INDEPENDENT ORBITER ASSESSMENT

ASSESSMENT OF THE DATA PROCESSING SYSTEM FMEA/CIL

28 NOVEMBER 1986

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MCDONNELL DOUGLAS ASTRONAUTICS COMPANY HOUSTON DIVISION

SPACE TRANSPORTATION SYSTEM ENGINEERING AND OPERATIONS SUPPORT

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INDEPENDENT ORBITER ASSESSMENT ASSESSMENT OF THE DATA PROCESSING SYSTEM FMEA/CIL

28 November 1986

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Independent Orbiter Assessment Assessment of the Data Processing System FMEA/CIL

1.0 EXECUTIVE SUMMARY

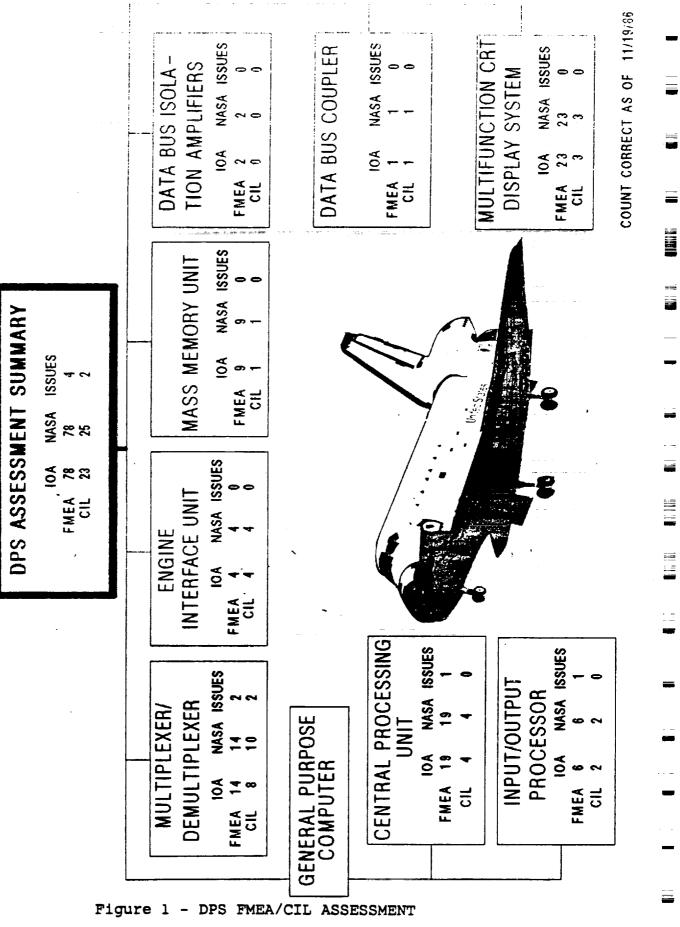
The McDonnell Douglas Astronautics Company (MDAC) was selected in June 1986 to perform an Independent Orbiter Assessment (IOA) of the Failure Modes and Effects Analysis (FMEA) and Critical Items List (CIL). Direction was given by the STS Orbiter and GFE Projects Office to perform the hardware analysis using the instructions and ground rules defined in <u>NSTS 22206</u>, <u>Instructions</u> for Preparation of FMEA and CIL, 10 October 1986.

The IOA effort first completed an analysis of the Data Processing System (DPS) hardware, generating draft failure modes and potential critical items. To preserve independence, this analysis was accomplished without reliance upon the results contained within the NASA FMEA/CIL documentation. The IOA results were then compared to the NASA FMEA/CIL baseline with proposed Post 51-L updates included. A resolution of each discrepancy from the comparison is provided through additional analysis as required. This report documents the results of that comparison for the Orbiter DPS hardware.

The IOA product for the DPS analysis consisted of one hundred twenty-two failure mode "worksheets" that resulted in twentythree potential critical items being identified. Comparison was made to the NASA baseline (as of 19 November 1986) which consisted of seventy-eight FMEAs and twenty-five CIL items. The comparison determined if there were any results which had been found by the IOA but were not in the NASA baseline. This comparison produced agreement on all but four FMEAs which caused differences in two CIL items. Figure 1 presents a comparison of the proposed Post 51-L NASA baseline, with the IOA recommended baseline, and any issues.

The issues arose due to differences between the NASA and IOA FMEA/CIL preparation instructions. NASA had used an older ground rules document which has since been superseded by the <u>NSTS 22206</u> used by the IOA. After comparison, there were no discrepancies found that were not already identified by NASA, and the remaining issues may be attributed to differences in ground rules.

DPS FMEA/CIL ASSESSMENT OVERVIEW



ORIGINAL PAGE

2.0 INTRODUCTION

2.1 Purpose

The 51-L Challenger accident prompted the NASA to readdress safety policies, concepts, and rationale being used in the National Space Transportation System (NSTS). The NSTS Office has undertaken the task of reevaluating the FMEA/CIL for the Space Shuttle design. The MDAC is providing an independent assessment of the proposed Post 51-L Orbiter FMEA/CIL for completeness and technical accuracy.

2.2 Scope

The scope of the independent FMEA/CIL assessment activity encompasses those Shuttle Orbiter subsystems and GFE hardware identified in the Space Shuttle Independent FMEA/CIL Assessment Contractor Statement of Work. Each subsystem analysis addresses hardware, functions, internal and external interfaces, and operational requirements for all mission phases.

2.3 Analysis Approach

The independent analysis approach is a top-down analysis utilizing as-built drawings to breakdown the respective subsystem into components and low-level hardware items. Each hardware item is evaluated for failure mode, effects, and criticality. These data are documented in the respective subsystem analysis report, and are used to assess the proposed Post 51-L NASA and Prime Contractor FMEA/CIL. The IOA analysis approach is summarized in the following Steps 1.0 through 3.0. Step 4.0 summarizes the assessment of the NASA and Prime Contractor FMEA/CIL which is documented in this report.

Step 1.0 Subsystem Familiarization

- 1.1 Define subsystem functions
 - 1.2 Define subsystem components
 - 1.3 Define subsystem specific ground rules and assumptions

Step 2.0 Define subsystem analysis diagram

- 2.1 Define subsystem
- 2.2 Define major assemblies
- 2.3 Develop detailed subsystem representations

Step 3.0 Failure events definition

- 3.1 Construct matrix of failure modes
- 3.2 Document IOA analysis results

Step 4.0 Compare IOA analysis data to NASA FMEA/CIL

- 4.1 Resolve differences
- 4.2 Review in-house
- 4.3 Document assessment issues

4.4 Forward findings to Project Manager

2.4 Ground Rules and Assumptions

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The ground rules and assumptions used in the IOA are defined in Appendix B. The subsystem specific ground rules were defined to limit the analysis to single-failed-parts for each failure mode. A subset of the failure mode keywords were identified for the DPS team. This allowed for commonality in the analysis results.

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3.0 SUBSYSTEM DESCRIPTION

3.1 Design and Function

The DPS consists of that hardware required for data acquisition, data manipulation, data display, and data transfer on the Orbiter, and includes the five onboard computers and their interfaces. Reference Figure 2. More specifically, the DPS consists of the following components:

- 1. Twelve MDM units which convert and format data at the remote locations. Each MDM has internal redundancy and consists of a Multiplexer Interface Adapter (MIA), Sequential Control Unit (SCU), Input/Output Module, Analog To Digital Converter, and Power Supply. They convert and format serial digital GPC commands into parallel discrete, digital, and analog data for transfer to vehicle subsystem hardware. They also convert and format parallel discrete, digital, and analog data from vehicle subsystems into serial digital data for transmission to the GPCs. Reference Figure 3.
- Five GPCs each consisting of a Central Processing Unit 2. (CPU) and Input/Output Processor (IOP). The CPU functionally consists of an Arithmetic Logic Unit, Local Store, Master Bus Control Unit, Data Flow Multiplexer, Micro-code control unit, CPU Timer, Interrupt Logic, Main Memory Timing Page, Timers, Address Bus Control, Main Memory, and Power Supply. The IOP contains Control Monitor, IOP Main Memory, Channel Control, Direct Memory Access Queue, Arithmetic Logic Units, Local Store, Micro-code store and Decode, MIAs, and Time-slice and Multiplexing. One of the functions of the GPCs is to support guidance, navigation, and control requirements of the vehicle. They provide for the monitoring and control of vehicle subsystems. They also check for data transmission errors and crew input error. Vehicle system failures and out-of-tolerance conditions are annunciated by the GPCs. Reference Figure 4 and Figure 5.
- 3. The MCDS consists of three Keyboard Units (KU), four Display Units (DU) and four Display Electronics Units (DEU). Each KU has Keys, Switches and Lights. The DU consists of X/Y Deflection Amplifiers, Video Amplifiers, Cathode-Ray Tube, BITE and Power Supplies. The DEU has an Oscillator, Memory, Key-board Adapter, Symbol Generator, MIA, Control Logic, BITE, Load Switch, and Power Supplies. The subsystem provides for crew/vehicle interface via a keyboard and CRT display. The crew can interact with the subsystems with keyboard entries and executions. Reference Figure 6 and Figure 7.

- Thirty serial digital data buses are connected to the 4. Bus Terminal Units (BTUs) via 227 DBCs. The DBCs are shown in Figure 8.
- Two DBIAs provide the amplification necessary to drive 5. the stubs and provide isolation when the stubs are opened or shorted at the umbilicals.
- Two MMUs contain MIAs, Read Electronics, Write 6. Electronics, Mass Memory Control Logic, Power Supply with Switch, Tape Transport Mechanism with motor, tape and heads. The mass memory unit stores programs for loading into the GPCs and the MCDS. Reference Figure 9.

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Three EIUs provide status and command capability of the 7. main engines. Each EIU contains a MIA, BITE, Status Buffer, Controller Interface Adapter, Operational Interface Element, Data Status and Power Supply. The EIU transfers main engine control commands from the GPC and main engine status for use by the GPC, the GSE launch processing system, and the operational instrumentation system. Reference Figure 10.

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The DPS interfaces with many onboard Orbiter systems including the Main Propulsion System, Solid Rocket Boosters, Reaction Control System (RCS), Orbital Maneuvering System (OMS), Air Surface Controls used for guidance and control, Nose-wheel Steering, and the Master Timing Unit.

3.2 Interfaces and Locations

The DPS hardware is located throughout the Orbiter. The composite data bus network provides the hardware interfaces between the GPCs and all other avionics subsystems that communicate via a digital data format. Reference Figure 11. GPCs 1 and 4 are located in Avionics Bay 1 while GPCs 2 and 5 are located in Avionics Bay 2, to provide separation of redundancy. GPC 3 is located in Avionics Bay 3. Each GPC interfaces to all Flight Critical MDMs, however only one GPC normally communicates to only one FF and one FA MDM during ascent and entry dynamic flight.

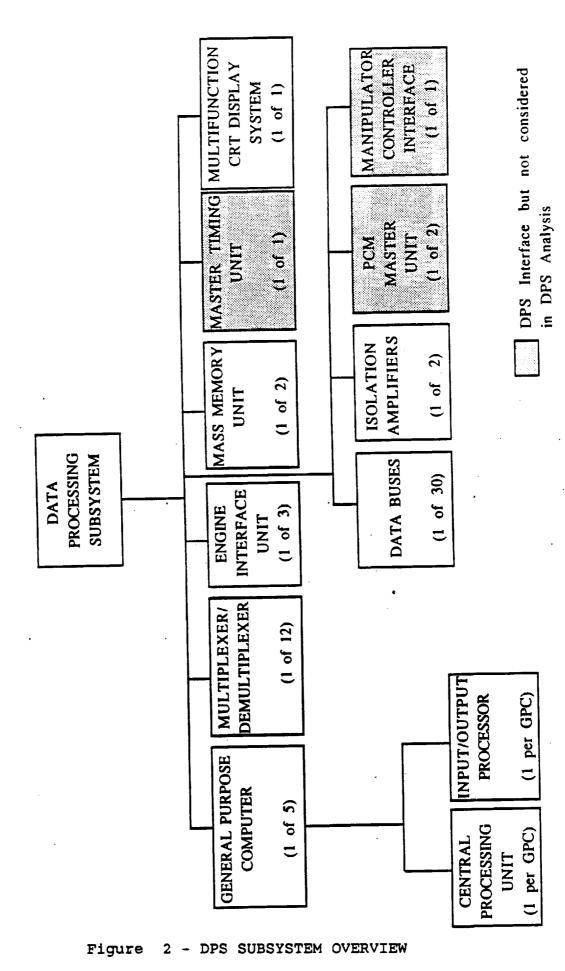
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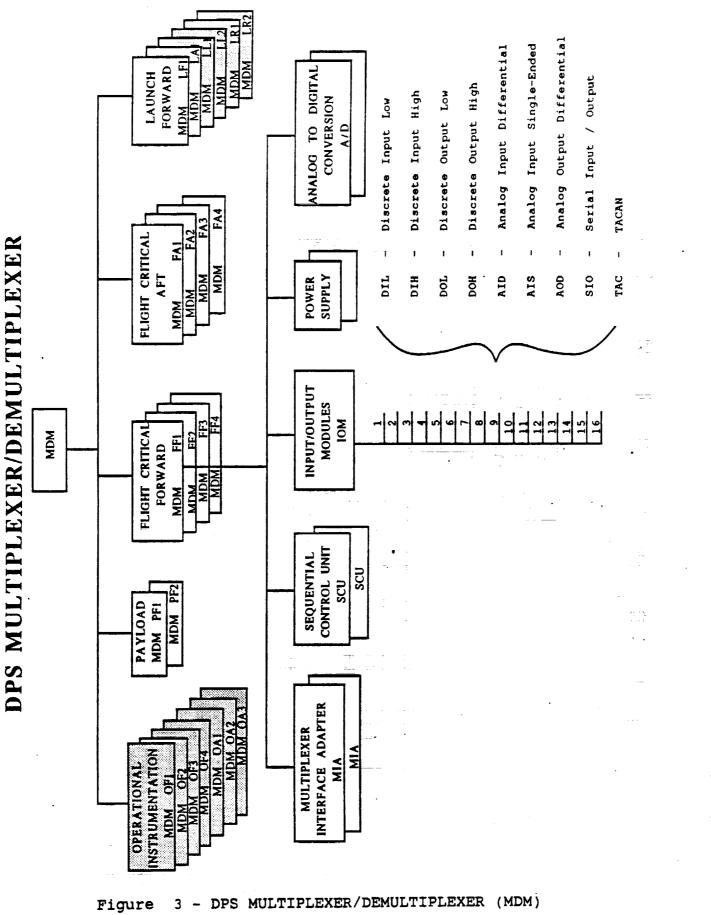
3.3 Hierarchy

Figure 2 illustrates the hierarchy of the DPS hardware and the corresponding subcomponents. Figures 3 through 10 comprise the detailed system representations.

DATA PROCESSING SUBSYSTEM OVERVIEW

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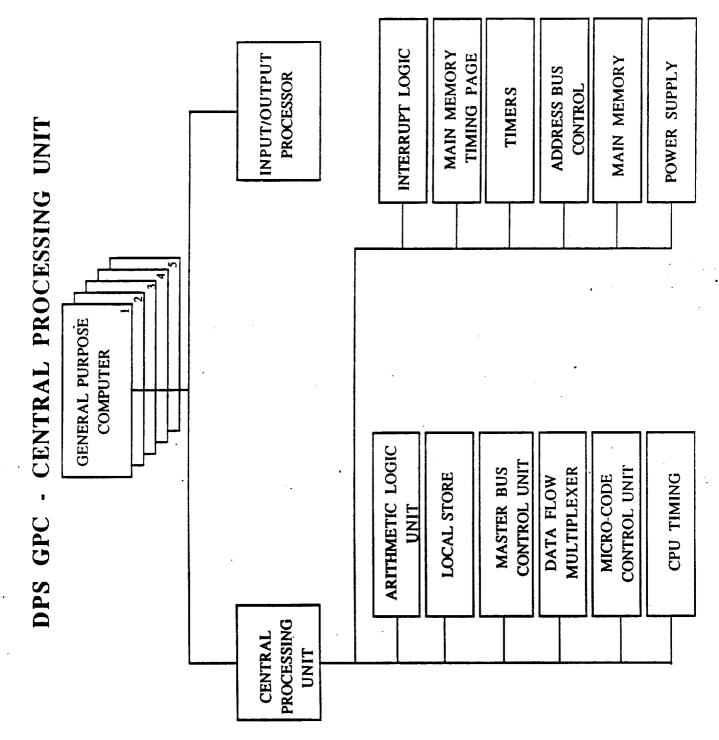
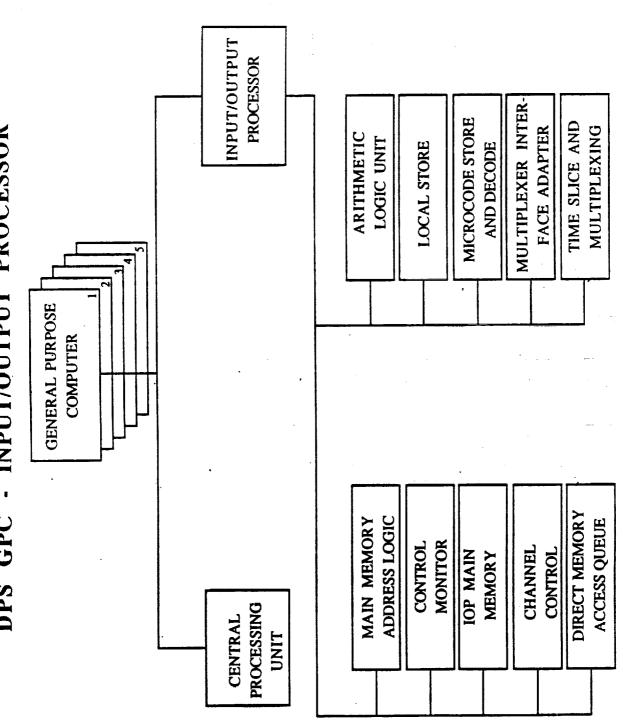


Figure 4 - DPS GPC CENTRAL PROCESSING UNIT (CPU)

DPS GPC - INPUT/OUTPUT PROCESSOR



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Figure 5 - DPS GPC INPUT/OUTPUT PROCESSOR (IOP)

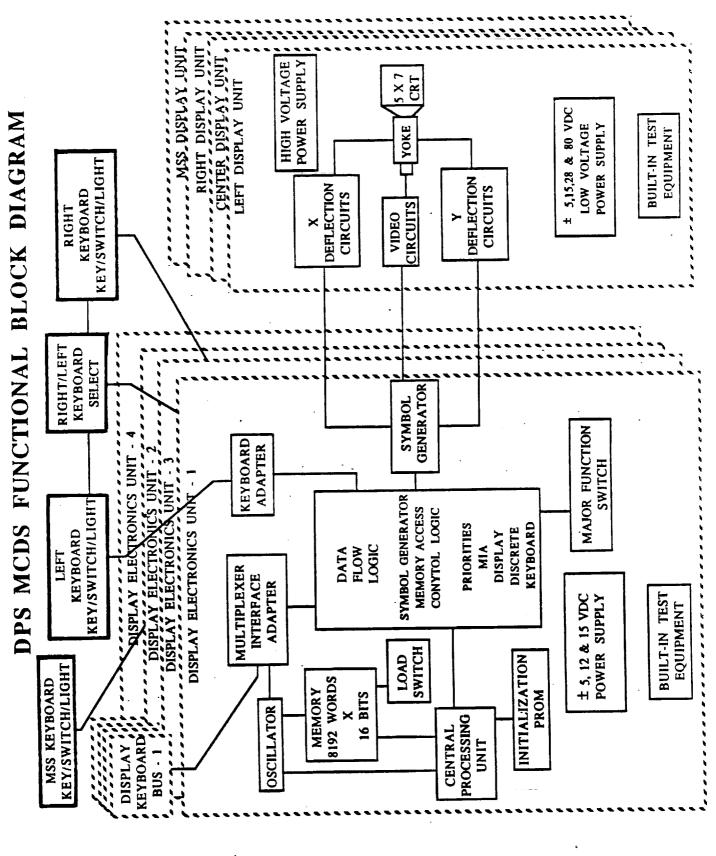
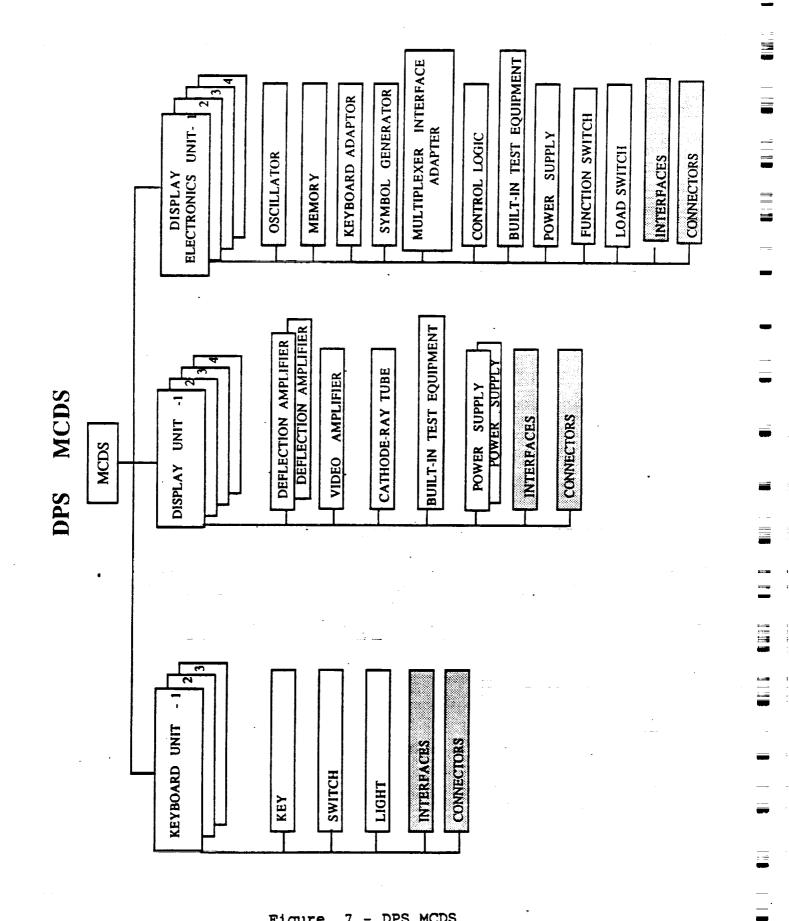


Figure 6 - DPS MCDS FUNCTIONAL BLOCK DIAGRAM



DPS MCDS Figure 7 -

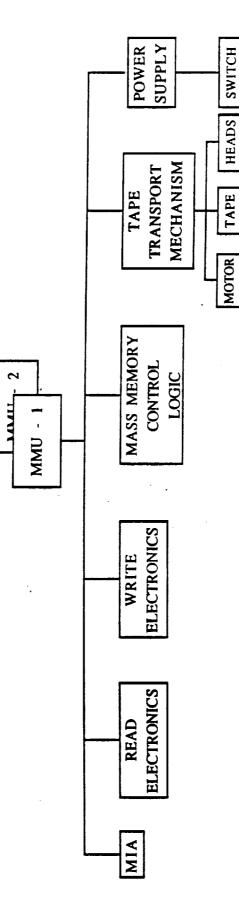
.RS			DATA BUS	INTER-COMPUTER-4 INTER-COMPUTER-5	INSTRUMENTATION/FCMMU-1 INSTRUMENTATION/PCMMU-2	INSTRUMENTATION/PCMMU-3 INSTRUMENTATION/PCMMU-4	INSTRUMENTATION/PCMMU-5 I AIINCH/ROOST-1		MASS MEMORY-1	MASS MEMORY-2	PAYLOAD INFERFACE-I Davioad interface.	PAYLOAD IN IEKFAUE-2	PAYLOAD 2
BUS COUPLERS		1	QUANTITY	v. v. c	n en (י ר ר	3	16	9	9	v	r 6	æ
DPS DATA BUS			DATA BUS	DISPLAY/KEYBOARD-1 DISPLAY/KEYBOARD-2		FLIGHT CRITICAL-1 FLIGHT CRITICAL-2	FLIGHT CRITICAL-3				FLIGHT CKHICAL-8 INTEP COMPLITED_1	INTER-COMPUTER-1 INTER-COMPUTER-2	INTER-COMPUTER-3
	PIN No.	•	QUANTITY	9 - 1	9 ٢	11	= :	11	12	12	12	~ ~	، م ا

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Figure 8 - DPS DATA BUS COUPLERS (DBC)





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Figure 9 - DPS MASS MEMORY UNIT (MMU)

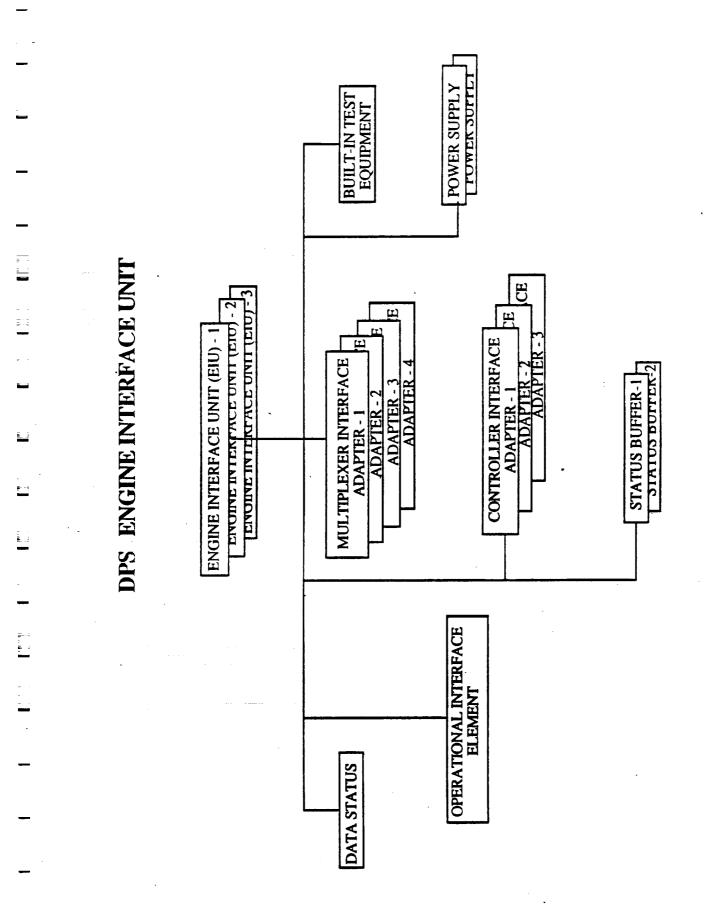


Figure 10 - DPS ENGINE INTERFACE UNIT (EIU)

MDM FAI PROVISIONS OPERATIONAL INSTRUMENTATION BUSES 4 AVIDNICS BAY 3 PAYLDAD ВАΥ MDM DA1 AVIONICS BAY 6 AVIONICS MEC DATA PROCESSING SUBSYSTEM 3 Z LAUNCH/BODST BUSES GPC/CPU/IDP MDM FF3 MDM FA4 EIU 3 MDM DF3 2 DPERATIONAL INSTRUMENTATION BUSES 5 FLIGHT INSTRUMENTATION DATA BUSES MDM DA3 5 INTER COMPUTER DATA BUSES 2 MISSIDN CRITICAL DATA BUSES **B FLIGHT CRITICAL DATA BUSES** 4 DATA DISPLAY/ENTRY BUSES 2 MASS MEMDRY DATA BUSES MDM FA3 MDM BUSES MMU a PCM-2 MASTER GPC/CPU/JDP 24.5 F വ S N U 2 LAUNCH/BDDDST AVIONICS BAY MEC EIU N E AVIONICS BAY MDM DA2 MDM FF264 MDM PF2 MDM FA2 MDM OF2 DBIA DBIA MDM LF1 SRB MDM LR2 GPC/CPU/IDP 144 AVIDNICS BAY RIGHT MDM LR1 MDM OF1 PCM-1 MDM FF1 HAL MDM LEFT SRB MDM AREA MDM DF 4 JPPER CREV FVD AF T DDU 2 N ო MCIU DEU DEU DEU

Figure 11 - DPS FUNCTIONAL INTERFACES AND LOCATIONS

4.0 ASSESSMENT RESULTS

The IOA analysis of the DPS hardware initially generated eightyfive failure mode worksheets and identified two Potential Critical Items (PCIs) before starting the assessment process. In order to facilitate comparison, thirty-seven additional failure mode analysis worksheets were generated. These analysis results were compared to the proposed NASA Post 51-L baseline of seventyeight FMEAs and twenty-five CIL items, which was generated using the Rockwell 100-2G FMEA/CIL instructions. Upon completion of the assessment, sixty of the seventy-eight FMEAs were in agreement. Of the eighteen that remained, fourteen had minor discrepancies that did not affect criticality. Of the remaining four, two issues were with FMEAs (05-5-B03-1-1 and 05-5-B03-2-1) that had considered failure modes outside the DPS subsystem, and caused inflated criticalities. These criticalities mistakenly placed both FMEAs on the CIL. The other two issues were with FMEAs (05-5-B01-1-1 and 05-5-B02-1-1) that also considered failure modes outside the DPS subsystem. However, when the correct failure mode is included, the current criticalities will remain unchanged. In summary, all issues may be attributed to differences between ground rules in Rockwell 100-2G and NSTS 22206 instructions. The TOA recommends correcting the failure modes considered in the four FMEAs, which lowers criticality assignments in two of the FMEAs, and removes them from the CIL.

A summary of the quantity of NASA FMEAs assessed, versus the recommended IOA baseline, and any issues identified is presented in Table I.

Table I Summary of IOA FMEA Assessment							
Component	NASA	IOA	Issues				
MDM GPC MCDS DBC DBIA MMU EIU	14 25 23 1 2 9 4	14 25 23 1 2 9 4	2 2 - - - - - -				
TOTAL	78	78	4				

A summary of the quantity of NASA CIL items assessed, versus the recommended IOA baseline, and any issues identified is presented in Table II.

Table II	Summary of 1	IOA CIL Assess	nent
Component	NASA	IOA	Issues
MDM GPC MCDS DBC DBIA MMU EIU	10 6 3 1 - 1 4	8 6 3 1 - 1 4	2 - - - - - -
TOTAL	25	23	2

Appendix C presents the detailed assessment worksheets for each failure mode identified and assessed. Appendix D highlights the NASA Critical Items and corresponding IOA worksheet ID. Appendix E contains the IOA analysis worksheets that were used to assess the NASA FMEA/CIL. Appendix F provides a cross reference between the NASA FMEA and corresponding IOA worksheet(s). IOA recommendations are also summarized. =

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Table III presents a summary of the IOA recommended failure criticalities for the Post 51-L FMEA baseline. Further discussion of each of these subdivisions and the applicable failure modes is provided in subsequent paragraphs.

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TABLE III Summary of IOA Recommended Failure Criticalities									
Criticality:	1/1	2/1R	2/2	3/1R	3/2R	3/3	TOTAL		
MDM GPC MCDS DBC DBIA MMU EIU	- - - - 2	4 5 3 1 - - 2	- - - - 1 -	6 9 14 - - -	2 1 - 1 6 -	2 10 5 - 1 2 -	14 25 23 1 2 9 4		
TOTAL	2	15	1	29	11	20	78		

Of the failure modes analyzed, twenty-three were determined to be critical items. A summary of the IOA recommended critical items is presented in Table IV.

TABLE IV Summary of IOA Recommended Critical Items								
Criticality:	1/1	2/1R	2/2	3/1R	3/2R	3/3	TOTAL	
MDM GPC MCDS DBC DBIA MMU EIU	- - - - 2	4. 5 3 1 - 2	- - - 1 -	4 - - - -		- - - - -	8 6 1 - 1 4	
TOTAL	2	15	1	5	+		23	

The scheme for assigning IOA assessment (Appendix C) and analysis (Appendix E) worksheet numbers is shown in Table V.

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	Table V IOA Worksheet Numbers
Component	IOA ID Number
MDM GPC MCDS MMU EIU	DPS-100 to DPS-195 DPS-201 to DPS-232 DPS-300 to DPS-321 (includes DBC and DBIA) DPS-400 to DPS-417 DPS-501 to DPS-509

4.1 Assessment Results MDM

The IOA has a total of forty-two assessment worksheets associated with the fourteen NASA MDM FMEAs; excluding the OF, OA, LL, and LR MDM groups, as shown in Figure 3. The IOA worksheets correspond to nine different failure modes for each of the four groups of MDMs, plus six worksheets that are power related. The numbering scheme is shown in the table below.

IOA ID Range	Item Group
DPS-100 to 108	FF - Flight Forward
DPS-120 to 128	FA – Flight Aft
DPS-140 to 148	PF - Payload Forward
DPS-180 to 188	LF,LA - Launch Forward and Aft
DPS-190 to 195	Power related: RPCs, switches, and resistors

Three basic failure modes were found: Loss of Output, Erroneous Output, and Premature Operation. A failure mode may have a different effect, and thus a different criticality, if applied separately to both output sides of a MDM; that is, a MDM's outputs to GPCs and LRUs (such as sensors and effectors). Thus it was decided to treat each output side separately for each basic failure mode, resulting in six failure modes; such as "Loss of Output to GPC" and "Loss of Output to LRU". As it turned out, the effects were somewhat different but the criticalities remained the same.

Three other failure modes were added which were considered applicable to only one output. These are "Selected All Channels Wrong to LRU" (worksheets DPS-106, 126, 146, and 186), "Stuck on a Constant Output to LRU" (DPS-107, 127, 147, and 187), and "Falsely Stuck on Busy Mode" to GPC (DPS-108, 128, 148, and 188). The first two specific failure modes could be considered special cases of "Erroneous Output to LRU", and the third failure mode could be considered a special case of "Loss of Output to GPC". They were considered on the possibility that the specific cases would differ in effects and criticality from the general cases. Again, the result was that these specific cases differed in their effects but not in their criticalities from the general cases.

The NASA FMEAs considered general failure modes, consequently each output and specific cases were not covered uniquely. This resulted in one (NASA FMEA) to many (IOA worksheets) relationships, as shown in the following table. This table shows how the NASA FMEAs and IOA worksheets associated with MDMs map onto each other.

Failure <u>Mode</u> Loss of Output	PF	NASA FMEAS 05-5-B03-2-1 05-5-B03-1-1 05-5-B03-5-1 05-5-B03-4-1	
Output	FA PF LF,LA	05-5-B03-2-2 05-5-B03-1-2 05-5-B03-5-2 05-5-B03-4-2	102, 103, 106, 107 122, 123, 126, 127 142, 143, 146, 147 182, 183, 186, 187
-		no map no map no map no map	104, 105 124, 125 144, 145 184, 185
Miscell- aneous	RPC RPC Switch Switch	05-6S-BRES3-1 05-6S-BRPC3-1 05-6S-BRPC3-2 05-6S-BSW3 -1 05-6S-BSW3 -2 05-6S-BSW5 -3	192 193

The number of FMEAs and CILs by criticality are summarized in the following table. The Unmapped IOA column is the raw number of IOA analysis worksheets. The Mapped IOA column is the number of IOA analysis worksheets after they have been mapped onto the NASA FMEAs.

	Unmapped	Mapped			
Criticality	IOĀ	IOA	NASA	IOA CILS	Issues
2/1R	15	4	6	4	2
2/2	0	0	0	0	0
3/1R	16	6	4	4	0
3/2R	9	2	2	0	0
3/3	2	2	2	0	0
Total	42	14	14	8	2

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The NASA FMEAs also covered power related items associated with the MDMs, including Remote Power Controllers (RPCs), Power Switches, and Current Limiting Resistors. IOA did not cover these items in the original analysis due to time constraints, but did cover them later, concurring with NASA's reevaluation of these six. IOA's DPS subsystem team did not cover the Operational Instrumentation Forward and Aft (OA and OF) MDMs, since they were considered to be in the domain of IOA's Instrumentation subsystem team. IOA and NASA also did not cover the Launch Left and Launch Right (LL and LR) MDMs since they are within the SRBs.

The difference in the number of FMEAs is due to the fact that IOA considered more specific failure modes than NASA. Another difference is that NASA did not consider the "Premature Operation to GPC" and "Premature Operation to LRU" failure modes for MDMs. This however is not an issue since the criticality of the function of the hardware item (2/1R) was not increased by these failure modes. Also, after further analysis these failure modes are considered to be non-credible.

The criticalities for the LF and LA MDMs (3/2R) were the same for IOA and NASA. For the FF, FA, and PF MDMs however, IOA's criticalities (3/1R) were lower than NASA's criticalities (2/1R). Part of this difference is due to whether the effects of multiple unrelated failures were taken into account. The NASA, using the <u>Rockwell</u> 100-2G hardware criticality 2 ground rules, considered in FMEAS 05-5-B03-1-1 and 05-5-B03-2-1, a MDM failure and then considered an Aero Surface Amplifier (ASA) next related failure outside the DPS subsystem. Whereas, the IOA, using <u>NSTS</u> 22206, considered in assessment worksheets DPS-100, <u>DPS-101</u>, <u>DPS-108</u>, DPS-120, DPS-121, and DPS-128, a MDM failure and then considered the next redundant item failure to be another MDM. The IOA does not concur with these two NASA reevaluations. The IOA believes the hardware criticality should be downgraded to three, thereby removing these two FMEAS from the CIL. The IOA concurred with the remaining twelve FMEAS.

