAN SOP					
S_ATO	V90X7498X	SEL ATO ABORT REQUEST SIGNAL	DL FMT 21/A MSC		BD		93017G	*
S_TAL	V90X7497X	SEL TAL ABORT REQUEST SIGNAL	DL FMT 21/A MSC		BD		93017G	*
THC_ASN(1)	V90X8145X	SEL AFT THC NEG X OUTPUT	DL FMT 22/1 DL FMT 32/A THC SOP		BD		93017G	*
THC_ASN(2)	V90X8139X	SEL AFT THC NEG Y OUTPUT	DL FMT 22/1 DL FMT 32/A THC SOP		BD		93017G	*
THC_ASN(3)	V90X8141X	SEL AFT THC NEG Z OUTPUT	DL FMT 22/1 DL FMT 32/A THC SOP		BD		93017G	*
THC_ASP(1)	V90X8136X	SEL AFT THC POS X OUTPUT	DL FMT 22/1 DL FMT 32/A THC SOP		BD		93017G	*
THC_ASP(2)	V90X8143X	SEL AFT THC POS Y OUTPUT	DL FMT 22/1 DL FMT 32/A THC SOP		BD		93017G	*

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
THC_ASP(3)	V90X8140X	SEL AFT THC POS Z OUTPUT	DL FMT 22/1 DL FMT 32/A THC SOP		BD		93017G	*
THC_FSN(1)	V90X7694X	SEL FWD THC NEG X OUTPUT	DEORB GUID DL FMT 22/A DL FMT 23/A DL FMT 32/A ORB INS GUID THC SOP		BD		93017G	*
THC_FSN(2)	V90X7695X	SEL FWD THC NEG Y OUTPUT	TRANS DAP DEORB GUID DL FMT 22/A DL FMT 23/A DL FMT 32/A ORB INS GUID THC SOP		BD		93017G	*
THC_FSN(3)	V90X7696X	SEL FWD THC NEG Z OUTPUT	TRANS DAP DEORB GUID DL FMT 22/A DL FMT 23/A DL FMT 32/A GRTLS DAP ORB INS GUID THC SOP		BD		93017G	*
THC_FSP(1)	V90X7697X	SEL FWD THC POS X OUTPUT	TRANS DAP DEORB GUID DL FMT 22/A DL FMT 23/A DL FMT 32/A ORB INS GUID THC SOP		BD		93017G	*
THC_FSP(2)	V90X7698X	SEL FWD THC POS Y OUTPUT	TRANS DAP DEORB GUID DL FMT 22/A DL FMT 23/A DL FMT 32/A ORB INS GUID THC SOP		BD		93017G	*

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
THC_FSP(3)	V90X7699X	SEL FWD THC POS Z OUTPUT	DEORB GUID DL FMT 22/A DL FMT 23/A DL FMT 32/A ORB INS GUID THC SOP TRANS DAP		BD		93017G	*
	V90M2865P	CGRB_ORB_TRIPLE_SF_STAT\$(1:)	DL FMT 22/1 DL FMT 32/1				93017G	*
	V90M2866P	CGRB_ORB_TRIPLE_SF_STAT\$(2:)	DL FMT 22/1 DL FMT 32/1				93017G	*
	V90M2867P	CGRB_ORB_TRIPLE_SF_STAT\$(3:)	DL FMT 22/1 DL FMT 32/1				93017G	*
	V90M2868PA	CGRB_ORB_TRIPLE_SF_STAT\$(4:)	DL FMT 22/1				93017G	*
	V90M2869PA	CGRB_ORB_TRIPLE_SF_STAT\$(5:)	DL FMT 22/1				93017G	*
	V90M2870PA	CGRB_ORB_TRIPLE_SF_STAT\$(6:)	DL FMT 22/1				93017G	*
	V90M2871P	CGRB_ORB_DUAL_FAST_DILEMMA	DL FMT 22/1 DL FMT 32/1				93017G	*
	V90M2872P	CGRB_ORB_DUAL_SLOW_DILEMMA	DL FMT 22/A DL FMT 32/A				93017G	*
	V90M2881P	CGRB_ORB_TRIPLE_FAST_DILEMMA	DL FMT 22/1 DL FMT 32/1				93017G	*
	V90M2939PA	CGEB_FLT_LG2_FLAG_HFE	DL FMT 22/1 DL FMT 32/A				93017G	*
	V90M2950P	CGRB_ORB_TRIPLE_OUT	DL FMT 22/1 DL FMT 32/A				93017G	*
	V90M2952P	CGRB_ORB_TRIPLE_SLOW_OUT	DL FMT 32/A				93017G	*
	V90M2966P	CGRB_SW_SEL\$(1:)	DL FMT 21/A DL FMT 22/1 DL FMT 23/1 DL FMT 32/1				93017G	*
	V90M2967P	CGRB_SW_SEL\$(2:)	DL FMT 21/1 DL FMT 22/A DL FMT 23/A DL FMT 32/A				93017G	*
	V90M2968P	CGRB_SW_SEL\$(3:)	DL FMT 21/A DL FMT 22/1 DL FMT 23/A DL FMT 32/A				93017G	*
	V90M2971P	CGRB_SW_SF\$(1:)	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1				93017G	*
	V90M2972P	CGRB_SW_SF\$(2:)	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1				93017G	*

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90M2973P	CGRB_SW_SF\$(3:)	DL FMT 22/1 DL FMT 23/1 DL FMT 32/1				93017G	*
	V90M2974P	CGRB_SW_SF\$(4:)	DL FMT 23/1				93017G	*
	V90M2975P	CGRB_SW_SF\$(5:)	DL FMT 23/1				93017G	*
	V90M2976P	CGRB_SW_SF\$(6:)	DL FMT 23/1				93017G	*
	V90M2983P	CGRB_SW_DIL\$(1:)	DL FMT 22/1 DL FMT 23/1				93017G	*
	V90M2984P	CGRB_SW_DIL\$(2:)	DL FMT 23/1				93017G	*
	V90M2985P	CGRB_SW_DIL\$(3:)	DL FMT 22/1 DL FMT 23/A DL FMT 32/A				93017G	*
	V90M2987P	CGRB_ERM_SF\$(1:)	DL FMT 23/1 DL FMT 32/A				93017G	*
	V90M2988P	CGRB_ERM_SF\$(2:)	DL FMT 23/1				93017G	*
	V90M3126P	CGRB_SF_ST_GAX (1)	DL FMT 22/1 DL FMT 23/1 DL FMT 32/A				93017G	*
	V90M3127P	CGRB_SF_ST_GAX (2)	DL FMT 22/1 DL FMT 23/1 DL FMT 32/A				93017G	*
	V90M3128P	CGRB_SF_ST_GAX (3)	DL FMT 22/1 DL FMT 23/1 DL FMT 32/A				93017G	*
	V90M3140P	CGRB_RM_FLAG 5	DL FMT 21/2				93017G	*
	V90X3337X	ENTRY ROLL MODE L GAIN A DES/FAIL	DL FMT 23/1 DL FMT 32/A RM SWITCH/SURF FB DISP		BD		93017G	*
	V90X3338X	ENTRY ROLL MODE L GAIN B DES/FAIL	DL FMT 23/1 DL FMT 32/A RM SWITCH/SURF FB DISP		BD		93017G	*
	V90X3339X	ENTRY ROLL MODE L GAIN C DES/FAIL	DL FMT 23/1 DL FMT 32/A RM SWITCH/SURF FB DISP		BD		93017G	*
	V90X3340X	ENTRY ROLL MODE L GAIN D DES/FAIL	DL FMT 23/1 DL FMT 32/A RM SWITCH/SURF FB DISP		BD		93017G	*
	V90X3341X	ENTRY ROLL MODE AILERON A FAIL	DL FMT 23/1		BD		93017G	*
	V90X3342X	ENTRY ROLL MODE AILERON B FAIL	DL FMT 23/1		BD		93017G	*
	V90X3343X	ENTRY ROLL MODE AILERON C FAIL	DL FMT 23/1		BD		93017G	*
	V90X3344X	ENTRY ROLL MODE AILERON D FAIL	DL FMT 23/1		BD		93017G	*

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X3432X	ET SEP MANUAL DEFAULT	GAX					
	V90X3433X	AFT SENSE DEFAULT	GAX					
	V90X3438X	ET SEP AUTO DEFAULT	GAX					
	V90X3439X	FASCOS AUTO RESET	SSME OPS					
	V90X3440X	FASCOS INHIBIT	SSME OPS				89598A	
	V90X3441X	ENTRY ROLL MODE SW FAIL	GAX					
	V90X3443X	ME-1 SAFING CMD	SSME OPS					
	V90X3444X	ME-2 SAFING CMD	SSME OPS					
	V90X3445X	ME-3 SAFING CMD	SSME OPS					
	V90X3446X	ME-1 SHUTDOWN SW DISAGREE	GAX					
	V90X3447X	ME-2 SHUTDOWN SW DISAGREE	GAX					
	V90X3448X	ME-3 SHUTDOWN SW DISAGREE	GAX					
	V90X5205X	FCS MON CHAN 1 R/O SW DISAGREE	DL FMT 23/1		BD		93017G	*
	V90X5215X	FCS MON CHAN 2 R/O SW DISAGREE	DL FMT 23/1		BD		93017G	*
	V90X5225X	FCS MON CHAN 3 R/O SW DISAGREE	DL FMT 23/1		BD		93017G	*
	V90X5235X	FCS MON CHAN 4 R/O SW DISAGREE	DL FMT 23/1		BD		93017G	*
	V90X6505X	LH BODY FLAP AUTO/MANUAL SW DIS	DL FMT 23/1		BD		93017G	*
	V90X6515X	LH BODY FLAP UP SW DISAGREE	DL FMT 23/A GAX		BD		93017G	*
	V90X6525X	LH BODY FLAP DOWN SW DISAGREE	DL FMT 23/A GAX		BD		93017G	*
	V90X6550X	LH BODY FLAP AUTO/MAN A FAIL	DL FMT 23/1		BD		93017G	*
	V90X6551X	LH BODY FLAP AUTO/MAN B FAIL	DL FMT 23/1		BD		93017G	*
	V90X6552X	LH BODY FLAP AUTO/MAN C FAIL	DL FMT 23/1		BD		93017G	*
	V90X6605X	RH BODY FLAP AUTO/MANUAL SW DIS	DL FMT 23/1		BD		93017G	*
	V90X6615X	RH BODY FLAP UP SW DISAGREE	DL FMT 23/A GAX		BD		93017G	*
	V90X6625X	RH BODY FLAP DOWN SW DISAGREE	DL FMT 23/A GAX		BD		93017G	*
	V90X6650X	RH BODY FLAP AUTO/MAN A FAIL	DL FMT 23/1		BD		93017G	*
	V90X6651X	RH BODY FLAP AUTO/MAN B FAIL	DL FMT 23/1		BD		93017G	*
	V90X6652X	RH BODY FLAP AUTO/MAN C FAIL	DL FMT 23/1		BD		93017G	*
	V90X6815X	LH SBTC TAKEOVER SW DISAGREE	DL FMT 23/1		BD		93017G	*
	V90X6850X	LH SBTC TAKEOVER - A FAIL	DL FMT 23/1		BD		93017G	*
	V90X6851X	LH SBTC TAKEOVER - B FAIL	DL FMT 23/1		BD		93017G	*
	V90X6852X	LH SBTC TAKEOVER - C FAIL	DL FMT 23/1		BD		93017G	*
	V90X6915X	RH SBTC TAKEOVER SW DISAGREE	DL FMT 23/1		BD		93017G	*
	V90X6950X	RH SBTC TAKEOVER - A FAIL	DL FMT 23/1		BD		93017G	*
	V90X6951X	RH SBTC TAKEOVER - B FAIL	DL FMT 23/1		BD		93017G	*
	V90X6952X	RH SBTC TAKEOVER - C FAIL	DL FMT 23/1		BD		93017G	*
	V90X7020X	FCS MON CHAN 1 RST/OVRD A FAIL	DL FMT 23/1		BD		93017G	*
	V90X7021X	FCS MON CHAN 1 RST/OVRD B FAIL	DL FMT 23/1		BD		93017G	*
	V90X7022X	FCS MON CHAN 1 RST/OVRD C FAIL	DL FMT 23/1		BD		93017G	*
	V90X7023X	FCS MON CHAN 2 RST/OVRD A FAIL	DL FMT 23/1		BD		93017G	*
	V90X7024X	FCS MON CHAN 2 RST/OVRD B FAIL	DL FMT 23/1		BD		93017G	*

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X7025X	FCS MON CHAN 2 RST/OVRD C FAIL	DL FMT 23/1		BD		93017G	*
	V90X7026X	FCS MON CHAN 3 RST/OVRD A FAIL	DL FMT 23/1		BD		93017G	*
	V90X7027X	FCS MON CHAN 3 RST/OVRD B FAIL	DL FMT 23/1		BD		93017G	*
	V90X7028X	FCS MON CHAN 3 RST/OVRD C FAIL	DL FMT 23/1		BD		93017G	*
	V90X7029X	FCS MON CHAN 4 RST/OVRD A FAIL	DL FMT 23/1		BD		93017G	*
	V90X7030X	FCS MON CHAN 4 RST/OVRD B FAIL	DL FMT 23/1		BD		93017G	*
	V90X7031X	FCS MON CHAN 4 RST/OVRD C FAIL	DL FMT 23/1		BD		93017G	*
	V90X7042X	OMS-L ENG ARM CMD SW DISAGREE	DL FMT 22/1		BD		93017G	*
			DL FMT 23/A					
	V90X7043X	OMS-L ENG ARM/PRESS CMD SW DIS	DL FMT 22/1		BD		93017G	*
			DL FMT 23/A					
	V90X7044X	OMS-R ENG ARM CMD SW DISAGREE	DL FMT 22/1		BD		93017G	*
			DL FMT 23/A					
	V90X7045X	OMS-R ENG ARM/PRESS CMD SW DIS	DL FMT 22/1		BD		93017G	*
			DL FMT 23/A					
	V90X7050X	RH ADI ATTITUDE REF PB SW DISAGREE	DL FMT 22/1		BD		93017G	*
			DL FMT 23/A					
			DL FMT 32/A					
	V90X7051X	RH - ROLL TRIM SW DISAGREE	DL FMT 23/A		BD		93017G	*
			GAX					
	V90X7052X	RH RHC - PITCH TRIM SW DISAGREE	DL FMT 23/A		BD		93017G	*
	V90X7053X	RH RHC + PITCH TRIM SW DISAGREE	DL FMT 23/A		BD		93017G	*
	V90X7054X	RH RHC - ROLL TRIM SW DISAGREE	DL FMT 23/A		BD		93017G	*
	V90X7055X	RH RHC + ROLL TRIM SW DISAGREE	DL FMT 23/A		BD		93017G	*
	V90X7056X	RH RHC TRIM INHIBIT SW DISAGREE	DL FMT 23/A		BD		93017G	*
	V90X7101X	SELECTED LH AUTO PITCH MODE SW	DL FMT 23/A		BD		93017G	*
	V90X7105X	FCS LH PITCH AUTO MODE SW DISAGREE	DL FMT 23/1		BD		93017G	*
	V90X7110X	FCS LH PITCH AUTO MODE A FAIL	DL FMT 23/1		BD		93017G	*
	V90X7111X	FCS LH PITCH AUTO MODE B FAIL	DL FMT 23/1		BD		93017G	*
	V90X7112X	FCS LH PITCH AUTO MODE C FAIL	DL FMT 23/1		BD		93017G	*
	V90X7134X	LH SPD BK/THROT AUTO/MAN A FAIL	DL FMT 23/1		BD		93017G	*
	V90X7135X	LH SPD BK/THROT AUTO/MAN B FAIL	DL FMT 23/1		BD		93017G	*
	V90X7136X	LH SPD BK/THROT AUTO/MAN C FAIL	DL FMT 23/1		BD		93017G	*
	V90X7141X	SELECTED LH CSS PITCH MODE SW	DL FMT 23/A		BD		93017G	*
	V90X7145X	FCS LH PITCH CSS MODE SW DISAGREE	DL FMT 23/1		BD		93017G	*
	V90X7150X	FCS LH PITCH CSS MODE A FAIL	DL FMT 23/1		BD		93017G	*
	V90X7151X	FCS LH PITCH CSS MODE B FAIL	DL FMT 23/1		BD		93017G	*
	V90X7152X	FCS LH PITCH CSS MODE C FAIL	DL FMT 23/1		BD		93017G	*
	V90X7161X	SELECTED LH CSS R/Y MODE SW	DL FMT 23/A		BD		93017G	*
	V90X7165X	FCS LH R-Y CSS MODE SW DISAGREE	DL FMT 23/1		BD		93017G	*
	V90X7170X	FCS LH R-Y CSS MODE A FAIL	DL FMT 23/1		BD		93017G	*
	V90X7171X	FCS LH R-Y CSS MODE B FAIL	DL FMT 23/1		BD		93017G	*
	V90X7172X	FCS LH R-Y CSS MODE C FAIL	DL FMT 23/1		BD		93017G	*
	V90X7174X	RH SPD BK/THROT AUTO/MAN A FAIL	DL FMT 23/1		BD		93017G	*
	V90X7175X	RH SPD BK/THROT AUTO/MAN B FAIL	DL FMT 23/1		BD		93017G	*