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4.2 Assessment Results GPC

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The GPC analysis was subdivided into IOP and CPU failures. Generic black box failures were analyzed with causes stemming from failures of the subcomponents such as the MIA, as shown in Figure 4 and Figure 5. IOA has analyzed twenty-five failure modes (FMEAs) related to the General Purpose Computers (GPCs). Four of these FMEAs are attributable to the Input/Output Processors (IOP), eleven are related to the Central Processing Units (CPU), and the remaining ten affect various EPD&C switch functions associated with the GPC. NASA wrote twenty-five GPC related FMEAs: two CPU related, two IOP related, five switch related, four GPC status related, and two GPC power related. The following table is a summary of the GPC related FMEA criticalities including the results of the DPS Pre-board:

Criticality	IOA	NASA	IOA CILS	Issues
2/1R	5	5	5	2
3/1R	9	9	1	0
3/2R	1	1	0	0
3/3	10	10	0	0
Total	25	25	6	- 2

The seven NASA proposed individual power component failures (FMEA 05-6S-BDIOx-1, 05-6S-BDMC1-1, 05-6S-BDMC1-2, 05-6S-BFUS1-1, 05-6S-BRES1-1, 05-6S-BRPC1-1, and 05-6S-BRPC1-2) were analyzed, along with the four failures of the GPC status indicators. These failure modes are covered in Appendix E.

Of the five switch related failures analyzed by NASA, the CPU Output Switch FMEAs (05-5-BI5-1-1 and 05-5-BI5-1-3) agree with the IOA assessment (DPS-211) as does the Mode Switch FMEA (05-5-BI7-1-1, DPS-210). One GPC Power Switch FMEA (05-6S-BSW1-2) written by NASA is confirmed by a similar TOA FMEA (DPS-216) as criticality 3/1R; the newly-proposed GPC Power Switch FMEA (05-6S-BSW1-3) is consistent with the IOA analysis DPS-217. IOA agrees with the assessment that inadvertent power switch opening has the same effects as CPU Loss of Output (05-5-B01-1-1).

The NASA and IOA analyses of the CPU and IOP erroneous output FMEAs (05-5-B01-1-2, 05-5-B02-1-2, DPS-206 and DPS-202, respectively) are identical in criticality 3/1R, as are the analyses of the inadvertent command outputs from the IOP with criticality 2/1R (05-5-B02-1-3, DPS-225). An IOA analysis of erroneous data inputs to the IOP (DPS-204) brought similar effects with 3/1R criticality. The IOA analyzed a failure mode (DPS-208) on the CPU which was not considered by NASA. This 2/1R failure is similar in effect to the IOP inadvertent command output failure (05-5-B02-1-3): CPU attempts to output data on incorrect bus due to errors in memory locations containing configuration or bus-stringing parameters (e.g. the Nominal Bus Assignment Table). In this case two output data channels would be lost simultaneously and the actuators would not be able to select the correct data paths. IOA determined this to be a non-credible failure mode during the assessment process.

The NASA analysis of the CPU "Loss Of Output" (05-5-B01-1-1) has a criticality of 2/1R. IOA analysis 205, using the <u>NSTS 22206</u> does not take into account the effects of multiple unlike failures outside the DPS subsystem. IOA does not agree with the effects assigned by NASA. The IOA recommends changing the effects to delete the sentence "During ascent/entry, this...". The IOA does concur with the rest of NASA's reevaluation and rationale.

The NASA analysis of the IOP "Loss of Output" (05-5-B02-1-1) has a criticality of 2/1R. Initially, the IOA analysis 201 assigned a hardware criticality of 3 for this failure mode. The IOA does not believe a single IOP failure would cause loss of mission. The second failure of an IOP would not result in loss of crew/vehicle. However, NASA's failure effects coupled this failure with an undetected ASA failure (outside the DPS subsystem). This could result in two healthy paths being voted out. This could possibly cause loss of vehicle. Simultaneous dissimilar failures were excluded from the IOA. Multiple failures are inconsistent with the <u>NSTS 22206</u>. The IOA recommends changing the effects to delete the sentence "During ascent/entry, this...". The IOA does concur with the rest of NASA's reevaluation and rationale.

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4.3 Assessment Results MCDS

The MCDS consists of the KU, DU, and DEU. Functional failures of components were analyzed. These components are shown functionally in Figure 6 and Figure 7. Nine failure modes were identified, thirty IOA assessment worksheets and twenty-one IOA analysis worksheets were generated. These were then compared to the twenty-three NASA FMEAS. The difference in the total number of FMEAs may be attributed predominantly to the fact that NASA has one FMEA per failure mode whereas IOA has multiple failure modes per worksheet. The additional seven IOA assessment worksheets yielded no additional unique FMEAs and are not included in the comparison FMEA count. They are included in the Appendices for completeness. No issues were identified.

	Number	of	FMEAs b	рy	criticality	
Criticality	IOA		NAS	SĀ	IOA CIL	Issues
2/1R	3			3	3	0
3/1R	15		1	15	0	0
3/3	5			5	<u> </u>	0
Total	23		- 2	23	- 3	. 0

4.4 Assessment Results DBC

Thirty serial digital data buses connect the GPC IOPs to the BTUs via 227 DBCs. The DBCs' functional components are shown in Figure 8. Two failure modes were identified and one worksheet was generated. No issues were identified.

Number	of FMEAs	by critical	lity	
Criticality	IOA	NASA	IOA CIL	Issues
2/1R	1	1	1	0
				• .

4.5 Assessment Results DBIA

The DBIAs consists of components required to provide isolation between the Orbiter Launch/Boost Data Buses and the SRBs and associated GSE. Four failure modes were identified and two worksheets were generated. No issues or CILs were identified.

Num	ber of F	MEAs by criti	cality	
Criticality	IOA	NASA	IOA CIL	Issues
3/2R	1	1	0	0
3/3	1	1	0	0

4.6 Assessment Results MMU

The MMU analysis investigated failures in the individual components of power supply, read and write electronics, tape transport mechanism, MIA and control logic. These are shown functionally in Figure 9. The power switch and RPC were also investigated. Most of the failures were criticality 3/2R. One critical item was identified.

Numbe	r of MMU	related FMEA	As by criti	cality
Criticality	IOA	NASA	IOA CIL	Issues
2/2	1	1	1	0
3/2R	6	6	0	Ō
3/3	2	2	0	0
Total	9	<u>-9</u>	1	<u> </u>

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The IOA 400 through 407, 411 and 412 correspond to NASA FMEAs 05-5-B04-2-1 and 05-5-B04-2-2. These FMEAs are concerned with malfunctions of the MMU unit itself. The difference in number of FMEAs is due to the fact that the IOA analysis considered failures of individual components of the MMU, such as the tape transport mechanism. There was no significant difference in the results. Both IOA and NASA found the criticality to be 3/2R.

Four NASA FMEAS (05-6S-BRPC2-1, 05-6S-BSW2-1, 05-6S-BSW2-2, and an as yet unnumbered new item) correspond to IOA FMEAS 408, 409, and 410. These FMEAS deal with failures of the MMU power switches and RPCs. The only difference in the results in this group is that IOA found the switch failure mode which causes the MMU to remain permanently on to be criticality 3/3 rather than 3/2R. The NASA agreed with this criticality in their reevaluation report.

The IOA FMEA 415 corresponds to NASA FMEA 05-5-B20-1-1. This FMEA deals with failure of the GPC IPL source switch. Both IOA and NASA found the criticality to be 2/2. This is the only CIL item associated with the MMUs.

The NASA FMEAS 05-5-B16-1-1 (GPC IPL switch, criticality 3/2R), 05-5-B18-1-1 (GPC IPL indicator, criticality 3/3), and 05-6S-BRES2-1 (current limit resistor, criticality 3/2R) were analyzed by IOA and are contained in Appendix E. No issues were identified.

4.7 Assessment Results EIU

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There were no differences between the hardware and functional criticalities assigned by IOA and NASA on the baseline FMEAs of the Engine Interface Unit (EIU).

Number of EIU related FMEAs by Criticality.

Criticality	IOA	NASA	IOA CILS	Issues
1/1	0	2	2	0
2/1R	0	2	2	0
3/1R	5	0	_0	0
Totals	5	4	4	0

The NASA presented at the Level III Pre Board (12th and 15th of September, 1986) requests to upgrade the two existing FMEAs from 3/1R to 2/1R. The rationale presented was for a heavy payload. The loss of one engine can cause loss of mission. The IOA can accept this upgrade of criticality based upon a combined payload and vehicle weight requiring three main engines to achieve mission orbit goals.

The second upgrade was requested against the power circuit. The loss of the second circuit causes loss of the EIU. The worst case failure would occur during the last 10 seconds prior to MECO when the crew may not have enough time to respond to manual engine shutdown. This could cause an engine to have fuel or oxidizer depletion with engine running. Previous tests have indicated that pumps fail due to cavitation. In fact, the engine turbine pumps have exploded from cavitations. The IOA agrees with this upgrade and rationale.

There were two new FMEAs proposed by NASA at the pre-board with criticalities of 1/1.- The first was for a failure mode of erroneous output to the GPC. The GPC would then command the prevalves to close with the engine running. That would cause the high pressure turbine pumps to throw turbine blades which have caused uncontained engine failures. The engine explodes and the crew and vehicle are lost.

The second proposed FMEA deals with the failure of the power switch. The failure mode was both contacts shorted to ground. The loss of power to the EIU causes loss of control of engine throttling and shutdown. If failure occurs in the last six to ten seconds before MECO, the crew would have to manually shutdown the engines. The engines would ingest gas causing pump cavitation and disintegration. This results in loss of crew and vehicle.

Four additional failure modes were analyzed by IOA, but following the pre-board these modes were found to be covered by one of the original baseline FMEAs.

5.0 REFERENCES

Reference documentation available from NASA and Rockwell was used in the analysis. The documentation used included the following: 1. ICD 13M15000, Vehicle/Main Engine Interface Control Document, Rev. U, 6-18-85. DPS Console Handbook, 8-1-84. 2. JSC-18819, Booster-Systems Briefs, 10-1-84. 3. JSC-19041, DPS System Briefs, 4-20-85. 4. JSC-18820, Integrated System Schematic Rev. D, 9-28-85. 5. VS70-971102, Booster Console Handbook, 10-17-85. 6. JSC-17239, Shuttle Flight Operations Manual, Volume 5, 7. JSC-12770, Data Processing System, 3-24-84. STS Operational Flight Rules, Final PCN-3, 8. JSC-12820, 6-28-85. Space Shuttle Systems Handbook, Rev. C, DCN-5, 9. JSC-11174, 9-13-85. Operations and Maintenance Requirements and 10. V72 Vol III, Specification Document - Orbiter OMRSD -DPS, 6-13-86. Orbiter Vehicle Operational Configuration 11. STS82-0032 FMEA for DPS Subsystem, Revised 1-28-83. 12. VS70-973099 Integrated System Schematic, Rev Al0, 10-17-85. Orbiter Operational Configuration Critical 13. JSC-18730 Items List, 12-17-82. Instructions for Preparation of Failure Modes 14. NSTS 22206, and Effects Analysis (FMEA) and Critical Items List(CIL), 10-10-86. 15. MDAC IOA DPS Working Paper No. 1.0-WP-VA86001-02, 10-24-86. 16. NASA-JSC FMEA & CIL Review Comments, A. DPS - GPC's and MCDS and EPD&C - DPS Items, 9-11-86. B. Engine Interface Unit (EIU), 9-19-86. C. Mass Memory Unit (MMU), 9-19-86. D. MDM, DBC, & DBIA, 8-22-86.

APPENDIX A ACRONYMS

- Analog to Digital A/D - Analog Input Differential AID - Analog Input Single-ended AIS - Arithmetic Logic Unit ALU AOA - Abort Once Around AOD - Analog Output Differential ASA - Aero Surface Amplifier ATO - Abort To Orbit - Backup Flight Controller BFC - Backup Flight System BFS - Built-In Test Equipment BITE - Backup System Services BSS BTU - Bus Terminal Unit - Critical Item CI CIA - Controller Interface Adapter - Computer Interface Conditioning Unit CICU - Critical Items List CIL CPU - Central Processing Unit CRIT - Criticality - Cathode Ray Tube CRT - Caution and Warning System C&W DBC - Data Bus Coupler - Data Bus Isolation Amplifier DBIA DDU - Display Driver Unit DEU - Display Electronics Unit DIH - Discrete Input High DIL - Discrete Input Low - Direct Memory Access DMA DOH - Discrete Output High DOL - Discrete Output Low DPS - Data Processing System - Display Unit DU Engine Interface Unit EIU EVA - Extravehicular Activity FA - Flight Aft FCOS - Flight Control Operating System FF - Flight Forward FM - Failure Mode - Failure Mode and Effects Analysis FMEA - General Purpose Computer GPC - Ground Support Equipment GSE - Inertial Measurement Unit IMU - Independent Orbiter Assessment IOA IOM - Input/Output Module - Input/Output Processor IOP IPL - Initial Program Load - Keyboard Unit KU

LA LF LL LPS LR LRU MC MCDS MCIU MDAC MDM MEC		Launch Aft Launch Forward Launch Left Launch Processing System Launch Right Line Replaceable Unit Memory Configuration Multifunction CRT Display System Manipulator Controller Interface Unit McDonnell Douglas Astronautics Company Multiplexer/Demultiplexer Main Engine Controller Multiplexer Interface Adapter	
MIA MM		Major Mode	
MMU		Mass Memory Unit	
MTU			
NA	_	Not Applicable	
NASA	_	National Aeronautics and Space Administration	
NSTS	_	National Space Transportation System	
OA			
OF	_	Operational Aft Operational Forward	
OIE	_	Operational Interface Element	
OMRSD	-	Operational Maintenance Requirements and Specification	IS
OMS		Orbital Maneuvering System	
OPS	-	Operational Sequence	
		Potential Critical Item	
PCM		Pulse Code Modulation	
PF	-	Payload Forward	
RCS	-	Reaction Control System Rotational Hand Controller	
RHC			
RI		Rockwell International	
RM	-	Redundancy Management Remote Manipulator System	
RMS	<u> </u>	Remote Manipulator System addresses your of the address of the add	
RPC			
		Redundant Set	
RTLS	-	Return To Landing Site Sequential Control Unit	<u>.</u>
SCU		pedreutrat concrot outc	
		Serial Input/Output	
SM		Systems Management	3
SRB		Solid Rocket Booster	<u>.</u>
SSME STS	_	Space Shuttle Main Engine Space Transportation System	
STS SW		Software	
TAC		Tacan Arrendraad a Arrendra ar	
TAL		Transatlantic Abort Landing	
TD		Touch Down	
THC	_	Translational Hand Controller	
VDC	_	Volts Direct Current	

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APPENDIX B

DEFINITIONS, GROUND RULES, AND ASSUMPTIONS

B.1 Definitions

B.2 Project Level Ground Rules and AssumptionsB.3 Subsystem-Specific Ground Rules and Assumptions

APPENDIX B DEFINITIONS, GROUND RULES, AND ASSUMPTIONS

B.1 Definitions

Definitions contained in NSTS 22206, Instructions For Preparation of FMEA/CIL, 10 October 1986, were used with the following amplifications and additions.

INTACT ABORT DEFINITIONS:

 $\underline{\rm RTLS}$ - begins at transition to OPS 6 and ends at transition to OPS 9, post-flight

TAL - begins at declaration of the abort and ends at transition to OPS 9, post-flight

<u>AOA</u> - begins at declaration of the abort and ends at transition to OPS 9, post-flight

<u>ATO</u> - begins at declaration of the abort and ends at transition to OPS 9, post-flight

<u>CREDIBLE (CAUSE)</u> - an event that can be predicted or expected in anticipated operational environmental conditions. Excludes an event where multiple failures must first occur to result in environmental extremes

CONTINGENCY CREW PROCEDURES - procedures that are utilized beyond the standard malfunction procedures, pocket checklists, and cue cards

EARLY MISSION TERMINATION - termination of onorbit phase prior to planned end of mission

EFFECTS/RATIONALE - description of the case which generated the highest criticality

HIGHEST CRITICALITY - the highest functional criticality determined in the phase-by-phase analysis

<u>MAJOR</u> <u>MODE</u> (<u>MM</u>) - major sub-mode of software operational sequence (OPS)

<u>MC</u> - Memory Configuration of Primary Avionics Software System (PASS)

<u>MISSION</u> - assigned performance of a specific Orbiter flight with payload/objective accomplishments including orbit phasing and altitude (excludes secondary payloads such as GAS cans, middeck P/L, etc.)

MULTIPLE ORDER FAILURE - describes the failure due to a single cause or event of all units which perform a necessary (critical) function

OFF-NOMINAL CREW PROCEDURES - procedures that are utilized beyond the standard malfunction procedures, pocket checklists, and cue cards

OPS - software operational sequence

PRIMARY MISSION OBJECTIVES - worst case primary mission objectives are equal to mission objectives

PHASE DEFINITIONS:

PRELAUNCH PHASE - begins at launch count-down Orbiter power-up and ends at moding to OPS Major Mode 102 (liftoff)

LIFTOFF MISSION PHASE - begins at SRB ignition (MM 102) and ends at transition out of OPS 1 (Synonymous with ASCENT)

ONORBIT PHASE - begins at transition to OPS 2 or OPS 8 and ends at transition out of OPS 2 or OPS 8

DEORBIT PHASE - begins at transition to OPS Major Mode 301 and ends at first main landing gear touchdown

LANDING/SAFING PHASE - begins at first main gear touchdown and ends with the completion of post-landing safing operations

APPENDIX B DEFINITIONS, GROUND RULES, AND ASSUMPTIONS

B.2 IOA Project Level Ground Rules and Assumptions

The philosophy embodied in NSTS 22206, Instructions for Preparation of FMEA/CIL, 10 October 1986, was employed with the following amplifications and additions.

1. The operational flight software is an accurate implementation of the Flight System Software Requirements (FSSRs).

RATIONALE: Software verification is out-of-scope of this task.

 After liftoff, any parameter which is monitored by system management (SM) or which drives any part of the Caution and Warning System (C&W) will support passage of Redundancy Screen B for its corresponding hardware item.

> RATIONALE: Analysis of on-board parameter availability and/or the actual monitoring by the crew is beyond the scope of this task.

3. Any data employed with flight software is assumed to be functional for the specific vehicle and specific mission being flown.

RATIONALE: Mission data verification is out-of-scope of this task.

4. All hardware (including firmware) is manufactured and assembled to the design specifications/drawings.

RATIONALE: Acceptance and verification testing is designed to detect and identify problems before the item is approved for use.

5. All Flight Data File crew procedures will be assumed performed as written, and will not include human error in their performance.

RATIONALE: Failures caused by human operational error are out-of-scope of this task.

6. All hardware analyses will, as a minimum, be performed at the level of analysis existent within NASA/Prime Contractor Orbiter FMEA/CILs, and will be permitted to go to greater hardware detail levels but not lesser.

> RATIONALE: Comparison of IOA analysis results with other analyses requires that both analyses be performed to a comparable level of detail.

7. Verification that a telemetry parameter is actually monitored during AOS by ground-based personnel is not required.

RATIONALE: Analysis of mission-dependent telemetry availability and/or the actual monitoring of applicable data by ground-based personnel is beyond the scope of this task.

8. The determination of criticalities per phase is based on the worst case effect of a failure for the phase being analyzed. The failure can occur in the phase being analyzed or in any previous phase, whichever produces the worst case effects for the phase of interest.

RATIONALE: Assigning phase criticalities ensures a thorough and complete analysis.

9. Analysis of wire harnesses, cables and electrical connectors to determine if FMEAs are warranted will not be performed nor FMEAs assessed.

> RATIONALE: Analysis was substantially complete prior to NSTS 22206 ground rule redirection.

10. Analysis of welds or brazed joints that cannot be inspected will not be performed nor FMEAs assessed.

RATIONALE: Analysis was substantially complete prior to NSTS 22206 ground rule redirection.

11. Emergency system or hardware will include burst discs and will exclude the EMU Secondary Oxygen Pack (SOP), pressure relief valves and the landing gear pyrotechnics.

RATIONALE: Clarify definition of emergency systems to ensure consistency throughout IOA project.

APPENDIX B DEFINITIONS, GROUND RULES, AND ASSUMPTIONS

B.3 DPS-Specific Ground Rules and Assumptions

14-11-12-1-7<u>77</u>-1

The IOA analysis was performed to the component or assembly level of the DPS subsystem. The analysis considered the worst case effects of the hardware or functional failure on the subsystem, mission, and crew and vehicle safety.

1. Crew procedures that take the two good FCS <u>channels</u> to override following two GPC or two MDM failures are considered in assigning criticality.

RATIONALE: Clarifies standard cockpit procedures that can be considered in assigning criticality.

APPENDIX C DETAILED ASSESSMENT

This section contains the IOA assessment worksheets generated during the assessment of this subsystem. The information on these worksheets facilitates the comparison of the NASA FMEA/CIL (Pre and Post 51-L) to the IOA detailed analysis worksheets included in Appendix E. Each of these worksheets identifies the NASA FMEA being assessed, corresponding MDAC Analysis Worksheet ID (Appendix E), hardware item, criticality, redundancy screens, and recommendations. For each failure mode, the highest assessed hardware and functional criticality is compared and discrepancies noted as "N" in the compare row under the column where the discrepancy occurred.

LEGEND FOR IOA ASSESSMENT WORKSHEETS

Hardware Criticalities: = Loss of life or vehicle 1 = Loss of mission or next failure of any redundant item -2 (like or unlike) could cause loss of life/vehicle 3 = All others Functional Criticalities: IR = Redundant hardware items (like or unlike) all of which, if failed, could cause loss of life or vehicle 2R = Redundant hardware items (like or unlike) all of which, if failed, could cause loss of mission Redundancy Screens A, B and C: = Passed Screen Ρ = Failed Screen F NA = Not Applicable NASA Data : Baseline = NASA FMEA/CIL - Baseline with Proposed Post 51-L Changes New CIL Item : X = Included in CIL Compare Row : N = Non compare for that column (deviation)

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		<u> </u>					
ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/86 DPS-100 05-5-B03-2-1		NASA DATA: BASELINE [X] NEW []				
SUBSYSTEM: MDAC ID: ITEM:	DPS 100 MDM FF1,FF2,FF	73,FF4	1				
LEAD ANALYST:	W. A. Haufler						
ASSESSMENT:	La constanta de la composición		· · · · · ·				
CRITICAL FLIGH	ITY REDUND	ANCY SCREENS	CIL ITEM				
	NC A	В	C				
NASA [2 /1R IOA [3 /1R] [P]] [P]	[P] [[P] [P [X] P []	*			
COMPARE [N/] []	[]][ן מ]				
RECOMMENDATIONS:	•						
[3 /1R] [P]	[P] [P] [D] (ADD/DELE	TE)			
* CIL RETENTION	RATIONALE: (If	applicable)					
•			ADEQUATE [X] NADEQUATE []				
REMARKS:			••••				
SIMULTANEOUS DIS MULTIPLE FAILURE			UDED FROM THE IOA	, [.]			
IOA RECOMMENDS R	EPLACING THIS I	PHRASE IN TH	IS NASA/RI FMEA'S				
EFFECTS FIELD "C	OUPLED WITH AND	UNDETECTED	FCS FAILURE (IN TAILURE IN ANOTHI	THE FD			
MDM". IOA DID N	OT CONSIDER DEG	RADED STATE	VECTORS.				
IOA DOES NOT BEL	IEVE THE LOSS O	F TWO STATE	VECTORS WILL CAUS ON ENTRY, THE LO	SE NGG OF			
THE SECOND STATE	VECTOR WILL PE		BITER TO FLY WITH				
REMAINING STATE		DEEVATIATI	ON AND RATIONALE.				
IOA RECOMMENDS D	OWNGRADING HARD	WARE CRITICA	LITY TO 3, THERE				
REMOVING THE FME	A FROM THE CIL.						

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ASSESSMEI ASSESSMEI NASA FMEI	NT DATE: NT ID: A #:	10/06/ DPS-10 05-5-B	86 1 03-2-	-1		NASA DATA BASELINE NEW		
SUBSYSTEN MDAC ID: ITEM:		DPS 101 MDM FI	Fl,FF					
LEAD ANA	LYST:	W. A.	Hauf]	ler				
ASSESSMEN	YT:							
C	ITY F	REI	DUNDA	NCY	SCREEN	S	CIL ITEM	
	HDW/FU	NC	A		В		С	
NASA IOA	[2 /1R [3 /1R]]	[P [P]	[P [P] [] [P] P]	[X]* []
COMPARE	[N /]	[]	[]	[]	[N]
* CIL RET	[3 /lR TENTION] RATIONA	[P]] (If a	[P .ppl:] [icable) I	P] (<i>P</i> ADEQUATE NADEQUATE	[]
COVERED FAILED MI CARD/CHA SIMULTANI MULTIPLE IOA RECON EFFECTS I NULL POSI MDM". IO IOA DOES LOSS OF C THE SECON REMAINING IOA DOES	BY THIS DM PORT NNEL FAI EOUS DIS FAILURE MMENDS F FIELD, " ITION)", OA DID N NOT BEL CREW OR ND STATE G STATE NOT CON DS DOWNG	ROCKWEI - SCU, LURE". SIMILAH S ARE J EPLACIN COUPLED WITH " OT CONS IEVE TH VEHICLE VECTON. VECTOR. CUR WIT RADING	L FM MIA, MIA, FAI INCON IG TH O WITH COUPH SIDER IE LOS C. IN R WIL TH NA HARD	EA W: A/D SISTI IS PI H ANI LED W DEGH SS OF N THE L PEI SA'S WARE	ITH PO' ENT HRAS UNI ITH RADE WOI RMIT REE	FAILURI WER SUF RE EXCI WITH TH E IN TH DETECTE A LIKE D STATE RST CAS THE OF VALUATI	FAILURE I VECTORS. VECTORS W E ON ENTRY	OUTPUT: I/O THE IOA. 206. I FMEA'S LURE (IN THE IN ANOTHER TILL CAUSE I, THE LOSS OF FLY WITH ONE TIONALE. IOA

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-102	NASA DATA: BASELINE [X] NEW []						
SUBSYSTEM: MDÁC ID: ITEM:	DPS 102 MDM FF1,FF2,FF3,FF4	·						
LEAD ANALYST:	W. A. Haufler							
ASSESSMENT:								
FLIGH	T	ITEM						
IOA [3 /IR] [P] [P]] [P] [P]							
COMPARE [N/] [] []	[א] [א]						
RECOMMENDATIONS:	(If different from NAS	SA)						
. [/] [] []	[] [] (ADD/DELETE)						
* CIL RETENTION	RATIONALE: (If applicable) ADEQUATE [X] INADEQUATE []						
SUBSYSTEM: DPS MDAC ID: 102 ITEM: MDM FF1,FF2,FF3,FF4 LEAD ANALYST: W. A. Haufler ASSESSMENT: CRITICALITY REDUNDANCY SCREENS CIL FLIGHT HDW/FUNC A B C NASA [2 /1R] [P] [P] [P] [X] * IOA [3 /1R] [P] [P] [P] [Y] [] [] COMPARE [N /] [] [] [] [] [] [] [] RECOMMENDATIONS: (If different from NASA) [/] [] [] [] [] [] [] [] * CIL RETENTION RATIONALE: (If applicable) ADEQUATE [X]								
NO DIFFERENCES.								
ید. ۱۹۹۳ - ۱۹۹۳ - ۱۹۹۹ ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹ - ۱۹۹۹								

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-103		NASA DATA: BASELINE [X] NEW []					
MDAC ID:	103	`F3,FF4						
LEAD ANALYST:	W. A. Haufler							
ASSESSMENT:								
ASSESSMENT ID: DFS-103 BASELINE [X] NASA FMEA #: 05-5-B03-2-2 NEW [] SUBSYSTEM: DFS MDAC ID: 103 ITEM: MDM FF1,FF2,FF3,FF4 LEAD ANALYST: W. A. Haufler ASSESSMENT: CRITICALITY REDUNDANCY SCREENS CIL FLIGHT REDUNDANCY SCREENS CIL ITEM HDW/FUNC A B C NASA [2 /LR] [P] [P] [P] [Y] [X]* IOA [3 /LR] [P] [P] [P] [J] [] COMPARE [N /] [] [] [] [] [] [] [] RECOMMENDATIONS: (If different from NASA) [/] [] [] [] [] [] [] [] RECOMMENDATIONS: (If different from NASA) [/] [] [] [] [] [] [] RETORMENDATION RATIONALE: (If applicable) * CIL RETENTION RATIONALE: (If applicable) REMARKS: THIS FAILURE MODE "ERRONEOUS OUTPUT TO LRU" IS CONSIDERED TO BE COVERED BY THIS ROCKWELL FMEA WITH FAILURE MODE "ERRONEOUS OUTPUT: ADDRESS CHECK FAILURE, DATA ERROR TO MDM MODULE, OR MODULE SELECT FAILURE".								
NASA [2 /lr IOA [3 /lr] [P]] [P]	[P] [P]	[P] [P]	[X]* []				
COMPARE [N/] []	-[]	[]]	[א]				
RECOMMENDATIONS:	(If differe	ent from N	(ASA)					
[/] []	[]	[]]	[] (ADD/DELETE)				
•	RATIONALE: (If	applicab	ADEQUATE					
THIS FAILURE MOD COVERED BY THIS OUTPUT: ADDRESS	ROCKWELL FMEA CHECK FAILURE AILURE". IALLY CONSIDEF	WITH FAIL , DATA ERI R DEGRADED	URE MODE "EN ROR TO MDM N STATE VECT	RONEOUS MODULE, OR ORS.				

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-104	NASA DATA: BASELINE NEW	[]
SUBSYSTEM: MDAC ID: ITEM:	DPS 104 MDM FF1,FF2,FF3,FF4		
LEAD ANALYST:	W. A. Haufler	-g ¥3 ₹	·
ASSESSMENT:			
CRITICAL FLIGHT HDW/FUN			CIL ITEM
NASA [/ IOA [3 /1R] [] []] [P] [P]	[] [P]	[]*
COMPARE [N /N] [И] [И]	[N]	[]
RECOMMENDATIONS:	(If different from NAS	A)	
. [/] [] []	[] (AD	[] D/DELETE)
	RATIONALE: (If applicable	ADEQUATE	[] []
THIS FAILURE MODI	O NOT COVER THIS FAILURE E, "PREMATURE OPERATION T	O GPC", IS D	ETERMINED TO
s.#2;,- +	് പിട്ടാം മക്ഷാം കേഴവം നിന്നം. പ	no ordenano en	nen en

C-6

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/80 DPS-105 NONE	5		NASA DATA BASELINE NEW	[]					
SUBSYSTEM: MDAC ID: ITEM:	DPS 105 MDM FF1	-								
LEAD ANALYST: W. A. Haufler										
ASSESSMENT:										
CRITICAL FLIGH		REDUNDA	5	CIL ITEM						
HDW/FU	-	A	В	С						
NASA [/ IOA [3 /lR] [] P]	[]. [[P] [] P]	[]*					
COMPARE [N/N] [ן א	[и] [N]	[]					
RECOMMENDATIONS:	(If d:	ifferent	from NASA	I .						
[/] [J	[]][] (AI	[] DD/DELETE)					
* CIL RETENTION 1	RATIONALI	E: (If a		ADEQUATE IADEQUATE	[] , []					
REMARKS: THIS FAILURE MOD BE NON-CREDIBLE.	E "PREMA	TURE OPE	ERATION TO	LRU" IS DEI	FERMINED TO					

REPORT DATE 12/01/86 C-7

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/96 DPS-106 05-5-B03-2-	-2	NASA DATA BASELINE NEW	[X]
SUBSYSTEM: MDAC ID: ITEM:	DPS 106 MDM FF1,FF2	2,FF3,FF4		
LEAD ANALYST:	W. A. Haufl	er		
ASSESSMENT:				
CRITICAL		UNDANCY SCREENS	5	CIL
FLIGH HDW/FU		В	С	ITEM
NASA [2 /1R IOA [3 /1R] [P]] [P]	. [P] [[P] [P] P]	[X] *
COMPARE [N/] []	ז ניז נ]	[N]
RECOMMENDATIONS:	(If diffe	erent from NASA)	
ſ /] []	[][] (AI	[] DD/DELETE)
* CIL RETENTION N	RATIONALE: ()	/	ADEQUATE IADEQUATE	[X] []
IOA DID NOT INIT: IOA DOES CONCUR				

NO DIFFERENCES.

REPORT DATE 12/01/86

C-8

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	20/0//00	NASA DATA: BASELINE [X] NEW []								
MDAC ID:	DPS 107 MDM FF1,FF2,FF3,FF4	•								
LEAD ANALYST:	W. A. Haufler									
ASSESSMENT:										
CRITICALITY REDUNDANCY SCREENS CIL FLIGHT ITEM HDW/FUNC A B C										
NASA [2 /1R IOA [3 /1R] [P] [P] [] [P] [P] [P] [X]* P] []								
COMPARE [N/] [] [] [ן א]								
RECOMMENDATIONS:	(If different from NASA)	· · ·								
[/] [] [] [] [] (ADD/DELETE)								
* CIL RETENTION		ADEQUATE [X] ADEQUATE []								
CONSIDERED TO BE "ERRONEOUS OUTPU" MODULE, OR MODUI IOA DID NOT INIT	DE "STUCK ON A CONSTANT OUTH COVERED BY THIS ROCKWELL F T: ADDRESS CHECK FAILURE, LE SELECT FAILURE". TALLY CONSIDER DEGRADED STA WITH NASA'S REEVALUATION AN	MEA WITH FAILURE MODE DATA ERROR TO MDM TE VECTORS.								

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/86 DPS-108 05-5-B03-2-1	NASA DATA: BASELINE [X] NEW []
	DPS 108 MDM FF1,FF2,FF3,FF4	
LEAD ANALYST:	W. A. Haufler	
ASSESSMENT:		
FLIGHT	ITY <u>REDUNDANCY</u> SCREENS I NC A B	ITEM
NASA [2/1R IOA [3/1R] [P] [P] [] [P] [P] [P] [X]* P] []
COMPARE [N/	J [] [] [] [ן אן
RECOMMENDATIONS:	(If different from NASA)	,
[3 /1R] [P] [P] [P] [D] (ADD/DELETE)
* CIL RETENTION F		ADEQUATE [X] ADEQUATE []
BE COVERED BY TH: FAILED MDM PORT CARD/CHANNEL FAI SIMULTANEOUS DISS	E "FALSELY STUCK ON BUSY MC IS ROCKWELL FMEA WITH FAILU - SCU, MIA, A/D, POWER SUPF LURE". SIMILAR FAILURES WERE EXCLU- S ARE INCONSISTENT WITH THE	DDE" IS CONSIDERED TO JRE MODE "NO OUTPUT: PLIES, OR I/O JDED FROM THE IOA.
IOA RECOMMENDS RI EFFECTS FIELD, "C NULL POSITION)", MDM". IOA DID NC IOA DOES NOT BELI LOSS OF CREW OR V THE SECOND STATE REMAINING STATE V IOA DOES NOT CONC	EPLACING THIS PHRASE IN THE COUPLED WITH AN UNDETECTED WITH "COUPLED WITH A LIKE OT CONSIDER DEGRADED STATE EVE THE LOSS OF TWO STATE V VEHICLE. IN THE WORST CASE VECTOR WILL PERMIT THE ORE VECTOR. CUR WITH NASA'S REEVALUATIO RADING HARDWARE CRITICALITY	E NASA/RI FMEA'S FCS FAILURE (IN THE FAILURE IN ANOTHER VECTORS. VECTORS WILL CAUSE ON ENTRY, THE LOSS OF BITER TO FLY WITH ONE N AND RATIONALE. IOA

REPORT DATE 12/01/86 C-10

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #: SUBSYSTEM:	10/06/86 DPS-120 05-5-B03	5 9-1-1		NASA DATA: BASELINE NEW	
MDAC ID:	120	,FA2,FA3,			
LEAD ANALYST:	W. A. Ha	ufler			
ASSESSMENT:					
CRITICAL FLIGH HDW/FU	r	REDUNDAN	CY SCREENS B	c	CIL ITEM
HDW/FU	NC	A	D	C	
NASA [2/lr IOA [3/lr] [P][P][P] [P] [P] P]	[X]* []
COMPARE [N/] [] [] []	[N]
RECOMMENDATIONS:	(If d	ifferent	from NASA)	i i	•
[3 /1R	j (P] [P] [P] (AI	[D] DD/DELETE)
* CIL RETENTION	RATIONALE	E: (If ap)		ADEQUATE NADEQUATE	[X] []
REMARKS: SIMULTANEOUS DIS MULTIPLE FAILURE IOA RECOMMENDS R EFFECTS FIELD, " NULL POSITION)", MDM". IOA DOES NOT CON IOA RECOMMENDS D REMOVING THE FME	S ARE INC EPLACING COUPLED V WITH "CC CUR WITH	CONSISTEN THIS PHR WITH AN U DUPLED WI NASA'S R NG THE HA	T WITH TH ASE IN TH NDETECTED TH A LIKE EEVALUATIO	E NSTS 222 IS NASA/RI FCS FAILUI FAILURE IN ON AND RAT	06. FMEA'S RE (IN THE N ANOTHER IONALE.

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ASSESSMENT I										ASA DAT BASELIN NE	E [X]
SUBSYSTEM: MDAC ID: ITEM:		DPS 121 MDM F	'Al,F	FA2,FA	3,3	FA	4	-			
LEAD ANALYST	:	W. A.	Hau	fler							
ASSESSMENT:											
	ICALI LIGHT	ITY	R	EDUND	AN	CY	SCRE	ENS	}		CIL
		4C	A			в			с		ITEM
NASA [2 IOA [3	/lR /lR]]	[P [P]	[[P P]	[[P P]	[X] * []
COMPARE [N	17]	[]	[]	[]	[N],
RECOMMENDATI	ONS:	(If	dif	feren	t	fr	om NA	SA)			
[3	/IR]	[P]	[P]	[P		[D] ADD/DELETE)
* CIL RETENT	ION P	RATION	ALE:	(If ;	apı	91 :	icabl	•		EQUATE EQUATE	
THIS FAILURE BY THE ROCKW PORT - SCU, FAILURE".	ELL I	FMEA WI	ITH '	FAILU	RE	M	DDE "	NO	OU.	TPUT:	
SIMULTANEOUS MULTIPLE FAI IOA RECOMMEN EFFECTS FIEL NULL POSITIO MDM".	LURE: DS R D, "(s are Eplaci Couplei	INCC NG I D WI	NSIST HIS P TH AN	EN PHR U	T AS ND	WITH E IN ETECI	THE THI ED	e n Is Fc	ISTS 22 NASA/R S FAIL	206. I FMEA'S URE (IN THE
IOA DOES NOT	DS D	OWNGRA	DING	THE	HÁ						TIONALE. TO 3, THEREBY

ASSESSMEI ASSESSMEI NASA FMEZ	NT	I	D:	DPS	-12	2		-2						ASA D Basel		[x]]		
SUBSYSTEN MDAC ID: ITEM: ·	M:			DPS 122 MDN																
LEAD ANA	LY	ST	:	w .	A.	Ha	uf	ler												
ASSESSMEN	NT :	:																		
¢		FI	ICALI LIGHI	2					DAN		SCI	REENS	с				IL CEN	1		
	1	104	V/FUI	NC			Α			В			-							
NASA IOA			/1R /1R] [P P]	[[P P]	[[P P]		[[X]	*	
COMPARE	[N	/]		נ]	[]	[]		נ	N	ן		
RECOMMEN	DA	TI	ONS:	((If	di	.f1	ere	nt	fr	om 1	NASA)							
	.[/]		[]	ן ני]	[]	(AI	•	/DI		ETE)	Ì
* CIL RE	ΓEI	NT:	ION I	RATI	ONA	LE	:	(If	apj	91 :	icab			DEQUA DEQUA		[[x]]		
REMARKS: IOA DID I IOA DOES	NO' C	T ON	INIT CUR	IALI WITH	LY (H NZ	con As <i>i</i>	15] 4'5	DER RE	E/ EVA	T LU	SEP ATI	DOO: ON A	RS ND	CLOS RATI	ING	P: LE	RE	MA	TUR	ELY.

NO DIFFERENCES.

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-123			NASA DATA BASELINE NEW	[X]
SUBSYSTEM: MDAC ID: ITEM:	DPS 123 MDM FA1	, FA2, FA3	,FA4		
LEAD ANALYST:	W. A. Ha	aufler			
ASSESSMENT:					
CRITICAL FLIGH		REDUNDAN	NCY SCREEN	S	CIL ITEM
HDW/FU.		A	В	С	
NASA [2 /1R IOA [3 /1R] [] [P] [P] [[P] [[P] [P] P]	[X]* []
COMPARE [N/] []	[]][3	ן א ן
RECOMMENDATIONS:	(If d	ifferent	from NASA)	۰.
. [/] [¹] [ַ <u>י</u> ו]	[] DD/DELETE)
* CIL RETENTION 1	RATIONALI	E: (If ap		ADEQUATE NADEQUATE	[X] []
REMARKS: THIS FAILURE MODE "ERRONEOUS OUTPUT TO LRU" IS CONSIDERED TO BE COVERED BY THIS ROCKWELL FMEA WITH FAILURE MODE "ERRONEOUS OUTPUT: ADDRESS CHECK FAILURE, DATA ERROR TO MDM MODULE, OR MODULE SELECT FAILURE". IOA DOES CONCUR WITH NASA'S REEVALUATION AND RATIONALE. NO DIFFERENCES.					

REPORT DATE 12/01/86 C-14

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-124 BASELI	
SUBSYSTEM: MDAC ID: ITEM:	DPS 124 MDM FA1,FA2,FA3,FA4	
LEAD ANALYST:	W. A. Haufler	
ASSESSMENT:		
CRITICAL FLIGH HDW/FU		CIL ITEM
NASA [/ IOA [3 /lr] [] [] []] [P] [P] [P]	[] *
COMPARE [N/N] [И] [И] [И]	[]
RECOMMENDATIONS:	(If different from NASA)	
· [/] [] [] []	[] (ADD/DELETE)
`	RATIONALE: (If applicable) ADEQUAT INADEQUAT	
	D NOT COVER THIS FAILURE MODE. DE, "PREMATURE OPERATION TO GPC", I	S DETERMINED TO

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-125	NASA DATA: BASELINE [] NEW []
SUBSYSTEM: MDAC ID: ITEM:	DPS 125 MDM FA1,FA2,FA3,FA4	■ Mana ya separa na ta
LEAD ANALYST:	W. A. Haufler	
ASSESSMENT:		
	ITY REDUNDANCY SCREE	ITEM
FLIGH HDW/FU		C
NASA [/ IOA [3 /1R] [] [] []] [P] [P]	[] / [] * . [P] / []
COMPARE [N /N	ן מן נאן	
RECOMMENDATIONS:	(If different from NAS	5A)
[/] [] []	[] [] (ADD/DELETE)
* CIL RETENTION	RATIONALE: (If applicable	ADEQUATE [] INADEQUATE []
	D NOT COVER THIS FAILURE E, "PREMATURE OPERATION I	MODE.

REPORT DATE 12/01/86 C-16

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-126		TA: NE [X] EW []
SUBSYSTEM: MDAC ID: ITEM:	DPS 126 MDM FA1,FA2,FA	13,FA4	
LEAD ANALYST:	W. A. Haufler		
ASSESSMENT:			
CRITICAL FLIGH		DANCY SCREENS	CIL ITEM
HDW/FU		ВС	
NASA [2 /1R IOA [3 /1R] [P]] [P]	[P] [P] [P] [P]	[X]* []
COMPARE [N/] [.]	[]][]	[א]
RECOMMENDATIONS:	(If differer	nt from NASA)	
ι /] []	נז נז	[] (ADD/DELETE)
* CIL RETENTION	RATIONALE: (If	applicable) ADEQUAT INADEQUAT	
REMARKS: IOA DID NOT INIT IOA DOES CONCUR	IALLY CONSIDER WITH NASA'S REP	E/T SEP DOORS CLOSI EVALUATION AND RATIO	NG PREMATURELY.

NO DIFFERENCES.

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C-17

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-127	NASA DATA: BASELINE [X] NEW []			
SUBSYSTEM: MDAC_ID: ITEM:	DPS 127 MDM FA1,FA2,FA3,FA	A4			
LEAD ANALYST:	W. A. Haufler				
ASSESSMENT:					
CRITICAL FLIGH	ITY REDUNDANCY	Y SCREENS CIL ITEM			
HDW/FU					
NASA [2 /1R IOA [3 /1R	[P] [P] [P] [P]	P] [P] [X]* P] [P] []			
COMPARE [N/] [] [] [ן (א) בייייי בייייי (א) (א) בייייי בייייי בייייי בייייי בייייי בייייי בייייי בייייי ביייי בייי ביייי ביייי ביייי בייי ביייי ביייי ביייי ביייי בייי ביייי ביייי ביייי ביייי ביייי בייי ביי			
RECOMMENDATIONS:	(If different fr	rom NASA)			
[/] [] [] [] [] (ADD/DELETE)			
* CIL RETENTION RATIONALE: (If applicable) ADEQUATE [X] INADEQUATE []					
REMARKS: THIS FAILURE MODE "STUCK ON A CONSTANT OUTPUT TO LRU" IS CONSIDERED TO BE COVERED BY THIS ROCKWELL FMEA WITH FAILURE MODE "ERRONEOUS OUTPUT: ADDRESS CHECK FAILURE, DATA ERROR TO MDM MODULE, OR MODULE SELECT FAILURE". IOA DID NOT INITIALLY CONSIDER E/T SEP DOORS CLOSING PREMATURELY. IOA DOES CONCUR WITH NASA'S REEVALUATION AND RATIONALE. NO DIFFERENCES.					

REPORT DATE 12/01/86 C-18

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:		NASA DATA: BASELINE [X] NEW []
SUBSYSTEM: MDAC ID: ITEM:	DPS 128 MDM FA1,FA2,FA3,FA4	
LEAD ANALYST:	W. A. Haufler	
ASSESSMENT:		
	ITY REDUNDANCY SCREEN	S CIL ITEM
FLIGH HDW/FU		C
NASA [2 /1R IOA [3 /1R] [P] [P] [] [P] [P] [P] [X]* P] []
COMPARE [N/	<u>ן</u> ניז ניז נ	[И] [
RECOMMENDATIONS:	(If different from NASA)
[3 /1R] [P] [P] [P] [] (ADD/DELETE)
* CIL RETENTION	RATIONALE: (If applicable) I	ADEQUATE [X] NADEQUATE []
BE COVERED BY TH FAILED MDM PORT- CARD/CHANNEL FAI SIMULTANEOUS DIS MULTIPLE FAILURE IOA RECOMMENDS F EFFECTS FIELD, " NULL POSITION)", MDM."	DE "FALSELY STUCK ON BUSY M IS ROCKWELL FMEA WITH FAII -SCU, MIA, A/D, POWER SUPPL	ODE" IS CONSIDERED TO JURE MODE "NO OUTPUT: JES, OR I/O JUDED FROM THE IOA. IE NSTS 22206. IS NASA/RI FMEA'S FCS FAILURE (IN THE FAILURE IN ANOTHER

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C-19

ASSESSME ASSESSME NASA FME	NT ID:	DPS-14				NASA I BASEI	DATA: LINE [X] NEW []
SUBSYSTE MDAC ID: ITEM:		DPS 140 MDM PF					
LEAD ANA	LEAD ANALYST: W. A. Haufler						
ASSESSME	NT:						
	CRITICAL		REDUN	DANCY	SCRE	ENS	CIL
	FLIGH HDW/FU		A	в		C	ITEM
NASA IOA]]	[P] [P]	[P [P]	[P] [P]	
COMPARE	[N /]	[]	ľ]	[]	[N]
RECOMMEN	DATIONS:	(If	differe	nt fr	om NA	SA)	
	[/]	[]	[]	ſĴ	[] (ADD/DELETE)
•••	TENTION	RATIONA	LE: (If	appl	icabl	e) ADEQUA INADEQUA	
REMARKS: IOA DID COMMAND.		IALLY C	ONSIDER	LOSS	OF P	AYLOAD BA	Y DOORS CLOSE
	CONCUR		SA'S RE	EVALU	ATION	AND RAT	IONALE.
						· · · · · · · · · · · · · · · · · · ·	
							· · · ·
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REPORT DATE 12/01/86

C-20

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:		NASA DATA: BASELINE [X] NEW []			
	DPS 141 MDM PF1,PF2				
LEAD ANALYST:	W. A. Haufler				
ASSESSMENT:					
CRITICALI FLIGHT HDW/FUN		S CIL ITEM C			
NASA [2 /1R IOA [3 /1R] [P] [P] [] [P] [P] [P] [X]* P] []			
COMPARE [N/] [] [] [] []	[א] [
RECOMMENDATIONS:	(If different from NASA	.)			
[/] [] [] [] [] [] (ADD/DELETE)			
	RATIONALE: (If applicable) I	ADEQUATE [X] NADEQUATE []			
REMARKS: THIS FAILURE MODE "LOSS OF OUTPUT TO LRU" IS CONSIDERED TO BE COVERED BY THIS ROCKWELL FMEA WITH FAILURE MODE "NO OUTPUT: FAILED MDM PORT-SCU, MIA, A/D, POWER SUPPLIES, OR I/O CARD/CHANNEL FAILURE". IOA DID NOT INITIALLY CONSIDER LOSS OF PAYLOAD BAY DOORS CLOSE					
COMMAND. IOA DOES CONCUR N NO DIFFERENCES.	WITH NASA'S REEVALUATION A	ND RATIONALE.			

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C-21

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/86 DPS-142 05-5-B03-5-2	NASA DATA BASELINE NEW	[X]
SUBSYSTEM: MDAC ID: ITEM:	DPS 142 MDM PF1,PF2		
LEAD ANALYST:	W. A. Haufler		
ASSESSMENT:			
	ITY REDUNDA	NCY SCREENS	CIL
FLIGH HDW/FU		ВС	ITEM
NASA [2 /1R IOA [3 /1R] [P]] [P]	[P] [P] [P] [P]	[X] * [] _
COMPARE [N/	נ ז נ	[] []	[N]
RECOMMENDATIONS:	(If different	from NASA)	· · · · · · · · · · · · · · · · · · ·
[/	ניין נ	[] [] (AI	[] DD/DELETE)
* CIL RETENTION 1	RATIONALE: (If a	pplicable) ADEQUATE INADEQUATE	
DOOR'S LATCH TO	UNLATCH.	NADVERTENT COMMAND TO ALUATION AND RATIONA	•

REPORT DATE 12/01/86 C-22

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/86 DPS-143 05-5-B03	5-5-2		NASA DATA: BASELINE NEW	[X]
MDAC ID:	DPS 143 MDM PF1,				
LEAD ANALYST:	W. A. Ha	ufler			
ASSESSMENT:					
CRITICAL FLIGH	ITY	REDUNDANC	Y SCREENS		CIL ITEM
	NC	A	B	с	
NASA [2/lR IOA [3/lR] [P][P].[P] [P] [P] P]	[X]* · []
COMPARE [N/] [] . [.] []	[N]
RECOMMENDATIONS:	(If d:	ifferent f	rom NASA)		
[/] [] [] []	[] D/DELETE)
* CIL RETENTION	RATIONALI	E: (If app)		ADEQUATE IADEQUATE	[X] [] ·
REMARKS: THIS FAILURE MOD COVERED BY THIS OUTPUT: ADDRESS MODULE SELECT FA IOA DID NOT INIT DOOR'S LATCH TO IOA DOES CONCUR	ROCKWELL CHECK FA AILURE". IALLY CON UNLATCH.	FMEA WITH LILURE, DAT	FAILURE TA ERROR OVERTENT	MODE "ERRO TO MDM MOI COMMAND TO	DNEOUS DULE, OR D PAYLOAD BAY
NO DIFFERENCES.					

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/86 DPS-144 NONE		NASA DATA BASELINE NEW	
SUBSYSTEM: MDAC ID: ITEM:	DPS 144 MDM PF1,P	PF2	1 - 1712 and 1944 and 1944 An an	
LEAD ANALYST:	W. A. Hau	fler		
ASSESSMENT:				
		EDUNDANCY SC	REENS	CIL
FLIGH HDW/FU		В	С	ITEM
NASA [/ IOA [3 / IR] [] [P) []) [P]	[] [P]	[·] .* []
COMPARE [N /N] · []	4] [И]	[.N]	[]
RECOMMENDATIONS:	(If dif	ferent from	NASA)	
[/] [] []	[] (A	[] .DD/DELETE)
* CIL RETENTION	RATIONALE:	(If applica	ble) ADEQUATE INADEQUATE	
REMARKS: ROCKWELL/NASA DI THIS FAILURE MOD BE NON-CREDIBLE.	D NOT COVE E, "PREMAT	R THIS FAILU URE OPERATIO	RE MODE. N TO GPC", IS	DETERMINED TO

REPORT DATE 12/01/86 C-24

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:				NASA DATA BASELINE NEW	[]
	DPS 145 MDM PF1,PF	72				
LEAD ANALYST:	W. A. Hauf	ler				
ASSESSMENT:						
CRITICAL FLIGH	r	EDUNDANCY		-	CIL ITEM	
HDW/FU	NC A	B		Ċ		
NASA [/ IOA [3 /1R] [] [P] [] [P) [] [] P]	[] *].
COMPARE [N/N	и] (] [^ N	·) [ן א]	[]
RECOMMENDATIONS:	(If dif:	ferent fr	om NASA	A)		
ι (/] [ן נ] [[] (A)	[DD/DE] LETE)
* CIL RETENTION	RATIONALE:	(If appl		ADEQUATE INADEQUATE	-]
REMARKS: ROCKWELL/NASA DI THIS FAILURE MOD BE NON-CREDIBLE.	E, "PREMAT	R THIS FA	ILURE I	MODE. D LRU", IS 1	DETERI	MINED TO

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/86 DPS-146 05-5-B03-5-	-2	NASA DATA BASELINE NEW	[X]	
SUBSYSTEM: MDAC ID: ITEM:	DPS 146 MDM PF1,PF2	2	- 14.	*** **	
LEAD ANALYST:	W. A. Hauf]	ler			
ASSESSMENT:					
CRITICAL		DUNDANCY SCREE	NS	CIL	
FLIGH HDW/FU		В	c	ITEM	
NASA [2/lR IOA [3/lR] [P]] [P]	[P] [P]	[P] [P]	[X] *]	
COMPARE [N/] [·] []	[]]	נא]	
RECOMMENDATIONS: (If different from NASA)					
[/] []	[]]	[] (A)	[] DD/DELETE)	
* CIL RETENTION RATIONALE: (If applicable) ADEQUATE [X] INADEQUATE [] REMARKS:					
IOA DID NOT INITIALLY CONSIDER INADVERTENT COMMAND TO PAYLOAD BAY DOOR'S LATCH TO UNLATCH. IOA DOES CONCUR WITH NASA'S REEVALUATION AND RATIONALE. NO DIFFERENCES.					

REPORT DATE 12/01/86 C-26

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ASSESSMENT DATE: 10/06/86 ASSESSMENT ID: DPS-147 NASA DATA: BASELINE [X] NEW [] 05-5-B03-5-2 NASA FMEA #: SUBSYSTEM: DPS MDAC ID: 147 MDM PF1, PF2 ITEM: LEAD ANALYST: W. A. Haufler ASSESSMENT: CIL CRITICALITY REDUNDANCY SCREENS ITEM FLIGHT A B HDW/FUNC C [P]·[P] [P] [P] [P] [P] -[X]* NASA [2/lR]IOA $\begin{bmatrix} 3 \\ 1R \end{bmatrix}$ COMPARE [N /] [] [] [] [N] RECOMMENDATIONS: (If different from NASA)] (ADD/DELETE) * CIL RETENTION RATIONALE: (If applicable) ADEQUATE [X] INADEQUATE [. **REMARKS:** THIS FAILURE MODE "STUCK ON A CONSTANT OUTPUT TO LRU" IS CONSIDERED TO BE COVERED BY THIS ROCKWELL FMEA WITH FAILURE MODE "ERRONEOUS OUTPUT: ADDRESS CHECK FAILURE, DATA ERROR TO MDM MODULE, OR MODULE SELECT FAILURE". IOA DID NOT INITIALLY CONSIDER INADVERTENT COMMAND TO PAYLOAD BAY DOOR'S LATCH TO UNLATCH. IOA DOES CONCUR WITH NASA'S REEVALUATION AND RATIONALE. NO DIFFERENCES.

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/86 DPS-148 05-5-B03-5-1	1	NASA DATA: BASELINE [X] NEW []			
SUBSYSTEM:	DPS 148 MDM PF1,PF2					
LEAD ANALYST:	W. A. Haufler		· · · · ·			
ASSESSMENT:						
FLIGH	ITY REDUND. T NC A		ITEM			
NASA [2 /1R IOA [3 /1R] · [P]] [P]	[P] [F [P] [F	>] [X] * >] []			
COMPARE [N /] []]	[]][]	ן א <u>יי</u> ייא (א)			
RECOMMENDATIONS: (If different from NASA)						
[/] []	[] [] [] (ADD/DELETE)			
* CIL RETENTION 1	RATIONALE: (If a	pplicable)	enter a la companya de la companya d			
	· · ·	A	DEQUATE [X] DEQUATE []			
REMARKS: THIS FAILURE MODE "FALSELY STUCK ON BUSY MODE" IS CONSIDERED TO BE COVERED BY THIS ROCKWELL FMEA WITH FAILURE MODE "NO OUTPUT: FAILED MDM PORT - SCU, MIA, A/D, POWER SUPPLIES, OR I/O CARD/CHANNEL FAILURE". IOA DID NOT COVER THIS FAILURE MODE IN THE ORIGINAL ANALYSIS. IOA DOES CONCUR WITH NASA'S REEVALUATION AND RATIONALE. A SECOND MDM FAILURE WOULD REQUIRE EVA TO CLOSE PAYLOAD BAY DOORS FOR WORST CASE FAILURE MODE. NO DIFFERENCES.						

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/86 DPS-180 05-5-B03-4-1	NASA DATA BASELINE NEW	[X]	
SUBSYSTEM: MDAC ID: ITEM:	DPS 180 MDM LF1, LA1			
LEAD ANALYST:	W. A. Haufler			
ASSESSMENT:				
CRITICAL FLIGH		NS	CIL ITEM	
HDW/FU		С		
NASA [3 /2R IOA [3 /2R	[P] [NA] [P] [NA]	[P] [P]	[]*	
COMPARE [/] [] []	[]	[]	
RECOMMENDATIONS: (If different from NASA)				
[/	J [] []	[] (A	[] .DD/DELETE)	
* CIL RETENTION	RATIONALE: (If applicable	e) ADEQUATE INADEQUATE		
NO DIFFERENCES.				

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:		NASA DA BASELI N	TA: NE [X] EW []		
SUBSYSTEM: MDAC ID: ITEM:	DPS 181 MDM LF1,LA1				
LEAD ANALYST:	W. A. Haufler				
ASSESSMENT:					
CRITICAL FLIGH	ITY REDUND	ANCY SCREENS	CIL ITEM		
HDW/FU		ВС	TIEM		
NASA [3 /2R IOA [3 /2R] [P]] [P]	[NA] [P] [NA] [P]	[]*		
COMPARE [/	1 [1]	[]][]	[]		
RECOMMENDATIONS: (If different from NASA)					
ī Ž] []	[]]]]]	[] (ADD/DELETE)		
* CIL RETENTION RATIONALE: (If applicable) ADEQUATE [] INADEQUATE []					
REMARKS: THIS FAILURE MODE "LOSS OF OUTPUT TO LRU" IS CONSIDERED TO BE COVERED BY THIS ROCKWELL FMEA WITH FAILURE MODE "NO OUTPUT: FAILED MDM PORT - SCU, MIA, A/D, POWER SUPPLIES, OR I/O CARD/CHANNEL FAILURE". NO DIFFERENCES.					

NO DIFFERENCES.

REPORT DATE 12/01/86 C-30

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:		NASA DATA BASELINE NEW	2 [X]
SUBSYSTEM: MDAC ID: ITEM:	DPS 182 MDM LF1,LA1		
LEAD ANALYST:	W. A. Haufler		
ASSESSMENT:			
CRITICAL FLIGH		DANCY SCREENS	CIL ITEM
HDW/FU	NC A	ВС	
NASA [3 /2R IOA [3 /2R] [P]] [P]	[NA] [P] [NA] [P]	[] * []
COMPARE [/] []	[][]	[]
RECOMMENDATIONS:	(If differe	ent from NASA)	
[/] []	[][](2	[] ADD/DELETE)
* CIL RETENTION	RATIONALE: (If	applicable) ADEQUATE INADEQUATE	[]
NO DIFFERENCES.			

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REPORT DATE 12/01/86 C-31

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/86 DPS-183 05-5-B03-4-2	NASA DATA BASELINE NEW	[X]
SUBSYSTEM: MDAC ID: ITEM:	DPS 183 MDM LF1,LA1	ang sa	
LEAD ANALYST:	W. A. Haufler	- · · · · · · · ·	
ASSESSMENT:			
CRITICAL FLIGH HDW/FUI	r i i i i i i i i i i i i i i i i i i i	ANCY SCREENS B C	CIL ITEM
NASA [3 /2R IOA [3 /2R		[NA] [P] [NA] [P]	[] * ^{***}
COMPARE [/] []	[][]	[]
RECOMMENDATIONS:	(If differen	t from NASA)	.
[/] []	[] [] (A	[] DD/DELETE)
* CIL RETENTION I	RATIONALE: (If a	applicable) ADEQUATE INADEQUATE	
COVERED BY THIS		TPUT TO LRU" IS CONSI ITH FAILURE MODE "ERR	

NO DIFFERENCES.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/86 DPS-184 NONE	NASA DATA: BASELINE NEW	[]
MDAC ID:	DPS 184 MDM LF1,LA1		
LEAD ANALYST:	W. A. Haufler		
ASSESSMENT:			
CRITICAL FLIGH			CIL ITEM
HDW/FUI		с	
NASA [/ IOA [3 /2R] [] [] [] [P] [NA] []] P]	[]*
COMPARE [N /N	ן נאן נאן ני	ן א	[] _.
RECOMMENDATIONS:	(If different from NASA)		
[/] [] [] [] [] []] (AI	[] D/DELETE) .
* CIL RETENTION 1		ADEQUATE ADEQUATE	[]
ROCKWELL/NASA DI	D NOT COVER THIS FAILURE MC E. "PREMATURE OPERATION TO	DE. GPC". IS D	ETERMINED TO

THIS FAILURE MODE, "PREMATURE OPERATION TO GPC", IS DETERMINED TO BE NON-CREDIBLE.

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/86 DPS-185 NONE	NASA DATA BASELINE NEW	[]	n - 2 a 12
MDAC ID:	DPS 185 MDM LF1,LA1			
LEAD ANALYST:	W. A. Haufler			
ASSESSMENT:				
CRITICAL FLIGH		;	CIL ITEM	
HDW/FU		с	T I EM	
NASA [/ IOA [3 /2R] [] []] [P] [NA] [] P]		
COMPARE [N/N] [N] [N] [N]	[]	
RECOMMENDATIONS:	(If different from NASA)			
[/]	J [] [] [] (Al	[] DD/DELETE)	
* CIL RETENTION I		ADEQUATE ADEQUATE	[] [,]	• •
ROCKWELL/NASA DI	D NOT COVER THIS FAILURE MC E, "PREMATURE OPERATION TO		DETERMINED TO	D

REPORT DATE 12/01/86 C-34

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/86 DPS-186 05-5-B03-4-2	NASA DATA: BASELINE NEW	[X] []
SUBSYSTEM: MDAC ID: ITEM:	DPS 186 MDM LF1,LA1		
LEAD ANALYST:	W. A. Haufler		
ASSESSMENT:			
CRITICAL FLIGH			CIL ITEM
HDW/FUI		С.	
NASA [3 /2R IOA [3 /2R] [P] [NA] [] [P] [NA] [P] P]	[] * []
COMPARE [/] [] [] [] [J	[]
RECOMMENDATIONS:	(If different from NASA)		
[/	1 [] [] [] (AI	[] DD/DELETE)
* CIL RETENTION N REMARKS: NO DIFFERENCES.		ADEQUATE ADEQUATE	[]

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REPORT DATE 12/01/86 C-35

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMÉA #:	10/06/86 DPS-187 05-5-B03-4-2	NASA DATA: BASELINE [X] NEW []
SUBSYSTEM: MDAC ID: ITEM:	DPS 187 MDM LF1,LA1	
LEAD ANALYST:	W. A. Haufler	
ASSESSMENT:		• • • • • • • • • • • • • • • • • • •
CRITICAL FLIGH HDW/FU		C CIL ITEM C
NASA [3 /2R IOA [3 /2R] [P] [NA] [] [P] [NA] [P] []**** P] []
COMPARE [/	J [] [] [] []
RECOMMENDATIONS:	(If different from NASA)	I
[/] [] [] [] [] (ADD/DELETE)
	RATIONALE: (If applicable)	ADEQUATE [] IADEQUATE []
BE COVERED BY TH	E "STUCK ON A CONSTANT OUT IS ROCKWELL FMEA WITH FAILU CHANNEL".	

REPORT DATE 12/01/86

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:			ATA: INE [X] VEW []
	DPS 188 MDM LF1,LA1		
LEAD ANALYST:	W. A. Haufler		
ASSESSMENT:			
CRITICALI FLIGHT		ANCY SCREENS	CIL ITEM
HDW/FUN		ВС	
NASA [3 /2R IOA [3 /2R] [P]] [P]	[NA] [P] [NA] [P]	[] * []
COMPARE [/] []	[] []]	[]
RECOMMENDATIONS:	(If differen	t from NASA)	
[/	J []	τι	[] (ADD/DELETE)
* CIL RETENTION I	RATIONALE: (If a	applicable) ADEQUA INADEQUA	
REMARKS: THIS FAILURE MODE "FALSELY STUCK ON BUSY MODE" IS CONSIDERED TO BE COVERED BY THIS ROCKWELL FMEA WITH FAILURE MODE "NO OUTPUT: MDM FAILED PORT - SCU, A/D, MIA, POWER SUPPLY, OR I/O CHANNEL".			

REPORT DATE 12/01/86 C-37

NO DIFFERENCES.

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMÉA #:	10/15/86 DPS-190 05-6S-BRES3-1		NASA DATA BASELINE NEW	:[]
SUBSYSTEM: MDAC ID: ITEM:	DPS 190 RESISTOR, CURI	RENT LIMIT	ING	
LEAD ANALYST:	W. A. HAUFLER			
ASSESSMENT:				
CRITICAL FLIGH	ITY REDUND.	ANCY SCREE	NS	CIL ITEM
HDW/FU		В	C	
NASA [3 /1R IOA [3 /1R] [P]] [P]	[F] [F]	[P] [P]	[X]* []
COMPARE [/] []	ַנ ז	[]	[N]
RECOMMENDATIONS:	(If differen	t from NAS	A)	
[/	1 []	[]		[] DD/DELETE)
* CIL RETENTION	RATIONALE: (If a		ADEQUATE	α δ
INADEQUATE [X] REMARKS: THE IOA DID NOT COVER THIS ITEM IN THE ORIGINAL ANALYSIS. THE IOA DOES CONCUR WITH NASA'S REEVALUATION. THE CIL RETENTION RATIONALE IS INADEQUATE BECAUSE IT IS NOT YET AVAILABLE.				

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DPS-191		BASELINE	-
191	ler, remote	POWER	
W. A. H	AUFLER		
	REDUNDANCY	SCREENS	CIL ITEM
-	A B	С	
] [] [P][F P][F] [P]] [P]	[X]* [X`]
] [[]][] []	[.]
(If d	lifferent fr	om NASA)	
] [] [] [] (2	[] ADD/DELETE)
RATIONAL	E: (If appl:	ADEQUATE	
REMARKS: THE IOA DID NOT COVER THIS ITEM IN THE ORIGINAL ANALYSIS. THE IOA DOES CONCUR WITH NASA'S REEVALUATION. THE CIL RETENTION RATIONALE IS INADEQUATE BECAUSE IT IS NOT YET AVAILABLE.			
	DPS-191 05-6S-B DPS 191 CONTROL W. A. H ITY T NC] [] [] [] [] [RATIONAL COVER TH ICUR WITH	191 CONTROLLER, REMOTE W. A. HAUFLER ITY REDUNDANCY T NC A B] [P] [F] [P] [F] [J] [(If different fr] [] [RATIONALE: (If app] COVER THIS ITEM IN ICUR WITH NASA'S REE	DPS-191 BASELINH 05-6S-BRPC3-1 NEW DPS 191 CONTROLLER, REMOTE POWER W. A. HAUFLER ITY REDUNDANCY SCREENS T NC A B C] [P] [F] [P]] [P] [F] [P]] [P] [F] [P]] [] [] [] [] (If different from NASA)] [] [] [] [] (ARTIONALE: (If applicable) ADEQUATE INADEQUATE COVER THIS ITEM IN THE ORIGINAL ANAL ICUR WITH NASA'S REEVALUATION.

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:		NASA DATA: BASELINE [X] NEW []
	DPS 192 CONTROLLER, REMOTE POWER	
LEAD ANALYST:	W. A. HAUFLER	
ASSESSMENT:		
CRITICAL FLIGH	ITY REDUNDANCY SCREENS	CIL ITEM
HDW/FU	NC A B	c
NASA [3 /3 IOA [3 /3] [P] [NA] [] [NA] [NA] [P] []*
COMPARE [/] [И] [] [ן א [] [א
RECOMMENDATIONS:	(If different from NASA)	
[/	1 C 1 C 1 C] [] (ADD/DELETE)
* CIL RETENTION 1		ADEQUATE [] ADEQUATE []
	COVER THIS ITEM IN THE ORIG	INAL ANALYSIS.
ACCORDING TO NST	S 22206, REDUNDANCY SCREENS CRITICALITY OF 3/3.	

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/15/86 DPS-193 05-6S-BSW3-1	NASA DATA: BASELINE [] NEW [X]
SUBSYSTEM: MDAC ID: ITEM:	DPS 193 SWITCH, MDM POWER	
LEAD ANALYST:	W. A. HAUFLER	
ASSESSMENT:		
CRITICAL FLIGH		CREENS CIL ITEM
HDW/FU		C
NASA [3 /1R IOA [3 /1R		[P] [X]* [P] [X]
COMPARE [/] []	[], [].
RECOMMENDATIONS:	(If different from	. NASA)
· · · · · · · · · · · · · · · · · · ·] [] []	[] [] (ADD/DELETE)
	RATIONALE: (If applica	able) ADEQUATE [] INADEQUATE [X]
THE IOA DOES CON	COVER THIS ITEM IN TH CUR WITH NASA'S REEVA N RATIONALE IS INADEQU	

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REPORT DATE 12/01/86 C-41

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/15/86 DPS-194 05-6S-BSW3-2	NASA DATA: BASELINE [] NEW [X]
SUBSYSTEM: MDAC ID: ITEM:	DPS 194 SWITCH, MDM POWER	n an
LEAD ANALYST:	W. A. HAUFLER	
ASSESSMENT:		
CRITICAL FLIGH	ITY REDUNDANCY	SCREENS CIL ITEM
	NC A B	
NASA [3 /3 IOA [3 /3] [P] [N2] [NA] [N2	A] [P] []* A] [NA] []
COMPARE [/	ן נאן נ	ן [א]
RECOMMENDATIONS:	(If different fro	om NASA)
[/	J [] [] [] [] (ADD/DELETE)
* CIL RETENTION	RATIONALE: (If appli	icable)
		ADEQUATE [] INADEQUATE []
REMARKS: THE IOA DID NOT ACCORDING TO NST	COVER THIS ITEM IN S 22206, REDUNDANCY	THE ORIGINAL ANALYSIS. SCREENS MUST BE "NA" OR BLANK
FOR FMEAS WITH A	CRITICALITY OF 3/3 THE IOA ASSESSMENT	

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REPORT DATE 12/01/86 C-42

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-195	W5-3	NASA DATA BASELINE NEW	-
SUBSYSTEM: MDAC ID: ITEM:	DPS 195 SWITCH, M	NDM POWER		
LEAD ANALYST:	W. A. HAU	UFLER		
ASSESSMENT:				
CRITICAL FLIGH HDW/FU	Г	REDUNDANCY A B	SCREENS C	CIL ITEM
NASA [3 /1R IOA [3 /1R] []	P] [F P] [F] [P]] [P]	[X]* []
COMPARE [/] [] []	[N]
RECOMMENDATIONS:	(If di	fferent fro	om NASA)	
[/] [] - [] [] (A	[] DD/DELETE)
* CIL RETENTION	RATIONALE	: (If appli	cable) ADEQUATE INADEQUATE	
REMARKS: THE IOA DID NOT THE IOA DOES CON THE CIL RETENTIO AVAILABLE.	CUR WITH	NASA'S REEV	ALUATION.	

REPORT DATE 12/01/86

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/86 DPS-201 05-5-B02-1-1 DPS	NASA DATA: BASELINE [X] NEW []
SUBSYSTEM: MDAC ID: ITEM:	DPS 201 Input/Output Processor (IO	P) car
LEAD ANALYST:	T. B. Cribbs	
ASSESSMENT:		
FLIGH		ITEM
HDW/FU	NC A B	С
NASA [2 /1R IOA [3 /1R] [P] [P] [] [P] [P] [P] [X]* P] []
COMPARE [N/] [] [] [] [N]
RECOMMENDATIONS:	(If different from NASA)	
[/] [] [] [] [] (ADD/DELETE)
* CIL RETENTION		ADEQUATE [X] ADEQUATE []
REMARKS :		en andri alla die en ere ere alla die de d
	SIMILAR FAILURES WERE EXCLU	
	S ARE INCONSISTENT WITH THE FFECTS COUPLED THIS FAILURE	
	YSTEM FAILURE. THIS COULD	
	D OUT. THIS COULD POSSIBLY	CAUSE LOSS OF
VEHICLE. TOA RECOMMENDS C	HANGING THE EFFECTS TO DELE	TE THE SENTENCE
"DURING ASCENT/H	ENTRY, THIS".	
IOÀ DOES CONCUR ' RATIONALE.	WITH THE REST OF NASA'S REEV	VALUATION AND
VUTTONUTE:		

ASSESSMENT DATH ASSESSMENT ID: NASA FMEA #:	: 10/06/86 DPS-202 05-5-B02-1-2		SA DATA: ASELINE [X] NEW []
SUBSYSTEM: MDAC ID: ITEM:	DPS 202 Input/Output	Processor (IOP)	
LEAD ANALYST:	T. B. Cribbs		
ASSESSMENT:			
CRITICA FLIC HDW/H	HT	NDANCY SCREENS B C	CIL ITEM
NASA [3 /] IOA [3 /]	R] [P] R] [P]	[P] [P [P] [P] []*
COMPARE [/] []	ן ביו] []
RECOMMENDATION	: (If differ	ent from NASA)	
[/] []	[] [] [] (ADD/DELETE)
* CIL RETENTION	RATIONALE: (II	AD	EQUATE [] EQUATE []

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REPORT DATE 12/01/86 C-45

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/86 DPS-203 NONE	NASA DATA: BASELINE [] NEW []
SUBSYSTEM: MDAC ID: ITEM:	DPS 203 Input/Output Processor (IO	P)
LEAD ANALYST:	T. B. Cribbs	
ASSESSMENT:		
CRITICAL		CIL
FLIGHT HDW/FUN		ITEM
NASA [/ IOA [3 /IR] [] [] [] [P] [P] []	P] [],*
COMPARE [N/N] [N] [N] [1	4] []
RECOMMENDATIONS:	(If different from NASA)	
t /	3 [] [] [] [] (ADD/DELETE)
* CIL RETENTION F		ADEQUATE [] ADEQUATE []
	COVER THIS FAILURE MODE OF AND EFFECTS ARE DETERMINED	PREMATURE OPERATION.