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X7176X	RH SPD BK/THROT AUTO/MAN C FAIL	DL FMT 23/1		BD		93017G	*
	V90X7178X	LH ADI ATTITUDE SELECT SW INVALID	GAX TLM					
	V90X7179X	RH ADI ATTITUDE SELECT SW INVALID	GAX TLM					
	V90X7181X	SELECTED LH AUTO R/Y MODE SW	DL FMT 23/A		BD		93017G	*
	V90X7185X	FCS LH R-Y AUTO MODE SW DISAGREE	DL FMT 23/1		BD		93017G	*
	V90X7190X	FCS LH R-Y AUTO MODE A FAIL	DL FMT 23/1		BD		93017G	*
	V90X7191X	FCS LH R-Y AUTO MODE B FAIL	DL FMT 23/1		BD		93017G	*
	V90X7192X	FCS LH R-Y AUTO MODE C FAIL	DL FMT 23/1		BD		93017G	*
	V90X7203X	LH RHC TRIM INHIBIT SW DISAGREE	DL FMT 23/A		BD		93017G	*
	V90X7207X	LH SPD BK/THROT A/M SW DISAGREE	DL FMT 23/1		BD		93017G	*
	V90X7208X	RH SPD BK/THROT A/M SW DISAGREE	DL FMT 23/1		BD		93017G	*
	V90X7214X	RCS MASTER XFEED FROM LEFT-1 FAIL	DL FMT 23/1		BD		93017G	*
	V90X7215X	RCS MASTER XFEED FROM LEFT-2 FAIL	DL FMT 23/1		BD		93017G	*
	V90X7216X	RCS MASTER XFEED FROM LEFT-3 FAIL	DL FMT 23/1		BD		93017G	*
	V90X7217X	RCS MASTER XFEED FROM RIGHT-1 FAIL	DL FMT 23/1		BD		93017G	*
	V90X7218X	RCS MASTER XFEED FROM RIGHT-2 FAIL	DL FMT 23/1		BD		93017G	*
	V90X7219X	RCS MASTER XFEED FROM RIGHT-3 FAIL	DL FMT 23/1		BD		93017G	*
	V90X7224X	LH ADI ATTITUDE REF PB SW DISAGREE	DL FMT 22/1 DL FMT 23/A DL FMT 32/A					
	V90X7225X	LH + ROLL TRIM SW DISAGREE	DL FMT 23/A GAX		BD		93017G	*
	V90X7227X	RCS MASTER XFEED FROM LEFT SW DIS	DL FMT 22/1 DL FMT 23/1		BD		93017G	*
	V90X7228X	RCS MASTER XFEED FROM RIGHT SW DIS	DL FMT 22/1 DL FMT 23/1		BD		93017G	*
	V90X7235X	LH - ROLL TRIM SW DISAGREE	DL FMT 23/A GAX		BD		93017G	*
	V90X7245X	LH + PITCH TRIM SW DISAGREE	DL FMT 23/A GAX		BD		93017G	*
	V90X7246X	LH RHC - PITCH TRIM SW DISAGREE	DL FMT 23/A		BD		93017G	*
	V90X7247X	LH RHC + PITCH TRIM SW DISAGREE	DL FMT 23/A		BD		93017G	*
	V90X7248X	LH RHC - ROLL TRIM SW DISAGREE	DL FMT 23/A		BD		93017G	*
	V90X7249X	LH RHC + ROLL TRIM SW DISAGREE	DL FMT 23/A		BD		93017G	*
	V90X7255X	LH - PITCH TRIM SW DISAGREE	DL FMT 23/A GAX		BD		93017G	*
	V90X7265X	LH + YAW TRIM SW DISAGREE	DL FMT 23/A GAX		BD		93017G	*
	V90X7275X	LH - YAW TRIM SW DISAGREE	DL FMT 23/A GAX		BD		93017G	*
	V90X7301X	SELECTED RH AUTO PITCH MODE SW	DL FMT 23/A		BD		93017G	*
	V90X7305X	FCS RH PITCH AUTO MODE SW DISAGREE	DL FMT 23/1		BD		93017G	*
	V90X7310X	FCS RH PITCH AUTO MODE A FAIL	DL FMT 23/1		BD		93017G	*

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X7311X	FCS RH PITCH AUTO MODE B FAIL	DL FMT 23/1		BD		93017G	*
	V90X7312X	FCS RH PITCH AUTO MODE C FAIL	DL FMT 23/1		BD		93017G	*
	V90X7341X	SELECTED RH CSS PITCH MODE SW	DL FMT 23/A		BD		93017G	*
	V90X7345X	FCS RH PITCH CSS MODE SW DISAGREE	DL FMT 23/1		BD		93017G	*
	V90X7350X	FCS RH PITCH CSS MODE A FAIL	DL FMT 23/1		BD		93017G	*
	V90X7351X	FCS RH PITCH CSS MODE B FAIL	DL FMT 23/1		BD		93017G	*
	V90X7352X	FCS RH PITCH CSS MODE C FAIL	DL FMT 23/1		BD		93017G	*
	V90X7361X	SELECTED RH CSS R/Y MODE SW	DL FMT 23/A		BD		93017G	*
	V90X7365X	FCS RH R-Y CSS MODE SW DISAGREE	DL FMT 23/1		BD		93017G	*
	V90X7370X	FCS RH R-Y CSS MODE A FAIL	DL FMT 23/1		BD		93017G	*
	V90X7371X	FCS RH R-Y CSS MODE B FAIL	DL FMT 23/1		BD		93017G	*
	V90X7372X	FCS RH R-Y CSS MODE C FAIL	DL FMT 23/1		BD		93017G	*
	V90X7381X	SELECTED RH AUTO R/Y MODE SW	DL FMT 23/A		BD		93017G	*
	V90X7385X	FCS RH R-Y AUTO MODE SW DISAGREE	DL FMT 23/1		BD		93017G	*
	V90X7390X	FCS RH R-Y AUTO MODE A FAIL	DL FMT 23/1		BD		93017G	*
	V90X7391X	FCS RH R-Y AUTO MODE B FAIL	DL FMT 23/1		BD		93017G	*
	V90X7392X	FCS RH R-Y AUTO MODE C FAIL	DL FMT 23/1		BD		93017G	*
	V90X7425X	RH + ROLL TRIM SW DISAGREE	DL FMT 23/A		BD		93017G	*
			GAX					
	V90X7445X	RH + PITCH TRIM SW DISAGREE	DL FMT 23/A		BD		93017G	*
			GAX					
	V90X7455X	RH - PITCH TRIM SW DISAGREE	DL FMT 23/A		BD		93017G	*
			GAX					
	V90X7465X	RH + YAW TRIM SW DISAGREE	DL FMT 23/A		BD		93017G	*
			GAX					
	V90X7475X	RH - YAW TRIM SW DISAGREE	DL FMT 23/A		BD		93017G	*
			GAX					
	V90X7495X	LH RADAR ALTIMETER DISPLAY	AVVI PROC					
	V90X7496X	RH RADAR ALTIMETER DISPLAY	AVVI PROC					
	V90X7501X	SEL RCS MASTER CROSSFEED FROM LEFT	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
			MSC					
			ORB DAP					
			RCS/RCS XFEED					
	V90X7502X	SEL RCS MASTER CROSSFEED FROM RT	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
			MSC					
			ORB DAP					
			RCS/RCS XFEED					
	V90X7536X	SEL LH ADI ATTITUDE REF PB	DL FMT 21/A		BD		93017G	*
			DL FMT 22/1					
			DL FMT 23/A					
			DL FMT 32/A					
			HUD PROC					

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X7537X	SEL RH ADI ATTITUDE REF PB	DL FMT 21/A DL FMT 22/1 DL FMT 23/A DL FMT 32/A HUD PROC		BD		93017G	*
	V90X7538X	SEL RTLS ABORT REQUEST SIGNAL	DL FMT 21/A MSC		BD		93017G	*
	V90X7539XA	SEL OMS-L ENG ARM CMD	MSC OMS RM				90182	
	V90X7540XA	SEL OMS-L ENG ARM/PRESS CMD	MSC OMS FIRE SEQ OMS RM				90182	
	V90X7541XA	SEL OMS-R ENG ARM CMD	MSC OMS RM				90182	
	V90X7542XA	SEL OMS-R ENG ARM/PRESS CMD	MSC OMS FIRE SEQ OMS RM				90182	
	V90X7548X	SEL MPS ENG LIMIT CONTROL AUTO	DL FMT 21/A SSME OPS		BD		93017G	*
	V90X7549X	SEL MPS ENG LIMIT CONTROL ENABLE	SSME OPS					
	V90X7550X	SEL MPS ENG LIMIT CONTROL INHIBIT	SSME OPS					
	V90X7551X	SEL MPS ME-1 SHUTDOWN CMD	DL FMT 21/2 SSME OPS		BD		93017G	*
	V90X7552X	SEL MPS ME-2 SHUTDOWN CMD	DL FMT 21/2 SSME OPS		BD		93017G	*
	V90X7553X	SEL MPS ME-3 SHUTDOWN CMD	DL FMT 21/2 SSME OPS		BD		93017G	*
	V90X7554X	SEL ET SEP AUTO	DL FMT 21/A ET SEP SEQ		BD		93017G	*
	V90X7556X	SEL ET SEP MNL ENABLE	DL FMT 21/A ET SEP SEQ RTLS TRAJ 2 DISP XXXXXX TRAJ 1 DISP XXXXXX TRAJ 2 DISP		BD		93017G	*
	V90X7557X	SEL MPS PRPLT DUMP BU LH2 VLV OP	MPS DUMP					
	V90X7559X	SEL MPS PRPLT DUMP SEQ START	MPS DUMP					
	V90X7564X	SEL ET SEP INITIATE/WOW-WONG CMD	DL FMT 21/A ET SEP SEQ LANDING SOP SSME OPS		BD		93017G	*
	V90X7567X	SEL MPS PRPLT DUMP SEQ STOP	MPS DUMP					
	V90X7570X	SEL SRB SEPARATION AUTO CMD	DL FMT 21/A		BD		93017G	*
	V90X7571X	SEL SRB SEPN MNL/AUTO ENABLE CMD	DL FMT 21/A SRB SEP SEQ		BD		93017G	*

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X7572X	SEL SRB SEP INITIATE/WOW-WONG CMD	DL FMT 21/A LANDING SOP SRB SEP SEQ		BD		93017G	*
	V90X7690X	SEL FWD DAP SELECT A	FC SWIT PROC TLM					
	V90X7691X	SEL FWD DAP SELECT B	FC SWIT PROC TLM					
	V90X7702X	SEL AFT RCS JETS NORM	FC SWIT PROC TLM					
	V90X7703X	SEL AFT RCS JETS VERNIER	FC SWIT PROC TLM					
	V90X7707X	SEL AFT ROTATION PITCH DISC RATE	FC SWIT PROC TLM					
	V90X7708X	SEL AFT ROTATION ROLL DISC RATE	FC SWIT PROC TLM					
	V90X7709X	SEL AFT ROTATION YAW DISC RATE	FC SWIT PROC TLM					
	V90X7710X	SEL AFT ROTATION PITCH PULSE	FC SWIT PROC TLM					
	V90X7711X	SEL AFT ROTATION ROLL PULSE	FC SWIT PROC TLM					
	V90X7712X	SEL AFT ROTATION YAW PULSE	FC SWIT PROC TLM					
	V90X7713X	SEL AFT MANUAL LVLH	FC SWIT PROC TLM					
	V90X7714X	SEL AFT TRANSLATION Z LOW	FC SWIT PROC TLM					
	V90X7715X	SEL AFT TRANSLATION Z HIGH	FC SWIT PROC TLM					
	V90X7716X	SEL AFT TRANSLATION X NORM	FC SWIT PROC TLM					
	V90X7717X	SEL AFT TRANSLATION Y NORM	FC SWIT PROC TLM					
	V90X7718X	SEL AFT TRANSLATION Z NORM	FC SWIT PROC TLM					
	V90X7719X	SEL AFT TRANSLATION X PULSE	FC SWIT PROC TLM					
	V90X7720X	SEL AFT TRANSLATION Y PULSE	FC SWIT PROC TLM					
	V90X7721X	SEL AFT TRANSLATION Z PULSE	FC SWIT PROC TLM					
	V90X7722X	SEL FWD RCS JETS NORM	FC SWIT PROC TLM					
	V90X7723X	SEL FWD RCS JETS VERNIER	FC SWIT PROC TLM					

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X7733X	SEL FWD MANUAL LVLH	FC SWIT PROC TLM					
	V90X7734X	SEL FWD TRANSLATION Z LOW	FC SWIT PROC TLM					
	V90X7735X	SEL FWD TRANSLATION Z HIGH	FC SWIT PROC TLM					
	V90X7736X	SEL FWD TRANSLATION X NORM	FC SWIT PROC TLM					
	V90X7737X	SEL FWD TRANSLATION Y NORM	FC SWIT PROC TLM					
	V90X7738X	SEL FWD TRANSLATION Z NORM	FC SWIT PROC TLM					
	V90X7739X	SEL FWD TRANSLATION X PULSE	FC SWIT PROC TLM					
	V90X7740X	SEL FWD TRANSLATION Y PULSE	FC SWIT PROC TLM					
	V90X7741X	SEL FWD TRANSLATION Z PULSE	FC SWIT PROC TLM					
	V90X7742X	SEL MPS PRPLT DUMP BU LH2 VLV CL	MPS DUMP				92317B	
	V90X7775X	AFT ADI ATTITUDE SELECT SW INVALID	GAX TLM					
	V90X7776X	AFT ADI ERROR SWITCH INVALID	GAX TLM					
	V90X7777X	AFT ADI RATE SWITCH INVALID	GAX TLM					
	V90X7778X	AFT DAP SELECT A-A FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X7779X	AFT DAP SELECT A-B FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X7780X	AFT DAP SELECT A-C FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X7781X	AFT DAP SELECT B-A FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X7782X	AFT DAP SELECT B-B FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X7783X	AFT DAP SELECT B-C FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X7784X	AFT DAP AUTO A FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X7785X	AFT DAP AUTO B FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X7786X	AFT DAP AUTO C FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X7787X	AFT DAP MAN INRTL HOLD A FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X7788X	AFT DAP MAN INRTL HOLD B FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7789X	AFT DAP MAN INRTL HOLD C FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7790X	AFT THC NEG X OUTPUT-A FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 32/A					
			GAX					
	V90X7791X	AFT THC NEG Y OUTPUT-A FAIL	RM ORB DIP					
			DL FMT 22/1		BD		93017G	*
			DL FMT 32/A					
			GAX					
	V90X7792X	AFT THC NEG Z OUTPUT-A FAIL	RM ORB DIP					
			DL FMT 22/1		BD		93017G	*
			DL FMT 32/A					
			GAX					
	V90X7793X	AFT THC NEG X OUTPUT-B FAIL	RM ORB DIP					
			DL FMT 22/1		BD		93017G	*
			DL FMT 32/A					
			GAX					
	V90X7794X	AFT THC NEG Y OUTPUT-B FAIL	RM ORB DIP					
			DL FMT 22/1		BD		93017G	*
			DL FMT 32/A					
			GAX					
	V90X7795X	AFT THC NEG Z OUTPUT-B FAIL	RM ORB DIP					
			DL FMT 22/1		BD		93017G	*
			DL FMT 32/A					
			GAX					
	V90X7796X	AFT THC NEG X OUTPUT-C FAIL	RM ORB DIP					
			DL FMT 22/1		BD		93017G	*
			DL FMT 32/A					
			GAX					
	V90X7797X	AFT THC NEG Y OUTPUT-C FAIL	RM ORB DIP					
			DL FMT 22/1		BD		93017G	*
			DL FMT 32/A					
			GAX					
	V90X7798X	AFT THC NEG Z OUTPUT-C FAIL	RM ORB DIP					
			DL FMT 22/1		BD		93017G	*
			DL FMT 32/A					
			GAX					
	V90X7799X	AFT THC POS X OUTPUT-A FAIL	RM ORB DIP					
			DL FMT 22/1		BD		93017G	*
			DL FMT 32/A					
			GAX					
			RM ORB DIP					

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X7800X	AFT THC POS Y OUTPUT-A FAIL	DL FMT 22/1 DL FMT 32/A GAX		BD		93017G	*
	V90X7801X	AFT THC POS Z OUTPUT-A FAIL	DL FMT 22/1 DL FMT 32/A GAX		BD		93017G	*
	V90X7802X	AFT THC POS X OUTPUT-B FAIL	DL FMT 22/1 DL FMT 32/A GAX		BD		93017G	*
	V90X7803X	AFT THC POS Y OUTPUT-B FAIL	DL FMT 22/1 DL FMT 32/A GAX		BD		93017G	*
	V90X7804X	AFT THC POS Z OUTPUT-B FAIL	DL FMT 22/1 DL FMT 32/A GAX		BD		93017G	*
	V90X7805X	AFT THC POS X OUTPUT-C FAIL	DL FMT 22/1 DL FMT 32/A GAX		BD		93017G	*
	V90X7806X	AFT THC POS Y OUTPUT-C FAIL	DL FMT 22/1 DL FMT 32/A GAX		BD		93017G	*
	V90X7807X	AFT THC POS Z OUTPUT-C FAIL	DL FMT 22/1 DL FMT 32/A GAX		BD		93017G	*
	V90X7808X	FWD DAP SELECT A-A FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X7809X	FWD DAP SELECT A-B FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X7810X	FWD DAP SELECT A-C FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X7811X	FWD DAP SELECT B-A FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X7812X	FWD DAP SELECT B-B FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X7813X	FWD DAP SELECT B-C FAIL	DL FMT 22/1 DL FMT 32/1		BD		93017G	*

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X7814X	FWD DAP AUTO A FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7815X	FWD DAP AUTO B FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7816X	FWD DAP AUTO C FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7817X	FWD DAP MAN INRTL HOLD A FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7818X	FWD DAP MAN INRTL HOLD B FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7819X	FWD DAP MAN INRTL HOLD C FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7820X	FWD THC NEG X OUTPUT-A FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 23/1					
			DL FMT 32/A					
			GAX					
			RM ORB DIP					
	V90X7821X	FWD THC NEG Y OUTPUT-A FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 23/1					
			DL FMT 32/A					
			GAX					
			RM ORB DIP					
	V90X7822X	FWD THC NEG Z OUTPUT-A FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 23/1					
			DL FMT 32/A					
			GAX					
			RM ORB DIP					
	V90X7823X	FWD THC NEG X OUTPUT-B FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 23/1					
			DL FMT 32/A					
			GAX					
			RM ORB DIP					
	V90X7824X	FWD THC NEG Y OUTPUT-B FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 23/1					
			DL FMT 32/A					
			GAX					
			RM ORB DIP					
	V90X7825X	FWD THC NEG Z OUTPUT-B FAIL	DL FMT 22/1		BD		93017G	*
			DL FMT 23/1					
			DL FMT 32/A					
			GAX					
			RM ORB DIP					

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X7826X	FWD THC NEG X OUTPUT-C FAIL	DL FMT 22/1 DL FMT 23/1 DL FMT 32/A GAX RM ORB DIP		BD		93017G	*
	V90X7827X	FWD THC NEG Y OUTPUT-C FAIL	DL FMT 22/1 DL FMT 23/1 DL FMT 32/A GAX RM ORB DIP		BD		93017G	*
	V90X7828X	FWD THC NEG Z OUTPUT-C FAIL	DL FMT 22/1 DL FMT 23/1 DL FMT 32/A GAX RM ORB DIP		BD		93017G	*
	V90X7829X	FWD THC POS X OUTPUT-A FAIL	DL FMT 22/1 DL FMT 23/1 DL FMT 32/A GAX RM ORB DIP		BD		93017G	*
	V90X7830X	FWD THC POS Y OUTPUT-A FAIL	DL FMT 22/1 DL FMT 23/1 DL FMT 32/A GAX RM ORB DIP		BD		93017G	*
	V90X7831X	FWD THC POS Z OUTPUT-A FAIL	DL FMT 22/1 DL FMT 23/1 DL FMT 32/A GAX RM ORB DIP		BD		93017G	*
	V90X7832X	FWD THC POS X OUTPUT-B FAIL	DL FMT 22/1 DL FMT 23/1 DL FMT 32/A GAX RM ORB DIP		BD		93017G	*
	V90X7833X	FWD THC POS Y OUTPUT-B FAIL	DL FMT 22/1 DL FMT 23/1 DL FMT 32/A GAX RM ORB DIP		BD		93017G	*
	V90X7834X	FWD THC POS Z OUTPUT-B FAIL	DL FMT 22/1 DL FMT 23/1 DL FMT 32/A GAX RM ORB DIP		BD		93017G	*

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X7835X	FWD THC POS X OUTPUT-C FAIL	DL FMT 22/1 DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X7836X	FWD THC POS Y OUTPUT-C FAIL	RM ORB DIP DL FMT 22/1 DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X7837X	FWD THC POS Z OUTPUT-C FAIL	RM ORB DIP DL FMT 22/1 DL FMT 23/1 DL FMT 32/A GAX		BD		93017G	*
	V90X7840X	SENSE -X 1 FAIL	DL FMT 22/1		BD		93017G	*
	V90X7841X	SENSE -X 2 FAIL	DL FMT 22/1		BD		93017G	*
	V90X7842X	SENSE -X 3 FAIL	DL FMT 22/1		BD		93017G	*
	V90X7843X	SENSE -Z 1 FAIL	DL FMT 22/1		BD		93017G	*
	V90X7844X	SENSE -Z 2 FAIL	DL FMT 22/1		BD		93017G	*
	V90X7845X	SENSE -Z 3 FAIL	DL FMT 22/1		BD		93017G	*
	V90X7846X	AFT ADI ATTITUDE REF PB-DIS	DL FMT 22/A DL FMT 32/A		BD		93017G	*
	V90X7847X	AFT RCS JETS NORM DIS	DL FMT 22/A DL FMT 32/A				93017G	*
	V90X7848X	AFT RCS JETS VERNIER DIS	DL FMT 22/A DL FMT 32/A				93017G	*
	V90X7852X	AFT ROTATION PITCH DISC RATE DIS	DL FMT 22/A DL FMT 32/A		BD		93017G	*
	V90X7853X	AFT ROTATION ROLL DISC RATE DIS	DL FMT 22/A DL FMT 32/A		BD		93017G	*
	V90X7854X	AFT ROTATION YAW DISC RATE DIS	DL FMT 22/A DL FMT 32/A		BD		93017G	*
	V90X7855X	AFT ROTATION PITCH PULSE DIS	DL FMT 22/A DL FMT 32/A		BD		93017G	*
	V90X7856X	AFT ROTATION ROLL PULSE DIS	DL FMT 22/A DL FMT 32/A		BD		93017G	*
	V90X7857X	AFT ROTATION YAW PULSE DIS	DL FMT 22/A DL FMT 32/A		BD		93017G	*
	V90X7858X	AFT MANUAL LVLH DIS	TLM		BD			
	V90X7859X	AFT TRANSLATION Z LOW DIS	DL FMT 22/A DL FMT 32/A		BD		93017G	*
	V90X7860X	AFT TRANSLATION Z HIGH DIS	DL FMT 22/A DL FMT 32/A		BD		93017G	*

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X7861X	AFT TRANSLATION X NORM DIS	DL FMT 22/A		BD		93017G	*
			DL FMT 32/A					
	V90X7862X	AFT TRANSLATION Y NORM DIS	DL FMT 22/A		BD		93017G	*
			DL FMT 32/A					
	V90X7863X	AFT TRANSLATION Z NORM DIS	DL FMT 22/A		BD		93017G	*
			DL FMT 32/A					
	V90X7864X	AFT TRANSLATION X PULSE DIS	DL FMT 22/A		BD		93017G	*
			DL FMT 32/A					
	V90X7865X	AFT TRANSLATION Y PULSE DIS	DL FMT 22/A		BD		93017G	*
			DL FMT 32/A					
	V90X7866X	AFT TRANSLATION Z PULSE DIS	DL FMT 22/A		BD		93017G	*
			DL FMT 32/A					
	V90X7867X	FWD RCS JETS NORM DIS	DL FMT 22/1				93017G	*
			DL FMT 32/1					
	V90X7868X	FWD RCS JETS VERNIER DIS	DL FMT 22/1				93017G	*
			DL FMT 32/1					
	V90X7872X	FWD ROTATION PITCH DISC RATE DIS	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7873X	FWD ROTATION ROLL DISC RATE DIS	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7874X	FWD ROTATION YAW DISC RATE DIS	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7875X	FWD ROTATION PITCH PULSE DIS	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7876X	FWD ROTATION ROLL PULSE DIS	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7877X	FWD ROTATION YAW PULSE DIS	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7878X	FWD MANUAL LVLH DIS	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7879X	FWD TRANSLATION Z LOW DIS	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7880X	FWD TRANSLATION Z HIGH DIS	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7881X	FWD TRANSLATION X NORM DIS	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7882X	FWD TRANSLATION Y NORM DIS	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7883X	FWD TRANSLATION Z NORM DIS	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7884X	FWD TRANSLATION X PULSE DIS	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					
	V90X7885X	FWD TRANSLATION Y PULSE DIS	DL FMT 22/1		BD		93017G	*
			DL FMT 32/1					

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X7886X	FWD TRANSLATION Z PULSE DIS	DL FMT 22/1 DL FMT 32/1		BD		93017G	*
	V90X7887X	AFT DAP SELECT A-DIS	TLM					
	V90X7888X	AFT DAP SELECT B-DIS	TLM					
	V90X7889X	AFT DAP AUTO DIS	TLM					
	V90X7890X	AFT DAP MAN INRTL DIS	TLM				89921C	
	V90X7891X	AFT THC NEG X OUTPUT-DIS	GAX RM ORB DIP TLM					
	V90X7892X	AFT THC NEG Y OUTPUT-DIS	GAX RM ORB DIP TLM					
	V90X7893X	AFT THC NEG Z OUTPUT-DIS	GAX RM ORB DIP TLM					
	V90X7894X	AFT THC POS X OUTPUT-DIS	GAX RM ORB DIP TLM					
	V90X7895X	AFT THC POS Y OUTPUT-DIS	GAX RM ORB DIP TLM					
	V90X7896X	AFT THC POS Z OUTPUT-DIS	GAX RM ORB DIP TLM					
	V90X7898X	FWD SPARE PBI DIS	TLM		BD		89921C	
	V90X7899X	AFT SPARE PBI DIS	TLM		BD		89921C	
	V90X8002X	SEL FWD MAN FREE DRIFT	FC SWIT PROC TLM		BD		89921C	
	V90X8003X	SEL FWD ALT PRCS DAP MODE	FC SWIT PROC TLM		BD		89921C	
	V90X8004X	FWD MAN FREE DRIFT DIS	TLM	EVENT	BD		89921C	
	V90X8006X	FWD ALT PRCS DAP MODE DIS	DL FMT 22/1 DL FMT 32/1	EVENT	BD		93017G	*
	V90X8007X	FWD MAN FREE DRIFT A FAIL	DL FMT 22/1 DL FMT 32/1	EVENT	BD		93017G	*
	V90X8008X	FWD MAN FREE DRIFT B FAIL	DL FMT 22/1 DL FMT 32/1	EVENT	BD		93017G	*
	V90X8009X	FWD MAN FREE DRIFT C FAIL	DL FMT 22/1 DL FMT 32/1	EVENT	BD		93017G	*
	V90X8012X	SEL AFT MAN FREE DRIFT	FC SWIT PROC TLM		BD		89921C	
	V90X8013X	SEL AFT ALT PRCS DAP MODE	FC SWIT PROC TLM		BD		89921C	
	V90X8014X	AFT MAN FREE DRIFT DIS	TLM	EVENT	BD		89921C	

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X8016X	AFT ALT PRCS DAP MODE DIS	DL FMT 22/A DL FMT 32/A	EVENT	BD		93017G	*
	V90X8017X	AFT MAN FREE DRIFT A FAIL	DL FMT 22/1 DL FMT 32/1	EVENT	BD		93017G	*
	V90X8018X	AFT MAN FREE DRIFT B FAIL	DL FMT 22/1 DL FMT 32/1	EVENT	BD		93017G	*
	V90X8019X	AFT MAN FREE DRIFT C FAIL	DL FMT 22/1 DL FMT 32/1	EVENT	BD		93017G	*
	V90X8022X	FWD MAN LVLH A FAIL	DL FMT 22/1 DL FMT 32/1	EVENT	BD		93017G	*
	V90X8023X	FWD MAN LVLH B FAIL	DL FMT 22/1 DL FMT 32/1	EVENT	BD		93017G	*
	V90X8024X	FWD MAN LVLH C FAIL	DL FMT 22/1 DL FMT 32/1	EVENT	BD		93017G	*
	V90X8032X	AFT MAN LVLH A FAIL	DL FMT 22/1 DL FMT 32/1	EVENT	BD		93017G	*
	V90X8033X	AFT MAN LVLH B FAIL	DL FMT 22/1 DL FMT 32/1	EVENT	BD		93017G	*
	V90X8034X	AFT MAN LVLH C FAIL	DL FMT 22/1 DL FMT 32/1	EVENT	BD		93017G	*
	V90X8047X	SEL FWD SPARE PBI	FC SWIT PROC TLM		BD		89921C	
	V90X8048X	SEL AFT SPARE PBI	FC SWIT PROC TLM		BD		89921C	
	V90X8124X	FWD DAP SELECT A-DIS	TLM					
	V90X8125X	FWD DAP SELECT B-DIS	TLM					
	V90X8126X	FWD DAP AUTO DIS	TLM					
	V90X8127X	FWD DAP MAN INRTL DIS	TLM				89921C	
	V90X8128X	FWD THC NEG X OUTPUT-DIS	GAX RM ORB DIP TLM					
	V90X8129X	FWD THC NEG Y OUTPUT-DIS	GAX RM ORB DIP TLM					
	V90X8130X	FWD THC NEG Z OUTPUT-DIS	GAX RM ORB DIP TLM					
	V90X8131X	FWD THC POS X OUTPUT-DIS	GAX RM ORB DIP TLM					
	V90X8132X	FWD THC POS Y OUTPUT-DIS	GAX RM ORB DIP TLM					

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X8133X	FWD THC POS Z OUTPUT-DIS	GAX RM ORB DIP TLM					
	V90X8134X	SENSE -X DIS	TLM					
	V90X8135X	SENSE -Z DIS	TLM					
	V90X8137X	SEL AFT DAP AUTO	FC SWIT PROC TLM					
	V90X8138X	SEL AFT DAP SELECT A	FC SWIT PROC TLM					
	V90X8142X	SEL AFT DAP MAN INRTL	FC SWIT PROC TLM				89921C	
	V90X8144X	SEL AFT DAP SELECT B	FC SWIT PROC TLM					
	V96X2101X	LH HSI MODE SELECT	ASC AREA NAV ENT AREA NAV					
	V96X2113X	LH HSI MODE SWITCH INVALID	GAX TLM					
	V96X2115X	LH HSI SOURCE SWITCH INVALID	GAX TLM					
	V96X2117X	LH HSI TRANS SWITCH INVALID	GAX TLM					
	V96X2151X	LH ADI RATE SWITCH INVALID	GAX TLM					
	V96X2155X	LH ADI ERROR SWITCH INVALID	GAX TLM					
	V96X2175X	LH AIR DATA SWITCH INVALID	GAX TLM					
	V96X2195X	LH RADAR ALT SWITCH INVALID	GAX TLM					
	V96X2201X	RH HSI MODE SELECT	ASC AREA NAV ENT AREA NAV					
	V96X2213X	RH HSI MODE SWITCH INVALID	GAX TLM					
	V96X2215X	RH HSI SOURCE SWITCH INVALID	GAX TLM					
	V96X2217X	RH HSI TRANS SWITCH INVALID	GAX TLM					
	V96X2251X	RH ADI RATE SWITCH INVALID	GAX TLM					
	V96X2255X	RH ADI ERROR SWITCH INVALID	GAX TLM					
	V96X2275X	RH AIR DATA SWITCH INVALID	GAX TLM					
	V96X2295X	RH RADAR ALT SWITCH INVALID	GAX TLM					

TABLE 4.12.5-2. OUTPUT FUNCTIONAL PARAMETERS FROM GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR
(G4.180)

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 4.12.5-3. GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR (G4.180) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
EAS_DEROTATE	V97U0093C	FT/SEC	F	S	D	P	G4.180	00	ZF9	91050C	

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

TABLE 4.12.5-4. GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR (G4.180) 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 4.12.5-5. GUIDANCE, NAVIGATION, AND CONTROL SWITCH PROCESSOR (G4.180) 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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4.13 FLIGHT CONTROL SYSTEM

4.13.1 Elevon DELTA P F/B FDIR (PF 4.241)

Elevon DELTA P F/B FDIR shall operate on four elevon transducers (i.e., right outboard, right inboard, left outboard, and left inboard). Each transducer signal is quadruply redundant and shall be processed as described in paragraph 4.0.2 for the four-parameter case (without BITE).