ASSESSME ASSESSME NASA FME	NT ID	: DPS-	06/86 -204 5-B02-:	L-2			4		DATA: LINE NEW	[X]
SUBSYSTE MDAC ID: ITEM:	M :	DPS 204 Inp	ut/Out	put	Proc	essoi	- (101	P)			
LEAD ANA	LYST:	T. 1	B. Cril	obs							
ASSESSME	NT:									-	
	FL	CALITY IGHT /FUNC	RI A	EDU	NDANC	Y SCF B	eens C	:		CIL ITEN	1
NASA IOA	[3 [3	/1R] /1R]	[P [P	j]	[[P] P]	[] []	,] ,]		[[] *]
COMPARE	[/]	ľ]	ן ב]	្រ]		[]
RECOMMEN	IDATIO	NS: (If dif:	fer	ent f	rom 1	NASA)				
	[]	/]	נ]	C]	[]	(AI] ELETE)
* CIL RE	TENTI	ON RATIO	ONALE:	(I:	E appi	licat	A	DEQU		[]]
NO DIFFE IN ROCKW CHANGE C	ELL'S	05-5 -I	302-1-2	2.	IOA'S						SIDERE

REPORT DATE 12/01/86 C-47

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/86 DPS-205 05-5-B01-1-1	NASA DAT BASELIN NE			
SUBSYSTEM: MDAC ID: ITEM:	DPS 205 Central Processi	ng Unit (CPU)	-		
LEAD ANALYST:	T. B. Cribbs				
ASSESSMENT:					
CRITICAL FLIGH HDW/FU	T	CY SCREENS B C	CIL ITEM		
NASA [2/lR IOA [3/lR] [P] [] [P] [P] [P] P] [P]	[] *		
COMPARE [N/] [] [נ ז נ	[N]		
RECOMMENDATIONS:	(If different	from NASA)			
[/	ז נ ז נ] [] (A	[] ADD/DELETE)		
* CIL RETENTION RATIONALE: (If applicable) ADEQUATE [X] INADEQUATE []					
REMARKS: SIMULTANEOUS DISSIMILAR FAILURES WERE EXCLUDED FROM THE IOA. MULTIPLE FAILURES ARE INCONSISTENT WITH THE NSTS 22206. NASA CONSIDERED ONE GPC AND ONE FCS FAILURE IN ASSIGNING THEIR CRITICALITY FOR THIS FMEA. THE IOA RECOMMENDS CHANGING THE EFFECTS TO DELETE THE SENTENCE "DURING ASCENT/ENTRY, THIS". IOA DOES CONCUR WITH THE REST OF NASA'S REEVALUATION AND RATIONALE.					

REPORT DATE 12/01/86

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/86 NASA DATA DPS-206 BASELINE 05-5-B01-1-2 NEW	[X]
SUBSYSTEM: MDAC ID: ITEM:	DPS 206 Central Processing Unit (CPU)	
LEAD ANALYST:	T. B. Cribbs	
ASSESSMENT:		
CRITICAL FLIGH		CIL ITEM
HDW/FU	NC A B C	
NASA [3 /1R IOA [3 /1R] [P] [P] [P]] [P] [P] [P]	[] * []
COMPARE [/	1 [] <u>[</u>] <u>1</u> <u>1</u> <u>1</u> <u>1</u>	נ י ז
RECOMMENDATIONS:	(If different from NASA)	
[/] [] [] [] (A	[] DD/DELETE)
* CIL RETENTION	RATIONALE: (If applicable) ADEQUATE INADEQUATE	[]
NO DIFFERENCES		

REPORT DATE 12/01/86 C-49

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APPENDIX C ASSESSMENT WORKSHEET

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-207	NASA DATA BASELINE NEW	[]	
MDAC ID:	DPS 207 Central Processing Unit	(CPU)		
LEAD ANALYST:	T. B. Cribbs			
ASSESSMENT:				
CRITICAL FLIGH			CIL ITEM	
HDW/FU	NC A B	С		
NASA [/ IOA [3 /1R] [] []] [P] [P]	[] [P]	[] *	
COMPARE [N/N] [N] [N]	[и]	[]	
RECOMMENDATIONS:	(If different from NA	SA)		
t Z] [] []	()	[] DD/DELETE)	
	RATIONALE: (If applicabl	e) ADEQUATE INADEQUATE		
REMARKS: IOA DOES CONCUR WITH NASA'S REEVALUATION. THE IOA DOES NOT RECOMMEND THAT A NEW FMEA BE WRITTEN, SINCE THE CRITICALITY OF THIS ITEM WAS NOT INCREASED BY THE FAILURE MODE.				

REPORT DATE 12/01/86

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:		DATA: LINE [X] NEW []
SUBSYSTEM: MDAC ID: ITEM:	DPS 208 Central Processing Unit (CPU)	
LEAD ANALYST:	T. B. Cribbs	
ASSESSMENT:		
CRITICALI FLIGHI		CIL ITEM
HDW/FUN		
NASA [./ IOA [2 /1R] [] [] []] [P] [P] [P]	[] * []
COMPARE [N /N] [И] [И] [И]	[]
RECOMMENDATIONS:	(If different from NASA)	
[/] [] [] []	[] (ADD/DELETE)
* CIL RETENTION P	RATIONALE: (If applicable) ADEQU INADEQU	
REMARKS: THE FAILURE MODE	AND EFFECTS ARE DETERMINED TO E	

REPORT DATE 12/01/86 C-51

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/86 DPS-209 NONE		NASA DATA BASELINE NEW	[]
SUBSYSTEM: MDAC ID: ITEM:	DPS 209 CPU Power	r Switch	n en	· · ·
LEAD ANALYST:	T. B. Cri	ibbs		
ASSESSMENT:				2 * 1 v.
CRITICAL FLIGH		REDUNDANCY SCREENS	}	CIL ITEM
HDW/FU	NC A	A B	С	
NASA [/ IOA [3 /3] [ז [א] [] [[AN] [AN] NA]	[]*
COMPARE [N /N] - [N	и] [и] [N]	[]
RECOMMENDATIONS:	(If dif	fferent from NASA)		
t /] [] [] [] (AI	[] DD/DELETE)
	RATIONALE:		ADEQUATE ADEQUATE	[] []
BEFORE THE CRITI SECOND FAILURES CRITICALITY.	CALITY OF ARE NOT AN	EQUIRE A SECOND FA THE POWER SWITCH NALYZED TO ESTABLI ECTS ARE DETERMINI	COULD BE I SH FUNCTIO	UPGRADED. DNAL
THIS FAILURE MUD	E AND EFFE	SCIS ARE DELERMINI	TO DE IN	OH-CKEDIDHE.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-210	NASA DAT. BASELINI NEV				
MDAC ID:	DPS 210 GPC Mode Switc					
LEAD ANALYST:	T. B. Cribbs					
ASSESSMENT:						
CRITICAL FLIGH	ITY REDUND	DANCY SCREENS	CIL ITEM			
HDW/FU	-	ВС				
NASA [2/1R IOA [3/1R] [P]] [P]	[P] [.P] [P] [P]	[X] * []			
COMPARE [N/] []		[N]			
RECOMMENDATIONS:	(If differen	nt from NASA)				
[- /	1 []		[] ADD/DELETE)			
* CIL RETENTION	RATIONALE: (If	applicable) ADEQUATE INADEQUATE	[] [X]			
INADEQUATE [X] REMARKS: THE IOA DOES NOT RECOMMEND THAT A NEW FMEA BE WRITTEN, SINCE THE CRITICALITY OF THIS ITEM WAS NOT INCREASED BY THE FAILURE MODE. IOA DOES CONCUR WITH NASA'S REEVALUATION. THE CIL RETENTION RATIONALE IS INADEQUATE BECAUSE IT IS NOT YET AVAILABLE.						

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ASSESSMENT DAT ASSESSMENT ID: NASA FMEA #:	: 10/06/86 DPS-211 05-5-B15-	-1-3	NASA D BASEL	
SUBSYSTEM: MDAC ID: ITEM:	DPS 211 GPC Outpu	ut Switch		
LEAD ANALYST:	T. B. Cri	ibbs		
ASSESSMENT:				
CRITIC. FLI		REDUNDANCY S	SCREENS	CIL ITEM
HDW/		A B	с	LIEM
NASA [3 / . IOA [3 /	R] [] R] []	P] [.P P] [P] [P]] [P]	[] *
COMPARE [/] [] [] []	[]
RECOMMENDATION	S: (If di:	fferent from	m NASA)	
[/] [ז ני <u></u>	נ ז 🦷 נ	[] (ADD/DELETE)
* CIL RETENTION	RATIONALE:	: (If applic	cable) ADEQUA INADEQUA	re []
REMARKS: THIS FAILURE M B15-1-3 WHICH 1		IDERED TO BI E CRITICALI		ROCKWELL'S 05-5- ILURE MODE.

REPORT DATE 12/01/86 C-54

	DPS-213 NONE		NASA DATA BASELINE NEW	[]]
MDAC ID:	DPS 213 GPC Power :	Switch		
LEAD ANALYST:	T. B. Crib	bs		
ASSESSMENT:				
CRITICAL FLIGH	т	DUNDANCY SCRE		CIL ITEM
HDW/FU	NC A	В	С	
NASA [/ IOA [3 /1R] [] [P] []] [P]	[] [P]	[] * []
COMPARE [N/N	и] [] [N]	[N]	[]
RECOMMENDATIONS:	(If diff	erent from NA	.SA)	· .
[/] [] []	[] (A	[] DD/DELETE)
* CIL RETENTION RATIONALE: (If applicable) ADEQUATE [] INADEQUATE []				
REMARKS: NASA/RI DID NOT COVER THIS FAILURE MODE. IOA DOES NOT RECOMMEND A FMEA BEING WRITTEN SINCE THE CRITICALITY OF THIS ITEM WAS NOT INCREASED BY THE FAILURE MODE.				

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REPORT DATE 12/01/86 C-55

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/16/86 DPS-214 05-6S-BDM	4C1-2	NASA DATA BASELINE NEW	
SUBSYSTEM: MDAC ID: ITEM:	DPS 214	DULE CONTROLLER	2	
LEAD ANALYST:	B. ROBB			
ASSESSMENT:			,	
		REDUNDANCY SCREE	ens	CIL ITEM
FLIGH HDW/FU	-		С	TICW.
NASA [3 /3 IOA [3 /3] [P] [N	P] [P] IA] [NA]	[P] [NA]	[] *
COMPARE [/] []	N] [N]	[N]	[]
RECOMMENDATIONS:	(If dif	fferent from NAS	5A) .	
[/) [1 I J	[] (A	[] DD/DELETE)
* CIL RETENTION 1	RATIONALE:	(If applicable	≥) ADEQUATE INADEQUATE	
REMARKS: IOA DID NOT COVE EFFECTS TO POWER NASA AGREED WITH ACCORDING TO NST	UP A GPC. THE IOA A	ROCKWELL SHOU	ANALYSIS. N JLD DOWNGRAD IMENDATION.	O HARMFUL DE THE FMEA.

FOR FMEAS WITH A CRITICALITY OF 3/3.

REPORT DATE 12/01/86 C-56

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/16/86 DPS-215 05-6S-BDMC1-1	NASA DATA: BASELÍNE [X] NEW []			
SUBSYSTEM: MDAC ID: ITEM:	DPS 215 DRIVER MODULE CONTROLLE				
LEAD ANALYST:	B. ROBB	<u> </u>			
ASSESSMENT:					
CRITICAL FLIGH HDW/FUN	Γ	CENS CIL ITEM C			
NASA [3 /1R IOA [3 /1R] [P] [P]] [P] [P]	[P] []* [P] []			
COMPARE [/	J <u>[</u>] [],				
RECOMMENDATIONS:	(If different from NZ	ASA)			
[/] [] []	[] [] (ADD/DELETE)			
	RATIONALE: (If applicab)	e) ADEQUATE [] INADEQUATE []			
REMARKS: NO DIFFERENCES. IOA DID NOT COVER THIS ITEM IN ORIGINAL ANALYSIS. THE CRITICALITY OF THE FUNCTION WAS NOT INCREASED BY THE FAILURE OF THE HARDWARE ITEM.					

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REPORT DATE 12/01/86

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/17/86 DPS-216 05-6S-BSW1-2	NASA DATA: BASELINE [] NEW [X]		
SUBSYSTEM: MDAC ID: ITEM:	DPS 216 SWITCH, GPC POWER			
LEAD ANALYST:	B. ROBB			
ASSESSMENT:				
CRITICAL FLIGH HDW/FU	-	C CIL ITEM C		
NASA [3 /3 · IOA [3 /3] [P] [P] [] [NA] [NA] [P] []* NA] []		
COMPARE [/] [N] [N] [и] []		
RECOMMENDATIONS:	(If different from NASA)			
[/] [] [] [] []] [] (ADD/DELETE)		
. •		ADEQUATE [] IADEQUATE []		
INADEQUATE [] IOA DID NOT COVER THIS FAILURE MODE IN THE ORIGINAL ANALYSIS. THE FAILURE MODE OF PREMATURE OPERATION CAUSES NO HARMFUL EFFECTS. THE CRITICALITY OF THE ROCKWELL FMEA SHOULD BE DOWNGRADED TO A 3/3. NASA AGREED WITH THE IOA ASSESSMENT RECOMMENDATION. ACCORDING TO NSTS 22206, REDUNDANCY SCREENS MUST BE "NA" OR BLANK FOR FMEAS WITH A CRITICALITY OF 3/3.				

REPORT DATE 12/01/86 C-58

ASSESSMENT DATE: 10/17/86 NASA DATA: ASSESSMENT ID: DPS-217 BASELINE [٦ NEW [X] NASA FMEA #: 05-6S-BSW1-3 (NEW) SUBSYSTEM: DPS 217 MDAC ID: SWITCH, GPC POWER ITEM: LEAD ANALYST: B. ROBB ASSESSMENT: CRITICALITY REDUNDANCY SCREENS CIL FLIGHT ITEM HDW/FUNC В C Α [P] [P] [P] [P] [P] NASA [2 /1R] [X]* [2 /1R] [P] [X] IOA COMPARE [/] [] [] RECOMMENDATIONS: (If different from NASA)] [[٦ (ADD/DELETE) * CIL RETENTION RATIONALE: (If applicable) ADEQUATE îхі INADEQUATE **REMARKS**: NO DIFFERENCES. THIS ITEM WAS PRESENTED AT THE DPS PRE-BOARD AS NEW FMEA. IOA DID NOT COVER THE FAILURE MODE IN THE ORIGINAL ANALYSIS. THE CIL RETENTION RATIONALE IS INADEQUATE BECAUSE IT IS NOT YET AVAILABLE.

IOA AGREES THAT CRITICALITY SHOULD BE SAME AS LOSS OF GPC OUTPUT FOR THIS FAILURE MODE.

ASSESSMENT DATE:	10/20/86	NASA DATA:	
ASSESSMENT ID:	DPS-218	BASELINE [X]	
NASA FMEA #:	05-5-B27-1-1	NEW []	
SUBSYSTEM: MDAC ID: ITEM:	DPS 218 STATUS LIGHT	• • • • • • • • • • • • • • • • • • •	

LEAD ANALYST: B. ROBB

ASSESSMENT:

	CRIT				REDUN	DAN	CY SCR	EEN	s		CIL ITE	-	
		LIGH W/FU			A		В		с	•		M	
NASA IOA	[3 [3	/3 /3]	[[P] NA]	[[P] NA]	[[P] NA]		[[]]	*
COMPARE	[/]	[N]	Γ	N]	[м]		[]	

RECOMMENDATIONS: (If different from NASA)

ן. ב	/ 1	I]	נ ז	ני ז <u></u>	[] (ADD/DELETE)
						(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable) ADEQ

ADEQUATE [] INADEQUATE [] ___

REMARKS:

NO DIFFERENCES. IOA DID NOT COVER THIS ITEM IN THE ORIGINAL ANALYSIS. ACCORDING TO NSTS 22206, REDUNDANCY SCREENS MUST BE "NA" OR BLANK

FOR FMEAS WITH A CRITICALITY OF 3/3.

REPORT DATE 12/01/86

NASA DATA: ASSESSMENT DATE: 10/20/86 BASELINE [X] ASSESSMENT ID: DPS-219 NEW [05-5-B27-2-1 NASA FMEA #:] DPS SUBSYSTEM: MDAC ID: 219 CICU ITEM: LEAD ANALYST: B. ROBB ASSESSMENT: REDUNDANCY SCREENS CIL CRITICALITY ITEM FLIGHT HDW/FUNC Α в С [P] NASA [3 /3 [P] [NA] .[P] [NA]] *] IOA [3 /3] [NA] ٦ COMPARE [/] [N] [N] Ι] RECOMMENDATIONS: (If different from NASA) [[] (ADD/DELETE) * CIL RETENTION RATIONALE: (If applicable) ADEQUATE [INADEQUATE Ĩ ٦ **REMARKS**: NO DIFFERENCES. IOA DID NOT COVER THIS ITEM IN ORIGINAL ANALYSIS.

ACCORDING TO NSTS 22206, REDUNDANCY SCREENS MUST BE "NA" OR BLANK FOR FMEAS WITH A CRITICALITY OF 3/3.

REPORT DATE 12/01/86

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/20/86 NASA DATA DPS-220 BASELINE 05-5-B16-1-1 NEW	[X]
SUBSYSTEM: MDAC ID: ITEM:	DPS 220 SWITCH, IPL	
LEAD ANALYST:	B. ROBB	
ASSESSMENT:		
CRITICAL FLIGH HDW/FU	IT	CIL ITEM
NASA [3 /2R IOA [3 /2R	R [P] [P] [P] R [P] [P] [P]	[] *
COMPARE [/		[]
RECOMMENDATIONS:	: (If different from NASA)	
[/] [] [] [] (A)	[] DD/DELETE)
	RATIONALE: (If applicable) ADEQUATE INADEQUATE	[]]
REMARKS: NO DIFFERENCES. ANALYSIS.	IOA DID NOT COVER THIS ITEM IN THE	ORIGINAL

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-221	NASA DATA: BASELINE [X] NEW []
	DPS 221 INDICATOR, IPL	
LEAD ANALYST:	B. ROBB	
ASSESSMENT:		
CRITICAL FLIGH	ITY REDUNDANCY SCREENS	CIL ITEM
HDW/FU		c
NASA [3 /3 IOA [3 /3] [P] [P] [] [NA] [NA] [P] [·]* NA] []
COMPARE [/] [И] [И] [и] []
RECOMMENDATIONS:	(If different from NASA)	
[/	1 [] [] [] [] [] (ADD/DELETE)
* CIL RETENTION		ADEQUATE [] ADEQUATE []
ANALYSIS. ACCORDING TO NST	IOA DID NOT COVER THIS ITE S 22206, REDUNDANCY SCREENS	M IN THE ORIGINAL
FOR FMEAS WITH A	A CRITICALITY OF 3/3.	

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-222		ATA: INE [X] IEW []
SUBSYSTEM: MDAC ID: ITEM:	DPS 222 INDICATOR, IP	L	
LEAD ANALYST:	B. ROBB		
ASSESSMENT:			
CRITICAL		DANCY SCREENS	CIL ITEM
HDW/FU	-	B C	
NASA [3 /3 IOA [3 /3] [P]] [NA]	[P] [P] [NA] [NA]	[] *
COMPARE [/] [N]	[и] [и]	[]
RECOMMENDATIONS:	(If differe	nt from NASA)	
[/] []	ניז ניז	[] (ADD/DELETE)
* CIL RETENTION	RATIONALE: (If	applicable) ADEQUAI INADEQUAI	E []
REMARKS: NO DIFFERENCES. ANALYSIS.	IOA DID NOT CO	OVER THIS ITEM IN TH	• • • • • • • • • • • • • • • • • • •
		DANCY SCREENS MUST 1 F 3/3.	BE "NA" OR BLANK

REPORT DATE 12/01/86 C-64

NASA DATA: ASSESSMENT DATE: 10/20/86 BASELINE [X] ASSESSMENT ID: DPS-223 NEW [05-5-B19-1-1 ٦ NASA FMEA #: SUBSYSTEM: DPS 223 MDAC ID: INDICATOR OUTPUT, BARBER POLE ITEM: B. ROBB LEAD ANALYST: ASSESSMENT: CIL REDUNDANCY SCREENS CRITICALITY ITEM FLIGHT С HDW/FUNC А B [P] [P] [P]] * NASA [3 /3] [3/3] [NA] [NA]] [NA] IOA [N] [] COMPARE [· /] RECOMMENDATIONS: (If different from NASA)] (ADD/DELETE) * CIL RETENTION RATIONALE: (If applicable) ADEQUATE ſ] INADEQUATE] [**REMARKS:** NO DIFFERENCES. IOA DID NOT COVER THIS ITEM IN THE ORIGINAL ANALYSIS. ACCORDING TO NSTS 22206, REDUNDANCY SCREENS MUST BE "NA" OR BLANK

REPORT DATE 12/01/86

FOR FMEAS WITH A CRITICALITY OF 3/3.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:		NASA DATA: BASELINE [X] NEW []
SUBSYSTEM: MDAC ID: ITEM:	DPS 224 INDICATOR OUTPUT, BARBE	R POLE
LEAD ANALYST:	B. ROBB	
ASSESSMENT:		
FLIGH		ITEM
HDW/FU		C
NASA [3 /3 IOA [3 /3] [P] [P]] [NA] [NA]	[P] []* [NA] []
COMPARE [/] [N] [N]	נ ז נא]
RECOMMENDATIONS:	(If different from NA	LSA)
[/] [] []	[] [] (ADD/DELETE)
	RATIONALE: (If applicabl	.e) ADEQUATE [] INADEQUATE []
ANALYSIS. ACCORDING TO NST	IOA DID NOT COVER THIS : S 22206, REDUNDANCY SCRE CRITICALITY OF 3/3.	ITEM IN THE ORIGINAL CENS MUST BE "NA" OR BLANK
FOR FPIEAD WITH A	CRITCHITT OF 3/3.	

REPORT DATE 12/01/86

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:			NASA DATA BASELINE NEW	[X]
SUBSYSTEM: MDAC ID: ITEM:	DPS 225 INPUT/OUTPUT	PROČESSOR	(IOP)	
LEAD ANALYST:	B. ROBB			
ASSESSMENT:				
CRITICAL FLIGH		IDANCY SCRE	ENS	CIL ITEM
HDW/FU	-	в	с	
NASA [2/1R IOA [2/1R]. [P]] [P]	[P] [P]	[P] [P]	[X]* [X]
COMPARE [/] []	[]	[]	[]
RECOMMENDATIONS:	(If differe	ent from NA	ASA)	
[/] []	[]	[] (A	[DD/DELETE)
* CIL RETENTION	RATIONALE: (If	applicab]	le) ADEQUATE INADEQUATE	[X] [`]
REMARKS: NO DIFFERENCES. ANALYSIS.	IOA DID NOT C	OVER THIS	FAILURE MODE	IN ORIGINAL

REPORT DATE 12/01/86 C-67

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-226	10/30/86 NASA DPS-226 BAS 05-6S-BRES1-1]
SUBSYSTEM: MÇAC ID: ITEM:	DPS 226 RESISTOR	R	-			
LEAD ANALYST:	H J LOWI	ERY				
ASSESSMENT:						
CRITICAL FLIGH		REDUND	ANCY SCREE	NS	CIL ITE	
HDW/FU		A	В	С	цт т т т	11
NASA [/NA IOA [/NA] [NA] NA]	[NA] [NA]	[NA] [NA]	[[] * 4
COMPARE [/	ן ב]	[]	[]	[]
RECOMMENDATIONS:	(If d	ifferen	t from NAS	A)		
[/] [ן ז	[]	[] (A] DD/D] Elete)
* CIL RETENTION	RATIONALI	E: (If a) ADEQUATE INADEQUATE	[[]]
REMARKS: FMEA HAS BEEN DE FUSE. IOA DID NOT COVE				•		

REPORT DATE 12/01/86 C-68

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/30/86 DPS-227 05-6S-BFUS1-1	NASA DATA: BASELINE [X] NEW []
SUBSYSTEM: MDAC ID: ITEM:	DPS 227 FUSE	
LEAD ANALYST:	H J LOWERY	
ASSESSMENT:		
CRITICAL FLIGH HDW/FU	Т	SCREENS CIL ITEM C
NASA [3 /1R IOA [3 /1R] [P] [P] [P] [P] [P] []*] [P] []
COMPARE [/] [] [] [] []
RECOMMENDATIONS:	(If different fro	DE NASA)
[/] [] [] [] [] (ADD/DELETE)
	RATIONALE: (If appli	.cable) ADEQUATE [] INADEQUATE []
REMARKS: NO DIFFERENCES. ORIGINAL ANALYSI		HIS FAILURE MODE IN THE

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ASSESSME ASSESSME NASA FME	NT I		DPS-2	10/30/86 NASA DATA: DPS-228 BASELINE 05-6S-BRPC1-1 NEW				[X]				
SUBSYSTE MDAC ID: ITEM:			DPS 228 CONTR										
LEAD ANA	LYST	:	НЈL	OWEF	RY								
ASSESSME	NT:												v
	F	ICAL LIGH	r				Y SCR				CIL		
	HD	W/FUI	NC	A	7]	В	С					
NASA IOA		/1R /1R		[] []	,] ,]	[]	P] P]	[P [P]]]]	*
COMPARE	[1]	[]	[]	[]		[]	
RECOMMEN	IDATI	ONS:	(If	dif	ffere	nt f	rom N	iasa)					
	[1 .]	נ]	[]	[]	(A] DD/D] ELE	TE)
* CIL RETENTION RATIONALE: (If applicable)													
					•	-,-		A		JATE JATE	[. []]	
NO DIFFE	REMARKS: NO DIFFERENCES. IOA DID NOT COVER THIS FAILURE MODE IN THE ORIGINAL ANALYSIS.												

REPORT DATE 12/01/86

C-70

ASSESSMENT DATE: 10/30/86 NASA DATA: ASSESSMENT ID: BASELINE [X] DPS-229 NEW [NASA FMEA #: 05-6S-BRPC1-2 ٦ SUBSYSTEM: DPS 229 MDAC ID: ITEM: CONTROLLER, REMOTE POWER H J LOWERY LEAD ANALYST: ASSESSMENT: CRITICALITY REDUNDANCY SCREENS CIL ITEM FLIGHT HDW/FUNC Α В С NASA [3 /3 [P] [P] [P]] * [NA] IOA [3 /3] [NA][NA] 1 COMPARE [/] [N] [1 RECOMMENDATIONS: (If different from NASA)] (ADD/DELETE) * CIL RETENTION RATIONALE: (If applicable) ADEQUATE [1 INADEQUATE Γ 1 REMARKS: NO DIFFERENCES. IOA DID NOT COVER THIS FAILURE MODE IN THE ORIGINAL ANALYSIS. ACCORDING TO NSTS 22206, REDUNDNACY SCREENS MUST BE "NA" OR BLANK

REPORT DATE 12/01/86 C-71

FOR FMEAS WITH A CRITICALITY OF 3/3.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	11/03/86 DPS-230 05-6S-BD		(NEW)	1	VASA DATA BASELINE NEW	[]
SUBSYSTEM: MDAC ID: ITEM:	DPS 230 DIODE	1 <u>1</u> 1 1				
LEAD ANALYST:	H J LOWE	RY				
ASSESSMENT:						
CRITICAL FLIGH		REDUND	ANCY	SCREENS	2.4	CIL ITEM
HDW/FU	-	A	В	c	2	
NASA [3 /1R IOA [3 /1R] [P] P]	[F [F] [F	•]	[X] * ^{***}
COMPARE [/] [נ	[ן ֿוֹנ <u>ו</u>]	[]]
RECOMMENDATIONS:	(If di	fferen	t fro	m NASA)		1967 - 1971 - 1971 - 1971
۲ <u>۱</u>	J []	1] [] (AI	[] DD/DELETE)
* CIL RETENTION	RATIONALE	: (If a	appli	cable)	tter	and a the second se
		·		À	DEQUATE DEQUATE	
REMARKS: NO DIFFERENCES. ORIGINAL ANALYSI	IOA DID N	IOT COV	VER TH	•	-	IN THE
THE CIL RETENTIO		LE IS :	INADE	QUATE BE	CAUSE IT	IS NOT YET
NASA AGREED WITH	THE IOA A	ASSESSI	MENT 1	RECOMMEN	NDATION.	

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-231	1-1		NASA DAI BASELIN NE	
SUBSYSTEM: MDAC ID: ITEM:	DPS 231 SWITCH, N	ORMAL-TE	IRM BACK-U	JP	
LEAD ANALYST:	H J LOWER	Y			
ASSESSMENT:					
CRITICAI FLIGH HDW/FU			Y SCREENS	5 C	CIL ITEM
		-	-	•	r 1 +
NASA [3 /1F IOA [3 /1F	8] [P 8] [P		P] [P] [P] P]	[] *
COMPARE [/] [] [] []	[]
RECOMMENDATIONS	: (If dif	ferent f	from NASA)	۰.
[/] [] [] [] ([] ADD/DELETE)
* CIL RETENTION	RATIONALE:	(If app		ADEQUATE	• •
REMARKS: NO DIFFERENCES. ORIGINAL ANALYS		OT COVER	THIS FAI	LURE MOD	E IN THE

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/86 DPS-232 05-6S-BSW1-1	10/06/86 NASA DPS-232 BASE 05-6S-BSW1-1				
SUBSYSTEM: MDAC ID: ITEM:	DPS 232 SWITCH, GPC					
LEAD ANALYST:	B. ROBB					
ASSESSMENT:						
CRITICAL FLIGH		NDANCY SCREENS	CIL ITEM			
HDW/FUI		в				
NASA [3 /lr IOA [3 /lr] [P]] [P]	[P] [I [P] [I) [`]*) []			
COMPARE [/] []	[]][] []			
RECOMMENDATIONS:	(If differ	ent from NASA)	• _			
[/] []	ַ נ ז ַ] [] (ADD/DELETE)	ł		
* CIL RETENTION 1	RATIONALE: (I		and the second			
			DEQUATE []			
	HE LOSS OF A D POWER SOURCES IOA DID NOT (RIVER MODULE C	OWER SWITCH HAS THE ONTROLLER. ONE OF URE MODE IN THE			

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REPORT DATE 12/01/86 C-74

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-300						
SUBSYSTEM: MDAC ID: ITEM:	DPS 300 KEYBOARD						
LEAD ANALYST:	H J LOWE	RY					
ASSESSMENT:							
CRITICAL FLIGH	JTY T	REDUNDAN	NCY SCREE	ns	CIL ITEM		
HDW/FU		A	в	С			
NASA [2 /1R IOA [3 /1R	2] [2] [P] [P] [[P] [P]	[P] [P]	[X] * []		
COMPARE [N/	,] []	[]	[]	[И]		
RECOMMENDATIONS:	(If di	ifferent	from NAS	SA)			
[/	ָּרַ רַ נ]	[]]	[] (2	[] DD/DELETE)		
* CIL RETENTION	RATIONALE	: (If ap	oplicable	2) ADEQUATE INADEQUATE			
REMARKS: REDUNDANT HARDWA DEORBIT. KEYBOA SECOND RELATED H IOA DOES CONCUR	RD COMMAN	ND CAPAB	ILITY WOU ULT IN LO	E DURING LI JLD BE INHII DSS OF LIFE	FTOFF AND SITED. THE VEHICLE.		

REPORT DATE 12/01/86 C-75

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/14/86 DPS-300A 05-5-B24-1-2	NASA BASE	DATA: LINE [X] NEW []		
SUBSYSTEM: MDAC ID: ITEM:	DPS 300 KEYBOARD SWIT				
LEAD ANALYST:	H J LOWERY				
ASSESSMENT:			in the second second		
CRITICAL FLIGH		DANCY SCREENS	CIL ITEM		
HDW/FU		B C	· · · · · ·		
NASA [3 /2R IOA [3 /1R		[P] [P] [P] [P]	[] * [] ,		
COMPARE [/N] []	[]][]	[]		
RECOMMENDATIONS:	(If differe	ent from NASA)			
τ /] []	[]][]]	[] (ADD/DELETE)		
* CIL RETENTION	RATIONALE: (If	applicable) ADEQU INADEQU	• •		
REMARKS: NO DIFFERENCES. CRITICALITY. IOA DOES CONCUR		MODE DID NOT UPGRA	DE THE FUNCTIONAL		

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REPORT DATE 12/01/86 C-76

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/14/86 DPS-300B 05-5-B24	3		NASA DATA BASELINE NEW	
SUBSYSTEM: MDAC ID: ITEM:	DPS 300 KEYBOARD	SWITCH	ł		
LEAD ANALYST:	H J LOWE	RY			
ASSESSMENT:					 .
CRITICAL FLIGH	т		ANCY SCRE		CIL ITEM
HDW/FU	NC	A	B	С	
NASA [2 /1R IOA [3 /1R] [P] P]	[P] [P]	[P] [P]	[X]* []
COMPARE [N/] [נ	[]	[]	[N]
RECOMMENDATIONS:	(If di	fferent	from NA	SA)	
[/] [[]]	[]]	[](A	[] DD/DELETE)
* CIL RETENTION	RATIONALE	: (If a	pplicabl	e) ADEQUATE INADEQUATE	[] [X]
REMARKS: IOA DOES CONCUR THE CIL RETENTIO				E BECAUSE IT	IS NOT YET

AVAILABLE. THIS FAILURE MODE DID NOT UPGRADE THE FUNCTIONAL CRITICALITY.

REPORT DATE 12/01/86 C-77

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/08/86 DPS-301 05-5-B21-1-1	NASA DATA BASELINE NEW	[]
SUBSYSTEM: MDAC ID: ITEM:	DPS 301 X/Y DEFLECTION AM	PLIFIERS	
LEAD ANALYST:	H J LOWERY		
ASSESSMENT:			
CRITICAL FLIGH HDW/FU	т	B C	CIL ITEM
NASA [3 /1R IOA [3 /1R] [P] [] [P] [P] [P] P] [P]	[]*
COMPARE [/	J [] [] []	[]
RECOMMENDATIONS:	(If different f	rom NASA)	
ι, /] [] [] [] (A	[] .DD/DELETE)
* CIL RETENTION	RATIONALE: (If app	licable) ADEQUATE INADEQUATE	
CRTS (DUS) ARE E NASA AGREED WITH	SSENTIAL FOR LIFE THE IOA ASSESSMEN WITH NASA'S REEVAL	T RECOMMENDATION.	ing and a second se

REPORT DATE 12/01/86 C-78

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:		1-1-2		NASA DAT BASELIN NE			
SUBSYSTEM: MDAC ID: ITEM:	DPS 302 VIDEO AN						
LEAD ANALYST:	H J LOW	ERY					
ASSESSMENT:							
CRITICAL FLIGH HDW/FU	T	REDUNI A	DANCY SCF	C	CIL ITEM		
NASA [3 /1R IOA [3 /1R] [] [P] P]	[P] [P]	[P] [P]	[]*		
COMPARE [/	ן נ]	[]	[]]	[]		
RECOMMENDATIONS:	(If d	ifferer	nt from N	IASA)			
[/	J []	[]	[]]	[] ADD/DELETE)		
* CIL RETENTION :	RATIONAL	E: (If	applicab	le) ADEQUATE INADEQUATE			
REMARKS: CRTS (DUS) ARE EN NASA AGREED WITH IOA DOES CONCUR	THE IOA	ASSESS	MENT REC	OMMENDATION.	. .		

REPORT DATE 12/01/86 C-79

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	10/08/86 DPS-303 05-5-B21-	1-1		NASA DATA BASELINE NEW]
SUBSYSTEM: MDAC ID: ITEM:	DPS 303 CATHODE-R	AY TUBE				. .
LEAD ANALYST:	h j lower	RY .				
ASSESSMENT:						
CRITICAL FLIGH HDW/FU	т		CY SCREE	NS C	CIL ITE	
				-	۔ ۲	1 *
NASA [3 /1R IOA [3 /1R] [P] [P	, j į	P] P] -	[P]	Ĭ	j
COMPARE [/] [) [J	[]]	[]
RECOMMENDATIONS:	(If dif	ferent	from NAS	A)		
[/] [] []	[] (A	[.DD/D] ELETE)
* CIL RETENTION		(If ap)	-) ADEQUATE INADEQUATE	[[]
REMARKS: CRTS (DUS) ARE E NASA AGREED WITH IOA DOES CONCUR	THE IOA A	SSESSME	NT RECOM	MENDATION.		n otame tooo

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/08/86 DPS-304 05-5-B21-1-2	NASA DATA: BASELINE [NEW [x]			
MDAC ID:	DPS 304 HI AND LOW VOLTAGE POWER	SUPPLIES				
LEAD ANALYST:	H J LOWERY					
ASSESSMENT:						
CRITICAL FLIGH	T REDUNDANCY SCREE		L Em			
HDW/FU	NC A B	С				
NASA [3 /1R IOA [3 /1R	[P] [P] [P] [P]	[P] [[P] _ [] *]			
COMPARE [/] [] []	[] ´ []			
RECOMMENDATIONS:	RECOMMENDATIONS: (If different from NASA)					
[/.		[] [(ADD/] DELETE)			
	RATIONALE: (If applicable	≥) ADEQUATE [INADEQUATE []]			
· ·	SSENTIAL FOR LIFE OR VEHI THE IOA ASSESSMENT RECOM					

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DDG-305	5 RPC4-1	NASA DATA BASELINE NEW	[]
MDAC ID:	DPS 305 RPC	^{т.}		· · · · · ·
LEAD ANALYST:	H J LOWE	RY		
ASSESSMENT:				
		REDUNDANCY	SCREENS	CIL ITEM
FLIGH HDW/FU		A B	с	LIEM
NASA [3 /1R IOA [3 /1R].[P] [P P] [P] [P]] [P]	[]*
COMPARE [/] [ן דער] []	[]]
RECOMMENDATIONS:	(If di	ifferent fr	om NASA)	
t /) [] [] [] (A	[] DD/DELETE)
* CIL RETENTION	RATIONALE	: (If appl:	icable) ADEQUATE INADEQUATE	
FLIGHT OF REDUND	ANT STRIN	FOR LIFE OF GS WHICH IS	R VEHICLE. VERIF PROVIDED BY MDM	MEASUREMENTS
MAY BE ERRONEOUS INITIATED BY A F			EASUREMENT DERIVA	TION IS

NASA AGREED WITH THE IOA ASSESSMENT RECOMMENDATION.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/08/86 DPS-306 05-5-B23-	-1-2	ł	VASA DATA: BASELINE NEW	[X]
MDAC ID:	DPS 306 MEMORY				
LEAD ANALYST:	H J LOWEF	RY			
ASSESSMENT:					
CRITICAL FLIGH		REDUNDANC	Y SCREENS		CIL ITEM
HDW/FU		A :	ВС	:	
NASA [3 /1R IOA [3 /1R] [F	P][]	P] [F P] [F	>] .	[]*
COMPARE [/] [] [] []	[]
RECOMMENDATIONS:	(If dia	fferent f	rom NASA)		
[/] [] [] [] (AI	[] DD/DELETE)
* CIL RETENTION	RATIONALE:	(If app)	A	ADEQUATE	
REMARKS: NO DIFFERENCES. CRITICALITY.	THIS FAIL	LURE MODE	DID NOT U	JPGRADE TH	HE FUNCTIONAL

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/08/86 DPS-307 05-5-B23-1-2	NASA DATA: BASELINE [X] NEW []
SUBSYSTEM: MDAC ID: ITEM:	DPS 307 KEYBOARD ADAPTER	
LEAD ANALYST:	H J LOWERY	
ASSESSMENT:		
CRITICAL		IS CIL ITEM
FLIGH HDW/FU		C
NASA [3 /1R · IOA [3 /1R	R] [P] [P]. [R] [P] [P] [P] []* P] []
COMPARE [/] [] [] [] [] []	[]][]] ⁽¹⁾
RECOMMENDATIONS:	: (If different from NASA	
[/	J [] [] [] [] (ADD/DELETE)
* CIL RETENTION	RATIONALE: (If applicable)	ADEQUATE [] NADEQUATE []
NO DIFFERENCES. CRITICALITY.	THIS FAILURE MODE DID NOT	UPGRADE THE FUNCTIONAL

REPORT DATE 12/01/86 C-84

ASSESSMENT ASSESSMENT NASA FMEA ‡	DATE: 10/14 ID: DPS-30 #: 05-5-1				TA: NE [X] EW []
SUBSYSTEM: MDAC ID: ITEM:	307	ARD ADAPT	ER		
LEAD ANALYS	ST: HJL	OWERY			
ASSESSMENT:					
	TICALITY FLIGHT IDW/FUNC	REDUND. A	ANCY SCRE	ENS C	CIL ITEM
NASA [IOA [2 /1R] 3 /1R_]	[P] [P]	[P] [P] _	[P] [P]	[X]* []
COMPARE [N /]	[]	[]	[]]	[N]
RECOMMENDA	TIONS: (If		t from NA	SA)	
1	/]	[]]	[]	[]	[] (ADD/DELETE)
	TION RATION	ALE: (If a	applicabl	e) ADEQUATI INADEQUATI	
DISSIMILAR PREMATURE T KEYBOARD EN PREVIOUS FA OPS MODE RI	FAILURES WE TRANSITION FI TRY IS TO B	RE EXCLUD ROM ONE M E CLEARED QUIRED TO ATED IN N	ED FROM T ODE TO AN IS A TWO NECESSIT ASA FMEA	HE IOA. OTHER MODE FAILURE EN ATE CREW IN 05-5-B23-1	FFECT SINCE A NITIATION OF -3.

REPORT DATE 12/01/86 C-85

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/08/86 DPS-308 05-5-B23-1-2	NASA DATA: BASELINE [X] NEW []
SUBSYSTEM: MDAC ID: ITEM:	DPS 308 SYMBOL GENERATOR	, in a sum and the second s
LEAD ANALYST:	H J LOWERY	
ASSESSMENT:		
CRITICAL FLIGH		CIL I
HDW/FU	-	С
NASA [3 /1R IOA_ [3 /1R		P] * P] []
COMPARE [/] [] [] [] []
RECOMMENDATIONS:	(If different from NASA)	
[/	1 [] [] [] [] (ADD/DELETE)
		ADEQUATE [] ADEQUATE []
REMARKS: NO DIFFERENCES. CRITICALITY.	1回101111111111111111111111111111111111	eree de la company de la company est
···· <u>-</u> · ·	الما السابقي الذي الما الماليون في الأراقي الأن الما الذي التي أن الما المالية الذي ال	na an a
as a state.		
	and second se	t 119 - La contra de la compañía de
	· · · · ·	

REPORT DATE 12/01/86 C-86.

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-308A			NASA DATA BASELINE NEW	[X]	
SUBSYSTEM: MDAC ID: ITEM:	DPS 308 SYMBOL GE					
LEAD ANALYST:	H J LOWER	Y				
ASSESSMENT:						
CRITICAL		EDUNDANC	Y SCREEN	S	CIL ITEM	
FLIGH HDW/FU			В	С	LIGM	
NASA [3./1F IOA [3 /1F	[] [P] [P] [] [P][P][P] P]	[] * []	
COMPARE [/] [] [] []	[]	
RECOMMENDATIONS	(If dif	ferent i	from NASA	.) ·		
[/] [ן נ] []	[] DD/DELETE)	
* CIL RETENTION	RATIONALE:	(If app		ADEQUATE NADEQUATE	[]	
REMARKS: THIS FAILURE MO CONSIDERED TO BE	COVERED B	OUT/ERRON BY THIS F	NEOUS/ERR	ATIC OUTPU FMEA WITH	T" IS FAILURE MODE	

"LOSS OF OUTPUT". NO DIFFERENCES. THIS FAILURE MODE DID NOT UPGRADE THE FUNCTIONAL CRITICALITY.

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:		[X]]
	DPS 309 MIA		en art. Status
LEAD ANALYST:	H J LOWERY		
ASSESSMENT:		÷	· · ·
CRITICAL FLIGH	T	CIL ITEM	
HDW/FU.	NC A B C		
· NASA [3 /1R IOA [3 /1R] [P] [P] [P]] [P] [P] [P]	[[] *] .
COMPARE [/] [] [] []	C]
RECOMMENDATIONS:	(If different from NASA)		
[/		[DD/DE] LETE)
* CIL RETENTION REMARKS: NO DIFFERENCES.	RATIONALE: (If applicable) ADEQUATE INADEQUATE	[]

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:		DATA: CLINE [X] NEW []
SUBSYSTEM: MDAC ID: ITEM:	DPS 310 CONTROL LOGIC	
LEAD ANALYST:	H J LOWERY	
ASSESSMENT:		-
CRITICAL FLIGH		CIL ITEM
HDW/FU		
NASA [3 /1R _IOA [3 /1R	[P] [P] [P] [P] [P] [P]	[] * []
COMPARE [/] [] [] [] []	[]
RECOMMENDATIONS:	(If different from NASA)	
[/] [] [] []	[] (ADD/DELETE)
* CIL RETENTION REMARKS: NO DIFFERENCES.	RÁTIONALE: (If applicable) ADEQU INADEQU	

REPORT DATE 12/01/86 C-89

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/08/86 DPS-311 05-5-B23-1-2	NASA DATA BASELINE NEW	[X]
SUBSYSTEM: MDAC ID: ITEM:	DPS 311 POWER SUPPLIES		
LEAD ANALYST:	H J LOWERY		
ASSESSMENT:			
CRITICAL FLIGH		Y SCREENS	CIL ITEM
HDW/FU		B C A sub-	
NASA [3 /1R IOA [3 /1R] [P] []] [P] []	P] [P] P] [P]	[] *
COMPARE [/] [] [] []	[]
RECOMMENDATIONS:	(If different f	rom NASA)	
[/	ז ניז נ] [] (A)	[] DD/DELETE) -
* CIL RETENTION 1	RATIONALE: (If app	licable) ADEQUATE INADEQUATE	
REMARKS: NO DIFFERENCES.		TURASOUTH	

REPORT DATE 12/01/86

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-312	C5-1		ATA: INE [X] NEW []
SUBSYSTEM: MDAC ID: ITEM:	DPS 312 RPC			
LEAD ANALYST:	H J LOWER	Y		
ASSESSMENT:				
CRITICAL FLIGH	T	EDUNDANCY		CIL ITEM
HDW/FU	NC A	В	C	
NASA [3 /1R IOA [3 /1R] [P]] [P] [P]] [P]] [P]] [P]	[]* []
COMPARE [/] [] [] []	[]
RECOMMENDATIONS:	(If dif	ferent fro	om NASA)	
[/].[] [] []	[] (ADD/DELETE)
* CIL RETENTION	RATIONALE:	(If appli		TE []
REMARKS: VERIFICATION IN MDM MEASUREMENTS DERIVATION IS IN	5 MAY BE EF	RONEOUS SI	NCE THE STATU	

THIS FAILURE MODE DID NOT UPGRADE THE FUNCTIONAL CRITICALITY.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-312A	NASA DA BASELII NI	TA: NE [X] EW []	
SUBSYSTEM: MDAC ID: ITEM:	DPS 312 RPC			
LEAD ANALYST:	H J LOWERY			
ASSESSMENT:				
CRITICAL FLIGH		ANCY SCREENS	CIL ITEM	
HDW/FU	—	ВС		
NASA [3 /1R IOA [3 /1R] [P]] [P]	[P] [P] [P] [P]	[] *	
COMPARE [/] []	[]][]	[]]	
RECOMMENDATIONS:	(If differen	t from NASA)		
[/] []		[] (ADD/DELETE)	
* CIL RETENTION	RATIONALE: (If a	applicable) ADEQUATI INADEQUATI		
REMARKS: THIS NASA FMEA NUMBER WAS COVERED IN THE ORIGINAL IOA ANALYSIS. THIS FAILURE MODE "OPEN/CLOSED/PREMATURE OPERATION" IS CONSIDERED TO BE COVERED BY THIS ROCKWELL FMEA WITH FAILURE MODE "OPENS". IOA DOES CONCUR WITH NASA'S REEVALUATION. THIS FAILURE MODE DID NOT UPGRADE THE FUNCTIONAL CRITICALITY.				

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VERIFICATION IN FLIGHT OF REDUNDANT STRINGS WHICH IS PROVIDED BY MDM MEASUREMENTS MAY BE ERRONEOUS SINCE THE STATUS MEASUREMENT DERIVATION IS INITIATED BY A REDUNDANT CIRCUIT.

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ASSESSMENT DATE: 10/14/86 NASA DATA: ASSESSMENT ID: DPS-312B BASELINE [X] NASA FMEA #: 05-6S-BSW4-1 NEW []				
SUBSYSTEM:DPSMDAC ID:312ITEM:RPC				
LEAD ANALYST: H J LOWERY				
ASSESSMENT:				
CRITICALITY REDUNDANCY SCREENS CIL FLIGHT ITEM HDW/FUNC A B C				
NASA [3/1R] [P] [P] [P] []* IOA [3/1R] [P] [P] [P] []				
COMPARE [/] [] [] []				
RECOMMENDATIONS: (If different from NASA)				
[/][][][][][][] (ADD/DELETE)				
* CIL RETENTION RATIONALE: (If applicablé) ADEQUATE [] INADEQUATE []				
REMARKS: THIS NASA FMEA NUMBER WAS NOT COVERED IN THE ORIGINAL IOA ANALYSIS. THIS FAILURE MODE "OPEN/CLOSED/PREMATURE OPERATION" IS CONSIDERED TO BE COVERED BY THIS ROCKWELL FMEA WITH FAILURE MODE "PREMATURE OPERATION". VERIFICATION IN FLIGHT OF REDUNDANT STRINGS WHICH IS PROVIDED BY THE MDM MEASUREMENTS MAY BE ERRONEOUS SINCE THE STATUS MEASUREMENT DERIVATION IS INITIATED BY A REDUNDANT CIRCUIT.				
IOA DOES CONCUR WITH NASA'S REEVALUATION. THIS FAILURE MODE DID NOT UPGRADE THE FUNCTIONAL CRITICALITY.				

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IOA DOES CONCUR WITH NASA'S REEVALUATION. NOT UPGRADE THE FUNCTIONAL CRITICALITY.

ASSESSMENT DATE: 10/14/86 ASSESSMENT ID: DPS-312C NASA DATA: BASELINE [X] NEW [NASA FMEA #: 05-65-BFUS2-1 1 SUBSYSTEM: DPS MDAC ID: 312 RPC ITEM: LEAD ANALYST: H J LOWERY ASSESSMENT: REDUNDANCY SCREENS CRITICALITY CIL ITEM FLIGHT В HDW/FUNC А С NASA [3/1R] [P] [P] IOA [3/1R] [P] [P] [P] [P] [ſ COMPARE [/] [] [] [] [] RECOMMENDATIONS: (If different from NASA)] (ADD/DELETE) * CIL RETENTION RATIONALE: (If applicable) ADEQUATE 1 INADEQUATE [] REMARKS: THIS NASA FMEA NUMBER WAS NOT COVERED IN THE ORIGINAL IOA ANALYSIS. THIS FAILURE MODE "OPEN/CLOSED/PREMATURE OPERATION" IS CONSIDERED TO BE COVERED BY THIS ROCKWELL FMEA WITH FAILURE MODE "PREMATURE OPERATION" VERIFICATION IN FLIGHT OF REDUNDANT STRINGS WHICH IS PROVIDED BY THE MDM MEASUREMENTS MAY BE ERRONEOUS SINCE THE STATUS MEASUREMENT DERIVATION IS INITIATED BY A REDUNDANT CIRCUIT. IOA DOES CONCUR WITH NASA'S REEVALUATION. THIS FAILURE MODE DID NOT UPGRADE THE FUNCTIONAL CRITICALITY.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-313	NASA DATA BASELINE NEW	[X]		
SUBSYSTEM: MDAC ID: ITEM:	DPS 313 LOAD SWITCH				
LEAD ANALYST:	H J LOWERY		-		
ASSESSMENT:					
CRITICAL FLIGH		NCY SCREENS	CIL ITEM		
HDW/FU		ВС	115M		
NASA [3 /1R IOA [3 /3] [P]] [NA]	[P] [P] [NA] [NA]	[] * []		
COMPARE [/N] [N]		[]		
RECOMMENDATIONS: (If different from NASA)					
[/] []	[] [] (A	[] NDD/DELETE)		
* CIL RETENTION	RATIONALE: (If a	applicable) ADEQUATE INADEQUATE			
		DURING A MISSION. S VALUATION.	WITCH IS NOT		

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/08/86 DPS-314 05-5-B26-1-2	NASA DATA: BASELINE NEW	[X]		
SUBSYSTEM: MDAC ID: ITEM:	DPS 314 FUNCTION SWITCH	n an			
LEAD ANALYST:	H J LOWERY				
ASSESSMENT:			Maria Sur		
CRITICAL FLIGH	Т		CIL ITEM		
HDW/FU		_			
NASA [3 /1R IOA [3 /1R] [P] [P]] [P] [P]	[P] [P]	[]*		
COMPARE [/] [] []		[]		
RECOMMENDATIONS: (If different from NASA)					
[/	.] [] []	[] (AD	[] D/DELETE)		
* CIL RETENTION RATIONALE: (If applicable) ADEQUATE [] ADEQUATE [] INADEQUATE []					
REMARKS: NO DIFFERENCES. CRITICALITY.	THIS FAILURE MODE DI	D NOT UPGRADE TH	E FUNCTIONAL		

REPORT DATE 12/01/86

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/14/86 DPS-314A 05-5-B26-1-1	NASA DATA: BASELINE [X] NEW []		
SUBSYSTEM: MDAC ID: ITEM:	DPS 314 FUNCTION SWITCH			
LEAD ANALYST:	H J LOWERY			
ASSESSMENT:				
CRITICAL FLIGH	T	CIL ITEM C		
HDW/FU		C		
NASA [3 /1R IOA [3 /1R] [P] [P] [] [P] [P] [P] []* P] []		
COMPARE [/] [] [] [] [] []	<u>ј</u> [],		
RECOMMENDATIONS:	(If different from NASA)	- · ·		
[/	J [] [] [] [] (ADD/DELETE)		
* CIL RETENTION RATIONALE: (If applicable) ADEQUATE []				
REMARKS: NO DIFFERENCES. CRITICALITY.	THIS FAILURE MODE DID NOT	ADEQUATE [] UPGRADE THE FUNCTIONAL		

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/14/86 DPS-314B 05-5-B26-1-3	NASA DATA: BASELINE [X] NEW []		
SUBSYSTEM: MDAC ID: ITEM:	DPS 314 FUNCTION SWITCH			
LEAD ANALYST:	H J LOWERY			
ASSESSMENT:				
CRITICAL FLIGH		CIL ITEM		
HDW/FU		C		
NASA [3 /1R IOA [3 /1R] [P] [P] [] [P] [P] [P] []* P] []		
COMPARE [/] [] [] [] []] []		
RECOMMENDATIONS: (If different from NASA)				
t /] [] [] [] [] (ADD/DELETE)		
* CIL RETENTION RATIONALE: (If applicable)				
DENT DZC -		ADEQUATE [] ADEQUATE []		
REMARKS: NO_DIFFERENCES. CRITICALITY.	THIS FAILURE MODE DID NOT	UPGRADE THE FUNCTIONAL		

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DDG-215		NASA DATA: BASELINE [X] NEW []	
SUBSYSTEM: MDAC ID: ITEM:	DPS 315 DATA BUS COUPL	ER (DBC)		
LEAD ANALYST:	H J LOWERY			
ASSESSMENT:				
FLIGH	ITY REDUNDA T NC A	ANCY SCREENS B	C CIL ITEM C	
NASA [2 /1R IOA [3 /1R] [P]] [P]	[P] [[P] [P] [X] * P] []	
COMPARE [N/] []	נ ז נ] [N]	
RECOMMENDATIONS:	(If differen	t from NASA)		
[/] []	[][]] [] (ADD/DELETE)	
* CIL RETENTION RATIONALE: (If applicable) ADEQUATE [X] INADEQUATE [] REMARKS: IOA DOES CONCUR WITH NASA'S REEVALUATION AND RATIONALE. REDUNDANT HARDWARE WOULD NOT BE ACCESSIBLE DURING LIFTOFF AND DEORBIT. IF THE SECOND RELATED FAILURE WAS ASSOCIATED WITH EITHER PRE- VALVES OR PURGE DURING RTLS ABORT THIS FAILURE WOULD RESULT IN LOSS OF LIFE/VEHICLE. SIMULTANEOUS DISSIMILAR FAILURES WERE				
LOSS OF LIFE/VEH EXCLUDED FROM TH MULTIPLE FAILURE	IE IOA.			

REPORT DATE 12/01/86

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-316			DATA: ELINE [X] NEW []	
SUBSYSTEM: MDAC ID: ITEM:	DPS 316 DBIA	u n a si si si s	·		
LEAD ANALYST:	H J LOWE	RY			
ASSESSMENT:					
CRITICAL FLIGH		REDUNDANCY	SCREENS	CIL ITEM	
HDW/FU	NC	A B	с	2	
NASA [3 /2R IOA [3 /2R] [P] [N. P] [N.	A] [P] A] [P]	[]*	
COMPARE [/] [ׂם נ	ן <u>ן</u> ז	[]	
RECOMMENDATIONS:	(If di	fferent fr	om NASA)		
[/] [] [] []	[] (ADD/DELET	E)
* CIL RETENTION 1	RATIONALE	: (If appl		JATE [] JATE []	•
REMARKS: NO DIFFERENCES. CRITICALITY.	THIS FAI	LURE MODE			IONAL

REPORT DATE 12/01/86

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	• •	NASA DATA BASELINE NEW	[X]	
SUBSYSTEM: MDAC ID: ITEM:	DPS 316 DBIA			
LEAD ANALYST:	H J LOWERY			
ASSESSMENT:				
CRITICAL FLIGH HDW/FU	T	Y SCREENS B C	CIL ITEM	
NASA [3 /3 IOA [3 /2R] [P] [] [P] [P] [P] NA] [P]	[]*	
COMPARE [/N	1 [1 _, [и] []	[]	
RECOMMENDATIONS:	(If different f	from NASA)		
t /] [] [] [] (A	[] .DD/DELETE)	
* CIL RETENTION	RATIONALE: (If app	licable)		
		ADEQUATE INADEQUATE	• •	
REMARKS: THIS FAILURE MODE "OPEN/SHORT/ERRONEOUS/ERRATIC OUTPUT" IS CONSIDERED TO BE COVERED BY THIS ROCKWELL FMEA WITH FAILURE MODE "ALL CREDIBLE MODES". THE IOA DOES CONCUR WITH NASA'S REEVALUATION. THIS FAILURE MODE DID NOT UPGRADE THE FUNCTIONAL CRITICALITY.				

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-317			NASA DATA BASELINE NEW	
SUBSYSTEM: MDAC ID: ITEM:	DPS 317 RESISTOR				
LEAD ANALYST:	H J LOWE	RY			
ASSESSMENT:					
CRITICAL FLIGH		REDUNDAN	CY SCREE	INS	CIL ITEM
HDW/FU		A	В	С	II DM
NASA [3 /3 IOA [3 /3] [] [P][NA][P] NA]	[P] [NA]	[]*
COMPARE [/	J, C	и] [N]	[N]	[]
RECOMMENDATIONS:	(If di	fferent	from NAS	SA)	· · · ·
[/] [] []	[] (A	[] DD/DELETE)
* CIL RETENTION	RATIONALE	: (If.ap	plicable		
	• • • •			ADEQUATE INADEQUATE	
REMARKS: THE IOA DID NOT THE IOA DOES CON ACCORDING TO NST FOR FMEAS WITH A	CUR WITH S 22206,	NASA'S R REDUNDAN	N THE OF EEVALUAT CY SCREE	CION.	"NA" OR BLANK
		11	. 1992. 1997. 19	1	entra interna a

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REPORT DATE 12/01/86 C-102

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ASSESSMENT DATE: 10/14/86 NASA DATA: BASELINE [] NEW [X] ASSESSMENT ID: DPS-318 NASA FMEA #: 05-6S-BRPC4-2 SUBSYSTEM: DPS MDAC ID: 318 ITEM: RPC LEAD ANALYST: H J LOWERY ASSESSMENT: REDUNDANCY SCREENS CIL CRITICALITY ITEM FLIGHT HDW/FUNC Α В С [P] [P] [P] NASA [3 /3] IOA [3 /3 [NA] [NA] [NA] Г 1] COMPARE [/] [N] [N] [N] . [.] RECOMMENDATIONS: (If different from NASA)] (ADD/DELETE) * CIL RETENTION RATIONALE: (If applicable) ADEQUATE Γ INADEQUATE ĩ Γ **REMARKS:** THIS FAILURE MODE "PREMATURE OPERATION" IS CONSIDERED TO BE COVERED BY THIS ROCKWELL FMEA WITH FAILURE MODE "INADVERTENT OUTPUT". NO EFFECT SINCE DU WILL HAVE POWER APPLIED PREMATURELY, BUT DISPLAY WILL NOT APPEAR UNTIL THE DEU IS TURNED ON. NASA AGREED WITH THE IOA ASSESSMENT RECOMMENDATION. THE IOA DID NOT COVER THIS FAILURE MODE IN THE ORIGINAL ANALYSIS. ACCORDING TO NSTS 22206, REDUNDANCY SCREENS MUST BE "NA" OR BLANK FOR FMEAS WITH A CRITICALITY OF 3/3.

REPORT DATE 12/01/86 C-103

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #: SUBSYSTEM:	10/14/86 DPS-319 05-6S-BSW4-	[] [X]			
MDAC ID:	DPS 319 SWITCH, CRT				
LEAD ANALYST:	H J LOWERY				
ASSESSMENT:					
FLICH	T	UNDANCY SCREENS		CIL ITEM	
HDW/FU	NC A	B	C		
NASA [3 /3 IOA [3 /3] [P]] [NA]	[P] [[NA] [P] NA]	[·] * []	
COMPARE [/	ן נא	ן א ן [N] _	[]	
RECOMMENDATIONS:	(If diffe	erent from NASA)			
· [/] []	[][[] D/DELETE)	
* CIL RETENTION D	RATIONALE: (ADEQUATE ADEQUATE		
THIS FAILURE MODE "PREMATURE OPERATION" IS CONSIDERED TO BE COVERED THIS ROCKWELL FMEA WITH FAILURE MODE "PREMATURE OPERATION". NO EFFECT SINCE DU WILL HAVE POWER APPLIED PREMATURELY, BUT DISPLAY WILL NOT APPEAR UNTIL DEU IS TURNED ON. NASA AGREED WITH THE IOA ASSESSMENT RECOMMENDATION.					
IOA DID NOT COVER THIS FAILURE MODE IN THE ORIGINAL ANALYSIS. ACCORDING TO NSTS 22206, REDUNDANCY SCREENS MUST BE "NA" OR BLANK FOR FMEAS WITH A CRITICALITY OF 3/3.					

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RÉPORT DATE 12/01/86 C-104

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NASA DATA: ASSESSMENT DATE: 10/14/86 ASSESSMENT ID: DPS-320 BASELINE (NEW [X 1 NASA FMEA #: 05-6S-BRPC5-2 DPS SUBSYSTEM: MDAC ID: 320 ITEM: RPC LEAD ANALYST: H J LOWERY ASSESSMENT: CIL REDUNDANCY SCREENS CRITICALITY ITEM FLIGHT ВС HDW/FUNC A [P] NASA [3 /3] [P] [P] [NA] [NA] IOA [3/3] [NA] COMPARE [/] [N] [N] ſ 1 RECOMMENDATIONS: (If different from NASA) (ADD/DELETE) * CIL RETENTION RATIONALE: (If applicable) ADEQUATE [INADEQUATE [1 **REMARKS:** THIS FAILURE MODE "PREMATURE OPERATION" IS CONSIDERED TO BE COVERED BY THIS ROCKWELL FMEA WITH FAILURE MODE "INADVERTENT OUTPUT". NO EFFECT SINCE DEU WILL HAVE POWER APPLIED PREMATURELY. IOA DID NOT COVER THIS FAILURE MODE IN THE ORIGINAL ANALYSIS. NASA AGREED WITH THE IOA ASSESSMENT RECOMMENDATION. ACCORDING TO NSTS 22206, REDUNDANCY SCREENS MUST BE "NA" OR BLANK FOR FMEAS WITH A CRITICALITY OF 3/3.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-321	IO1-2 (NEW)	NASA DATA BASELINE NEW	•	
SUBSYSTEM: MDAC ID: ITEM:	DPS 321 DIODE, SU	JPPRESSOR			
LEAD ANALYST:	H J LOWER	RY			
ASSESSMENT:					
CRITICAL FLIGH		REDUNDANCY SCREEN	S	CIL ITEM	
	NC A	A B	C	LIEM	
NASA [3 /3 IOA [3 /3] [N] [N	NA] [NA] [NA] [NA] [NA] NA]	[] * [] [*] [*]	
COMPARE [/	<u>ן</u> ב][]]	[]	
RECOMMENDATIONS: (If different from NASA)					
[/] [ז נ ז נ] (Al	[] DD/DELETE)	
* CIL RETENTION RATIONALE: (If applicable) ADEQUATE [] INADEQUATE [] REMARKS:					
NAME IN THE ACCORDING TO NOTS 22206, REDUNDANCY SCREENS MUST BE "NA" OR BLANK FOR FMEAS WITH A CRITICALITY OF 3/3.					

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REPORT DATE 12/01/86 C-106

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:		A DATA: ELINE [] NEW [X]				
SUBSYSTEM: MDAC ID: ITEM:	DPS 322 SWITCH, CRT POWER					
LEAD ANALYST:	h j lowery					
ASSESSMENT:						
CRITICAL FLIGH	łT	CIL ITEM				
HDW/FU	JNC A B C					
NASA [3 /1R IOA [3 /1R	R] [P] [P] [P] R] [P] [P] [P]	[] * []				
COMPARE [/] [] [] []	[]				
RECOMMENDATIONS: (If different from NASA)						
[/] [] [] []	[] (ADD/DELETE)				
•		QUATE [] QUATE []				
REMARKS: REF. 05-6Q-2201-	-3. NASA-JSC FMEA & CIL REVIEW	COMMENTS, 9-11-				

REF. 05-6Q-2201-3. NASA-JSC FMEA & CIL REVIEW COMMENTS, 9-11-86. IOA DID NOT COVER THIS FAILURE MDOE IN THE ORIGINAL ANALYSIS. IOA DOES CONCUR WITH NASA'S REEVALUATION.

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ASSESSME ASSESSME NASA FME	NT 1	D:	DP	S-4	00	-2 - 1				ł		DATA ELINE NEW	[X]
SUBSYSTE MDAC ID: ITEM:	м:		DP 40 Ta	0	crar	nspor	t i	mec	hani	.sm			-	
LEAD ANA	LYSI	::	к.	Pie	etz									
ASSESSME	NT:				•									
	F	ICAL	Г				IDAI		SCR	EENS	¥., f	11 - <u>1</u>	CIL ITEN	
	HD	W/FU	NC		A	•		В		C				
NASA IOA	[3 [3	/2R /2R]]	·	[] [])]		(P (P]	[] [])])]		[[] *]
COMPARE	[.	/]		[]		[-]	[]		C]
RECOMMEN	(DAT)	CONS:		(If	dif	fere	ent	fr	om N	iasa)				
	נ	/]		[]		ני ^י]	[נ	(A)	ן ום / סכ] Elete)
* CIL RE	TENI	ION	RAT	IONZ	ALE:	(If	ar	ppl	icab	A	DEQU		[]
REMARKS: NO DIFFE	RENG	CES.		s In							-		-	- 19

REPORT DATE 12/01/86 C-108

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/10/86 DPS-401 05-5-B04-2	2-1		A DATA: Seline [X] NEW []
SUBSYSTEM: MDAC ID: ITEM:	DPS 401 Tape trans	sport mech	nanism	
LEAD ANALYST:	K. Pietz			:
ASSESSMENT:				
CRITICAL FLIGH		EDUNDANCY	SCREENS	CIL ITEM
HDW/FU	-	В	С	LIEM
NASA [3 /2R IOA [3 /2R] [P] [P] [P]]] [P]] [P]	[]·*. []
COMPARE [/] [] [] []	[]
RECOMMENDATIONS:	(If dif:	ferent fro	om NASA)	
[/] [J [J []	[] (ADD/DELETE)
* CIL RETENTION TREMARKS:	RATIONALE:	(If appli	ADEC	QUATE [] QUATE []
NO DIFFERENCES.				•

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NASA DATA: ASSESSMENT DATE: 10/10/86 ASSESSMENT ID: DPS-402 BASELINE [X] NEW [NASA FMEA #: 05-5-B04-2-1 1 SUBSYSTEM: DPS 402 MDAC ID: ITEM: Read electronics LEAD ANALYST: K. Pietz ASSESSMENT: CRITICALITY REDUNDANCY SCREENS CIL ITEM FLIGHT HDW/FUNC В С Α [P] [P] [P] [P] [P] [P] NASA [3 /2R] - E IOA [3 /2R] E 1 COMPARE [/] [] RECOMMENDATIONS: (If different from NASA) [(ADD/DELETE) * CIL RETENTION RATIONALE: (If applicable) ADEQUATE [] INADEQUATE [] **REMARKS:** . .

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NO DIFFERENCES.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/10/86 NASA DATA DPS-403 BASELINE 05-5-B04-2-1 NEW	[X]			
SUBSYSTEM: MDAC ID: ITEM:	DPS 403 Read electronics				
LEAD ANALYST:	K. Pietz				
ASSESSMENT:					
CRITICAL FLIGH		CIL ITEM			
HDW/FU					
NASA [3 /2R IOA [3 /2R] [P] [P] [P]] [P] [P] [P]	[]* []			
COMPARE [/] [] [] []	[]			
RECOMMENDATIONS: (If different from NASA)					
[/		[] DD/DELETE)			
* CIL RETENTION T REMARKS: NO DIFFERENCES.	RATIONALE: (If applicable) ADEQUATE INADEQUATE	[]			

REPORT DATE 12/01/86 C-111

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/10/86 DPS-404 05-5-B04-2-1	NASA DATA: BASELINE [X] NEW []			
	DPS 404 MIA	•			
LEAD ANALYST:	K. Pietz				
ASSESSMENT:					
CRITICAL FLIGH		NS CIL ITEM			
HDW/FU		C and the state			
NASA [3 /2R IOA [3 /2R] [P] [P]] [P] [P]	[P] []*. [P] []			
COMPARE [/] [] []	[]][]			
RECOMMENDATIONS: (If different from NASA)					
[/	1 [] []	[] [] (ADD/DELETE)			
* CIL RETENTION A REMARKS: NO DIFFERENCES.	RATIONALE: (If applicable) ADEQUATE [] INADEQUATE []			

REPORT DATE 12/01/86

C-112

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/10/86 DPS-405 05-5-B04-2-1	NASA DATA BASELINE NEW	[X]
SUBSYSTEM: MDAC ID: ITEM:	DPS 405 MIA		
LEAD ANALYST:	K. Pietz		
ASSESSMENT:			
CRITICAL FLIGH		:NS	CIL ITEM
HDW/FU		С	
NASA [3 /2R IOA [3 /2R] [P] [P]] [P] [P]	[P] [P]	[]*
COMPARE [/] [] []	[]	[]]
RECOMMENDATIONS:	(If different from NAS	5A)	•
t /] [] []	[] (A	[] DD/DELETE)
	RATIONALE: (If applicable	e) ADEQUATE INADEQUATE	
REMARKS: NO DIFFERENCES.			

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/10/86 DPS-406 05-5-B04-	2-1		NASA DATA BASELINE NEW	x] \$]
SUBSYSTEM: MDAC ID: ITEM:	DPS 406 Write ele	ctronic	cs	-		
LEAD ANALYST:	K. Pietz					
ASSESSMENT:						
CRITICAL FLIGH		EDUNDAN	ICY SCRE	ENS	CIL ITEM	ſ
HDW/FU	NC A		В	C		
NASA [3 /2R IOA [3 /2R	.] [P] [P) () (P] P]	[P] [P]	[[] *]
COMPARE [/) []	[]	[]	C]
RECOMMENDATIONS:	(If dif	ferent	from NA	SA)		
[/] [] []	[]] DD/DE] LETE)
* CIL RETENTION	RATIONALE:	(If ap	plicabl	e) ADEQUATE INADEQUATE	ſ]
REMARKS: NO DIFFERENCES.					L.	.

REPORT DATE 12/01/86 C-114

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/10/86 DPS-407 05-5-B04-2-1	BASELINE	NASA DATA: BASELINE [X] NEW []			
	DPS 407 RPC					
LEAD ANALYST:	K. Pietz					
ASSESSMENT:						
CRITICALI FLIGHT	TY REDUNDANCY S	SCREENS	CIL ITEM			
HDW/FUN	IC A B	С				
NASA [3 /2R IOA [3 /2R] [P] [P]] [P] [P]] [P]] [P]	[] *			
COMPARE [/	1 [] [] []	[]			
RECOMMENDATIONS:	RECOMMENDATIONS: (If different from NASA)					
[/	J [] []] [] (AI	[] DD/DELETE)			
* CIL RETENTION H REMARKS: NO DIFFERENCES.	RATIONALE: (If applic	cable) ADEQUATE INADEQUATE	[] []			

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/10/8 DPS-408 05-6S-B				ASA DATA BASELINE NEW	: [X] []
SUBSYSTEM: MDAC ID: ITEM:	DÞS 408 Switch						
LEAD ANALYST:	K. Piet:	2					
ASSESSMENT:							
CRITICAL FLIGH		REDUND	ANCY S	CREENS		CIL ITEN	r
HDW/FU		A	B	с	1 : Te 7 - 1	LIEF	L
NASA [3 /2R IOA [3 /2R] [P] P]	[P] [P]	[P [P	-] ·	[[] *
COMPARE [/] []	[]] []	۵]
RECOMMENDATIONS:	(If d	ifferen	t from	n NASA)			
[/] []	[]	[] (Al	[DD/DE] ELETE)
* CIL RETENTION	RATIONALI	E: (If a	applic	AI	EQUATE EQUATE	ב]
REMARKS: NO DIFFERENCES.					PÃOVIT	Ĺ	l Rođen stale

		SA DATA: ASELINE [] NEW [X]			
MDAC ID:	DPS 409 Switch				
LEAD ANALYST:	K. Pietz				
ASSESSMENT:					
CRITICALI FLIGHT		CIL ITEM			
HDW/FUN					
NASA [3 /3 IOA [3 /3] [P] [P] [P] [NA] [NA] [NA] []*			
COMPARE [/] [N] [N] [N] []			
RECOMMENDATIONS: (If different from NASA)					
[/] [] [] [] [] (ADD/DELETE)			
* CIL RETENTION R		EQUATE [] EQUATE []			
REMARKS: ACCORDING TO NSTS 22206, REDUNDANCY SCREENS MUST BE "NA" OR BLANK FOR FMEAS WITH A CRITICALITY OF 3/3. NASA AGREED WITH THE IOA ASSESSMENT RECOMMENDATION.					