4.13.1.1 Functional Requirements.

The limits for the Elevon DELTA P F/B differencing test are K-loads (see paragraph 4.13.1.3).

4.13.1.2 Processing Requirements.

Elevon DELTA P F/B FDIR shall be processed at the rates shown in Table 4.0-2 during the ascent phase in MM 102.

4.13.1.3 Parameter Tables for Elevon DELTA P F/B FDIR.

The IDD inputs and outputs are listed in Tables 4.13.1.3-1 and 4.13.1.3-2 respectively. K-loads are listed in Table 4.13.1.3-4. There are no I-load or constants requirements for Elevon DELTA P F/B FDIR.

TABLE 4.13.1.3-1. INPUT FUNCTIONAL PARAMETERS FOR DELTA PRESSURE FEEDBACK FDIR (G4.241)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V58P0816C	L INBD ELEVON PRI DELTA PRESS 1	ASA 1	VDC	AMB		93017G	*
	V58P0817C	L INBD ELEVON PRI DELTA PRESS 2	ASA 2	VDC	AMB		93017G	*
	V58P0818C	L INBD ELEVON PRI DELTA PRESS 3	ASA 3	VDC	AMB		93017G	*
	V58P0819C	L INBD ELEVON PRI DELTA PRESS 4	ASA 4	VDC	AMB		93017G	*
	V58P0866C	L OUTBD ELEVON PRI DELTA PRESS 1	ASA 1	VDC	AMB		93017G	*
	V58P0867C	L OUTBD ELEVON PRI DELTA PRESS 2	ASA 2	VDC	AMB		93017G	*
	V58P0868C	L OUTBD ELEVON PRI DELTA PRESS 3	ASA 3	VDC	AMB		93017G	*
	V58P0869C	L OUTBD ELEVON PRI DELTA PRESS 4	ASA 4	VDC	AMB		93017G	*
	V58P0916C	R INBD ELEVON PRI DELTA PRESS 1	ASA 1	VDC	AMB		93017G	*
	V58P0917C	R INBD ELEVON PRI DELTA PRESS 2	ASA 2	VDC	AMB		93017G	*
	V58P0918C	R INBD ELEVON PRI DELTA PRESS 3	ASA 3	VDC	AMB		93017G	*
	V58P0919C	R INBD ELEVON PRI DELTA PRESS 4	ASA 4	VDC	AMB		93017G	*
	V58P0966C	R OUTBD ELEVON PRI DELTA PRESS 1	ASA 1	VDC	AMB		93017G	*
	V58P0967C	R OUTBD ELEVON PRI DELTA PRESS 2	ASA 2	VDC	AMB		93017G	*
	V58P0968C	R OUTBD ELEVON PRI DELTA PRESS 3	ASA 3	VDC	AMB		93017G	*
	V58P0969C	R OUTBD ELEVON PRI DELTA PRESS 4	ASA 4	VDC	AMB		93017G	*
	V91X6370X	LIB ELEVON PRI DELTA P 1 CF	FCOS					
	V91X6371X	LIB ELEVON PRI DELTA P 2 CF	FCOS					
	V91X6372X	LIB ELEVON PRI DELTA P 3 CF	FCOS					
	V91X6373X	LIB ELEVON PRI DELTA P 4 CF	FCOS					
	V91X6380X	LOB ELEVON PRI DELTA P 1 CF	FCOS					
	V91X6381X	LOB ELEVON PRI DELTA P 2 CF	FCOS					
	V91X6382X	LOB ELEVON PRI DELTA P 3 CF	FCOS					
	V91X6383X	LOB ELEVON PRI DELTA P 4 CF	FCOS					
	V91X6390X	RIB ELEVON PRI DELTA P 1 CF	FCOS					
	V91X6391X	RIB ELEVON PRI DELTA P 2 CF	FCOS					
	V91X6392X	RIB ELEVON PRI DELTA P 3 CF	FCOS					
	V91X6393X	RIB ELEVON PRI DELTA P 4 CF	FCOS					
	V91X6400X	ROB ELEVON PRI DELTA P 1 CF	FCOS					
	V91X6401X	ROB ELEVON PRI DELTA P 2 CF	FCOS					
	V91X6402X	ROB ELEVON PRI DELTA P 3 CF	FCOS					
	V91X6403X	ROB ELEVON PRI DELTA P 4 CF	FCOS					

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

TABLE 4.13.1.3-2. OUTPUT FUNCTIONAL PARAMETERS FROM DELTA PRESSURE FEEDBACK FDIR (G4.241)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90J6786C	LIB ELEVON DELTA PRESSURE COMMAND	SF					
	V90J6787C	LOB ELEVON DELTA PRESSURE COMMAND	SF					
	V90J6788C	RIB ELEVON DELTA PRESSURE COMMAND	SF					
	V90J6789C	ROB ELEVON DELTA PRESSURE COMMAND	SF					
	V90X6770X	LIB ELEVON DELTA PRESSURE 1 FAIL	TLM					
	V90X6771X	LIB ELEVON DELTA PRESSURE 2 FAIL	TLM					
	V90X6772X	LIB ELEVON DELTA PRESSURE 3 FAIL	TLM					
	V90X6773X	LIB ELEVON DELTA PRESSURE 4 FAIL	TLM					
	V90X6774X	LOB ELEVON DELTA PRESSURE 1 FAIL	TLM					
	V90X6775X	LOB ELEVON DELTA PRESSURE 2 FAIL	TLM					
	V90X6776X	LOB ELEVON DELTA PRESSURE 3 FAIL	TLM					
	V90X6777X	LOB ELEVON DELTA PRESSURE 4 FAIL	TLM					
	V90X6778X	RIB ELEVON DELTA PRESSURE 1 FAIL	TLM					
	V90X6779X	RIB ELEVON DELTA PRESSURE 2 FAIL	TLM					
	V90X6780X	RIB ELEVON DELTA PRESSURE 3 FAIL	TLM					
	V90X6781X	RIB ELEVON DELTA PRESSURE 4 FAIL	TLM					
	V90X6782X	ROB ELEVON DELTA PRESSURE 1 FAIL	TLM					
	V90X6783X	ROB ELEVON DELTA PRESSURE 2 FAIL	TLM					
	V90X6784X	ROB ELEVON DELTA PRESSURE 3 FAIL	TLM					
	V90X6785X	ROB ELEVON DELTA PRESSURE 4 FAIL	TLM					

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 4.13.1.3-3. DELTA PRESSURE FEEDBACK FDIR (G4.241) 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 4.13.1.3-4. DELTA PRESSURE FEEDBACK FDIR (G4.241) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
LIMIT(33)	V98U9734C	00	+6.0	E+02 LBS/IN**2	F	S	P	G4.241	90109D	
N_ELVN_PRES_FBK ELVN PRI P FBN COUNTER	V97U3028C	00	+3	ND	I	S	P	G4.241	90109D	

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

TABLE 4.13.1.3-5. DELTA PRESSURE FEEDBACK FDIR (G4.241) 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.

4.13.2 SRB RGA FDIR (PF4.242)

The SRB rate gyros are a quad redundant subsystem within the SRB's (two RGA's in the left SRB and two RGA's in the right SRB), providing pitch rate and yaw rate data during first stage ascent. Thus, there are two SRB RGA FDIR algorithms associated with respective SF's: pitch and yaw. At the event SRB_NULL_CMD, the pitch and yaw rate data source is switched by the user from SRB to Orbiter rate gyros.

The SRB RG SOP processed the measured signals from the two RGA's in the right SRB and the two RGA's in the left SRB and generates the four rate signals for the selection filters. The SRB RGA FDIR shall operate on the signals from the SRB RG SOP as described in paragraph 4.0.2 for the SRB RGA four parameter case (without BITE) until the first failure and shall not preclude the use of the remaining parameters in the SF for any subsequent failures.

The SRB RGA SF shall operate as described in paragraph 4.1 for the four parameter case. (BITE is available, but is not used, and DATA_GOOD flags are not generated.)

4.13.2.1 Functional Requirements

The limits for RGA differencing tests shall be determined as follows:

$$\text{LIMIT}_{(q)} = |\text{Selected SRB rate}_{(q)}| (\text{LSF}(4) + \text{CON}(4))$$

$$\text{or } (r) \qquad \text{or } (r) \qquad \text{or } (5) \qquad \text{or } (5)$$

LSF() = limit scale factor

CON() = a limit constant

q, r subscripts refer to pitch and yaw axes and 4 and 5 indexes imply constants.

These parameters are K-loads (see paragraph 4.13.2.3).

4.13.2.2 Processing Requirements.

SRB RGA FDIR shall be processed at the rate shown in Table 4.0-2 during Major Modes 101 and 102 (prelaunch and first-stage ascent). Processing may be terminated after the ascent DAP and attitude processor have switched for SRB to Orbiter rate sources in response to SRB_NULL_CMD.

4.13.2.3 Parameter Tables for SRB RGA FDIR.

The IDD inputs and outputs are listed in Tables 4.13.2.3-1 and 4.13.2.3-2 respectively. K-loads are listed in Table 4.13.2.3-4. There are no I-load or constants requirements for SRB RGA FDIR.

TABLE 4.13.2.3-1. INPUT FUNCTIONAL PARAMETERS FOR SOLID ROCKET BOOSTER RATE GYRO ASSEMBLY FDIR (G4.242)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
Q_SRB	V90R2511C	SRGA SEL PITCH RATE	SF	DEG/S			93017G	*
RGQCF(1)	V91X2780X	SRGA 1 PITCH RATE CF	FCOS				79935H	
RGQCF(2)	V91X2792X	SRGA 2 PITCH RATE CF	FCOS				79935H	
RGQCF(3)	V91X2782X	SRGA 3 PITCH RATE CF	FCOS				79935H	
RGQCF(4)	V91X2794X	SRGA 4 PITCH RATE CF	FCOS				79935H	
RGRCF(1)	V91X2781X	SRGA 1 YAW RATE CF	FCOS				79935H	
RGRCF(2)	V91X2793X	SRGA 2 YAW RATE CF	FCOS				79935H	
RGRCF(3)	V91X2783X	SRGA 3 YAW RATE CF	FCOS				92847C	
RGRCF(4)	V91X2795X	SRGA 4 YAW RATE CF	FCOS				79935H	
R_SRB	V90R2512C	SRGA SEL YAW RATE	SF	DEG/S			93017G	*
SRBQC(1)	V95R4260C	STRING 1 SRGA COMP PITCH RATE	SRB RG SOP	DEG/S			93017G	*
SRBQC(2)	V95R4262C	STRING 2 SRGA COMP PITCH RATE	SRB RG SOP	DEG/S			93017G	*
SRBQC(3)	V95R4270C	STRING 3 SRGA COMP PITCH RATE	SRB RG SOP	DEG/S			93017G	*
SRBQC(4)	V95R4272C	STRING 4 SRGA COMP PITCH RATE	SRB RG SOP	DEG/S			93017G	*
SRBRC(1)	V95R4261C	STRING 1 SRGA COMP YAW RATE	SRB RG SOP	DEG/S			93017G	*
SRBRC(2)	V95R4263C	STRING 2 SRGA COMP YAW RATE	SRB RG SOP	DEG/S			93017G	*
SRBRC(3)	V95R4271C	STRING 3 SRGA COMP YAW RATE	SRB RG SOP	DEG/S			93017G	*
SRBRC(4)	V95R4273C	STRING 4 SRGA COMP YAW RATE	SRB RG SOP	DEG/S			93017G	*

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

TABLE 4.13.2.3-2. OUTPUT FUNCTIONAL PARAMETERS FROM SOLID ROCKET BOOSTER RATE GYRO ASSEMBLY FDIR
(G4.242)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90M3170P	STRING SRGA FAIL	DL FMT 21/1				93017G	*
	V90R6752C	SRGA COMMAND	SF				79935H	
	V90X6748X	STRING 1 SRGA FAIL	DL FMT 21/1				93017G	*
	V90X6749X	STRING 2 SRGA FAIL	DL FMT 21/1				93017G	*
	V90X6750X	STRING 3 SRGA FAIL	DL FMT 21/1				93017G	*
	V90X6751X	STRING 4 SRGA FAIL	DL FMT 21/1		BD		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 4.13.2.3-3. SOLID ROCKET BOOSTER RATE GYRO ASSEMBLY FDIR (G4.242) 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 4.13.2.3-4. SOLID ROCKET BOOSTER RATE GYRO ASSEMBLY FDIR (G4.242) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
CON(04) SRB RGA PITCH RATE LIMIT CONSTANT	V98U7956C	00	+4.5	E-01 DEG/SEC	F		S	P G4.242	90254	
CON(05) SRB RGA YAW RATE LIMIT CONSTANT	V98U7957C	00	+4.5	E-01 DEG/SEC	F		S	P G4.242	90254	
LSF(04) SRB RGA PITCH RATE LIMIT SC FACTOR	V98U7958C	00	+4.9999989	E+00 PCT	F		S	P G4.242	90508B	
LSF(05) SRB RGA YAW RATE LIMIT SC FACTOR	V98U7959C	00	+4.9999989	E+00 PCT	F		S	P G4.242	90508B	
SRB_RGA_N_CNT SRB RGA N COUNTER	V98U7960C	00	+5	ND	I		S	P G4.242	90254	

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

TABLE 4.13.2.3-5. SOLID ROCKET BOOSTER RATE GYRO ASSEMBLY FDIR (G4.242) 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.

4.13.3 Landing Gear WOW RM (4.243)

The purpose of landing gear (LG) weight on wheels (WOW) principle function shall be to monitor the main gear and nose gear NOWOW discrettes and the main gear Null-Fail discrettes to determine the status of the WOW (weight on main gear), WONG (weight on nose gear), and MGBKV (main gear brake iso valve) discrettes. These functions shall be performed at the 6.25 Hz rate prior to the Landing SOP in MM305 and MM603.

4.13.3.1 LG WOW RM Functional Requirements

The Main Gear (MG) processing functions shall utilize the left and right main gear NOWOW proximity sensor discrettes and a NOWOW and Null-Fail discrete from each main gear wheel (i.e. left inboard & outboard and right inboard & outboard) provided by the anti-skid boxes A & B for generating WOW and MGBKV. The Nose Gear (NG) processing functions shall utilize the nose gear NOWOW proximity sensor discrettes, the WOW discrete, and theta from A/E Att Proc for generating WONG. Figure 4.13.3-1 represents the functional block diagram for LG WOW RM processing. The LG WOW RM principal function shall generate the WOW, WONG, and MGBKV discrettes as follows:

4.13.3.1.1 Hardware Upgrade Test

If EDO_HDW_UP discrete is false bypass all LG WOW RM processing.

4.13.3.1.2 First Pass Check

If any of the following: LMGNOWOW, L1NOWOW, L2NOWOW, RMGNOWOW, R3NOWOW, or R4NOWOW = 0 on first pass through LG WOW RM, set appropriate discrete fail flag = TRUE. If NLGNOWOW1 = 0 on first pass, set and latch NLGNOWOW1 = 1. If NLGNOWOW2 = 0 on first pass set and latch NLGNOWOW2 = 1.

4.13.3.1.3 MG NOWOW Discrete FDIR

The FDIR for the left and right main gear NOWOW discrettes shall be treated separately (i.e. failure of a NOWOW discrete on one main gear shall not affect the availability of the discrettes on the other side). FDIR processing for the left and right MGNOWOW discrettes shall be performed when two or more NOWOW discrettes are available and discontinued when less than two discrettes are available. A NOWOW discrete is considered available if:

1. its associated commfault flag is false
2. its associated null-fail flag does not indicate a null-failure (Good Signal = 1, Null-Fail = 0)
3. its associated null-fail commfault flag is false
4. it was not previously failed by FDIR
5. it was not failed by 1st pass check

3 Level FDIR Processing. When 3 NOWOW discretetes are available, FDIR shall perform a 2 out of 3 voting test to isolate a failure. If a NOWOW discrete disagrees with the other two discretetes for T_MG_FAIL consecutive cycles then that discrete shall be declared failed and it's associated NOWOW_FAIL flag set and latched true.