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/14/86 DPS-410 05-5-B04-	·2-1		NASA DAT BASELIN NE	
SUBSYSTEM: MDAC ID: ITEM:	DPS 410 Control l	ogic			
LEAD ANALYST:	K. Pietz				
ASSESSMENT:					
CRITICAL FLIGH	T	EDUNDAN			CIL ITEM
HDW/FU	NC A	L	В	C	
NASA [3 /2R IOA [3 /2R] [P] [P) [] [P] P]	[P] [P]	[] *
COMPARE [/] [1]	[]	[]
RECOMMENDATIONS:	(If dif	ferent	from NA	SA)	
[/] [] [3	[] ([] ADD/DELETE)
* CIL RETENTION	RATIONALE:	(If app	plicabl	e) ADEQUATE INADEQUATE	
REMARKS: NO DIFFERENCES.					

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/14/86 DPS-411 05-5-B04-		1	NASA DATA BASELINE NEW	[X]]
SUBSYSTEM: MDAC ID: ITEM:	DPS 411 Control J	logic				
LEAD ANALYST:	K. Pietz					
ASSESSMENT:						
CRITICAL		REDUNDANCY	SCREENS		CIL ITEM	r
FLIGH HDW/FU		A B	, (c ·	₩. T. T. T. T.	*
NASA [3 /2R IOA [3 /2R] []	P] [P P] [P] [] [P] P]	[[] *]
COMPARE [/] [] [J []	1]
RECOMMENDATIONS: (If different from NASA)						
[/].[] [j C] (A] DD/DI] ELETE)
* CIL RETENTION	RATIONALÈ	: (If appl	•	ADEQUATE ADEQUATE	[]
REMARKS: NO DIFFERENCES.						

REPORT DATE 12/01/86 C-119

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-412	NASA DATA: BASELINE [X] NEW []			
MDAC ID:	DPS 412 Power supply				
LEAD ANALYST:	K. Pietz				
ASSESSMENT:		· .			
CRITICAL FLIGH		ENS CIL ITEM			
HDW/FU		C			
NASA [3 /2R IOA [3 /2R] [P] [P]] [P] [P]	[P] [] *. [P] []			
COMPARE [/] [] []	[]][]			
RECOMMENDATIONS:	(If different from NA	SA)			
[/	J [] []	[] [] (ADD/DELETE)			
* CIL RETENTION	RATIONALE: (If applicabl	ADEQUATE []			
INADEQUATE [] REMARKS: THIS FAILURE MODE, "FAILS OUT OF TOLERANCE", IS CONSIDERED TO BE COVERED BY THIS ROCKWELL FMEA WITH FAILURE MODE, "LOSS OF OUTPUT".					

REPORT DATE 12/01/86 C-120

ASSESSMENT ID: I	10/17/86 NASA DATA: DPS-413 BASELINE 05-6S-BRES2-1 NEW	[X]
MDAC ID:	DPS 413 RESISTOR, CURRENT LIMITER	
LEAD ANALYST:	B. ROBB	
ASSESSMENT:		te set en
CRITICALI FLIGHT		CIL ITEM
HDW/FUNC	C A B C	
NASA [3 /2R IOA [3 /2R] [P] [P] [P]] [P] [P] [P]	[]*
COMPARE [/] [] [] [] []	[]
RECOMMENDATIONS:	(If different from NASA)	
· · · · · · · · · · · · · · · · · · ·		[] DD/DELETE)
* CIL RETENTION RA	ATIONALE: (If applicable) ADEQUATE INADEQUATE	[] []
		ORIGINAL

то BE COVERED BY MDAC ID. 408, A SWITCH WHICH IS IN SERIES WITH THIS RESISTOR.

REPORT DATE 12/01/86 C-121

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-414			NASA DA BASELI N	
SUBSYSTEM: MDAC ID: ITEM:	DPS 414 CONTROL	LER, REM	IOTE POV	TER	
LEAD ANALYST:	H J LOW	ERY			
ASSESSMENT:					
CRITICAL FLIGH HDW/FU	T	REDUNDA	NCY SCF B	C	CIL ITEM
•			_	-	• • •
NASA [3 /2R IOA [3 /2R		P] P]	[P]	[P] [P]	[] * []
COMPARE [/] []	[]]	[]	[]
RECOMMENDATIONS:	(If d	ifferent	: from)	IASA)	
[/] []	[]	[]	[] (ADD/DELETE)
* CIL RETENTION RATIONALE: (If applicable) ADEQUATE [] INADEQUATE []					
REMARKS: NO DIFFERENCES. ANALYSIS.	IOA DID	NOT COV	ER THIS	FAILURE IN	THE ORIGINAL

REPORT DATE 12/01/86

C-122

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/06/86 DPS-415 05-5-B20-1-1 DPS	NASA DATA BASELINE NEW		
	DPS 415 IPL Source Switch			
LEAD ANALYST:	T. B. Cribbs			
ASSESSMENT:				
CRITICAL FLIGH HDW/FU		CY SCREENS B C	CIL ITEM	
NASA [2 /2 IOA [3 /3] [P] [] [NA] [P] [P] NA] [NA]	[X]*. []	
COMPARE [N /N] [И] [и] [и]	[N]	
RECOMMENDATIONS:	(If different a	from NASA)		
[/] [] [] [] (A	[] DD/DELETE)	
_	RATIONALE: (If app	olicable) ADEQUATE INADEQUATE		
LOAD IS COMPLETE HAVE TO OCCUR BE	A SYSTEMS SOFTWAR	DE BECAUSE AFTER IN RE PROBLEM OF SOME WOULD BE MADE TO RE	TYPE WOULD	
GPC. SIMULTANEOUS DISSIMILAR FAILURES WERE EXCLUDED FROM THE IOA. MULTIPLE FAILURES ARE INCONSISTENT WITH NSTS 22206. ACCORDING TO NSTS 22206, REDUNDANCY SCREENS MUST BE "NA' OR BLANK FOR FMEAS WITH A CRITICALITY OF 3/3. IOA DOES CONCUR WITH NASA'S REEVALUATION AND RATIONALE.				

REPORT DATE 12/01/86 C-123

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	11/10/86 DPS-416 MMU-1 (NEW)	NASA D. BASEL	
SUBSYSTEM: MDAC ID: ITEM:	DPS 416 CONTROLLER,	REMOTE POWER	
LEAD ANALYST:	T. B. Cribbs	3	
ASSESSMENT:			
CRITICAL FLIGH HDW/FU	T	JNDANCY SCREENS B C	CIL ITEM
· .			
NASA [3 /3 IOA [3 /3] [NA]] [NA]	[NA] [NA] [NA] [NA]	[]*
COMPARE [/	1 []	[][]	[]
RECOMMENDATIONS:	(If differ	rent from NASA)	
<u>ِ</u> ۲ ۲] []	נייני	[] (ADD/DELETE)
* CIL RETENTION	RATIONALE: (I	f applicable) ADEQUAT INADEQUAT	
TAL DID NOT COUR			

IOA DID NOT COVER THIS FAILURE MODE IN THE ORIGINAL ANALYSIS. ACCORDING TO NSTS 22206, REDUNDANCY SCREENS MUST BE "NA" OR BLANK FOR FMEAS WITH A CRITICALITY OF 3/3. NASA AGREED WITH THE IOA ASSESSMENT RECOMMENDATION. Ĩ

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REPORT DATE 12/01/86 C-124

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-417			NASA DATA BASELINE NEW		
SUBSYSTEM: MDAC ID: ITEM:	DPS 417 SWITCH, 3	IPL				
LEAD ANALYST:	H J LOWE	RY				
ASSESSMENT:						
CRITICAL FLIGH		REDUNDANC	Y SCREENS	5	CIL ITEI	
HDW/FU		A	В	с		•
NASA [3 /2R IOA [3 /2R] [P][P][P] [P] [P] P] .	[[] *
COMPARE [/] [] [] []	Ĩ)
RECOMMENDATIONS	(If di	ifferent f	rom NASA)			
[/] [] [] []] ELETE)
* CIL RETENTION	RATIONALE	: (If app		ADEQUATE IADEQUATE	[[]
REF. 05-5-B16-1-		JSC FMEA				9-19-86.

IOA DID NOT COVER THIS ITEM IN THE ORIGINAL ANALYSIS. NASA AGREED WITH THE IOA ASSESSMENT RECOMMENDATION.

REPORT DATE 12/01/86 C-125

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/14/80 DPS-501 05-5-B08			ASA DATA: BASELINE [] NEW [X]
MDAC ID:	DPS 501 CIA			. .
LEAD ANALYST:	B. ROBB			Υ. σ. 1000 ·
ASSESSMENT:				
CRITICAI FLIGH HDW/FU	T	REDUNDANCY A B		CIL ITEM
			-	······
NASA [2 /1R IOA [3 /1R		P] [F P] [P] [P] [X]*
COMPARE [N/] [] []] [Ŋ]
RECOMMENDATIONS	(If di	ifferent fr	om NASA)	
[/] [] [] [] [] (ADD/DELETE)
* CIL RETENTION	RATIONALE	E: (If appl	AI	DEQUATE [] DEQUATE [X]
REMARKS: THIS FAILURE MOI	E, "LOSS	OF OUTPUT	TO MAIN EN	GINE ON ONE
CHANNEL", COULD	BE CONSID	DERED TO BE	COVERED E	BY ROCKWELL 05-05-

B08-1-1 WITH FAILURE MODE, "NO OUTPUT". IOA DOES CONCUR WITH NASA'S REEVALUATION. THE CIL RETENTION RATIONALE IS INADEQUATE BECAUSE IT IS NOT YET AVAILABLE.

REPORT DATE 12/01/86 C-126

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NASA DATA: ASSESSMENT DATE: 10/14/86 ASSESSMENT ID: BASELINE [DPS-502] NEW [X] 05-5-B08-1-1 NASA FMEA #: SUBSYSTEM: DPS MDAC ID: 502 ITEM: MIA LEAD ANALYST: B. ROBB ASSESSMENT: CIL REDUNDANCY SCREENS CRITICALITY ITEM - FLIGHT HDW/FUNC Α В C NASA [2/1R][P] [F] [P] [P] [P] [X]* [3 /1R] [P] IOA [] COMPARE [N /] [] [N] [] / [N] **RECOMMENDATIONS:** (If different from NASA)] [1 (ADD/DELETE) * CIL RETENTION RATIONALE: (If applicable) ADEQUATE Γ 1 INADEQUATE [X] **REMARKS:** IOA DOES CONCUR WITH NASA'S REEVALUATION. THE CIL RETENTION RATIONALE IS INADEQUATE BECAUSE IT IS NOT YET AVIALABLE.

REPORT DATE 12/01/86 C-127

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/14/86 DPS-503 05-5-B08-1-1	NASA DATA BASELINI NEV	-
MDAC ID:	DPS 503 POWER CONTROL SW	VITCH	12.1
LEAD ANALYST:	B. ROBB		
ASSESSMENT:			·
CRITICAL		ICY SCREENS	CIL ITEM
FLIGH HDW/FU		B C C	TICM
NASA [2 /1R IOA [3 /1R] [P] [] [P] [F] [P] P] [P]	[]*
COMPARE [N/] []]	[א] [א]	[]
RECOMMENDATIONS:	(If different	from NASA)	
[/	J [] [] [] (2	[] ADD/DELETE)
* CIL RETENTION	RATIONALE: (If ap	plicable) ADEQUATE INADEQUATE	[1]
CHANNELS", IS CON	ISIDERED TO BE CO	T TO MAIN ENGINE ON VERED BY ROCKWELL O DANT POWER SUPPLIES	ALL COMMAND

IOA DOES CONCUR WITH NASA'S REEVALUATION. THE CIL RETENTION RATIONALE IS INADEQUATE BECAUSE IT IS NOT YET AVIALBLE.

REPORT DATE 12/01/86

C-128

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	DPS-504	NASA DATA: BASELINE [] NEW [X]		
	DPS 504 INTERNAL POWER SUPPLIES	5		
LEAD ANALYST:	B. ROBB			
ASSESSMENT:				
FLIGH'	-	CENS CIL ITEM		
HDW/FU	NC A B	с		
NASA [2 /lr IOA [3 /lr] [P] [F]] [P] [P]	[P] [X]* [P] []		
COMPARE [N/] [] [и]	[] [<u>N</u>]		
RECOMMENDATIONS:	(If different from NA	ASA)		
[/] [] []	[] [] (ADD/DELETE)		
* CIL RETENTION	RATIONALE: (If applicabl	.e) ADEQUATE [] INADEQUATE [X]		
REMARKS: THIS FAILURE MODE, "LOSS OF OUTPUT TO MAIN ENGINE ON ALL COMMAND CHANNELS", IS CONSIDERED TO BE COVERED BY ROCKWELL 05-5-B08-1-1, WITH THIS FAILURE "LOSS OF REDUNDANT POWER SUPPLIES". IOA DOES CONCUR WITH NASA'S REEVALUATION.				

THE CIL RETENTION RATIONALE IS INADEQUATE BECAUSE IT IS NOT YET AVAILABLE.

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REPORT DATE 12/01/86 ° C-129

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:			NASA DAT BASELIN NE		
MDAC ID:	DPS 505 CONTROLLER I	NTERFACE AI	DAPTER		
LEAD ANALYST:	B. ROBB				
ASSESSMENT:					
CRITICAL		NDANCY SCRI	EENS	CIL	
FLIGH HDW/FU	NC A	В	C	ITEM	
NASA [2/1R IOA [3/1R] [P]] [P]	[F] [P]	[P] [P]	[X]*	
COMPARE [N/] []	[א]	[]	[N]	
RECOMMENDATIONS:	(If differ	ent from Na	ASA)	•	
[/] []	[]		[] ADD/DELETE)	
* CIL RETENTION	RATIONALE: (I	f applicabl	le) ADEQUATE INADEQUATE	[] [X]	
REMARKS: THIS FAILURE MODE, "LOSS OF OUTPUT ON STATUS OF ENGINES", IS CONSIDERED TO BE COVERED BY ROCKWELL 05-5-B08-1-1, WITH THIS FAILURE MODE "NO OUTPUT".					
IOA DOES CONCUR THE CIL RETENTIO AVAILABLE.				r is not yet	

REPORT DATE 12/01/86

C-130

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/14/80 DPS-506 05-5-B08			NASA DATA BASELINE NEW	[X]
SUBSYSTEM: MDAC ID: ITEM:	DPS 506 OIE				
LEAD ANALYST:	B. ROBB				
ASSESSMENT:					
CRITICAL FLIGH		REDUNDA	NCY SCRE	ENS	CIL ITEM
HDW/FU		A	В	C	
NASA [2 /1R IOA [3 /3		P] NA]	[F] [NA]	[P] [NA]	[] * [] [.]
COMPARE [N/N] [N]	[N]	[N]	[]
RECOMMENDATIONS:	(If d	ifferen	t from NA	SA)	
[/] []	[]	[] (A	[] .DD/DELETE)
* CIL RETENTION	RATIONAL	E: (If a	pplicabl	e) ADEQUATE INADEQUATE	[]
NASA/RI DID NOT	SPECIFIC	ALLY COV	VER THIS	FAILURE MODE	E, "LOSS OF

NASA/RI DID NOT SPECIFICALLY COVER THIS FAILURE MODE, "LOSS OF OUTPUT TO S-BAND, MAINTENANCE RECORDS, AND LPS T-O UMBILICAL". THIS FAILURE MODE IS CONSIDERED TO BE COVERED BY ROCKWELL FMEA 05-5-B08-1-1, WITH FAILURE MODE "NO OUTPUT".

REPORT DATE 12/01/86 C-131

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	10/16/86 DPS-507 05-6S-BCKT	: [] [X]				
SUBSYSTEM: MDAC ID: ITEM:	DPS 507 CIRCUIT, E	IU POWER				
LEAD ANALYST:	B. ROBB					
ASSESSMENT:						
CRITICAL FLIGH HDW/FU	T	DUNDANCY SCREE B	NS C	CIL ITEM		
NASA [2 / IR		ודן	[P]	[X]*		
IQA [2 /1R	Ĵ (P] [F]] [F]	[P] ·	[X]		
COMPARE [/	ן ב ב ריק ב	ן נ ון	[]]	[]		
RECOMMENDATIONS: (If different from NASA)						
[/] [] []	[] (A)	[] DD/DELETE)		
* CIL RETENTION	RATIONALE:) ADEQUATE INADEQUATE	[] [X]		
NO DIFFERENCES. IOA DID NOT COVER THIS ITEM IN ORIGINAL ANALYSIS. IOA DOES CONCUR WITH THE NASA REEVALUATION.						

ANALYSIS. IOA DOES CONCUR WITH THE NASA REEVALUATION. THE CIL RETENTION RATIONALE IS INADEQUATE BECAUSE IT IS NOT YET AVAILABLE.

REPORT DATE 12/01/86 C-132

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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	11/03/86 DPS-508 EIU-1 (NEW)		SA DATA: ASELINE [] NEW [X]
SUBSYSTEM: MDAC ID: ITEM:	DPS 508 EIU		
LEAD ANALYST:	h j lowery		
ASSESSMENT:			•
CRITICAL FLIGH HDW/FU	Т	ANCY SCREENS B C	CIL ITEM
NASA [1 /1 IOA [1 /1] [P]] [P]	[F] [P] [F] [P]] [X]* [X]
COMPARE [/] []	[-]][] []
RECOMMENDATIONS:	(If differen	t from NASA)	
[/] []	[][] [] (ADD/DELETE)
* CIL RETENTION	RATIONALE: (If	AD	EQUATE [] EQUATE [X]
REMARKS: IOA DID NOT COVE NASA AGREED WITH	I THE IOA ASSESS	MENT RECOMMEND	ATION.

THE RETENTION RATIONALE IS INADEQUATE BECAUSE IT IS NOT YET AVAILABLE. THIS IS A NEW FMEA PRESENTED AT THE DPS PREBOARD.

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REPORT DATE 12/01/86 C-133

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ASSESSMEN ASSESSMEN NASA FMEA	T ID:	11/03/3 DPS-509 EIU-2	Ð	W)			-	ASA DATA BASELINE NEW]]	x]	
SUBSYSTEM MDAC ID: ITEM:	:	DPS 509 SWITCH,	, P(OWER								
LEAD ANAL	YST:	H J LOV	VER	x								
ASSESSMEN	T:					-						
C	RITICAL FLIGH	т		EDUND.		SCREE			CI IT			
	HDW/FU	NC	A		В		С					
NASA IOA	[1 /1 [1 /1] [P P]]	[·F [F]	[P [P]	[[X X]	*
COMPARE	[/].	[.]	[]	[] .	[]	
RECOMMEND	ATIONS:	(If d	lif	feren	t fr	om NAS	A)					
	[/] []	[]	[A)	[DD/	DE:] LE'	IE)
* CIL RET	ENTION :	RATIONAI	E:	(If a	appl		A	DEQUATE DEQUATE	נ נ	x]]	
REMARKS: IOA DID NO								RIGINAL	ANA	ĽY	SI	s.

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NASA AGREED WITH THE IOA ASSESSMENT RECOMMENDATION. THE CIL RETENTION RATIONALE IS INADEQUATE BECAUSE IT IS NOT YET AVAILABLE. THIS IS A NEW FMEA PRESENTED AT THE DPS PREBOARD.

REPORT DATE 12/01/86 C-134

APPENDIX D

CRITICAL ITEMS

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APPENDIX D

CRITICAL ITEMS

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NASA FMEA	IDA ID	ITEM NAME	FAILURE MODE
MDM * 05-5 -B03-1-1 05-5 -B03-1-2 * 05-5 -B03-2-1 05-5 -B03-2-2 05-5 -B03-5-1 05-5 -B03-5-2 % 05-65-BRES3-1 % 05-65-BRPC3-1 % 05-65-BSW3 -1 % 05-65-BSW5 -3	120 122 108 107 141 142 190 191 193 195	FA MDM FA MDM FF MDM FF MDM PF MDM RESISTOR RPC SWITCH SWITCH	LOSS OF OUTPUT LOSS OF OUTPUT LOSS OF OUTPUT LOSS OF OUTPUT LOSS OF OUTPUT LOSS OF OUTPUT OPEN LOSS OF OUTPUT PREMATURE OPERATION FAILS-TO-TRANSFER
GPC * 05-5 -B01-1-1 * 05-5 -B02-1-1 05-5 -B02-1-3 % 05-5 -B17-1-1 % 05-65-BDIDX-1 % 05-65-BSW1 -3	205 201 225 210 230 217	CPU IOP IOP SWITCH DIODE SWITCH	LOSS OF OUTPUT LOSS OF OUTPUT ERRONEOUS OUTPUT LOSS OF OUTPUT FAILS OPEN FAILS OPEN
MCDS 05-5-B22-1-1 05-5-B23-1-3 % 05-5-B24-1-1	300 307 300	SWITCH KBD ADAPTER SWITCH	ERRONEOUS OUTPUT ERRONEOUS OUTPUT FAILS OPEN
DBC 05-5-814-1-1	315	DBC	FAILS OPEN/SHORT
MMU 05-5-820-1-1	415	SWITCH	FAILS-TO-TRANSFER
EIU % EIU-1 % EIU-2 % 05-5 -B08-1-1 % 05-65-BCKT1-1	508 509 501 507	EIU SWITCH CIA POWER CKT	ERRONEOUS OUTPUT SHORT-TO-GROUND NO OUTPUT FAILS OPEN/SHORT

NOTE * IOA ISSUE

% ADDED TO CIL POST 51-L

APPENDIX E DETAILED ANALYSIS

This section contains the IOA analysis worksheets generated during the analysis of this subsystem. The information on these worksheets is intentionally similar to the NASA FMEAs. Each of these sheets identifies the hardware item being analyzed, and parent assembly, as well as the function. For each failure mode, the possible causes are outlined, and the assessed hardware and functional criticality for each mission phase is listed, as described in the NSTS 22206, Instructions for Preparation of FMEA and CIL, 10 October 1986. Finally, effects are entered at the bottom of each sheet, and the worst case criticality is entered at the top.

LEGEND FOR IOA ANALYSIS WORKSHEETS

Hardware Criticalities:

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- 1 = Loss of life or vehicle
 - = Loss of mission or next failure of any redundant item

(like or unlike) could cause loss of life/vehicle

3 = All others

Functional Criticalities:

- IR = Redundant hardware items (like or unlike) all of which, if failed, could cause loss of life or vehicle.
- 2R = Redundant hardware items (like or unlike) all of which, if failed, could cause loss of mission.

Redundancy Screen A:

- 1 = Is Checked Out PreFlight
 - = Is Capable of Check Out PreFlight
- 3 = Not Capable of Check Out PreFlight
- NA = Not Applicable

Redundancy Screens B and C:

- P = Passed Screen
- F = Failed Screen
- NA = Not Applicable

INDEPENDENT ORBITER ASSESSMENT ORBITER SUBSYSTEM ANALYSIS WORKSHEET

HIGHEST CRITICALITY HDW/FUNC 10/03/86 DATE: 3/1R FLIGHT: SUBSYSTEM: DPS 3/1R ABORT: 100 MDAC ID: MDM FF1, FF2, FF3, FF4 ITEM: FAILURE MODE: Loss of Output to GPC LEAD ANALYST: W. A. Haufler SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: 1) DPS Multiplexer-DeMultiplexers (MDM) 2) Flight critical Forward MDM (FF1..4) 31 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC FLIGHT PHASE HDW/FUNC ABORT 3/2R RTLS: 3/1R PRELAUNCH: TAL: 3/1R LIFTOFF: 3/1R 3/2R ONORBIT: AOA: 3/1R 3/1R ATO: 3/1R DEORBIT: LANDING/SAFING: 3/1R C[P] REDUNDANCY SCREENS: A [1] B [P] Av Bay 1,2,3,2 LOCATION: PART NUMBER: MC615-0004-6110,5110 CAUSES: Vibration, Corrosion, Contamination EFFECTS/RATIONALE: FCOS sets Commfault flag for that data. Application SW ignores that data. FCOS bypasses MDM after 2nd consecutive commfault, and displays fault msg on CRTs. Port moding may recover MDM, but not allowed during ascent until after 2nd MDM failure. If all redundancy fails, lose use of IMU torquing, forward RCS jets, Hand Controls (THC,RHC), most switches and indicators.

REFERENCES:

REPORT DATE 12/20/86

E-2

DATE: SUBSYSTEM: MDAC ID:	10/03/86 DPS 101		FICALITY LIGHT: BORT:	HDW/FUNC 3/1R 3/1R
ITEM: FAILURE MOD	MDM FF1,FF2,FF3,FF E: Loss of Output to			
LEAD ANALYS	T: W. A. Haufler	SUBSYS LEAD:	B. Robb	
BREAKDOWN H 1) DPS 2) Multip 3) Flight 4) 5) 6) 7) 8) 9)	IERARCHY: Lexer-DeMultiplexers () critical Forward MDM	MDM) (FF14)		
	CRITIC	ALITIES		
LIFT ONOR DEOR	PHASE HDW/FUNC AUNCH: 3/2R OFF: 3/1R BIT: 3/2R	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNG 3/1R 3/1R 3/1R 3/1R 3/1R	2
REDUNDANCY	SCREENS: A [1]	B ['P]	C[P]	

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LOCATION: AV Bay 1,2,3,2 PART NUMBER: MC615-0004-6110,5110

CAUSES: Vibration, Corrosion, Contamination

EFFECTS/RATIONALE:

FCOS does not directly detect this error via MDM Return Word processing. Fault tolerance depends on redundant strings to voting LRUs. Detection depends on separate, redundant feedback signals.

If all redundancy fails, lose use of IMU torquing, forward RCS jets, Hand Controls (THC,RHC), most switches and indicators.

REFERENCES:

HIGHEST CRITICALITY HDW/FUNC DATE: 10/03/86 FLIGHT: 3/1R SUBSYSTEM: DPS 3/1R ABORT: MDAC ID: 102 MDM FF1, FF2, FF3, FF4 ITEM: FAILURE MODE: Erroneous Output to GPC LEAD ANALYST: W. A. Haufler SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MDM) Flight critical Forward MDM (FF1..4) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC 3/2R RTLS: 3/1R ---PRELAUNCH: 3/1R TAL: 3/1R LIFTOFF: 3/2R AOA: 3/1R ONORBIT: 3/1R ATO: 3/1R DEORBIT: LANDING/SAFING: 3/1R REDUNDANCY SCREENS: A [1] B [P] C[P] LOCATION: Av Bay 1,2,3,2 PART NUMBER: MC615-0004-6110,5110 CAUSES: Vibration, Corrosion, Contamination EFFECTS/RATIONALE: FCOS sets Commfault flag for that data. Application SW ignores that data. FCOS bypasses MDM after 2nd consecutive commfault, and displays fault msg on CRTs. Port moding may recover MDM, but not allowed during ascent until after 2nd MDM failure. If all redundancy fails, lose use of IMU torquing, forward RCS jets, Hand Controls (THC, RHC), most switches and indicators. **REFERENCES:**

DATE:10/03/86HIGHEST CRITICALITYHDW/FUNCSUBSYSTEM:DPSFLIGHT:3/1RMDAC ID:103ABORT:3/1R			
ITEM: MDM FF1,FF2,FF3,FF4 FAILURE MODE: Erroneous Output to LRU			
LEAD ANALYST: W. A. Haufler SUBSYS LEAD: B. Robb			
BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MDM) 3) Flight critical Forward MDM (FF14) 4) 5) 6) 7) 8) 9)			
CRITICALITIES			
FLIGHT PHASEHDW/FUNCABORTHDW/FUNCPRELAUNCH:3/2RRTLS:3/1RLIFTOFF:3/1RTAL:3/1RONORBIT:3/2RAOA:3/1RDEORBIT:3/1RATO:3/1RLANDING/SAFING:3/1RATO:3/1R			
REDUNDANCY SCREENS: A [1] B [P] C [P]			
LOCATION: Av Bay 1,2,3,2 PART NUMBER: MC615-0004-6110,5110			
CAUSES: Vibration, Corrosion, Contamination			

EFFECTS/RATIONALE:

FCOS does not directly detect this error via MDM Return Word processing. Fault tolerance depends on redundant strings to voting LRUs. Detection depends on separate, redundant feedback signals.

If all redundancy fails, lose use of IMU torquing, forward RCS jets, Hand Controls (THC,RHC), most switches and indicators.

REFERENCES:

HDW/FUNC HIGHEST CRITICALITY DATE: 10/03/86 FLIGHT: 3/1R SUBSYSTEM: DPS ABORT: 3/1R MDAC ID: 104 MDM FF1, FF2, FF3, FF4 ITEM: FAILURE MODE: Premature Operation to GPC LEAD ANALYST: W. A. Haufler SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MDM) Flight critical Forward MDM (FF1..4) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE RTLS: 3/1R 3/2R PRELAUNCH: TAL: LIFTOFF: 3/1R 3/1R 3/2R AOA: 3/1R ONORBIT: 3/1R ATO: DEORBIT: 3/1R LANDING/SAFING: 3/1R REDUNDANCY SCREENS: A [1] B [P] C [P] LOCATION: Av Bay 1,2,3,2 PART NUMBER: MC615-0004-6110,5110 and the second s CAUSES: Vibration, Corrosion, Contamination EFFECTS/RATIONALE: 11 1 1 <u>1</u> 1 1 1 1 This failure on either port can interfere with FCOS returning data from other BTU(s) and cause healthy BTU(s) to be bypassed. Port moding will not fix a blabbing MDM. Power cycling may reset electronics, but cannot be performed during ascent (power switches cannot be reached), and will not always stop premature operations. If all redundancy fails, lose use of IMU torquing, forward RCS jets, Hand Controls (THC,RHC), most switches and indicators. **REFERENCES:**

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DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 105	HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/1R ABORT: 3/1R
ITEM: MDM FF1,FF2,FF3,FF4 FAILURE MODE: Premature Operation t	to LRU
LEAD ANALYST: W. A. Haufler St	UBSYS LEAD: B. Robb
BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MDI 3) Flight critical Forward MDM (H 4) 5) 6) 7) 8) 9)	M) FFl4)
CRITICAL	TTIES
FLIGHT PHASE HDW/FUNC	ABORT HDW/FUNC '
PRELAUNCH: 3/2R	RTLS: 3/1R
LIFTOFF: 3/1R	TAL: 3/1R
ONORBIT: 3/2R	AOA: $3/1R$
DEORBIT: 3/1R	ATO: 3/1R
LANDING/SAFING: 3/1R	, ,
REDUNDANCY SCREENS: A [1]	B[P] C[P]
LOCATION: Av Bay 1,2,3,2 PART NUMBER: MC615-0004-6110,5110	- · · ·
CAUSES: Vibration, Corrosion, Conta	amination
EFFECTS/RATIONALE: FCOS does not directly detect this e processing. Fault tolerance depends voting LRUS. Detection depends on s signals. If all redundancy fails, lose use o	on redundant strings to separate, redundant feedback

If all redundancy fails, lose use of IMU torquing, forward RCS jets, Hand Controls (THC,RHC), most switches and indicators.

REFERENCES:

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HIGHEST CRITICALITY HDW/FUNC 10/03/86 DATE: 3/1R FLIGHT: SUBSYSTEM: DPS 3/1R ABORT: MDAC ID: 106 ITEM: MDM FF1,FF2,FF3,FF4 FAILURE MODE: Selected All Channels Wrong LEAD ANALYST: W. A. Haufler SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MDM) Flight critical Forward MDM (FF1..4) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT FLIGHT PHASE HDW/FUNC RTLS: PRELAUNCH: 3/2R 3/1R LIFTOFF: 3/1R 3/1R TAL: 3/2R AOA: 3/1R ONORBIT: ATO: DEORBIT: 3/1R 3/1R LANDING/SAFING: 3/1R REDUNDANCY SCREENS: A [1] B[P] C[P] · LOCATION: Av Bay 1,2,3,2 PART NUMBER: MC615-0004-6110,5110 CAUSES: Vibration, Corrosion, Contamination EFFECTS/RATIONALE: The GPC's FCOS and the LRUs would reject all data from that MDM except any data that happened to be in the same format as the expected data. Redundancy Mgt. soon detects and bypasses that MDM, and the effects of wrong data input or output is minimized. If all redundancy fails, lose use of IMU torquing, forward RCS jets, Hand Controls (THC,RHC), most switches and indicators.

E-8

REFERENCES:

DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 107	HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/1R ABORT: 3/1R
ITEM: MDM FF1,FF2,FF3,FF4 FAILURE MODE: Stuck on a Constant	Output to LRU
LEAD ANALYST: W. A. Haufler	SUBSYS LEAD: B. Robb
BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (M 3) Flight critical Forward MDM 4) 5) 6) 7) 8) 9)	(DM) (FF14)
CRITICA	LITIES
FLIGHT PHASE HDW/FUNC	ABORT HDW/FUNC
PRELAUNCH: 3/2R	RTLS: 3/1R TAL: 3/1R
LIFTOFF: 3/1R	AOA: $3/1R$
ONORBIT: 3/2R DEORBIT: 3/1R	ATO: $3/1R$
LANDING/SAFING: 3/1R	
REDUNDANCY SCREENS: A [1]	B[P] C[P]
LOCATION: Av Bay 1,2,3,2 PART NUMBER: MC615-0004-6110,5110) –
CAUSES: Vibration, Corrosion, Cor	ntamination
EFFECTS/RATIONALE: FCOS does not directly detect this	error via MDM Return Word
processing. Fault tolerance depend	is on redundant strings to
voting LRUS. Detection depends or	1 separate, redundant feedback
signals.	an it i i i an i
If all redundancy fails, lose use jets, Hand Controls (THC,RHC), mos	of IMU torquing, forward RCS st switches and indicators.
REFERENCES:	

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HIGHEST CRITICALITY HDW/FUNC 10/03/86 DATE: FLIGHT: 3/1R SUBSYSTEM: DPS ABORT: 3/1R MDAC ID: 108 MDM FF1, FF2, FF3, FF4 ITEM: FAILURE MODE: Falsely Stuck on Busy Mode LEAD ANALYST: W. A. Haufler SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MDM) Flight critical Forward MDM (FF1..4) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC FLIGHT PHASE HDW/FUNC ABORT 3/1R PRELAUNCH: 3/2R RTLS: 3/1R 3/1R LIFTOFF: TAL: 3/1R ONORBIT: 3/2R AOA: ATO: DEORBIT: 3/1R 3/1R LANDING/SAFING: 3/1R REDUNDANCY SCREENS: A [1] B [P] C [P] LOCATION: Av Bay 1,2,3,2 PART NUMBER: MC615-0004-6110,5110 CAUSES: Vibration, Corrosion, Contamination, SCU Busy Crossstrap stuck high EFFECTS/RATIONALE: FCOS sets Commfault flag for that data. Application SW ignores that data. FCOS bypasses MDM after 2nd consecutive commfault, and displays fault msg on CRTs. Port moding may recover MDM, but not allowed during ascent until after 2nd MDM failure.

If all redundancy fails, lose use of IMU torquing, forward RCS jets, Hand Controls (THC,RHC), most switches and indicators.