The failure counters shall be reset by good comparisons at the 3 Level. FDIR shall not increment or reset failure counters when a discrete is not available.

2 Level FDIR Processing. When any 2 NOWOW discretetes are available, FDIR shall perform a comparison test on the remaining inputs to determine if a disagreement exists. If the NOWOW discretetes disagree for T_MG_FAIL consecutive cycles then a dilemma shall be declared and the applicable (RMG/LMG)_DLMA flag shall be set true. Since two level processing is not capable of isolating the failed discrete, the disagree case shall not be considered a failure.

The dilemma counter and dilemma flag shall be reset by good comparisons at the 2 Level. FDIR shall not increment or reset the dilemma counter when a discrete is not available.

The MG NOWOW discrete FDIR shall provide the SF function with the failure status of the NOWOW discretetes. This status information shall be utilized for Selection Filter moding control.

4.13.3.1.4 MG NOWOW Discrete SF

Selection Filtering shall be performed on the available discretetes as defined previously in Section 4.13.3.1.3 Selection filtering shall be processed separately for the left and right main gear discretetes. Selection filtering shall provide a SEL LMGNOWOW discrete and a SEL RMGNOWOW discrete as follows;

1. If three NOWOW discretetes are available, the selected output shall be the majority vote of the three input values.
2. If two NOWOW discretetes are available, the selected output shall be the logical "OR" of the two input values (Due to negated input values, an "OR" function is used to achieve the desired "AND" function results).
3. If only one NOWOW discrete is available, it's status shall be the selected output.
4. If there are no valid inputs, the selected output shall be the last valid selected output.

4.13.3.1.5 Determination of MG Processing Output

If either SEL LMGNOWOW or SEL RMGNOWOW = 0 for (consecutive or non-consecutive) TD_WOW counts, set and latch WOW = true.

If (SEL LMGNOWOW = 0 or LMG DLMA = 1) and (SEL RMGNOWOW = 0 or RMG DLMA = 1) set and latch MGBKV = true.

4.13.3.1.6 Determination of NG Processing Output

If $(NLGNOWOW1 = 0 \text{ and } NLGCF1 = 0)$ or $(NLGNOWOW2 = 0 \text{ and } NLGCF2 = 0)$ then;

If $WOW = 1$ and $\Theta < ATT_WONG$ set $WONG = 1$, else set and latch appropriate discrete $(NLGNOWOW1 \text{ or } NLGNOWOW2) = 1$

4.13.3.2 Interface Requirements

The IDD inputs and outputs are listed in Tables 4.13.3.2–1 and 4.13.3.2–2 respectively. I–Loads definitions applicable to this principal function are listed in Table 4.13.3.2–3. The K–Load definition applicable to this principal function is listed in Table 4.13.3.2–4. There are no constants requirements for LG WOW RM.

4.13.3.3 Initialization Requirements

WOW, WONG, and MGBKV shall be initialized to false.

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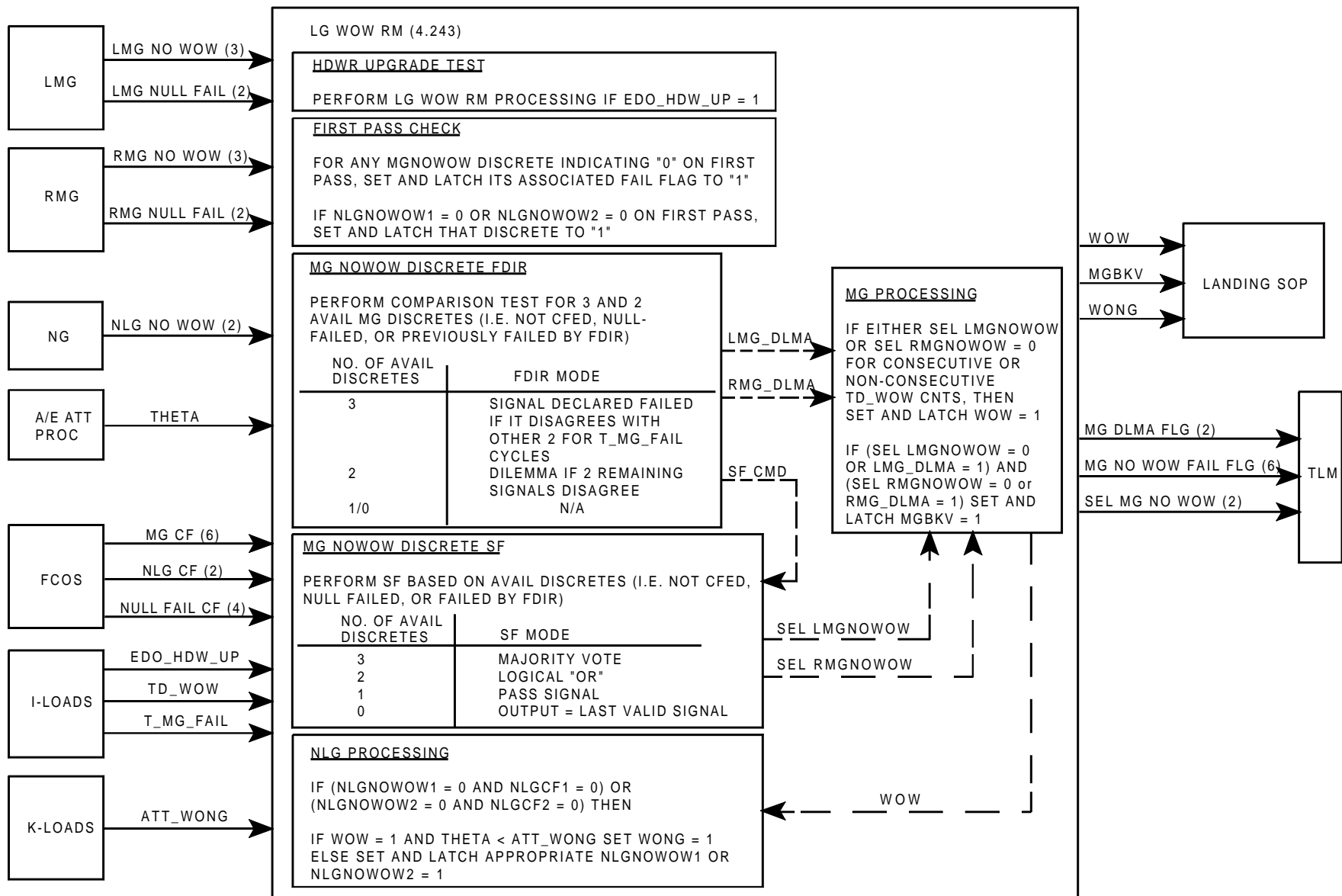


FIGURE 4.13.3-1. Landing Gear WOW RM Block Diagram

TABLE 4.13.3.2-1. INPUT FUNCTIONAL PARAMETERS FOR LANDING GEAR WEIGHT-ON-WHEELS RM (G4.243)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
L1NOWOW	V51X0131X	WHEEL 1 NO WEIGHT ON WHEEL	AS BOX A	EVENT	BD		93017G	*
L1NOWOWCF	V91X8167X	WHEEL 1 NO WOW COMMFAULT	FCOS		BD		90112E	
L1NULLFAIL	V51X0133X	WHEEL 1 NOWOW NULL FAILURE	AS BOX A	EVENT	BD		93017G	*
L1NULLFAILCF	V91X8171X	WHEEL 1 NO WOW NULL FAIL COMMFAULT	FCOS		BD		90112E	
L2NOWOW	V51X0132X	WHEEL 2 NO WEIGHT ON WHEEL	AS BOX B	EVENT	BD		93017G	*
L2NOWOWCF	V91X8168X	WHEEL 2 NO WOW COMMFAULT	FCOS		BD		90112E	
L2NULLFAIL	V51X0134X	WHEEL 2 NOWOW NULL FAILURE	AS BOX B	EVENT	BD		93017G	*
L2NULLFAILCF	V91X8172X	WHEEL 2 NO WOW NULL FAIL COMMFAULT	FCOS		BD		90112E	
LMGCF	V91X8114X	LEFT MAIN GEAR NO WOW COMMFAULT	FCOS		BD		90112E	
LMGNOWOW	V51X0130X	LMG NO WEIGHT-ON-WHEELS	LCA F2		BD		93017G	*
NLGCF1	V91X8116X	NOSEGEAR NO WOW 1 COMMFAULT	FCOS		BD		90112E	
NLGCF2	V91X8117X	NOSEGEAR NO WOW 2 COMMFAULT	FCOS		BD		90112E	
NLGNOWOW1	V51X0330X	NLG NO WEIGHT-ON-WHEELS NO 1	LCA F3		BD		93017G	*
NLGNOWOW2	V51X0335X	NLG NO WEIGHT-ON-WHEELS NO 2	LCA F2		BD		93017G	*
R3NOWOW	V51X0231X	WHEEL 3 NO WEIGHT ON WHEEL	AS BOX A	EVENT	BD		93017G	*
R3NOWOWCF	V91X8169X	WHEEL 3 NO WOW COMMFAULT	FCOS		BD		90112E	
R3NULLFAIL	V51X0233X	WHEEL 3 NOWOW NULL FAILURE	AS BOX A	EVENT	BD		93017G	*
R3NULLFAILCF	V91X8173X	WHEEL 3 NO WOW NULL FAIL COMMFAULT	FCOS		BD		90112E	
R4NOWOW	V51X0232X	WHEEL 4 NO WEIGHT ON WHEEL	AS BOX B	EVENT	BD		93017G	*
R4NOWOWCF	V91X8170X	WHEEL 4 NO WOW COMMFAULT	FCOS		BD		90112E	
R4NULLFAIL	V51X0234X	WHEEL 4 NOWOW NULL FAILURE	AS BOX B	EVENT	BD		93017G	*
R4NULLFAILCF	V91X8174X	WHEEL 4 NO WOW NULL FAIL COMMFAULT	FCOS		BD		90112E	
RMGCF	V91X8115X	RIGHT MAIN GEAR NO WOW COMMFAULT	FCOS		BD		90112E	
RMGNOWOW	V51X0230X	RMG NO WEIGHT-ON-WHEELS	LCA F3		BD		93017G	*
THETA/THETA_TOPO	V90H2217C	BODY PITCH ATTITUDE EULER ANGLE	A/E ATT PROC	DEG	SPL		93017G	*

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

TABLE 4.13.3.2-2. OUTPUT FUNCTIONAL PARAMETERS FROM LANDING GEAR WEIGHT-ON-WHEELS RM (G4.243)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
L1NOWOWFAIL	V96X0244X	WHEEL 1 NOWOW DISCRETE FAIL	DL FMT 23/A	EVENT	BD		93017G	*
L2NOWOWFAIL	V96X0245X	WHEEL 2 NOWOW DISCRETE FAIL	DL FMT 23/A	EVENT	BD		93017G	*
LMGDLMA	V96X0251X	LEFT MAIN GEAR RM DILEMMA	DL FMT 23/A	EVENT	BD		93017G	*
LMGNOWOWFAIL	V96X0243X	LEFT MAIN GEAR NOWOW DISCRETE FAIL	DL FMT 23/A	EVENT	BD		93017G	*
MGBKV	V96X0242X	MAIN GEAR BRAKE ISO VALVE DISCRETE	LANDING SOP		BD		90112E	
R3NOWOWFAILL	V96X0247X	WHEEL 3 NOWOW DISCRETE FAIL	DL FMT 23/A	EVENT	BD		93017G	*
R4NOWOWFAILL	V96X0248X	WHEEL 4 NOWOW DISCRETE FAIL	DL FMT 23/A	EVENT	BD		93017G	*
RMGDLMA	V96X0252X	RIGHT MAIN GEAR RM DILEMMA	DL FMT 23/A	EVENT	BD		93017G	*
RMGNOWOWFAIL	V96X0246X	RT MAIN GEAR NOWOW DISCRETE FAIL	DL FMT 23/A	EVENT	BD		93017G	*
SELLMGNOWOW	V96X0249X	SELECTED LMG NO WEIGHT ON WHEELS	DL FMT 23/A	EVENT	BD		93017G	*
SELRMGNOWOW	V96X0250X	SELECTED RMG NO WEIGHT ON WHEELS	DL FMT 23/A	EVENT	BD		93017G	*
WONG	V96X0241X	WEIGHT ON NOSE GEAR	LANDING SOP		BD		90112E	
WOW	V96X0240X	WEIGHT ON MAIN GEAR	LANDING SOP		BD		90112E	
	V96M0147P	LG WOW PARENT	DL FMT 23/A				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 4.13.3.2-3. LANDING GEAR WEIGHT-ON-WHEELS RM (G4.243) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
EDO_HDW_UP	V97U9645C	ND	D		D	C	G4.243 G4.57	00	ZF9	DC2453	
TD_WOW	V97U9644C	COUNTS	I	S	D	C	G4.243	00	ZF9	DC2453	
T_MG_FAIL	V97U9625C	COUNTS	I	S	D	P	G4.243	00	ZF9	DC2453	

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

TABLE 4.13.3.2-4. LANDING GEAR WEIGHT-ON-WHEELS RM (G4.243) K-LOADS

FSSR NAME DESCRIPTION	MSID	MC	KLOAD VALUE	ENG UNITS	DT	P R	S	PR FCTN	LAST CR	R E V
ATT_WONG THETA FOR WONG INITIATE THRESHOLD	V98U7955C	00	+0.0	E+00 DEG	F	S	C	G4.243 G4.57	90112E	

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

TABLE 4.13.3.2-5. LANDING GEAR WEIGHT-ON-WHEELS RM (G4.243) 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.

4.13.4 Hydraulic System FDIR (PF 4.249)

Each of three hydraulic systems (1, 2, and 3) has a set of three independent sensors, which are identified as A, B, and C. Hydraulic system FDIR shall be performed on each set of sensors as outlined in paragraph 4.0.2 for the three-parameter case (without BITE). Candidate elements for FDIR shall be those currently selected as data candidates for the selection filter.

4.13.4.1 Functional Requirements

The limits for the hydraulic system(s) differencing test are I-loads (see paragraph 4.13.4.3).

4.13.4.2 Processing Requirements

Hydraulic system FDIR shall be processed at the rates listed in Table 4.0-2 during the ascent, entry, and abort phases (OPS 1, 3, and 6).

4.13.4.3 Parameter Tables for HYD SYS FDIR.

The IDD inputs and outputs are listed in Tables 4.13.4.3-1 and 4.13.4.3-2 respectively. Values for the I-loads are contained in the I-load requirements document (JSC-19350); however, I-load definitions applicable to this principle function are listed in Table 4.13.4.3-3. There are no K-load or constants requirements for HYD SYS FDIR.

TABLE 4.13.4.3-1. INPUT FUNCTIONAL PARAMETERS FOR HYDRAULIC SYSTEM FDI (G4.249)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
HSPM(1,1)	V58P0114C	HYDR SYS 1 SUPPLY PRESS A	HYDR SYS 1	VDC	AMU		93017G	*
HSPM(1,2)	V58P0115C	HYDR SYS 1 SUPPLY PRESS B	HYDR SYS 1	VDC	AMU			
HSPM(1,3)	V58P0116C	HYDR SYS 1 SUPPLY PRESS C	HYDR SYS 1	VDC	AMU		93017G	*
HSPM(2,1)	V58P0214C	HYDR SYS 2 SUPPLY PRESS A	HYDR SYS 2	VDC	AMU		93017G	*
HSPM(2,2)	V58P0215C	HYDR SYS 2 SUPPLY PRESS B	HYDR SYS 2	VDC	AMU			
HSPM(2,3)	V58P0216C	HYDR SYS 2 SUPPLY PRESS C	HYDR SYS 2	VDC	AMU		93017G	*
HSPM(3,1)	V58P0314C	HYDR SYS 3 SUPPLY PRESS A	HYDR SYS 3	VDC	AMU		93017G	*
HSPM(3,2)	V58P0315C	HYDR SYS 3 SUPPLY PRESS B	HYDR SYS 3	VDC	AMU			
HSPM(3,3)	V58P0316C	HYDR SYS 3 SUPPLY PRESS C	HYDR SYS 3	VDC	AMU		93017G	*
	V91X8029X	HYD SYS 1 PRESS A COMMFAULT	FCOS					
	V91X8030X	HYD SYS 1 PRESS B COMMFAULT	FCOS					
	V91X8031X	HYD SYS 1 PRESS C COMMFAULT	FCOS					
	V91X8032X	HYD SYS 2 PRESS A COMMFAULT	FCOS					
	V91X8033X	HYD SYS 2 PRESS B COMMFAULT	FCOS					
	V91X8034X	HYD SYS 2 PRESS C COMMFAULT	FCOS					
	V91X8035X	HYD SYS 3 PRESS A COMMFAULT	FCOS					
	V91X8036X	HYD SYS 3 PRESS B COMMFAULT	FCOS					
	V91X8037X	HYD SYS 3 PRESS C COMMFAULT	FCOS					

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

TABLE 4.13.4.3-2. OUTPUT FUNCTIONAL PARAMETERS FROM HYDRAULIC SYSTEM FDI (G4.249)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90X6350X	HYD SYS 1 DISAGREE	GAX		OVERVERRIDE DISP		92354	
	V90X6351X	HYD SYS 2 DISAGREE	GAX		OVERVERRIDE DISP		92354	
	V90X6352X	HYD SYS 3 DISAGREE	GAX		OVERVERRIDE DISP		92354	
	V90X6354X	HYD SYS 1 SF COMMAND	SF					
	V90X6355X	HYD SYS 2 SF COMMAND	SF					
	V90X6356X	HYD SYS 3 SF COMMAND	SF					

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 4.13.4.3-3. HYDRAULIC SYSTEM FDI (G4.249) I-LOADS

FSSR NAME	MSID	ENG UNITS	DT	PR	D	S	PR FCTN	MC	CAT	LAST CR	R E V
HSP_CNT	V98U7965C	ND	I	S	D	P	G4.249	00	ZFL	DC0691	
SF_DG_LIMIT	V97U4202C	VDC	F	S	D	P	G4.249	00	ZFL	DC0691	

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

TABLE 4.13.4.3-4. HYDRAULIC SYSTEM FDI (G4.249) 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 4.13.4.3-5. HYDRAULIC SYSTEM FDI (G4.249) 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.