REFERENCES:

REPORT DATE 12/20/86

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DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 120	HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/1R ABORT: 3/1R		
ITEM: MDM FA1,FA2,FA3,FA4 FAILURE MODE: Loss of Output to G			
LEAD ANALYST: W. A. Haufler	SUBSYS LEAD: B. Robb		
BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (M 3) Flight critical Aft MDM 4) 5) 6) 7) 8) 9)	(DM) (FA14)		
CRITICA FLIGHT PHASE HDW/FUNC	ABORT HDW/FUNC		
PRELAUNCH: 3/2R	RTLS: 3/1R		
	TAL: $3/1R$		
	AOA: $3/1R$		
ONORBIT: 3/2R			
DEORBIT: 3/1R LANDING/SAFING: 3/1R	ATO: 3/1R		
REDUNDANCY SCREENS: A [1]	B[P] C[P]		
LOCATION: AV Bay 4,5,6,6 PART NUMBER: MC615-0004-6110,5110)		
CAUSES: Vibration, Corrosion, Cor	ntamination		
EFFECTS/RATIONALE: FCOS sets Commfault flag for that data. Application SW ignores that data. FCOS bypasses MDM after 2nd consecutive commfault, and displays fault msg on CRTs. Port moding may recover MDM, but not allowed during ascent until after 2nd MDM failure. If all redundancy fails, lose use of aft RCS, Body Flap, Ailerons, Rudder, Speedbrake, and ability to purge SSMEs and tanks.			
REFERENCES:			

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HIGHEST CRITICALITY HDW/FUNC DATE: 10/03/86 FLIGHT: 3/1R SUBSYSTEM: DPS 3/1R ABORT: MDAC ID: 121 MDM FA1, FA2, FA3, FA4 ITEM: FAILURE MODE: Loss of Output to LRU LEAD ANALYST: W. A. Haufler SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MDM) 3) Flight critical Aft MDM (FA1..4) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT FLIGHT PHASE HDW/FUNC 3/1R 3/2R RTLS: PRELAUNCH: 3/1R 3/1R LIFTOFF: TAL: 3/1R ONORBIT: AOA: 3/2R 3/1R DEORBIT: 3/1R ATÓ: LANDING/SAFING: 3/1R REDUNDANCY SCREENS: A [1] B [P] C [P] LOCATION: Av Bay 4,5,6,6 PART NUMBER: MC615-0004-6110,5110 CAUSES: Vibration, Corrosion, Contamination EFFECTS/RATIONALE: FCOS does not directly detect this error via MDM Return Word processing. Fault tolerance depends on redundant strings to voting LRUs. Detection depends on separate, redundant feedback signals. If all redundancy fails, lose use of aft RCS, Body Flap, Ailerons, Rudder, Speedbrake, and ability to purge SSMEs and tanks. **REFERENCES:**

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HIGHEST CRITICALITY HDW/FUNC 10/03/86 DATE: 3/1R FLIGHT: SUBSYSTEM: DPS 3/1R ABORT: 122 MDAC ID: ITEM: MDM FA1, FA2, FA3, FA4 FAILURE MODE: Erroneous Output to GPC SUBSYS LEAD: B. Robb LEAD ANALYST: W. A. Haufler BREAKDOWN HIERARCHY: DPS 1) Multiplexer-DeMultiplexers (MDM) 2) 3) Flight critical Aft MDM (FA1..4) 4) 5) 6) 7) 8) 9) CRITICALITIES ABORT HDW/FUNC HDW/FUNC FLIGHT PHASE 3/1R PRELAUNCH: 3/2R ' RTLS: 3/1R 3/1R TAL: LIFTOFF: AOA: 3/1R 3/2R ONORBIT: ATO: 3/1R DEORBIT: 3/1R LANDING/SAFING: 3/1R C[P] REDUNDANCY SCREENS: A []] B [P] LOCATION: Av Bay 4,5,6,6 PART NUMBER: MC615-0004-6110,5110 CAUSES: Vibration, Corrosion, Contamination EFFECTS/RATIONALE: FCOS sets Commfault flag for that data. Application SW ignores that data. FCOS bypasses MDM after 2nd consecutive commfault, and displays fault msg on CRTs. Port moding may recover MDM, but not allowed during ascent until after 2nd MDM failure. If all redundancy fails, lose use of aft RCS, Body Flap, Ailerons, Rudder, Speedbrake, and ability to purge SSMEs and tanks. **REFERENCES:**

HIGHEST CRITICALITY HDW/FUNC 10/03/86 DATE: 3/1R FLIGHT: SUBSYSTEM: DPS 3/1R ABORT: 123 MDAC ID: MDM FA1, FA2, FA3, FA4 ITEM: FAILURE MODE: Erroneous Output to LRU SUBSYS LEAD: B. Robb LEAD ANALYST: W. A. Haufler BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MDM) performance and a second seco Flight critical Aft MDM (FA1..4) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC FLIGHT PHASE HDW/FUNC ABORT - 3/2R RTLS: 3/1R PRELAUNCH: TAL: 3/1R 3/1R LIFTOFF: ONORBIT: 3/2R AOA: 3/1R DEORBIT: 3/1R ATO: 3/1R LANDING/SAFING: 3/1R REDUNDANCY SCREENS: A [1] B [P] C [P] LOCATION: Av Bay 4,5,6,6 PART NUMBER: MC615-0004-6110,5110 CAUSES: Vibration, Corrosion, Contamination EFFECTS/RATIONALE: FCOS does not directly detect this error via MDM Return Word processing. Fault tolerance depends on redundant strings to voting LRUs. Detection depends on separate, redundant feedback signals. If all redundancy fails, lose use of aft RCS, Body Flap, Ailerons, Rudder, Speedbrake, and ability to purge SSMEs and tanks. **REFERENCES:**

DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 124	HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/1R ABORT: 3/1R
ITEM: MDM FA1,FA2,FA3,FA4 FAILURE MODE: Premature Operation	
LEAD ANALYST: W. A. Haufler	SUBSYS LEAD: B. Robb
BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (M) 3) Flight critical Aft MDM 4) 5) 6) 7) 8) 9)	
CRITICA	LITIES
FLIGHT PHASEHDW/FUNCPRELAUNCH:3/2RLIFTOFF:3/1RONORBIT:3/2RDEORBIT:3/1RLANDING/SAFING:3/1RREDUNDANCY SCREENS:A [1]LOCATION:Av Bay 4,5,6,6PART NUMBER:MC615-0004-6110,5110CAUSES:Vibration, Corrosion, ConEFFECTS/RATIONALE:This failure on either port can in data from other BTU(s) and cause gPort moding will not fix a blabbin electronics, but cannot be perform (power switches cannot be reached), premature operations. If all reduRCS, Body Flap, Ailerons, Rudder, purge SSMEs and tanks.	tamination terfere with FCOS returning good BTU(s) to be bypassed. g MDM. Power cycling may reset ed during ascent , and will not always stop ndancy fails, lose use of aft
REFERENCES:	

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HIGHEST CRITICALITY HDW/FUNC DATE: 10/03/86 3/1R SUBSYSTEM: DPS FLIGHT: 3/1R ABORT: MDAC ID: 125 ITEM: MDM FA1, FA2, FA3, FA4 FAILURE MODE: Premature Operation to LRU LEAD ANALYST: W. A. Haufler SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MDM) Flight critical Aft MDM (FA1..4) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES ABORT HDW/FUNC FLIGHT PHASE HDW/FUNC PRELAUNCH: 3/2R RTLS: 3/1R 3/1R LIFTOFF: 3/1R TAL: 3/1R ONORBIT: 3/2R AOA: ATO: DEORBIT: 3/1R 3/1R LANDING/SAFING: 3/1R and a second **REDUNDANCY SCREENS:** A [1] B [P] C [P] LOCATION: Av Bay 4,5,6,6 PART NUMBER: MC615-0004-6110,5110 CAUSES: Vibration, Corrosion, Contamination EFFECTS/RATIONALE: FCOS does not directly detect this error via MDM Return Word processing. Fault tolerance depends on redundant strings to voting LRUs. Detection depends on separate, redundant feedback signals. If all redundancy fails, lose use of aft RCS, Body Flap, Ailerons, Rudder, Speedbrake, and ability to purge SSMEs and tanks. **REFERENCES:**

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REPORT DATE 12/20/86

DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 126		HIGHEST (CRITICALITY FLIGHT: ABORT:	HDW/FUNC 3/1R 3/1R
ITEM: MDM FA FAILURE MODE: Select				
LEAD ANALYST: W. A. H	aufler	SUBSYS LEAD	D: B. Robb	
BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMu 3) Flight critical 4) 5) 6) 7) 8) 9)				-
-	CRITIC	ALITIES		,
FLIGHT PHASE			HDW/FUN	c
PRELAUNCH:	3/2R	RTL	5: 3/1R	
LIFTOFF:	3/1R	TAL		
ONORBIT:	3/2R	AOA		
DEORBIT:	3/1R	ATO	: 3/1R	
LANDING/SAFING	: 3/1R			
REDUNDANCY SCREENS:	A [1]	B [P]	C[P]	
LOCATION: AV Bay 4,5,6,6 PART NUMBER: MC615-0004-6110,5110				
CAUSES: Vibration, Corrosion, Contamination				
EFFECTS/RATIONALE: The GPC's FCOS and the LRUs would reject all data from that MDM except any data that happened to be in the same format as the				

except any data that happened to be in the same format as the expected data. Redundancy Mgt. soon detects and bypasses that MDM, and the effects of wrong data input or output is minimized. If all redundancy fails, lose use of aft RCS, Body Flap, Ailerons, Rudder, Speedbrake, and ability to purge SSMEs and tanks.

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REPORT DATE 12/20/86 E-17

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DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 127 ITEM: MDM FA1,FA2,FA3,FA	ABC	IGHT: 3/1R ORT: 3/1R	
FAILURE MODE: Stuck on a Constant	t Output to LRU	-	
LEAD ANALYST: W. A. Haufler	SUBSYS LEAD: B.	. Robb	
BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (N 3) Flight critical Aft MDM 4) 5) 6) 7) 8) 9)	1DM) (FA14)		
CRITIC	ALITIES	,	
FLIGHT PHASE HDW/FUNC		HDW/FUNC	
PRELAUNCH: 3/2R	RTLS:	3/1R	
LIFTOFF: 3/1R	TAL:	3/1R	
ONORBIT: 3/2R DEORBIT: 3/1R	AOA:	3/1R	
DEORBIT: 3/1R	ATO:	3/1R	
LANDING/SAFING: 3/1R			
REDUNDANCY SCREENS: A [1]	B[P]	С[Р] (С. С. С. С.	
LOCATION: Av Bay 4,5,6,6 PART NUMBER: MC615-0004-6110,5110) and a state of the	- 142 - 112	
CAUSES: Vibration, Corrosion, Cor	ntamination		
EFFECTS/RATIONALE: FCOS does not directly detect this error via MDM Return Word processing. Fault tolerance depends on redundant strings to voting LRUs. Detection depends on separate, redundant feedback signals. If all redundancy fails, lose use of aft RCS, Body Flap, Ailerons, Rudder, Speedbrake, and ability to purge SSMEs and tanks.			
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REPORT DATE 12/20/86

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DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 128	HIGHES	T CRITICALITY FLIGHT: ABORT:	HDW/FUNC 3/1R 3/1R
ITEM: MDM FA1,FA FAILURE MODE: Falsely St	2,FA3,FA4 uck on Busy Mode		
LEAD ANALYST: W. A. Haufle	er SUBSYS I	EAD: B. Robb	
BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultip 3) Flight critical Aft 4) 5) 6) 7) 8) 9)	lexers (MDM) MDM (FA14)		• •
	CRITICALITIES		
PRELAUNCH:3,LIFTOFF:3,ONORBIT:3,DEORBIT:3,	/1R 7 /2R 7	T HDW/FUNC TLS: 3/1R PAL: 3/1R IOA: 3/1R TO: 3/1R	:
REDUNDANCY SCREENS: A	1] B[P] C[P]	
LOCATION: AV Bay 4,5, PART NUMBER: MC615-0004-			

CAUSES: Vibration, Corrosion, Contamination, SCU Busy Crossstrap stuck high

EFFECTS/RATIONALE:

FCOS sets Commfault flag for that data. Application SW ignores that data. FCOS bypasses MDM after 2nd consecutive commfault, and displays fault msg on CRTs. Port moding may recover MDM, but not allowed during ascent until after 2nd MDM failure. If all redundancy fails, lose use of aft RCS, Body Flap, Ailerons, Rudder, Speedbrake, and ability to purge SSMEs and tanks.

REFERENCES:

HIGHEST CRITICALITY HDW/FUNC 10/03/86 DATE: FLIGHT: 3/1R DPS SUBSYSTEM: 3/3 ABORT: 140 MDAC ID: MDM PF1, PF2 ITEM: FAILURE MODE: Loss of Output to GPC LEAD ANALYST: W. A. Haufler SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MDM) Payload Forward MDM (PF1..2) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC HDW/FUNC ABORT FLIGHT PHASE 3/3 PRELAUNCH: 3/2R RTLS: 3/3 TAL: LIFTOFF: 3/3 AOA: 3/3 3/1R ONORBIT: 3/3 3/3 ATO: DEORBIT: LANDING/SAFING: 3/3 B [P] C[P] REDUNDANCY SCREENS: A [1] Av Bay 1,2 LOCATION: PART NUMBER: MC615-0004-6710,5710 CAUSES: Vibration, Corrosion, Contamination EFFECTS/RATIONALE: FCOS/BSS sets Commfault flag for that data. Application SW ignores that data. System software bypasses MDM after 2nd consecutive commfault, and displays fault msg on CRTs. Port moding may not recover MDM. If all redundancy fails, lose ability to release, open, close, and latch Payload Bay Doors, and ability to cradle and latch RMS arm without an EVA. **REFERENCES:**

1 1 1

DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 141	HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/1R ABORT: 3/3		
ITEM: MDM PF1,PF2 FAILURE MODE: Loss of Output to L	RU		
LEAD ANALYST: W. A. Haufler	SUBSYS LEAD: B. Robb		
BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (M 3) Payload Forward MDM 4) 5) 6) 7) 8) 9)	DM) (PF12)		
CRITICA			
FLIGHT PHASE HDW/FUNC PRELAUNCH: 3/2R LIFTOFF: 3/3 ONORBIT: 3/1R DEORBIT: 3/3 LANDING/SAFING: 3/3	ABORTHDW/FUNCRTLS:3/3TAL:3/3AOA:3/3ATO:3/3		
REDUNDANCY SCREENS: A [1]	B[P] C[P]		
LOCATION: Av Bay 1,2 PART NUMBER: MC615-0004-6710,5710			
CAUSES: Vibration, Corrosion, Con	tamination		
EFFECTS/RATIONALE: FCOS/BSS does not directly detect this error via MDM Return Word processing. Fault tolerance depends on redundant PF MDMs. Detection depends on separate, redundant feedback signals. If all redundancy fails, lose ability to release, open, close, and latch Payload Bay Doors, and ability to cradle and latch RMS arm without an EVA.			
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HIGHEST CRITICALITY HDW/FUNC DATE: 10/03/86 FLIGHT: 3/1R SUBSYSTEM: DPS 3/3 MDAC ID: 142 ABORT: ITEM: MDM PF1, PF2 FAILURE MODE: Erroneous Output to GPC LEAD ANALYST: W. A. Haufler SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MDM) Payload Forward MDM (PF1..2) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC 3/2R RTLS: PRELAUNCH: 3/3 ≝≓ TAL: LIFTOFF: 3/3 3/3 AOA: ONORBIT: 3/1R 3/3 DEORBIT: 3/3 ATO: 3/3 LANDING/SAFING: 3/3 REDUNDANCY SCREENS: B[P] C[P] A [1] LOCATION: Av Bay 1,2 PART NUMBER: MC615-0004-6710,5710 • • CAUSES: Vibration, Corrosion, Contamination EFFECTS/RATIONALE: FCOS/BSS sets Commfault flag for that data. Application SW ignores that data. System software bypasses MDM after 2nd consecutive commfault, and displays fault msg on CRTs. Port moding may not recover MDM. If all redundancy fails, lose ability to release, open, close, and latch Payload Bay Doors, and ability to cradle and latch RMS arm without an EVA. **REFERENCES:**

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DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 143	HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/1R ABORT: 3/3	
ITEM: MDM PF1,PF2 FAILURE MODE: Erroneous Output to	LRU	
LEAD ANALYST: W. A. Haufler	SUBSYS LEAD: B. Robb	
BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (M	DM)	
3) Payload Forward MDM 4) 5) 6) 7) 8) 9)	(PF12)	
CRITICA		
FLIGHT PHASE HDW/FUNC PRELAUNCH: 3/2R	ABORT HDW/FUNC RTLS: 3/3	
LIFTOFF: 3/3	TAL: 3/3	
ONORBIT: 3/1R DEORBIT: 3/3 LANDING/SAFING: 3/3	AOA: 3/3 ATO: 3/3	
REDUNDANCY SCREENS: A [1]	B[P] C[P]	
LOCATION: Av Bay 1,2 PART NUMBER: MC615-0004-6710,5710		
CAUSES: Vibration, Corrosion, Con	tamination	
EFFECTS/RATIONALE: FCOS/BSS does not directly detect this error via MDM Return Word processing. Fault tolerance depends on redundant PF MDMs. Detection depends on separate, redundant feedback signals. If all redundancy fails, lose ability to release, open, close, and latch Payload Bay Doors, and ability to cradle and latch RMS arm without an EVA.		
REFERENCES:		

HIGHEST CRITICALITY HDW/FUNC 10/03/86 DATE: FLIGHT: 3/1R SUBSYSTEM: DPS ABORT: 3/3 MDAC ID: 144 MDM PF1, PF2 ITEM: FAILURE MODE: Premature Operation to GPC LEAD ANALYST: W. A. Haufler SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MDM) Payload Forward MDM (PF1..2) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE RTLS: 3/3 3/2R PRELAUNCH: 3/3 LIFTOFF: 3/3 TAL: AOA: ONORBIT: 3/1R 3/3 ATO: DEORBIT: 3/3 3/3LANDING/SAFING: 3/3 REDUNDANCY SCREENS: A [1] B [P] C [P] LOCATION: Av Bay 1,2 PART NUMBER: MC615-0004-6710,5710 CAUSES: Vibration, Corrosion, Contamination EFFECTS/RATIONALE: This failure on either port can interfere with FCOS/BSS returning data from other PF MDM and cause good MDM to be bypassed. Port moding will not fix a blabbing MDM. Power cycling may reset electronics, but will not always stop premature operations. If all redundancy fails, lose ability to release, open, close, and latch Payload Bay Doors, and ability to cradle and latch RMS arm without an EVA. **REFERENCES:**

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DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 145	HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/1R ABORT: 3/3		
ITEM: MDM PF1,PF2 FAILURE MODE: Premature Operation	to LRU		
LEAD ANALYST: W. A. Haufler St	UBSYS LEAD: B. Robb		
BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MD) 3) Payload Forward MDM (1 4) 5) 6) 7) 8) 9)	M) PF12)		
CRITICAL			
FLIGHT PHASE HDW/FUNC PRELAUNCH: 3/2R LIFTOFF: 3/3 ONORBIT: 3/1R DEORBIT: 3/3 LANDING/SAFING: 3/3	ABORT HDW/FUNC RTLS: 3/3 TAL: 3/3 AOA: 3/3 ATO: 3/3		
REDUNDANCY SCREENS: A [1]	B[P] C[P]		
LOCATION: Av Bay 1,2 PART NUMBER: MC615-0004-6710,5710			
CAUSES: Vibration, Corrosion, Cont	amination		
EFFECTS/RATIONALE: FCOS/BSS does not directly detect this error via MDM Return Word processing. Fault tolerance depends on redundant PF MDMs. Detection depends on separate, redundant feedback signals. If all redundancy fails, lose ability to release, open, close, and latch Payload Bay Doors, and ability to cradle and latch RMS arm without an EVA.			

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HIGHEST CRITICALITY HDW/FUNC 10/03/86 DATE: 3/1R FLIGHT: DPS SUBSYSTEM: 3/3 ABORT: MDAC ID: 146 MDM PF1, PF2 ITEM: FAILURE MODE: Selected All Channels Wrong SUBSYS LEAD: B. Robb LEAD ANALYST: W. A. Haufler BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MDM) (PF1..2) 3) Payload Forward MDM 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC HDW/FUNC ABORT FLIGHT PHASE 3/2R RTLS: 3/3 PRELAUNCH: 3/3 TAL: 3/3 LIFTOFF: 3/1R 3/3 ONORBIT: AOA: 3/3 3/3 DEORBIT: ATO: LANDING/SAFING: 3/3 REDUNDANCY SCREENS: A [1] C[P] B[P] LOCATION: Av Bay 1,2 PART NUMBER: MC615-0004-6710,5710 CAUSES: Vibration, Corrosion, Contamination EFFECTS/RATIONALE: The GPC's FCOS and the LRUs would reject all data from that MDM except any data that happened to be in the same format as the expected data. Redundancy Mgt. soon detects and bypasses that MDM, and the effects of wrong data input or output is minimized. If all redundancy fails, lose ability to release, open, close, and latch Payload Bay Doors, and ability to cradle and latch RMS arm without an EVA. **REFERENCES:**

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HIGHEST CRITICALITY HDW/FUNC 10/03/86 DATE: FLIGHT: 3/1R SUBSYSTEM: DPS 3/3 ABORT: 147 MDAC ID: ITEM: MDM PF1, PF2 Stuck on a Constant Output to LRU FAILURE MODE: LEAD ANALYST: W. A. Haufler SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: DPS 1) Multiplexer-DeMultiplexers (MDM) 2) (PF1..2) Payload Forward MDM 3) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC FLIGHT PHASE ABORT HDW/FUNC 3/3 3/2R RTLS: PRELAUNCH: 3/3 TAL: 3/3 LIFTOFF: AOA: 3/1R 3/3 **ONORBIT:** ATO: 3/3 DEORBIT: 3/3 LANDING/SAFING: 3/3 **REDUNDANCY SCREENS:** A [1] B [P] C [P] LOCATION: Av Bay 1,2 PART NUMBER: MC615-0004-6710,5710 CAUSES: Vibration, Corrosion, Contamination EFFECTS/RATIONALE: FCOS/BSS does not directly detect this error via MDM Return Word processing. Fault tolerance depends on redundant PF MDMs. Detection depends on separate, redundant feedback signals. If all redundancy fails, lose ability to release, open, close, and latch Payload Bay Doors, and ability to cradle and latch RMS arm without an EVA. **REFERENCES:**

HIGHEST CRITICALITY HDW/FUNC DATE: 10/03/86 3/1R SUBSYSTEM: DPS FLIGHT: 3/3 ABORT: MDAC ID: 148 MDM PF1, PF2 ITEM: FAILURE MODE: Falsely Stuck on Busy Mode LEAD ANALYST: W. A. Haufler SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MDM) Payload Forward MDM (PF1..2) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC FLIGHT PHASE HDW/FUNC ABORT PRELAUNCH: 3/2R RTLS: 3/3 LIFTOFF: . 3/3 TAL: 3/3 ONORBIT: 3/1R AOA: 3/3 DEORBIT: 3/3 ATO: 3/3 LANDING/SAFING: 3/3 A[1] B[P] C[P] REDUNDANCY SCREENS: . [5 LOCATION: Av Bay 1,2 PART NUMBER: MC615-0004-6710,5710 CAUSES: Vibration, Corrosion, Contamination, SCU Busy Crossstrap stuck high EFFECTS/RATIONALE: FCOS/BSS sets Commfault flag for that data. Application SW ignores that data. System software bypasses MDM after 2nd consecutive commfault, and displays fault msg on CRTs. Port moding may not recover MDM. If all redundancy fails, lose ability to release, open, close, and latch Payload Bay Doors, and ability to cradle and latch RMS arm without an EVA. **REFERENCES:**

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HIGHEST CRITICALITY HDW/FUNC 10/03/86 DATE: 3/2R FLIGHT: SUBSYSTEM: DPS /NA ABORT: MDAC ID: 180 MDM LF1, LA1 ITEM: FAILURE MODE: Loss of Output to GPC SUBSYS LEAD: B. Robb LEAD ANALYST: W. A. Haufler BREAKDOWN HIERARCHY: 1) DPS Multiplexer-DeMultiplexers (MDM) 2) PreLaunch Forward & Aft MDM (LF, LA) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE RTLS: /NA 3/2R PRELAUNCH: /NA TAL: LIFTOFF: /NA AOA: /NA /NA ONORBIT: /NA ATO: DEORBIT: /NA 3/2R LANDING/SAFING: C [P] B [NA] **REDUNDANCY SCREENS:** A [1] LOCATION: Av Bay 1,6 PART NUMBER: MC615-0004-6610,5600 CAUSES: Vibration, Corrosion, Contamination EFFECTS/RATIONALE: FCOS sets Commfault flag for that data. Application SW ignores that data. FCOS bypasses MDM after 2nd consecutive commfault, and displays fault msg on CRTs. Port moding may recover MDM. If all redundancy fails, lose ability of GSE to monitor and control systems while attached. **REFERENCES:**

DATE: 10/03/86 HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/2RSUBSYSTEM: DPS /NA ABORT: MDAC ID: 181 ITEM: MDM LF1,LA1 FAILURE MODE: Loss of Output to LRU SUBSYS LEAD: B. Robb LEAD ANALYST: W. A. Haufler BREAKDOWN HIERARCHY: DPS 1) 2) Multiplexer-DeMultiplexers (MDM) 3) preLaunch Forward & Aft MDM (LF,LA) 4) 5) 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC PRELAUNCH: 3/2R RTLS: /NA LIFTOFF: /NA TAL: /NA ONORBIT: /NA AOA: /NA /NA /NA DEORBIT: ATO: LANDING/SAFING: 3/2RREDUNDANCY SCREENS: A [1] B [NA] C[P] LOCATION: Av Bay 1,6 PART NUMBER: MC615-0004-6610,5600 CAUSES: Vibration, Corrosion, Contamination EFFECTS/RATIONALE: FCOS does not directly detect this error via MDM Return Word processing. Fault tolerance depends on redundant strings to voting LRUs. Detection depends on separate, redundant feedback signals. If all redundancy fails, lose ability of GSE to monitor and control systems while attached. **REFERENCES:**

HDW/FUNC HIGHEST CRITICALITY DATE: 10/03/86 3/2R DPS FLIGHT: SUBSYSTEM: /NA ABORT: MDAC ID: 182 ITEM: MDM LF1,LA1 FAILURE MODE: Erroneous Output to GPC SUBSYS LEAD: B. Robb LEAD ANALYST: W. A. Haufler BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MDM) preLaunch Forward & Aft MDM (LF, LA) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC FLIGHT PHASE ABORT HDW/FUNC RTLS: /NA 3/2R PRELAUNCH: LIFTOFF: /NA TAL: /NA AOA: /NA ONORBIT: /NA ATO: /NA /NA DEORBIT: LANDING/SAFING: 3/2R REDUNDANCY SCREENS: C [P] A [1] B [NA] LOCATION: Av Bay 1,6 PART NUMBER: MC615-0004-6610,5600 CAUSES: Vibration, Corrosion, Contamination EFFECTS/RATIONALE: FCOS sets Commfault flag for that data. Application SW ignores that data. FCOS bypasses MDM after 2nd consecutive commfault, and displays fault msg on CRTs. Port moding may recover MDM, but not allowed during ascent until after 2nd MDM failure. If all redundancy fails, lose ability of GSE to monitor and control systems while attached. **REFERENCES:**

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HIGHEST CRITICALITY HDW/FUNC 10/03/86 DATE: FLIGHT: 3/2RSUBSYSTEM: DPS /NA ABORT: MDAC ID: 183 ITEM: MDM LF1, LA1 FAILURE MODE: Erroneous Output to LRU SUBSYS LEAD: B. Robb LEAD ANALYST: W. A. Haufler BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MDM) preLaunch Forward & Aft MDM (LF, LA) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES ABORT HDW/FUNC HDW/FUNC FLIGHT PHASE RTLS: /NA PRELAUNCH: 3/2R LIFTOFF: /NA TAL: /NA ONORBIT: /NA AOA: /NA /NA ATO: DEORBIT: /NA LANDING/SAFING: 3/2R REDUNDANCY SCREENS: A [1] B [NA] C [P] LOCATION: Av Bay 1,6 MC615-0004-6610,5600 _____ PART NUMBER: CAUSES: Vibration, Corrosion, Contamination EFFECTS/RATIONALE: FCOS does not directly detect this error via MDM Return Word processing. Fault tolerance depends on redundant strings to voting LRUs. Detection depends on separate, redundant feedback signals. If all redundancy fails, lose ability of GSE to monitor and control systems while attached. **REFERENCES:**

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HIGHEST CRITICALITY HDW/FUNC DATE: 10/03/86 3/2R FLIGHT: SUBSYSTEM: DPS /NA ABORT: MDAC ID: 184 MDM LF1, LA1 ITEM: FAILURE MODE: Premature Operation to GPC LEAD ANALYST: W. A. Haufler SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MDM) preLaunch Forward & Aft MDM (LF, LA) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC HDW/FUNC ABORT FLIGHT PHASE 3/2R RTLS: /NA PRELAUNCH: /NA TAL: LIFTOFF: /NA /NA /NA ONORBIT: AOA: /NA ATO: DEORBIT: /NA 3/2R LANDING/SAFING: C [P] A [1] B [NA] **REDUNDANCY SCREENS:** LOCATION: Av Bay 1,6 PART NUMBER: MC615-0004-6610,5600 CAUSES: Vibration, Corrosion, Contamination EFFECTS/RATIONALE: This failure on either port can interfere with FCOS returning data from other BTU(s) and cause good BTU(s) to be bypassed. Port moding will not fix a blabbing MDM. Power cycling may reset electronics, but will not always stop premature operations. If all redundancy fails, lose ability of GSE to monitor and control systems while attached. **REFERENCES:**

HIGHEST CRITICALITY HDW/FUNC DATE: 10/03/86 3/2R FLIGHT: SUBSYSTEM: DPS /NA ABORT: MDAC ID: 185 ITEM: MDM LF1, LA1 FAILURE MODE: Premature Operation to LRU SUBSYS LEAD: B. Robb LEAD ANALYST: W. A. Haufler BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MDM) preLaunch Forward & Aft MDM (LF,LA) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC FLIGHT PHASE HDW/FUNC ABORT RTLS: /NA PRELAUNCH: 3/2R LIFTOFF: /NA TAL: /NA /NA /NA ONORBIT: AOA: DEORBIT: /NA ATO: /NA LANDING/SAFING: 3/2R REDUNDANCY SCREENS: A [1] B [NA] C[P] LOCATION: Av Bay 1,6 PART NUMBER: MC615-0004-6610,5600 Vibration, Corrosion, Contamination CAUSES: EFFECTS/RATIONALE: FCOS does not directly detect this error via MDM Return Word processing. Fault tolerance depends on redundant strings to voting LRUs. Detection depends on separate, redundant feedback signals. If all redundancy fails, lose ability of GSE to monitor and control systems while attached. **REFERENCES:**

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HDW/FUNC HIGHEST CRITICALITY 10/03/86 DATE: FLIGHT: 3/2R SUBSYSTEM: DPS ABORT: /NA MDAC ID: 186 ITEM: MDM LF1, LA1 Selected All Channels Wrong FAILURE MODE: LEAD ANALYST: W. A. Haufler SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: DPS 1) Multiplexer-DeMultiplexers (MDM) 2) preLaunch Forward & Aft MDM (LF,LA) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE RTLS: 7NA 3/2R PRELAUNCH: /NA TAL: /NA LIFTOFF: AOA: /NA /NA ONORBIT: /NA /NA ATO: DEORBIT: LANDING/SAFING: 3/2R **REDUNDANCY SCREENS:** A [1] B [NA] C[P] LOCATION: Av Bay 1,6 PART NUMBER: MC615-0004-6610,5600 Vibration, Corrosion, Contamination CAUSES: EFFECTS/RATIONALE: The GPC's FCOS and the LRUs would reject all data from that MDM except any data that happened to be in the same format as the expected data. Redundancy Mgt. soon detects and bypasses that MDM, and the effects of wrong data input or output is minimized. If all redundancy fails, lose ability of GSE to monitor and control systems while attached. **REFERENCES:**

REPORT DATE 12/20/86

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HIGHEST CRITICALITY HDW/FUNC DATE: 10/03/86 3/2R FLIGHT: SUBSYSTEM: DPS /NA ABORT: MDAC ID: 187 ITEM: MDM LF1, LA1 FAILURE MODE: Stuck on a Constant Output to LRU SUBSYS LEAD: B. Robb LEAD ANALYST: W. A. Haufler BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MDM) 3) preLaunch Forward & Aft MDM (LF,LA) 4) 5) 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC PRELAUNCH: 3/2RRTLS: /NA LIFTOFF: /NA TAL: /NA ONORBIT: /NA AOA: /NA ATO: /NA DEORBIT: /NA LANDING/SAFING: 3/2R **REDUNDANCY SCREENS:** A [1] B [NA] C [P] Av Bay 1,6 LOCATION: PART NUMBER: MC615-0004-6610,5600 CAUSES: Vibration, Corrosion, Contamination EFFECTS/RATIONALE: FCOS does not directly detect this error via MDM Return Word processing. Fault tolerance depends on redundant strings to voting LRUs. Detection depends on separate, redundant feedback signals. If all redundancy fails, lose ability of GSE to monitor and control systems while attached. **REFERENCES:**

REPORT DATE 12/20/86

HIGHEST CRITICALITY HDW/FUNC 10/03/86 DATE: FLIGHT: 3/2RSUBSYSTEM: DPS /NA ABORT: MDAC ID: 188 MDM LF1,LA1 ITEM: FAILURE MODE: Falsely Stuck on Busy Mode SUBSYS LEAD: B. Robb LEAD ANALYST: W. A. Haufler BREAKDOWN HIERARCHY: 1) DPS 2) Multiplexer-DeMultiplexers (MDM) 3) preLaunch Forward & Aft MDM (LF, LA) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC FLIGHT PHASE HDW/FUNC ABORT RTLS: /NA PRELAUNCH: 3/2R TAL: /NA /NA LIFTOFF: AOA: /NA ONORBIT: /NA ATO: /NA DEORBIT: /NA 3/2R LANDING/SAFING: REDUNDANCY SCREENS: A [1] B [NA] C [P] LOCATION: Av Bay 1,6 PART NUMBER: MC615-0004-6610,5600 CAUSES: Vibration, Corrosion, Contamination, SCU Busy Crossstrap stuck high EFFECTS/RATIONALE: FCOS sets Commfault flag for that data. Application SW ignores that data. FCOS bypasses MDM after 2nd consecutive commfault, and displays fault msg on CRTs. Port moding may recover MDM. If all redundancy fails, lose ability of GSE to monitor and control systems while attached. **REFERENCES:**

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DATE:10/22/86HIGHEST CRITICALITYHDW/FSUBSYSTEM:DPSFLIGHT:3/1MDAC ID:190ABORT:3/1	R
ITEM: RESISTOR, CURRENT LIMITING FAILURE MODE: OPEN	
LEAD ANALYST: W. A. HAUFLER SUBSYS LEAD: B. ROBB	
BREAKDOWN HIERARCHY: 1) DPS 2) MULTIPLEXER-DEMULTIPLEXERS (MDM) 3) POWER DISTRIBUTION 4) RESISTOR, CURRENT LIMITING 5) 6) 7) 8) 9)	
CRITICALITIES	
FLIGHT PHASEHDW/FUNCABORTHDW/FUNCPRELAUNCH:3/2RRTLS:3/1RLIFTOFF:3/1RTAL:3/1RONORBIT:3/2RAOA:3/1RDEORBIT:3/1RATO:3/1RLANDING/SAFING:3/1RATO:3/1R	
REDUNDANCY SCREENS: A [1] B [F] C [P]	
LOCATION: PART NUMBER: RWR80S1211FR	
CAUSES: THERMAL STRESS, VIBRATION, SHOCK, FRACTURE	
EFFECTS/RATIONALE: NO EFFECT ON ONE FAILURE SINCE MDM ARE NOT INTERRUPTED WITH LOS OF ONE-OF-TWO POWER CIRCUITS. NO EFFECT ON FAILURES OF BOTH RESISTORS (NO LOSS OF VECHICLE) SINCE MDM ARE ALSO REDUNDANT.	35
REFERENCES:	

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HIGHEST CRITICALITY HDW/FUNC 10/22/86 DATE: 3/1R FLIGHT: SUBSYSTEM: DPS 3/1R ABORT: MDAC ID: 191 CONTROLLER, REMOTE POWER ITEM: FAILURE MODE: LOSS OF OUTPUT, FAILS TO CONDUCT, OPEN OR SHORT TO GROUND SUBSYS LEAD: B. ROBB LEAD ANALYST: W. A. HAUFLER BREAKDOWN HIERARCHY: 1) DPS 2) MULTIPLEXER-DEMULTIPLEXERS (MDM) 3) POWER DISTRIBUTION CONTROLLER, REMOTE POWER 4) 5) 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC RTLS: 3/1R PRELAUNCH: 3/2R TAL: 3/1R LIFTOFF: 3/1R 3/2R AOA: 3/1R ONORBIT: ATO: 3/1R 3/1R DEORBIT: LANDING/SAFING: 3/1R

REDUNDANCY SCREENS: A [1] B [F] C [P]

LOCATION:

PART NUMBER: MC450-0017-2050, 2075

CAUSES: PIECE PART STRUCTURE FAILURE, VIBRATION, THERMAL STRESS

EFFECTS/RATIONALE:

NO EFFECT ON ONE FAILURE SINCE MDM ARE NOT INTERRUPTED WITH LOSS OF ONE-OF-TWO POWER CIRCUITS. NO EFFECT ON FAILURE (NO LOSS OF VEHICLE) OF BOTH RESISTORS SINCE MDM ARE ALSO REDUNDANT.

REFERENCES:

REPORT DATE 12/20/86

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DATE: 10/22/86 SUBSYSTEM: DPS MDAC ID: 192	HIGHEST	CRITICALITY HDW/FUNC FLIGHT: 3/3 ABORT: 3/3
ITEM: CONTROLLER, F FAILURE MODE: INADVERTENT	REMOTE POWER OPERATION: CONDU	JCTS PREMATURELY
LEAD ANALYST: W. A. HAUFLER	SUBSYS LE	AD: B. ROBB
BREAKDOWN HIERARCHY: 1) DPS 2) MULTIPLEXER-DEMULTIPLE 3) POWER DISTRIBUTION 4) CONTROLLER, REMOTE POWE 5) 6) 7) 8)		
9)		
· (CRITICALITIES	
FLIGHT PHASEHDW/FUPRELAUNCH:3/3LIFTOFF:3/3ONORBIT:3/3DEORBIT:3/3LANDING/SAFING:3/3	RTI TAI AOF	LS: 3/3 L: 3/3 A: 3/3
REDUNDANCY SCREENS: A [NA] B [NA]	C [NA]
LOCATION:		•

PART NUMBER:

CAUSES: CONTAMINATION, SHOCK, PIÈCE PART FAILURE

EFFECTS/RATIONALE:

NO EFFECT ON ANY MDMs THAT ARE OPERATIONAL THROUGHOUT THE ENTIRE MISSION (FF1,3 AND FA1,2). POWER WILL BE APPLIED TO ANY ONE OF THE FOLLOWING MDMs: FF2,4 AND FA3,4 IF ITS DEDICATED SWITCH FAILS AND IF THE APPROPRIATE POWER BUSSES ARE "ON".