4.14 ORBITER RGA SMRD RM (PF4.257)

The purpose of the Orbiter RGA SMRD RM principal function shall be to monitor the Orbiter Spin Motor Rotation Detector (SMRD) Discretes to determine the power fail status of the associated RGAs.

4.14.1 Orbiter RGA SMRD RM Functional Requirements

The Orbiter RGA SMRD RM processing shall utilize the Pitch, Roll and Yaw SMRD discretes from each orbiter RGA. Selection Filtering (SF) and Fault Detection, Identification, and Reconfiguration (FDIR) shall be performed on each set of discretes. The orbiter RGA SMRD groupings that will make up redundant sets for RM processing purposes are identified in Table 4.14.1-1. The orbiter RGA SMRD RM functional block diagram is provided in Figure 4.14-1. A SMRD discrete of 0 indicates a fail condition.

Table 4.14.1-1. Orbiter RGA SMRD Groupings for Power Fail Determination	
Orbiter RGA 1	ORB RGA 1 Roll SMRD ORB RGA 1 Pitch SMRD ORB RGA 1 Yaw SMRD
Orbiter RGA 2	ORB RGA 2 Roll SMRD ORB RGA 2 Pitch SMRD ORB RGA 2 Yaw SMRD
Orbiter RGA 3	ORB RGA 3 Roll SMRD ORB RGA 3 Pitch SMRD ORB RGA 3 Yaw SMRD
Orbiter RGA 4	ORB RGA 4 Roll SMRD ORB RGA 4 Pitch SMRD ORB RGA 4 Yaw SMRD

4.14.1.1 Orbiter RGA SMRD FDIR

FDIR shall be performed on each group of orbiter RGA SMRD discretes as identified in table 4.14.1-1 for the orbiter RGAs. Each group of SMRD discretes shall be treated separately by FDIR. RGA SMRD FDIR for a given RGA shall only be performed when three discretes are available. An orbiter RGA SMRD discrete is available if its associated communication fault does not exist and it has not been previously failed by FDIR.

FDIR shall perform a two out of three voting test to isolate a failure. An orbiter RGA SMRD shall be declared failed if it disagrees with the other two discrete inputs for ten (10) consecutive FDIR cycles and its associated fail flag shall be set and latched and FDIR will be terminated for the associated set of SMRD discretes. Failure counters shall be reset by good comparisons. FDIR shall not increment or reset failure counters if an associated discrete is commfaulted.

4.14.1.2 Orbiter RGA SMRD Selection Filtering

SF shall be performed on each group of orbiter RGA SMRD discretes as identified in Table 4.14.1-1 for available orbiter RGAs. An orbiter RGA is available if its associated deselect command/ fail flag is not

set. The orbiter RGA SMRD SF will be terminated if less than two orbiter RGAs are available. Each group of SMRD discrettes shall be treated separately by SF. The SF mode for a given set of discrettes shall be determined by the availability of discrettes. An orbiter RGA SMRD discrete is available if its associated communication fault does not exist and it has not been previously failed by FDIR. The SF processing requirements for the orbiter RGA SMRD discrettes shall be:

1. If three SMRD discrettes are available, the selected SMRD output shall be the majority vote of the three input values.
2. If two SMRD discrettes are available, the selected SMRD output shall be the logical “OR” of the two input values.
3. If one SMRD discrete is available, the selected SMRD output shall be set to the remaining input value.
4. If no SMRD discrettes are available, the selected SMRD output shall be set to its last updated value as determined from valid inputs.

4.14.1.3 Orbiter RGA Failure Determination

The following failure determination processing shall be performed on each selected SMRD output from the orbiter SMRD selection filter:

If a Selected SMRD output is zero, set and latch the associated RGA Power Fail and DES CMD/FAIL Flags to the failed state and update the selection filter command. Otherwise, set both associated RGA Fail Flags to the non–failed state.

4.14.2 Processing Requirements

The Orbiter RGA SMRD RM shall be executed at the 25 Hz rate during Major Modes 101, 102, 103, (until Main Engine Zero Thrust), 304, 305, and 601 through 603; and at 12.5 Hz rate after main engine zero thrust through Major Mode 106, and Major Modes 301 through 303. This function shall be processed prior to the Selection Filter principal function.

4.14.3 Initialization Requirements

In OPS 1, all orbiter RGA SMRD fail flags and RGA fail flags will be initialized to the non–failed state. Upon transition into a different OPS, orbiter RGA SMRD fail flags, RGA fail flags, and fail counters will be initialized to the state last established in the previous OPS. The RGA fail flags will not be automatically reinitialized to the non-failed state if an OPS-1-9-1 transition sequence is performed.

4.14.4 Parameter Tables for ORB RGA SMRD RM

The IDD inputs and outputs are listed in Tables 4.14.4–1 and 4.14.4–2 respectively. There are no I–load, K–load or constants requirements for ORB RGA SMRD RM.

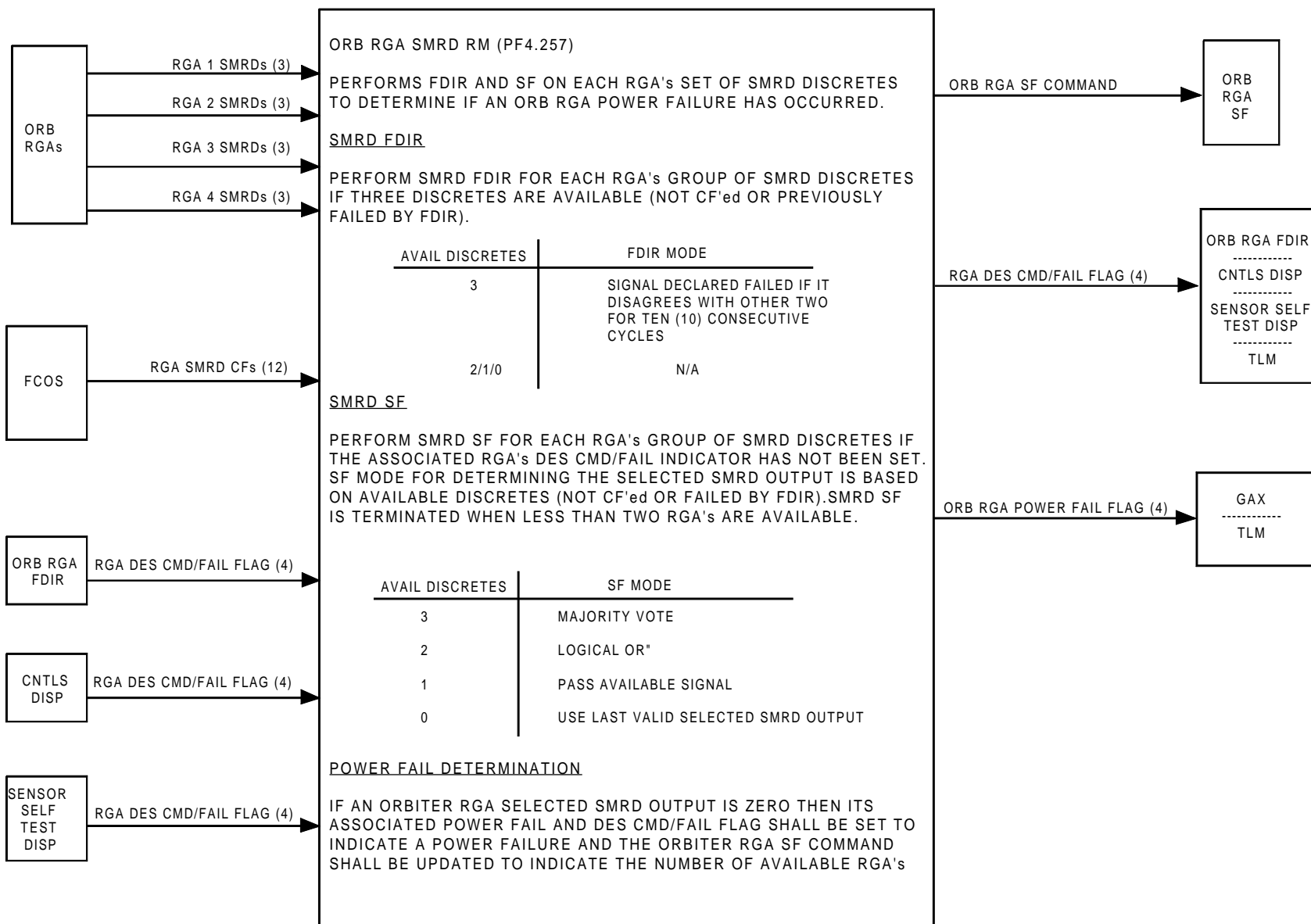


FIGURE 4.14-1. Orbiter RGA SMRD RM Functional Block Diagram

TABLE 4.14.4-1. INPUT FUNCTIONAL PARAMETERS FOR ORBITER RATE GYRO SPIN MOTOR ROTATION DETECTOR RM
(G4.257)

FSSR NAME	M/S ID	NOMENCLATURE	SOURCE	UNITS	DATA TYPE	P R E C	LAST CR	R E V
SMP (1)	V79X1860X	RGA 1 ROLL SMRD IND	RGAO 1		BD		93017G	*
SMP (2)	V79X1865X	RGA 2 ROLL SMRD IND	RGAO 2		BD		93017G	*
SMP (3)	V79X1870X	RGA 3 ROLL SMRD IND	RGAO 3		BD		93017G	*
SMP (4)	V79X1875X	RGA 4 ROLL SMRD IND	RGAO 4		BD		93017G	*
SMQ (1)	V79X1861X	RGA 1 PITCH SMRD IND	RGAO 1		BD		93017G	*
SMQ (2)	V79X1866X	RGA 2 PITCH SMRD IND	RGAO 2		BD		93017G	*
SMQ (3)	V79X1871X	RGA 3 PITCH SMRD IND	RGAO 3		BD		93017G	*
SMQ (4)	V79X1876X	RGA 4 PITCH SMRD IND	RGAO 4		BD		93017G	*
SMR (1)	V79X1862X	RGA 1 YAW SMRD IND	RGAO 1		BD		93017G	*
SMR (2)	V79X1867X	RGA 2 YAW SMRD IND	RGAO 2		BD		93017G	*
SMR (3)	V79X1872X	RGA 3 YAW SMRD IND	RGAO 3		BD		93017G	*
SMR (4)	V79X1877X	RGA 4 YAW SMRD IND	RGAO 4		BD		93017G	*
	V91X2699X	ORB RG 1 P SMRD IND COMMFAULT	FCOS				90477E	
	V91X2702X	ORB RG 2 P SMRD IND COMMFAULT	FCOS				90477E	
	V91X2703X	ORB RG 3 P SMRD IND COMMFAULT	FCOS				90477E	
	V91X2704X	ORB RG 4 P SMRD IND COMMFAULT	FCOS				90477E	
	V91X2705X	ORB RG 1 R SMRD IND COMMFAULT	FCOS				90477E	
	V91X2706X	ORB RG 2 R SMRD IND COMMFAULT	FCOS				90477E	
	V91X2707X	ORB RG 3 R SMRD IND COMMFAULT	FCOS				90477E	
	V91X2708X	ORB RG 4 R SMRD IND COMMFAULT	FCOS				90477E	
	V91X2709X	ORB RG 1 Y SMRD IND COMMFAULT	FCOS				90477E	
	V91X2710X	ORB RG 2 Y SMRD IND COMMFAULT	FCOS				90477E	
	V91X2711X	ORB RG 3 Y SMRD IND COMMFAULT	FCOS				90477E	
	V91X2712X	ORB RG 4 Y SMRD IND COMMFAULT	FCOS				90477E	
	V93X4516XA	RGA 1 DES CMD/FAIL	CNTLS DISP	EVENT	BD		93017G	*
	V93X4516XB	RGA 1 DES CMD/FAIL	SENSOR SELF TEST DISP	EVENT	BD		93017G	*
	V93X4516XC	RGA 1 DES CMD/FAIL	ORB RG FDIR	EVENT	BD		93017G	*
	V93X4518XA	RGA 2 DES CMD/FAIL	CNTLS DISP	EVENT	BD		93017G	*
	V93X4518XB	RGA 2 DES CMD/FAIL	SENSOR SELF TEST DISP	EVENT	BD		93017G	*
	V93X4518XC	RGA 2 DES CMD/FAIL	ORB RG FDIR	EVENT	BD		93017G	*
	V93X4520XA	RGA 3 DES CMD/FAIL	CNTLS DISP	EVENT	BD		93017G	*
	V93X4520XB	RGA 3 DES CMD/FAIL	SENSOR SELF TEST DISP	EVENT	BD		93017G	*
	V93X4520XC	RGA 3 DES CMD/FAIL	ORB RG FDIR	EVENT	BD		93017G	*
	V93X4522XA	RGA 4 DES CMD/FAIL	CNTLS DISP	EVENT	BD		93017G	*
	V93X4522XB	RGA 4 DES CMD/FAIL	SENSOR SELF TEST DISP	EVENT	BD		93017G	*
	V93X4522XC	RGA 4 DES CMD/FAIL	ORB RG FDIR	EVENT	BD		93017G	*

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

TABLE 4.14.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM ORBITER RATE GYRO SPIN MOTOR ROTATION DETECTOR RM
(G4.257)

FSSR NAME	M/S ID	NOMENCLATURE	DESTINATION	UNITS	DATA TYPE	P R E C	LAST CR	R E V
	V90M2892PD	CGRB_STATUS_2§(21:)	DL FMT 21/1 DL FMT 23/1 DL FMT 32/A				93017G	*
	V90U5660CB	ORB RGA SF COMMAND	SF				90477E	
	V90X5406X	ORB RGA 1 POWER FAIL	DL FMT 21/1 DL FMT 23/1 GAX	EVENT	BD		93017G	*
	V90X5407X	ORB RGA 2 POWER FAIL	DL FMT 21/1 DL FMT 23/1 GAX	EVENT	BD		93017G	*
	V90X5408X	ORB RGA 3 POWER FAIL	DL FMT 21/1 DL FMT 23/1 GAX	EVENT	BD		93017G	*
	V90X5409X	ORB RGA 4 POWER FAIL	DL FMT 21/1 DL FMT 23/1 GAX	EVENT	BD		93017G	*
	V93X4516XD	RGA 1 DES CMD/FAIL	CNTLS DISP DL FMT 21/1 DL FMT 23/1 DL FMT 32/A ORB RG FDIR	EVENT	BD		93017G	*
	V93X4518XD	RGA 2 DES CMD/FAIL	CNTLS DISP DL FMT 21/1 DL FMT 23/1 DL FMT 32/A ORB RG FDIR	EVENT	BD		93017G	*
	V93X4520XD	RGA 3 DES CMD/FAIL	CNTLS DISP DL FMT 21/1 DL FMT 23/1 DL FMT 32/A ORB RG FDIR	EVENT	BD		93017G	*
	V93X4522XD	RGA 4 DES CMD/FAIL	CNTLS DISP DL FMT 21/1 DL FMT 23/1 DL FMT 32/A ORB RG FDIR	EVENT	BD		93017G	*

TABLE 4.14.4-2. OUTPUT FUNCTIONAL PARAMETERS FROM ORBITER RATE GYRO SPIN MOTOR ROTATION DETECTOR RM
(G4.257)

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 4.14.4-3. ORBITER RATE GYRO SPIN MOTOR ROTATION DETECTOR RM (G4.257) 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 4.14.4-4. ORBITER RATE GYRO SPIN MOTOR ROTATION DETECTOR RM (G4.257) 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 4.14.4-5. ORBITER RATE GYRO SPIN MOTOR ROTATION DETECTOR RM (G4.257) 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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APPENDIX R CHANGE AUTHORIZATION REFERENCES

R.1 CR REFERENCE SUMMARY

Table R.1-1. lists the paragraphs, tables (T), and figures (F) that have been changed as a result of approved change requests commencing with OI-26 up to the current OI. Changes incorporated prior to OI-26 are listed in the Historical Change Request Summary.

Table R.1-1. CR Reference Summary			
Paragraph	CR No.	OI	CR Title
N/A	92307	29	FSSR Format Change - Documentation Only
N/A	92955A	32	Expand Effectivity of PASS-only RTF SCRs to Include OI-32
N/A	92973	32	Reassign Effectivity of SCRs 92542D & 92743D to OI-32
N/A	92978	32	Reassign Effectivity of SCR 92815 to OI-32
N/A	92986	32	Reassign Effectivity of SCRs 92839B & 92919A to OI-32
N/A	93051	32	Reassign Effectivity of SCR 92847C to Include OI-32
1.3-1.(T)	92103A	26B	FSSR Parameter Table Upgrade
4.0-1.(T)	93087E	33	RTLS ET Separation Improvements
4.0.2	91050C	28	Improved Fault Tolerance to Executing Beep Trim Derotation
	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements
	92919A	32	Correction to Restore THC FDIR Processing Rate
4.1-1.(T)	93087E	33	RTLS ET Separation Improvements
4.1-2.(T)	91051K	26B	Streamlined Shuttle GPS Capability
	92354	27	Delete Erroneous TLM Destinations
	92919A	32	Correction to Restore THC FDIR Processing Rate
4.1.4-1.(T)	92297B	27	Delete Erroneous TLM Destinations for NAV
	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements
4.1.4-2.(T)	91051K	26B	Streamlined Shuttle GPS Capability
	93023D	32	OI-32 Remote Control Orbiter Capability
	93090E	33	Bearing Displays
4.2-1.(T)	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements
4.2-1.(F)	91051K	26B	Streamlined Shuttle GPS Capability
	92069B	26B	Single-String GPS Documentation Cleanup
	92067D	27	Three String GPS Capability

Table R.1-1. CR Reference Summary			
Paragraph	CR No.	OI	CR Title
4.2-5.(F)	92369B	29	PASS GPS Operational Enhancements
	91051K	26B	Streamlined Shuttle GPS Capability
	92067D	27	Three String GPS Capability
4.2.1.2.1	92369B	29	PASS GPS Operational Enhancements
	91051K	26B	Streamlined Shuttle GPS Capability
	92067D	27	Three String GPS Capability
4.2.5-1.(T)	92369B	28	PASS GPS Operational Enhancements
	92067D	27	Three String GPS Capability
	92354	27	Delete Erroneous TLM Destinations
	90704F	28	DAP Hot-Stick Downmode Alert and Message
	90724D	28	OPS 6 Entry ECAL Automation
	90914C	28	Delay MOV MPS Dump/FRCs Dump @ MM602
	90662F	29	Automatic Reanchoring of an Upmoded IMU
	92355B	29	GPC Major Mode to MEDS
	92369B	29	PASS GPS Operational Enhancements
	92392C	29	Doc-Only Corrections for OI-29 CRs 92329E, 92364D, and 92369B
	92404B	29	Preserve MECO Vi, Altitude, & Altitude Rate in MM104
	92504G	30	Alleviate ET Recontact for RTLS 2EO Yellow and Orange Regions
	92565A	30	SE RTLS Increased Pitch Authority Using Forward RCS Jets
	93012D	32	PASS 6X TRAJ Display Enhancement
4.2.5-2.(T)	93023D	32	OI-32 Remote Control Orbiter Capability
	93064D	32	Errata Issue Clean-Up Part II
	91051K	26B	Streamlined Shuttle GPS Capability
	92067D	27	Three String GPS Capability
	92144C	27	Three-String GPS Documentation Cleanup
	90662F	29	Automatic Reanchoring of an Upmoded IMU
	92369B	29	PASS GPS Operational Enhancements
	92392C	29	Doc-Only Corrections for OI-29 CRs 92329E, 92364D, and 92369B
4.2.5-5.(T)	92389C	29	Spiral HAC in TAEM Area Navigation
	92332D	30	Add Theta Limits Bracket to MEDS ADI Displays
	93090E	33	Bearing Displays
4.3.2.6	92332D	30	Add Theta Limits Bracket to MEDS ADI Displays
4.3.5-1.(T)	90704F	28	DAP Hot-Stick Downmode Alert and Message

Table R.1-1. CR Reference Summary			
Paragraph	CR No.	OI	CR Title
	92389C	29	Spiral HAC in TAEM Area Navigation
	92332D	30	Add Theta Limits Bracket to MEDS ADI Displays
	93090E	33	Bearing Displays
4.3.5-2.(T)	92332D	30	Add Theta Limits Bracket to MEDS ADI Displays
4.4.1.3-1.(T)	93023D	32	OI-32 Remote Control Orbiter Capability
	93090E	33	Bearing Displays
4.4.1.3-2.(T)	92354	27	Delete Erroneous TLM Destinations
4.4.2.3-2.(T)	92354	27	Delete Erroneous TLM Destinations
4.5-1.(F)	92779A	30	Specify Separate Annunciations for TACAN Bearing and Range Fail
4.5-2.(F)	92067D	27	Three String GPS Capability
4.5-2.(3)(F)	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements
4.5-2.(8)(F)	92779A	30	Specify Separate Annunciations for TACAN Bearing and Range Fail
4.5-4.(1)(F)	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements
4.5-4.(2)(F)	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements
4.5-4.(3)(F)	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements
4.5-4.(4)(F)	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements
4.5-6.(1)(F)	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements
4.5-6.(2)(F)	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements
4.5-6.(3)(F)	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements
4.5-6.(4)F	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements
4.5.1.1	92067D	27	Three String GPS Capability
	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements
4.5.1.3	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements
4.5.1.3.1	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements

Table R.1-1. CR Reference Summary			
Paragraph	CR No.	OI	CR Title
4.5.1.3.2	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements
4.5.1.5	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements
4.5.1.5.1	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements
4.5.1.5.2	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements
4.5.3	92067D	27	Three String GPS Capability
4.5.4-1.(T)	92067D	27	Three String GPS Capability
	92389C	29	Spiral HAC in TAEM Area Navigation
	92450C	29	Documentation Clean-up for CR 92389
	93023D	32	OI-32 Remote Control Orbiter Capability
	93090E	33	Bearing Displays
4.5.4-2.(T)	92025B	26B	On-orbit TACAN Deletion
	92779A	30	Specify Separate Annunciations for TACAN Bearing and Range Fail
4.6.3-1.(T)	92297B	27	Delete Erroneous TLM Destinations for NAV
4.7.3.2	93087E	33	RTLS ET Separation Improvements
4.9-1.(F)	92871C	30/32	RCS Manifold Auto-Close for Failed-On Jet
	92887A	30/32	RCS Auto Manifold Close Enable/Disable via SPEC 23
4.9-6.(T)	92871C	30/32	RCS Manifold Auto-Close for Failed-On Jet
	92815	32	Jet Availability Discrete Disagreement
4.9-7.(T)	92871C	30/32	RCS Manifold Auto-Close for Failed-On Jet
4.9.1.1.1	92815	32	Jet Availability Discrete Disagreement
4.9.1.1.4	92340A	28	GAX Annunciation Correction for CR 92260B
4.9.1.3.2	92871C	30/32	RCS Manifold Auto-Close for Failed-On Jet
	92887A	30/32	RCS Auto Manifold Close Enable/Disable via SPEC 23
	92871C	30/32	RCS Manifold Auto-Close for Failed-On Jet
4.9.1.3.3	92887A	30/32	RCS Auto Manifold Close Enable/Disable via SPEC 23
	92899A	30/32	Correction CR to CRs 92871C and 92887A
	92922B	30/32	RCS Manifold Isolation Valve Close Command Timing Correction
4.9.1.3.4	92871C	30/32	RCS Manifold Auto-Close for Failed-On Jet
	92887A	30/32	RCS Auto Manifold Close Enable/Disable via SPEC 23
4.9.1.4.3	92320D	29	Software Changes for forward RCS Interconnect System (FICS)

Table R.1-1. CR Reference Summary

Paragraph	CR No.	OI	CR Title
4.9.3	92509C	29	Correction CR for Forward RCS Interconnect System (FICS)
	92871C	30/32	RCS Manifold Auto-Close for Failed-On Jet
	92887A	30/32	RCS Auto Manifold Close Enable/Disable via SPEC 23
4.9.4	92899A	30/32	Correction CR to CRs 92871C and 92887A
	92871C	30/32	RCS Manifold Auto-Close for Failed-On Jet
	92316B	29	Automating 2 nd MPS Vacuum Inert
4.9.4-1.(T)	92320D	29	Software Changes for Forward RCS Interconnect System (FICS)
	92871C	30/32	RCS Manifold Auto-Close for Failed-On Jet
	92887A	30/32	RCS Auto Manifold Close Enable/Disable via SPEC 23
4.9.4-2.(T)	92306A	28	Orbiter Window Protection
	92340A	28	GAX Annunciation Correction for CR 92260B
	92504G	30	Alleviate ET Recontact for RTLS 2EO Yellow and Orange Regions
	92565A	30	SE RTLS Increased Pitch Authority Using Forward RCS Jets
	92871C	30/32	RCS Manifold Auto-Close for Failed-On Jet
4.9.4-3.(T)	92887A	30/32	RCS Auto Manifold Close Enable/Disable via SPEC 23
	92320D	29	Software Changes for Forward RCS Interconnect System (FICS)
	92509C	29	Correction CR for Forward RCS Interconnect System (FICS)
4.9.4-4.(T)	92871C	30/32	RCS Manifold Auto-Close for Failed-On Jet
	92887A	30/32	RCS Auto Manifold Close Enable/Disable via SPEC 23
4.10.4-1.(T)	92354	27	Delete Erroneous TLM Destinations
	90724D	28	OPS 6 Entry ECAL Automation
	90914C	28	Delay MOV MPS Dump/FRCS Dump at MM 602
	92306A	28	Orbiter Window Protection
	92355B	29	GPS Major Mode to MEDS
	92404B	29	Preserve MECO Vi, Altitude, & Altitude Rate in MM104
	92950	32	G/C Steer Roll Bias Ramp at PPD or MECO
	93012D	32	PASS 6X TRAJ Display Enhancement
	93087E	33	RTLS ET Separation Improvements
	93090E	33	Bearing Displays
4.11-1.(F)	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements

Table R.1-1. CR Reference Summary			
Paragraph	CR No.	OI	CR Title
4.11.1.2	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements
4.11.4-1.(T)	93064D	32	Errata Issue Clean-Up Part II
4.11.4-2.(T)	92354	27	Delete Erroneous TLM Destinations
4.12-1.(T)	92839B	32	THC Command Response Improvement
	92919A	32	Correction to Restore THC FDIR Processing Rate
4.12-4.(T)	92225A	29	ET SEP Switch Default to Auto on a TAL Abort
	92578B	29	Correction for ET SEP Switch Default
4.12.1-1.(T)	91050C	28	Improved Fault Tolerance to Executing Beep Trim Derotation
4.12.1-2.(T)	91050C	28	Improved Fault Tolerance to Executing Beep Trim Derotation
4.12.1.4	91050C	28	Improved Fault Tolerance to Executing Beep Trim Derotation
	92225A	29	ET SEP Switch Default to Auto on a TAL Abort
	92578B	29	Correction for ET SEP Switch Default
	92839B	32	THC Command Response Improvement
	92919A	32	Correction to Restore THC FDIR Processing Rate
4.12.3	92839B	32	THC Command Response Improvement
	92919A	32	Correction to Restore THC FDIR Processing Rate
4.12.5	91050C	28	Improved Fault Tolerance to Executing Beep Trim Derotation
4.12.5-1.(T)	91050C	28	Improved Fault Tolerance to Executing Beep Trim Derotation
	92225A	29	ET SEP Switch Default to Auto on a TAL Abort
	92355B	29	GPC Major Mode to MEDS
	92578B	29	Correction for ET SEP Switch Default
	92522D	30	Overhaul MEDS Composite Flight Instrument Display
	92542D	32	Deletion of LO2 Step Pressurization CMDS
	93064D	32	Errata Issue Clean-Up Part II
	93090E	33	Bearing Displays
	93100C	33	OI-33 Remote Control Orbiter Capability Enhancement
4.12.5-2.(T)	92354	27	Delete Erroneous TLM Destinations
	92157	28	IDD Clarification to Remove Blanks from FSSR Names
	92317B	29	Monitoring of MPS Backup LH2 Valve Switch Closed
	92476A	29	Documentation Updates to Close SBTC SOP DRs
	92522D	30	Overhaul MEDS Composite Flight Instrument Display

Table R.1-1. CR Reference Summary			
Paragraph	CR No.	OI	CR Title
4.12.5-3.(T)	93007B	32	OPS-2 ADI Rate Switch Scaling Change for OI32
	93012D	32	PASS 6X TRAJ Display Enhancement
	91050C	28	Improved Fault Tolerance to Executing Beep Trim Derotation
4.13.2.3-1.(T)	92847C	32	Documentation Update to Redundancy Management (RM) Detailed Requirements
4.13.3.2-1.(T)	91051K	26B	Streamlined Shuttle GPS Capability
	92332D	30	Add Theta Limits Bracket to MEDS ADI Displays
4.13.4.3-2.(T)	92354	27	Delete Erroneous TLM Destinations

R.2 HISTORICAL CHANGE REQUEST SUMMARY

Table R.2-1. is an historical record of approved change requests incorporated since the initial baseline up to OI-25. Change requests commencing with OI-26 are reformatted and listed in the CR Reference Summary.

Table R.2-1. Historical Change Request Summary		
CR No.	OI	CR Title
2265B		Add IMU Align
2313A		SRB Mon FCN, Sel Filt, Sep Sequence
2340D		Rev to Proc and Disp
2386A		RM Cont/SWFB
2395		RCS Fault Limit
2409		IMU Gimbal Flip
2449D		OFT Contingency Abort Requirement
2464A		MML Number in the RM FSSR
2511A		OMS FDI Engine Fail
2602A		Radar ALT SOP Changes
12011		ORB RGA AA RDIR Rate
12071A		Maneuver Execute
12104		Three Axis RHC SOP Valid During Ascent
12109		On Orbit 1 I/O Update
12112		GAX Annunciation Rewrite
12148		MSBLS SOP Changes
12191		Delete Rotational Acceleration on NAV Base

Table R.2-1. Historical Change Request Summary		
CR No.	OI	CR Title
12197A		Orbit Sensor Self Test
12209A		IMU RM
12210A		Several RM Changes
12215B		ST SOP Rate Test
12218C		Aero Actuator Command
12256A		Aero-Jet DAP Recon
12266A		TACAN SOP and RM
12269		MSID Corrections to IDD
12276		OMS TVC Redundancy
12313C		Addition of TLM Requirements
12316		GNC Switch RM Processing Rate
12328A		Event Light Mod
12332		ADI Scale Changes
12336		I-Load OFT-1 Baseline
12337		I-Load OFT-1 Baseline
12339		I-Load OFT-1 Baseline
12355A		RCS Activity Lights (Roll, Pitch)
12356A		Add of Three-Axis Pulse Mode to Trans DAP
12358B		Manual Throttling Additions
12369D		RCS RM
12390A		RM Sensor Select
12401		Jet Select Logic
12404A		Proposed FCS 9 and Changes to Ascent
12411B		OMS Engine FDI Simplification
12415A		Default RM
12416A		ADTA SOP and RM
12431		GNC OPS 8 Interface Rqmts
12435B		Body Flap Position Feedback
12436B		SRB Rate Gyro RM
12442A		Integrated Ent Nav, Asc Nav & Orb Nav
12443		I-Load for Entry FACI
12467A		TACAN RM
12474C		Reduce IMU Velocity Processing Rate
12478		Update to Vehicle Mass
12488B		RHC Processing at 25 Hz
12490B		Attitude Sample Rate Reduction
12499E		Manual Landing SOP

Table R.2-1. Historical Change Request Summary		
CR No.	OI	CR Title
12531		I/O Table Corrections to VU Displays
12533A		RM Orbit Display U/D
12570A		Rate Command/Attitude Hold Mode Ascent
12586		Integrated Signal Interfaces for 6.35, 6.46 & MNVR DISPS
12600C		Integrated MSID Assignment for Uplink
12606A		IMU RM Mode Team
12613		Initialization of RM
12614		DEU Software Changes
12625C		OMS GMCL Actuator
12626		Guidecomp Processing of Radar Altitude
12636B		FO/FS Hydraulic SOP
12641		Modify ADT Checkout of the Body Flap Pilot Valves
12642		Reinstate Three-Axis RHC SOP Validation
12655A		RM FSSR Corrections
12656A		ADTA RM Threshold
12657		Horiz Sit Display Changes
12659B		RM Switches and Switches Display Changes
12664		S/W Mods to Support MCR 4957 (ET Sep & SRB Sep)
12678B		ADI Attitude Freeze Change
12696		UPP Drag Accel Protection
12699A		Add of Fast Sep Mode to ET Sep Seq
12718C		GNC SW RM Mods
12745		Deletion of OMS/OMS Interconnect S/W
12766		OMS Eng FDI
12770A		BF Command RM
12787		ET Ullage Pressure SF Rqmts
12804		IMU Vel Rectification Rate Change
12836		RCS/RCS X FEED
12868A		I-Load Change, Mod Team Actions
12886A		Body Flap Auto/Manual Switch
12896A		ET Sep Seq Cleanup
12910A		PCMMU Toggle Buffer Management
12912A		Sys S/W I-Load Deletions/Additions
12914A		Parallel SRB and ET Sep
12920B		GRTLS DAP Lashup
12933A		Enable/Inhibit Capability for Panel Trim Switches
12937		Elevon Trim Schedule for OFT

Table R.2-1. Historical Change Request Summary		
CR No.	OI	CR Title
12951B		Univ Pointing Spec Function I-Load Changes
12966		RHC Processing at 25 Hz
12981D		On-Orbit Flight Control
12987A		Entry Roll Mode Control S/W Proc Mods
12988		Relative Motion Documentation Update
12993		I-Loads – RI Version OFT1 FACI
12994		I-Loads for OFT1 FACI
19014A		On Orbit S/W Requirements
19017A		Nav OFT-1 Downlist
19022		Mods to MPAD I-Load Paper Baseline
19044A		Clarification of PL/SM
19052		IMU RM N-Counter
19054		Mods to I-Load Baseline of 9/21/78
19059		TACAN SOP and RM
19068A		Main Engine Shutdown Switch RM
19072A		Comm Fault addition to OMS TVC FB SOP
19085A		Add Comm Fault Logic to HYD Sop
19100		FSSR Update
19123		TACAN RM Self Test
19140		RHC Trip Level I-Load Change
19141		Add RHC SF in 101 and 102
19163A		R/S Launch Seq Cleanup
19172A		IMU RM Parameter on Entry TLM
19214		Attitude FDI Single Precision Fix
19219		TACAN RM Typos
19222		ET Sep Switch Default & ET Umb Door Close
19223B		Orb Rate Gyro Accel fdbk & FDIR
19227B		Add FC Trim Data to Entry, Traj 1-5 and Vert Sit 1-2
19231A		ADTA RM: Trip Lvl as Function of Estimated Beta (Ref: 12416A)
19237		Flt Accel Safety Cutoff System (FASCOS)
19249		Rev to CR 19052 (IMU RM N-Counter)
19266		Hyd Therm Cond Aerosurface Positioning
19270		RCS RM-Del of Automatic Downmoding of ON Failures
19300		FSSR Update 2
19339A		Remove SRB Mon FNC
19357B		IMU RM I-Load
19360A		Orb Rate Gyro Accelerometer

Table R.2-1. Historical Change Request Summary		
CR No.	OI	CR Title
19361A		Rewrite On-Orb Nav FSSR
19372A		OMS RM I-Load Update
19384		Update FCS FDIR I-Loads
19387		TACAN I-Load Change
19393		IMU RM Threshold Change
19400		Orb RGA Roll FDIR I-Load Correction
19403A		TACAN LRU Selection Logic
19409A		COAS Mark/ADI PB Signal I/F
19432		Doc Corrections to I-Load Data Base
19484A		I/L Data Tape Corrections From Community Review
19488A		IMU and ASC UPP Rate Change
19500		FSSR Update 3
19504		Three-Axis RHC Scheduling in Ascent and RTL
19530		Rev of Hydraulic Thermal Cond Aerosurface
19535		AA QMVS Constant Correction
19560A		I-Load Updates as a Result of IBM Testing
19630A		Orbit DAP Config Disp Inertia Item Entry Limits Update
19634		Selection Filter Rate Requirements Spec
19654		RGA, AA N Counter and Trip Level Changes
19662		MSID Number Correct IMU Bite Failure Flag
19671A		Body Flap PFB QMVS Selection Filter
19676		THC Power-Up Transient Fix
19693		Elimination of Three-Axis RHC From MM101
19712		Corrections to I-Load Data Tape for CPDS
19716		Extend RPTA FDIR
19721		Inconsistent RGA/AA FDIR Rate Requirements
19742		OMS Actuator FDI I-Load Changes
19749		Switch RM Required in OPS-8
19810B		STS-2 Nav Downlist Delta
19812		Additional I-Load Parameter Deletion Resulting per CR 19231A
19900		FSSR Update 5
19934C		Resched Hyd Sys SOP and FDI
19991A		IMU Fault Isolation Using RGM Rate
29002B		Add Pull out NZ CMD to Cont Abort Display
29046B		FCS Switch Nomenclature CHG (MCR 5949)
29065A		Estab MSIDs for QMVS I-Loads
29084		RCS RM Power Fail Manifold Status

Table R.2-1. Historical Change Request Summary		
CR No.	OI	CR Title
29105		IMU RM I-Loads
29149B		Add Program Interrupt Handling to Level A CPDS
29162A		I-Load Changes
29184		RCS RM Dilemma Counter Reset
29223A		OMS Actr RM Fail Counter
29229		OMS RM Constants Requirements
29278		Body Flap CMD I-Load Change
29350A		BF CMD RM Termination in MM105
29407C		Mnvr Exec Disp
29444C		Entry Controls Display
29471B		HFE Overrun Definition
29490C		RCS Vernier Leak Detection
29506		Hyd Thermal Cond SOP Correction
29539A		BF Feedback SF/GRTLS DAP Sequence Discrepancy
29578		Two-Level IMU Velocity SF First Pass
29585		BF CMD RM Improvement
29586		Change BF CMD RM Initialization
29617A		Scrub CR 19172A – IMU Entry TLM
29622		Aerosurface Actuator Feedback
29660A		Current Vehicle Mass Update
29686		Hydraulic FDIR I-Load Consolidation
29688B		Entry Controls Cleanup
29800B		FSSR Update 8
29831A		RCS Non-failed Jet Reset
29878		IMU RM Vel Threshold/N-Count
29895B		Update GN&C/SM-PL I/F Reqmts
29906		Sel Fltr and Elvn Delta P I/O
29911A		Common Ch Warning Deletion
29914		ADTA RM Trip Level Change
29977B		RJD Toggle Circuit
39077		TACAN Elevation Angle Limit
39078		Antenna Dwell and Channel I/L
39087A		Head Up Display (HUD)
39098		IMU RM Attitude Threshold
39155D		RCS Jet Priority Control
39264E		HUD Autoland Monitor Format
39359		Body Flap FDIR Trip Level

Table R.2-1. Historical Change Request Summary		
CR No.	OI	CR Title
39365F		HUD PROC I/O Cleanup
39374		C-Value QMVS I-Loads Update
39400		FSSR Update 10
39450B		CR Implementation Baseline, May 1981
39467A		DR Closeout – Documentation Cleanup
39485A		BF Fdbk FDIR – MM106 AND 602, 603
39486A		AA FDIR – MM103, 4, 5, 6 and 601
39521		ADTA RM Same-Side Trip Level
39537		Velocity Data Good Thresholds
39595A		CR Implementation Baseline Aug 1981
39629		Accelerometer QMVS C-Value
39640		FSSR Update 11
39688A		Aerosurface Actuator SOP Timing
39700D		ENT/GRTLS FCS Gain+Aero Mode
39740		ORB DAP Inertia Keyboard Limit
39790A		CR Implementation Baseline–Nov 81
39808		I-Load Description Added
39827A		RCS RM Comm Fault Requirements
39888A		TACAN 40 Deg Bearing Glitch
39917D		On-orb cg Offset Correction
39950		FSSR Update CR 12
39978B		Split RCS RM Fu and Ox Inj Temp
59007A		Delete RCS L5D Fu Temp
59008A		Add RCS L5D Fu Temp
59009A		Implementation of CR 39700D for STS–6
59045A		ADTA Failure Counter Reset
59103B		IMU RM Update
59120		ORB RGA FDIR I/L Descriptions
59126H		RCS X-Feed MCA Optimization
59235		Cage HUD Vel Vector–ADI PBI
59262B		Latch FASCOS Switch Inhibit
59276		MPS Sump Sw Nomenclature
59308A		IMU RM Cleanup
59386A		Correct CR 39537–IMU RM
59405A		Correction of CR 29926C
59412A		I-Load MSID Corrections
59450		FSSR Update 7

Table R.2-1. Historical Change Request Summary		
CR No.	OI	CR Title
59528A		RCS RM Comm Fault Check
59622A		RM FSSR Consistency – Doc
59720		OMS RM in OPS 6
59744D		GN&C Sw Output Clarification
59750		FSSR Update 8
59782B		Delete IMU/RM Flag Reset
59786A		Four–Contact Switch FDIR
59818		CR 39917D Cleanup
69002A		TACAN RM Doc Correction
69014B		Entry Control Cleanup
69070		FSSR Update 3
69198A		IMU RM I/L – IREO
69220F		Centaur Abort Dump
69389A		Clarify CR 59308A
69393		GMEM–Prelaunch SRB RGA Fail
69451I	22	Bi–Level MSBLS Data Edit
69519		PRE–IMRB RI I/L Ownership
69522		GMEM Eff for SRB RGA SF
69530C		Four–Level SF Requirements Consolidation
69696A		IMU RM I–Load Owner Change
69700		FSSR Update 4
69838C		Delete IMU RM I–Load Occurrence
69873B		OI–3 IMU RM Doc Cleanup
69890B		ASC Ent Att Proc Doc Cleanup
69893		Cleanup of CR 39264E
69997B		Entry Tal +X AFT RCS Dump
79106		SRB Chamber Pressure D/L Requirements
79134E		OMS Burn in MM 304
79152B		Forward RCS PTI Logic
79158C		Forward RCS Dump
79166C		RCS Doc Priority Corrections
79217A		ENT TACAN SOP Intf Doc Cleanup
79265A		IMU RM K–Load Update – ZS90
79266		IMU RM I/L Update ZFY1
79267		IMU RM I/L Update IRO1
79268		IMU RM I/L Update IRA1
79269		IMU RM I/L Update IRE1

Table R.2-1. Historical Change Request Summary		
CR No.	OI	CR Title
79335D		OMS/RCS OPS Downlist Changes
79338A		Change of EH/ASD PF Manager
79352		Corrections to Forward PTI Logic
79354		RCS Manifold Dilemma Update
79463A		Nose Wheel Position SOP
79556D	20	Add Controls Display to OPS 1/6
79561		Delete FCS Downmoding
79827		Cancel SRB RGA GMEM CRs
79901D		OPS Downlist Cleanup
79906C		FCS Downlist Scrub
79933F		Vent Door Seq. Scrub
79934		Correct ORB RGA/AA & SRGA FDI
79935H		SRB RGA Rechannelization
89137C		Delete HUD 2 (Autoland) Fmt
89165H		MPS Feed Disc. Latch Logic
89190B		Clarify RM/GAX Interface Requirements
89245D		Post MECO TAL Declaration
89250B		Bailout Control System
89251B		IMU RM K-Loads to I-Loads
89281B		Downlist Cleanup Deselect Commands
89336D	20	GNC Function OMS/RCS DL Chgs
89339E		OMS TVC Fail Flag Reset
89939E		Star Tracker SOP Doc Change
89474B		Auto NZ for Contingency Abort
89476		MSBLS Cleanup of CR 89281B
89491C		I-Load Owner Change
89494A		FSSR 10 errata / Doc Cleanup
89540B		I-Load Recategorization and Category Creation
89599C		Cleanup to Level B GN&C Document
89617A		Correct RCS Manifold Status Update
89631A	22	Change RCS Master XFEED Default Condition
89662B		IMU Redundancy Management
89666C	22	Auto Deselect Commfaulted IMU
89667E	21	TACAN & MLS RM ILDS to KLDS
89684C	20	Add RM in OPS 1/6 GNC LRUs
89689		IMU RM Pre-L/O KLDs to ILDs
89741B		Errata STS83-0010B

Table R.2-1. Historical Change Request Summary		
CR No.	OI	CR Title
89805		Errata Change, CR 89665 A Page e & IDD
89815A		Cleanup to 89245D
89832	23	Correct/Clarify RCS Manifold Status Requirements
89854A		Delete TLM Req for HYD SYS Parameters
89861		TACAN Bearing Post Selection Filter Doc Cleanup
89862A		Estimated-Beta Downlist Cleanup
89903B		Add Fuel Dissipation Ref. to MM601
89939E		Star Tracker SOP Doc Changes
89889H	20	Improved Nose Wheel Steering Software
89921C	20	Closed Loop PRCS Pulse Mode
89931	20	Add RCS Display (Spec 23) to OPS 1
89986H	22	OPS-1 IMU Alignment
89990E	21	Single Engine Auto Contingency Abort
89991E	21	Entry SSME Repositioning (For Dry Chute)
90007G	23	MPS Dump Enhancements
90094C	21	I-Load to K-Load Change
90094C	21	Cleanup LG WOW RM Documentation
90102D	21	LDG Gear Extension Isolation Valve
90109D	21	ILD/KLD Conversion: CAT, STC, ZF0, ZF5, ZF6, ZS5
90112E	21	EDO WOW Sensing Upgrades
90114B	21	Abort Sequencing Redesign
90115		Doc Cleanup for 510 Level B CPDS
90120B		Update Guidance Downmode Requirements
90182	21	SCM Scrub Completion
90203A	22	Change OME FDI Failure Counter K-Load
90204A	22	Change OMS I-Loads To K-Loads
90243C	22	Second Stage Auto Recognition of Second Engine Out
90254	21	CR 90094 K-Load Requirement Correction
90278D	21	MSBLS Data Downlist Cleanup
90319	21	EDO WOW Sensing Upgrades Cleanup
90374C	20	Automated FSSR Constants
90384A	21	Correct LG WOW RM Two-Level Processing (CR 90112E)
90426B	21	Cleanup LG WOW RM Documentation
90477E	22	Addition of Orbiter RGA SMRD RM
90485A	22	Initialization of Inertial Mode for CR89986H Cleanup
90508B	21	Correct Minor K-Load Value Differences Between Rqmts and Code
90689A	24	Start Manifold Status Processing in MM101

Table R.2-1. Historical Change Request Summary		
CR No.	OI	CR Title
90690A	24	Deletion of EQTN MSID Column from K-Load FSSR Tables
90705H	25	3 Engines Out Auto Contingency
90790	24	Add Memory Configuration to the FSSR I-Load Tables
90814C	24	Add Description of Database Generated FSSR Parameter Tables
90837G	24	Automatic Post Contact Firing Sequence
90881A	25	FSSR STS83-0001 Documentation Changes
90889C	23	FSSR STS83-0010 Documentation Changes
90900D	24	FSSR-9 Orbit Flight Control Documentation Changes
90935	24	CR 90837G Downlist / FSSR Clean-up
90960E	25	HAC Initiation Predictor and Position Error Displays
90964	25	Interface Clarification for 3 Engines Out CR 90705H
90966A	24	Deletion of the Qualifier from the FSSR I-Load tables
90973B	23	Main Gear RM "WOW" Flag Modification
91005B	23	OI-23 GN&C Doc Issues Cleanup
91066D	25	Standardize the FSSR Correlation Tables
92027B	25	TDMS-2 Required FSSR Changes

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