REFERENCES:

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REPORT DATE 12/20/86

E-40 °

DATE:10/22/86HIGHEST CRITICALITYHDW/FUNCSUBSYSTEM:DPSFLIGHT:3/1RMDAC ID:193ABORT:3/1R	
ITEM: SWITCH, MDM POWER FAILURE MODE: FAILS OPEN	
LEAD ANALYST: W. A. HAUFLER SUBSYS LEAD: B. ROBB	
BREAKDOWN HIERARCHY: 1) DPS 2) MULTIPLEXER-DEMULTIPLEXERS (MDM) 3) FA, FF2, FF4, AND PF MDMs 4) POWER DISTRIBUTION 5) SWITCH, MDM POWER 6) 7) 8) 9)	
CRITICALITIES	
FLIGHT PHASEHDW/FUNCABORTHDW/FUNCPRELAUNCH:3/2RRTLS:3/1RLIFTOFF:3/1RTAL:3/1RONORBIT:3/2RAOA:3/1RDEORBIT:3/1RATO:3/1RLANDING/SAFING:3/1RATO:3/1R	
REDUNDANCY SCREENS: A [1] B [F] C [P]	
LOCATION: PART NUMBER: ME452-0102-7201	
CAUSES: PIECE-PART STRUCTURAL FAILURE, CONTAMINATION, MECHANICAL SHOCK, VIBRATION	
EFFECTS/RATIONALE: NO EFFECT ON ONE FAILURE SINCE MDM ARE NOT INTERRUPTED WITH LOSS OF ONE-OF-TWO POWER CIRCUITS. NO EFFECT ON FAILURES OF BOTH RESISTORS (NO LOSS OF VEHICLE) SINCE MDMs ARE ALSO REDUNDANT.	
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REFERENCES:

DATE: 10/22/86 SUBSYSTEM: DPS MDAC ID: 194	HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/3 ABORT: 3/3			
ITEM: SWITCH, MDM POWER FAILURE MODE: PREMATURE OPERATION	: CLOSES INADVERTENTLY			
LEAD ANALYST: W. A. HAUFLER	SUBSYS LEAD: B. ROBB			
BREAKDOWN HIERARCHY: 1) DPS 2) MULTIPLEXER-DEMULTIPLEXERS (MDM) 3) FA, FF2, FF4, AND PF MDMs 4) POWER DISTRIBUTION 5) SWITCH, MDM POWER 6) 7) 8) 9)				
CRITICAL	LITIES			
FLIGHT PHASE HDW/FUNC	ABORT HDW/FUNC			
PRELAUNCH: 3/3	RTLS: 3/3			
LIFTOFF: 3/3	TAL: 3/3			
ONORBIT: 3/3	AOA: 3/3			
DEORBIT: 3/3 LANDING/SAFING: 3/3	ATO: 3/3			
REDUNDANCY SCREENS: A [NA]	B [NA] C [NA]			
LOCATION: PART NUMBER: ME452-0102-7201				
CAUSES: PIECE-PART STRUCTURAL FAII STRESS	LURE, SHOCK, VIBRATION, THERMAL			

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EFFECTS/RATIONALE:

NO EFFECT ON MDMS THAT ARE OPERATIONAL THROUGHOUT THE ENTIRE MISSION. THIS SWITCH FAILURE WILL INADVERTENTLY POWER UP MDMS THAT MIGHT BE OFF; I.E. FA3, FA4, FF2, AND FF4. NO LOSS OF VEHICLE.

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REFERENCES:

FLIGHT: 3/1R

ABORT:

3/1R

HIGHEST CRITICALITY HDW/FUNC 10/22/86 DATE: SUBSYSTEM: DPS MDAC ID: 195 ITEM: SWITCH, MDM POWER FAILURE MODE: FAILS OPEN LEAD ANALYST: W. A. HAUFLER SUBSYS LEAD: B. ROBB BREAKDOWN HIERARCHY:

- 1) DPS
- 2) MULTIPLEXER-DEMULTIPLEXERS (MDM)
- 3) FF1, AND FF3 MDMs
- 4) POWER DISTRIBUTION
- 5) SWITCH, MDM POWER
- 6.)
- 7)
- 8)
- 9)

FLIGHT PHASE	HDW/FUNC	ABÓRT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING			·

REDUNDANCY SCREENS: A [1] B [F] C [P]

LOCATION:

PART NUMBER: ME452-0102-7210

CAUSES: STRUCTURAL FAILURE, CONTAMINATION, MECHANICAL SHOCK, VIBRATION

EFFECTS/RATIONALE:

NO EFFECT ON ONE FAILURE SINCE MDM ARE NOT INTERRUPTED WITH LOSS OF ONE-OF-TWO POWER CIRCUITS. TWO FAILURE (LOSS OF BOTH POWER CIRCUITS AND THUS BOTH FF1 AND FF3) WOULD CAUSE LOSS OF ONE NSP INTERFACE. WORKAROUND EXISTS TO UPDATE STATE VECTOR WITH LOSS OF BOTH FF1 AND FF3.

REFERENCES:

HIGHEST CRITICALITY HDW/FUNC 10/03/86 DATE: 3/1R FLIGHT: DPS SUBSYSTEM: ABORT: 3/1R MDAC ID: 201 Input/Output Processor (IOP) ITEM: FAILURE MODE: Loss of output SUBSYS LEAD: B. Robb LEAD ANALYST: T. B. Cribbs BREAKDOWN HIERARCHY: 1) DPS General Purpose Computer (GPC) 2) 3) Input/Output Processor (IOP) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC HDW/FUNC ABORT FLIGHT PHASE RTLS: 3/1R PRELAUNCH: 3/2R 3/1R LIFTOFF: 3/1R TAL: 3/1R AOA: ONORBIT: 3/2R ATO: 3/1R 3/1R DEORBIT: LANDING/SAFING: 3/1R REDUNDANCY SCREENS: A [1] B [P] C [P] LOCATION: Av Bays

PART NUMBER:

CAUSES: MIA Fails to output to data bus due to piece/part failure from contamination or mechanical, thermal, or electrical overstress, or power failure

EFFECTS/RATIONALE:

Loss of a bus-commanding MIA results in loss of a GPC's ability to communicate over that bus, attached bus terminal units (BTU's), and all inputs and outputs connected to those BTU's. In dynamic flight phases, where a single BTU controls an actuator, the crew would have to manually intervene on a single failure, and switching transients could arise. Loss of all redundancy would cause loss of vehicle control.

REFERENCES: JSC 18820, JSC 11174, JSC 12770

DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 202		HIGHEST CI	RITICALITY FLIGHT: ABORT:	HDW/FUNC 3/1R 3/1R	
ITEM: Input/Out FAILURE MODE: Erratic/E	put Process rroneous Out	or (IOP) tput			
LEAD ANALYST: T. B. Crib	bs SUI	BSYS LEAD:	B. Robb		
BREAKDOWN HIERARCHY: 1) DPS 2) General Purpose Com 3) Input/Output Proces 4) 5) 6) 7) 8) 9)	puter (GPC) sor (IOP)				
	OD THTONT'	TATES			
PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT:	CRITICAL W/FUNC 3/2R 3/1R 3/2R 3/1R 3/1R 3/1R	ABORT RTLS TAL: AOA: ATO:	3/1R 3/1R	C	
REDUNDANCY SCREENS: A	[1]	В[Р]	C[P]		
LOCATION: Av Bays PART NUMBER:		· .			
CAUSES: Component failure due to contamination or mechanical, thermal, or electrical overstress in MIA, ALU, MUX, Local Store, or Memory					
EFFECTS/RATIONALE: Critical GPC outputs are validated by sumword comparison; however, errors are downlinked and logged, but not corrected. MDM/Actuator hardware cancels the effects of an erroneous output from a single channel by "Force fighting", but multiple failures during critical flight phases would likely result in loss of vehicel/life.					

REFERENCES: JSC 18820, JSC 11174, JSC 12770

REPORT DATE 12/20/86

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E-45 ∘

DATE: SUBSYSTEM: MDAC ID:	10/22/80 DPS 203	6	HIGHEST	CRITICALITY FLIGHT: ABORT:	HDW/FUNC 3/1R 3/1R
ITEM: FAILURE MO		/Output Proce ture Operatic			
LEAD ANALY	ST: T. B. (Cribbs	SUBSYS LEAD	B. Robb	
	al Purpose	Computer (GI ocessor (IOP)			
			ALITIES		
LIF ONOI DEOI	PHASE AUNCH: COFF: RBIT: RBIT: DING/SAFING	HDW/FUNC 3/3 2/1R 3/2R 2/1R 3: 2/1R	ABORT RTL TAL AOA ATO	: 2/1R : 3/1R	Ç.

REDUNDANCY SCREENS: A [1] B [P] C [P]

LOCATION: AV Bays PART NUMBER:

CAUSES: Control monitor, channel control, MSC, or microcode store failure results in invalid execution of program. Caused by piece/part failure.

EFFECTS/RATIONALE:

Premature issuance of critical outputs is detected by other GPC's in the Redundant Set. GPC fails to sync and strings are bypassed by other GPC's. Faulty commands are still passed to the actuator by failed GPC. Premature commands to actuators during dynamic flight phases would likely result in loss of vehicle/life, if actuator redundancy was lost or if simultaneous loss of two output channels.

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REFERENCES: JSC 18820, JSC 11174, JSC 12770

REPORT DATE 12/20/86

DATE:10/03/86HIGHEST CRITICALITYHDW/FUNCSUBSYSTEM:DPSFLIGHT:3/1RMDAC ID:204ABORT:3/1R
ITEM: Input/Output Processor (IOP) FAILURE MODE: Erroneous Input
LEAD ANALYST: T. B. Cribbs SUBSYS LEAD: B. Robb
BREAKDOWN HIERARCHY: 1) DPS 2) General Purpose Computer (GPC) 3) Input/Output Processor (IOP) 4) 5) 6) 7) 8) 9)
CRITICALITIES
FLIGHT PHASEHDW/FUNCABORTHDW/FUNCPRELAUNCH:3/2RRTLS:3/1RLIFTOFF:3/1RTAL:3/1RONORBIT:3/2RAOA:3/1RDEORBIT:3/1RATO:3/1RLANDING/SAFING:3/33/3
REDUNDANCY SCREENS: A [1] B [P] C [P]
LOCATION: Ay Bays

LOCATION: AV Bays PART NUMBER:

CAUSES: Component failure due to contamination or mechanical, thermal, or electrical overstress in MIA, ALU, MUX, Local Store, Memory, or DMA Queue

EFFECTS/RATIONALE:

Critical GPC/IOP inputs are validated thru parity checking. Recurring input errors result in either GPC "fail-to-sync" bringing down an erring GPC, or ignoring inputs from an erring MDM via a GPC mask. Erroneous inputs, if propagated through the GPC, could result in erroneous command outputs and loss of vehicle/life, if complete function was lost.

REFERENCES: JSC 18820, JSC 11174, JSC 12770

REPORT DATE 12/20/86 E-47

HDW/FUNC HIGHEST CRITICALITY 10/03/86 DATE: FLIGHT: 3/1R DPS SUBSYSTEM: ABORT: 3/1R MDAC ID: 205 Central Processing Unit (CPU) ITEM: FAILURE MODE: Loss of output SUBSYS LEAD: B. Robb LEAD ANALYST: T. B. Cribbs BREAKDOWN HIERARCHY: 1) DPS 2) General Purpose Computer (GPC) Central Processing Unit (CPU) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE PRELAUNCH: 3/3 RTLS: 3/1R LIFTOFF: 3/1R TAL: 3/1R 3/1R ONORBIT: 3/2R AOA: DEORBIT: 3/1R ATO: 3/1R LANDING/SAFING: 3/1R REDUNDANCY SCREENS: A [1] B [P] C [P] LOCATION: Av Bays PART NUMBER: and <u>200</u>1 and and a CAUSES: CPU fails to function due to loss of power or failure of memory timing page EFFECTS/RATIONALE: In dynamic flight phases where redundant set (RS) is operating, other GPC's recognize GPC failing to sync and issue fail votes against it. The failing GPC's voting logic then removes it from the RS. Four RS GPC's control critical flight functions; if at least three are lost, the 5th GPC (backup flight computer, BFS) is engaged. Loss of BFS would result in loss of vehicle/life. REFERENCES: JSC 18820, JSC 11174, JSC 12770

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HIGHEST CRITICALITY HDW/FUNC 10/03/86 DATE: FLIGHT: 3/1R SUBSYSTEM: DPS 3/1R ABORT: MDAC ID: 206 Central Processing Unit (CPU) ITEM: FAILURE MODE: Erroneous/erratic output SUBSYS LEAD: B. Robb LEAD ANALYST: T. B. Cribbs BREAKDOWN HIERARCHY: 1) DPS 2) General Purpose Computer (GPC) Central Processing Unit (CPU) 3) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT FLIGHT PHASE HDW/FUNC RTLS: 3/1RPRELAUNCH: 3/2R TAL: 3/1R 3/1R LIFTOFF: 3/1R AOA: ONORBIT: 3/3 ATO: 3/1R DEORBIT: 3/1R LANDING/SAFING: 3/1R A [1] B [P] C [P] REDUNDANCY SCREENS: LOCATION: Av Bays PART NUMBER: CAUSES: CPU outputs invalid data to IOP due to memory parity error, or failure of Master Bus Control, ALU, Data Flow Mux, or Local Store EFFECTS/RATIONALE: Critical GPC outputs are validated by sumword comparison to

outputs from redundant GPC's; however, detected errors are merely logged and downlinked without corrective action. Invalid command outputs are passed through Bus Terminal Units (BTU's) to actuators which "force fight" the redundant commands in order to vote out the erroneous command. Loss of more than one output channel to the same actuator would require crew intervention, possibly causing instable switchover transients.

REFERENCES: JSC 18820, JSC 11174, JSC 12770

HIGHEST CRITICALITY HDW/FUNC DATE: 10/03/86 3/1R SUBSYSTEM: FLIGHT: DPS ABORT: 3/1R MDAC ID: 207 ITEM: Central Processing Unit (CPU) FAILURE MODE: Delayed/premature/inadvertent operation LEAD ANALYST: T. B. Cribbs SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: 1) DPS 2) General Purpose Computer (GPC) 3) Central Processing Unit (CPU) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE 3/2R RTLS: 3/1R PRELAUNCH: 3/1R TAL: 3/1R LIFTOFF: AOA: 3/3 3/1R ONORBIT: ATO: DEORBIT: 3/1R 3/1R LANDING/SAFING: 3/1R REDUNDANCY SCREENS: A [1] B[P] C[P] LOCATION: Av Bays 🚿 PART NUMBER: CAUSES: CPU attempts to output data at inappropriate time due to processor slow-down while servicing recurring I/O errors, failure of interrupt logic, or intermittence in timing page. EFFECTS/RATIONALE: Redundant Set GPC's synch up by waiting for synch point messages from other GPC's to indicate completion of identical operations. Excessive processor load could require all GPC's to wait excessively, but each GPC would recognize the slow down and issue a fail-to-synch vote, and the slow GPC's voting logic would remove it from the RS. If performance of all GPC's was degraded during dynamic flight phases, vehicle instability could occur unless crew took control.

REFERENCES: JSC 18820, JSC 11174, JSC 12770

HIGHEST CRITICALITY HDW/FUNC 10/03/86 DATE: FLIGHT: 2/1R SUBSYSTEM: DPS ABORT: 2/1R 208 MDAC ID: Central Processing Unit (CPU) ITEM: Inadvertent operation FAILURE MODE: LEAD ANALYST: T. B. Cribbs SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: DPS 1) General Purpose Computer (GPC) 2) 3) Central Processing Unit (CPU) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC HDW/FUNC ABORT FLIGHT PHASE 2/1RRTLS: PRELAUNCH: 3/3 2/1R TAL: 2/1R LIFTOFF: 2/1R AOA: ONORBIT: 3/3 ATO: 2/1R 2/1R DEORBIT: LANDING/SAFING: 2/1R B[P] C [P] REDUNDANCY SCREENS: A [1] LOCATION: Av Bays PART NUMBER: CAUSES: CPU attempts to output data on incorrect data bus due to errors in memory locations containing configuration or bus-

EFFECTS/RATIONALE:

stringing parameters.

Loss of memory in bus assignment table (NBAT) could result in a GPC attempting to command a data bus commanded by another GPC. Both examine their respective NBAT and assume no error condition, and continue transmission on that same bus. This would cause all data on that bus to be erroneous. Furthermore, idle bus is created and 2 command paths are lost. Possible to outvote good commands: loss of vehicle/life.

REFERENCES: JSC 18820, JSC 11174, JSC 12770

HIGHEST CRITICALITY HDW/FUNC 10/03/86 DATE: FLIGHT: 3/3 SUBSYSTEM: DPS ABORT: 3/3 MDAC ID: 209 CPU Power Switch ITEM: FAILURE MODE: Fails closed LEAD ANALYST: T. B. Cribbs SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: 1) DPS General Purpose Computer (GPC) 2) Central Processing Unit (CPU) 3) CPU Power Switch 4) 5) 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC RTLS: 3/3 PRELAUNCH: 3/3 TAL: 3/3 LIFTOFF: 3/3 ONORBIT: 3/3 AOA: 3/3 DEORBIT: 3/3 ATO: 3/3 LANDING/SAFING: 3/3 h tehnina B [NA] C [NA] **REDUNDANCY SCREENS:** A [NA] LOCATION: Panel 06 PART NUMBER: CAUSES: CPU power switch is stuck in the "on" position due to contamination EFFECTS/RATIONALE:

Flight rules dictate that the crew should power off any GPC which has recurring errors during dynamic flight phases, as soon as possible to avoid erroneous outputs being sent to actuators. If the CPU power switch were stuck in the "on" position and another GPC began sending erroneous data, the actuators could not vote out the erroneous commands and the crew would need to take manual control.

REFERENCES: JSC 18820, JSC 11174, JSC 12770

DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 210	HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/1R ABORT: 3/1R
ITEM: GPC Mode Switch FAILURE MODE: Fails closed	
LEAD ANALYST: T. B. Cribbs SU	BSYS LEAD: B. Robb
BREAKDOWN HIERARCHY: 1) DPS 2) General Purpose Computer (GPC) 3) Central Processing Unit (CPU) 4) GPC Mode Switch 5) 6) 7) 8) 9)	
CRITICAL	· · · · · · · · · · · · · · · · · · ·
FLIGHT PHASEHDW/FUNCPRELAUNCH:3/3LIFTOFF:3/1RONORBIT:3/2RDEORBIT:3/1RLANDING/SAFING:3/1R	ABORT HDW/FUNC RTLS: 3/1R TAL: 3/1R AOA: 3/1R ATO: 3/1R
REDUNDANCY SCREENS: A [1]	B[P] C[P]
LOCATION: Panel O6 PART NUMBER:	- -
CAUSES: CPU mode switch is stuck position due to contamination	in the "halt" or "standby"
EFFECTS/RATIONALE: If the mode switch for a GPC were s GPC would in effect be disabled, si remaining GPC's would ignore this G available as a backup or redundant GPC's were stuck in the standby mod critical flight control functions.	milar to failing to halt. The PC, and the GPC would not be member. If all
REFERENCES: JSC 18820, JSC 11174,	JSC 12770

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HDW/FUNC HIGHEST CRITICALITY DATE: 10/03/86 FLIGHT: 3/1R SUBSYSTEM: DPS 3/1R MDAC ID: 211 ABORT: ITEM: GPC Output Switch FAILURE MODE: Fails closed LEAD ANALYST: T. B. Cribbs SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: 1) DPS General Purpose Computer (GPC) 2) 3) Central Processing Unit (CPU) GPC Output Switch 4) 5) 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC • 3/1R PRELAUNCH: 3/3 RTLS: 3/1R 3/1R LIFTOFF: TAL: 3/1R ONORBIT: 3/3 AOA: DEORBIT: 3/1R ATO: 3/1R LANDING/SAFING: 3/1R A[1] B[P] **REDUNDANCY SCREENS:** C [P] LOCATION: Panel 06 PART NUMBER: CAUSES: CPU output switch is stuck in the "terminate" or "backup" position due to contamination EFFECTS/RATIONALE:

If the Output Switch were stuck in the "terminate" position, this would have the same effect of disabling the GPC's output; all switches in this position would cause loss of vehicle control. If the switch were stuck in the "backup" position this GPC would only be available as BFS. If all switches in "backup" GPC 5 would be backup when engaged.

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REFERENCES: JSC 18820, JSC 11174, JSC 12770

REPORT DATE 12/20/86

DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 213	HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/1R ABORT: 3/1R
ITEM: GPC Power Switch FAILURE MODE: Fails open	
LEAD ANALYST: T. B. Cribbs	SUBSYS LEAD: B. Robb
BREAKDOWN HIERARCHY: 1) DPS 2) General Purpose Computer (GP 3) Central Processing Unit (CPU 4) GPC Power Switch 5) 6) 7) 8) 9)	C))
CRITIC	ALITIES
FLIGHT PHASE HDW/FUNC PRELAUNCH: 3/3 LIFTOFF: 3/1R ONORBIT: 3/2R DEORBIT: 3/1R LANDING/SAFING: 3/1R	ABORT HDW/FUNC RTLS: 3/1R TAL: 3/1R AOA: 3/1R ATO: 3/1R
REDUNDANCY SCREENS: A [1]	B[P] C[P]
LOCATION: Panel 06 PART NUMBER:	
CAUSES: CPU power switch is stuc power is lost	k in "off" position, or GPC
EFFECTS/RATIONALE: If the GPC power switch were stuc could not function, same as CPU I	k in the "OFF" position, the GPC oss of Output.
REFERENCES: JSC 18820, JSC 11174	, JSC 12770

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HIGHEST CRITICALITY HDW/FUNC 10/20/86 DATE: SUBSYSTEM: DPS FLIGHT: 3/3 ABORT: /NA MDAC ID: 214 ITEM: DRIVER MODULE CONTROLLER FAILURE MODE: PREMATURE OUTPUT LEAD ANALYST: B. ROBB SUBSYS LEAD: B. ROBB BREAKDOWN HIERARCHY: 1) DPS GENERAL PURPOSE COMPUTER (GPC) 2) 3) POWER DISTRIBUTION DRIVER MODULE CONTROLLER 4) 5) 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC PRELAUNCH: 3/3 RTLS: /NA /NA /NA /NA LIFTOFF: TAL: ONORBIT: /NA AOA: DEORBIT: ATO: /NA /NA LANDING/SAFING: /NA REDUNDANCY SCREENS: A [NA] B [NA] C [NA] LOCATION:

PART NUMBER:

CAUSES: INTERNAL COMPONENT FAILURE

EFFECTS/RATIONALE:

PREMATURE OPERATION CAUSES POWER TO BE APPLIED TO A GPC. NO HARMFUL EFFECTS TO POWER UP A GPC.

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REFERENCES:

DATE: 10/20/86 SUBSYSTEM: DPS MDAC ID: 215		TICALITY LIGHT: BORT:	HDW/FUNC 3/1R 3/1R
ITEM: DRIVER MODULE CONTRO FAILURE MODE: NO OUTPUT	LLER		
LEAD ANALYST: B. ROBB SUBSYS	LEAD: B. ROE	BB	
BREAKDOWN HIERARCHY: 1) DPS 2) GENERAL PURPOSE COMPUTER (GPC) 3) POWER DISTRIBUTION 4) DRIVER MODULE CONTROLLER 5) 6) 7) 8) 9)) •		
CRITICAL	LITIES		
FLIGHT PHASE HDW/FUNC PRELAUNCH: 3/1R LIFTOFF: 3/1R ONORBIT: 3/1R DEORBIT: 3/1R LANDING/SAFING: 3/1R	ABORT RTLS: TAL: AOA: ATO:		°C
REDUNDANCY SCREENS: A [1]	B [P]	C [P]	
LOCATION: PART NUMBER:			
CAUSES: INTERNAL COMPONENT	-		

EFFECTS/RATIONALE: LOSS ONE OF THREE REDUNDANT POWER SOURSES TO A GPC.

REFERENCES:

E-57

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HIGHEST CRITICALITY HDW/FUNC DATE: 10/20/86 FLIGHT: 3/3 SUBSYSTEM: DPS ABORT: 3/3 MDAC ID: 216 SWITCH, GPC POWER ITEM: FAILURE MODE: PREMATURE CLOSURE LEAD ANALYST: B. ROBB SUBSYS LEAD: B. ROBB BREAKDOWN HIERARCHY: 1) DPS GENERAL PURPOSE COMPUTER (GPC) 2) 3) POWER DISTRIBUTION SWITCH, GPC POWER 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT FLIGHT PHASE HDW/FUNC RTLS: PRELAUNCH: 3/3 3/3 3/3 3/3 LIFTOFF: TAL: AOA: -----ONORBIT: 3/3 3/3 ATO: DEORBIT: 3/3 3/3 LANDING/SAFING: 3/3 REDUNDANCY SCREENS: A [NA] B [NA] C [NA]

LOCATION: PART NUMBER:

CAUSES: VIBRATION, PIECE PART FAILURE

EFFECTS/RATIONALE: THE MAIN DC POWER IS APPLIED TO THE GPC. NO HARMFUL EFFECTS TO APPLY POWER TO A GPC.

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REFERENCES:

REPORT DATE 12/20/86

DATE: 10/20/86 SUBSYSTEM: DPS MDAC ID: 217		HIGHEST	CRITICALITY FLIGHT: ABORT:	HDW/FUNC 2/1R 2/1R
ITEM: SWITCH, FAILURE MODE: FAILS C	GPC POWER PEN			
LEAD ANALYST: B. ROBB	SUBSYS	LEAD: B.	ROBB	
BREAKDOWN HIERARCHY: 1) DPS 2) GENERAL PURPOSE C 3) POWER DISTRIBUTIC 4) SWITCH, GPC POWER 5) 6) 7) 8) 9)	N			
	CRITICAL	TIES		
FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 2/1R 2/1R 2/1R 2/1R 2/1R 2/1R	ABORT RTI TAI AOA ATC	.s: 2/1R .: 2/1R .: 2/1R	с

REDUNDANCY SCREENS: A [1] B [P] C [P]

LOCATION: PART NUMBER:

CAUSES: VIBRATION, PIECE PART FAILURE

EFFECTS/RATIONALE:

POSSIBLE MISSION TERMINATION ON FIRST FAILURE. SECOND FAILURE COULD CAUSE LOSS OF CREW AND VEHICLE. IF FAILURE OCCURS CLOSE TO MECO THERE IS NOT ENOUGH TIME TO MANUALLY SHUT DOWN ENGINES TO PREVENT CAVITATION.

REFERENCES:

HIGHEST CRITICALITY HDW/FUNC 10/20/86 DATE: FLIGHT: 3/3 SUBSYSTEM: DPS ABORT: 3/3 MDAC ID: 218 STATUS LIGHT ITEM: FAILURE MODE: NO OUTPUT LEAD ANALYST: B. ROBB SUBSYS LEAD: B. ROBB BREAKDOWN HIERARCHY: 1) DPS GENERAL PURPOSE COMPUTER (GPC) 2) GENERAL PROCESSING UNIT (CPU) 3) 4) STATUS LIGHT 5) 6) 7) 8) 9) CRITICALITIES ABORT HDW/FUNC HDW/FUNC FLIGHT PHASE RTLS: 3/3 PRELAUNCH: 3/3 3/3 TAL: 3/3 LIFTOFF: 3/3 3/3 AOA: ONORBIT: ATO: 3/3 DEORBIT: 3/3 LANDING/SAFING: 3/3 C [NA] REDUNDANCY SCREENS: A [NA] B [NA] LOCATION: PART NUMBER: CAUSES: FILAMENT FAILURE, VIBRATION

EFFECTS/RATIONALE: NO EFFECT. CRT DISPLAYS GPC STATUS, BARBER POLE INDICATES OUTPUT OF FAILED GPC IS TERMINATED.

REFERENCES:

DATE: 10/20/86 SUBSYSTEM: DPS MDAC ID: 219			ITICALITY FLIGHT: ABORT:	HDW/FUNC 3/3 3/3
ITEM: CICU FAILURE MODE: NO OUT	PUT			
LEAD ANALYST: B. ROBE	SUBSYS	LEAD: B. RO	BB	
BREAKDOWN HIERARCHY: 1) DPS 2) GENERAL PURPOSE 3) GENERAL PROCESSI 4) COMPUTER INTERFA 5) 6) 7) 8) 9)	NG UNIT (CPU)		: U)	
	CRITICAI	ITIES		
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	· ·
PRELAUNCH:	3/3	RTLS:	3/3	
LIFTOFF:	3/3	TAL:	3/3	
ONORBIT:	3/3	AOA:		
DEORBIT:	3/3	ATO:	3/3	
LANDING/SAFING	: 3/3			
REDUNDANCY SCREENS:	A [NA]	B [NA]	C [NA]	
LOCATION: PART NUMBER:	x			• •

CAUSES: INTERNAL COMPONENT FAILURE, VIBRATION

EFFECTS/RATIONALE:

NO EFFECT. LOSS OF CONVERSION POWER TO DRIVE GPC STATUS LIGHTS HAS SAME EFFECT AS LOSS OF STATUS LIGHT. OTHER INDICATORS PROVIDE GPC HEALTH STATUS. ,

REFERENCES:

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	10/20/86 DPS 220		HIGHEST	CRITICALITY FLIGHT: ABORT:	HDW/FUNC 3/2R 3/2R
ITEM: FAILURE MOD	SWITCH, 2 E: PREMATUR				
LEAD ANALYS	T: B. ROBB	SUBSYS	LEAD: B.	ROBB	
BREAKDOWN H 1) DPS 2) GENERAL 3) SWITCH, 4) 5) 6) 7) 8) 9)	L PURPOSE CO	MPUTER (GPC)	·	· · · · · · · · · · · · · · · · · · ·	
		CRITICAL	ITIES		
LIFT ONORI DEORI	AUNCH: DFF: BIT:	DW/FUNC 3/2R 3/2R 3/2R 3/2R 3/2R 3/2R	ABORT RTI TAI AOZ ATC	A: 3/2R	
REDUNDANCY	SCREENS:	A [1]	B [P]	C[P]	

LOCATION: PART NUMBER:

CAUSES: VIBRATION, PIECE PAST FAILURE

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EFFECTS/RATIONALE: NO EFFECT IF GPC IS IN RUN OR STANDBY MODE. IPL NOT NECESSARY IN-FLIGHT UNLESS ANOTHER FAILURE OCCURS TO GPC FIRST.

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REFERENCES:

DATE: 10/20/86 SUBSYSTEM: DPS MDAC ID: 221		HIGHEST	CRITICALITY FLIGHT: ABORT:	
ITEM: INDICATO FAILURE MODE: PREMATUR	OR, IPL RE OPERATION			
LEAD ANALYST: B. ROBB	SUBSYS	LEAD: B.	ROBB	
BREAKDOWN HIERARCHY: 1) DPS 2) GENERAL PURPOSE CO 3) INDICATOR, IPL 4) 5) 6) 7) 8) 9)	OMPUTER (GPC)	·		
	CRITICAL	ITIES		
FLIGHT PHASE I	IDW/FUNC	ABORT	HDW/FUN LS: 3/3 L: 3/3 A: 3/3	C
PRELAUNCH:	3/3 3/3 3/3 3/3	RTI	LS: $3/3$	
LIFTOFF:	3/3	TAI AOI	$- \frac{3}{3}$	
ONORBIT: DEORBIT:	3/3	AU/ 3 T/	3/3	
LANDING/SAFING:	3/3			
REDUNDANCY SCREENS:	A [NA]	B [NA]	C [NA]	
LOCATION: PART NUMBER:				
CAUSES: VIBRATION, SHO	OCK			
EFFECTS/RATIONALE: A FALSE INDICATOR OF T IPL FUNCTION CAN BE MOD	HE IPL FUNCTI	ON HAS N	O EFFECT ON T NNUNICATOR PA	THE GPC. NEL FOR

IPL FUNCTION CAN BE MONITORED ON COMPUTER ANNUNICATOR PANEL FOR GPC STATUS.

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REFERENCES:

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DATE: 10/20/86 SUBSYSTEM: DPS MDAC ID: 222		HIGHEST C	CRITICALITY FLIGHT: ABORT:	HDW/FUNC 3/3 3/3
ITEM: INDICA FAILURE MODE: FAILS	IOR, IPL TO TRANSFER IN	DICATION C	OF GPC MODE	
LEAD ANALYST: B. ROBB	SUBSYS	LEAD: B. F	ROBB	y
BREAKDOWN HIERARCHY: 1) DPS 2) GENERAL PURPOSE 3) INDICATOR, IPL 4) 5) 6) 7) 8) 9)	COMPUTER (GPC)			
	CRITICAL	ITIES		
	HDW/FUNC	ABORT	HDW/FUN	с
PRELAUNCH:	3/3	RTLS		
LIFTOFF:	3/3	TAL:		
ONORBIT:	3/3	AOA: ATO:		
DEORBIT: LANDING/SAFING	3/3 : 3/3	AIU:	3/3	
LANDING/SATING	/			
REDUNDANCY SCREENS:	A [NA]	B [NA]	C [NA]	
LOCATION: PART NUMBER:				•
CAUSES: VIBRATION, S	носк			
EFFECTS/RATIONALE: AN ERRONEOUS INDICATI EFFECT ON THE GPC'S F		STATUS WII	L BE DISPLA	YED. NO

REFERENCES:

DATE: 10/20/86 SUBSYSTEM: DPS MDAC ID: 223	HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/3 ABORT: 3/3
ITEM: INDICATOR OUTPUT FAILURE MODE: ERRONEOUS INDICAT	
LEAD ANALYST: B. ROBB SUBS	SYS LEAD: B. ROBB
BREAKDOWN HIERARCHY: 1) DPS 2) GENERAL PURPOSE COMPUTER (3) INDICATOR OUTPUT 4) 5) 6) 7) 8) 9)	GPC)
CRIT	ICALITIES
FLIGHT PHASE HDW/FUNC	ABORT HDW/FUNC
PRELAUNCH: 3/3	RTLS: 3/3
LIFTOFF: 3/3	TAL: 3/3
ONORBIT: 3/3	AOA: 3/3
LIFTOFF: 3/3 ONORBIT: 3/3 DEORBIT: 3/3	ATO: 3/3
LANDING/SAFING: 3/3	
REDUNDANCY SCREENS: A [NA]	B [NA] C [NA]
LOCATION: PART NUMBER:	- · · ·
CAUSES: FAILED DRIVER, SHOCK, V	VIBRATION
EFFECTS/RATIONALE: INDICATES ERRONEOUS GPC STATUS. STATUS DISPLAYED ON GPC STATUS	NO EFFECT OF GPC FUNCTION. GPC ANNUNCIATOR.

REFERENCES:

HDW/FUNC HIGHEST CRITICALITY DATE: 10/20/86 FLIGHT: 3/3 SUBSYSTEM: DPS ABORT: 3/3 MDAC ID: 224 INDICATOR OUTPUT, BARBER POLE ITEM: FAILURE MODE: FAILS TO TRANSFER SUBSYS LEAD: B. ROBB LEAD ANALYST: B. ROBB BREAKDOWN HIERARCHY: 1) DPS GENERAL PURPOSE COMPUTER (GPC) 2) 3) INDICATOR OUTPUT 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC FLIGHT PHASE HDW/FUNC ABORT 3/3 3/3 RTLS: PRELAUNCH: 3/3 TAL: 3/3 LIFTOFF: 3/3 ONORBIT: AOA: 3/3 3/3 ATO: 3/3 DEORBIT: LANDING/SAFING: 3/3 REDUNDANCY SCREENS: A [NA] B [NA] C [NA] LOCATION: PART NUMBER: CAUSES: VIBRATION, SHOCK, PIECE PART FAILURE

EFFECTS/RATIONALE: ERRONEOUS INDICATION OF GPC STATUS. GPC STATUS ANNUNCIATOR CAN BE MONITORED OF GPC STATUS.

REFERENCES:

REPORT DATE 12/20/86

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DATE: 10/24/86 SUBSYSTEM: DPS MDAC ID: 225	HIGHEST CRITICALITY HDW/FUNC FLIGHT: 2/1R ABORT: 2/1R
ITEM: INPUT/OUTPUT PROCES FAILURE MODE: ERRONEOUS OUTPUT	SOR (IOP)
LEAD ANALYST: B. ROBB SUBSYS	LEAD: B. ROBB
BREAKDOWN HIERARCHY: 1) DPS 2) GENERAL PURPOSE COMPUTER 3) INPUT/OUTPUT PROCESSOR (IOP) 4) 5) 6) 7) 8) 9)	
CRITICA	LITIES
FLIGHT PHASEHDW/FUNCPRELAUNCH:2/1RLIFTOFF:2/1RONORBIT:2/1RDEORBIT:2/1RLANDING/SAFING:2/1R	ABORT HDW/FUNC RTLS: 2/1R TAL: 2/1R AOA: 2/1R ATO: 2/1R
REDUNDANCY SCREENS: A [1]	B[P] C[P]

LOCATION: PART NUMBER:

CAUSES: INTERNAL COMPONENT FAILURE

EFFECTS/RATIONALE:

MAY EXECUTE COMMAND TO WRONG MDM WITH ADDRESS ERROR. THE WORST CASE WOULD BE TO AN UNVOTED EFFECTOR. NO EFFECT ON 1ST FAILURE. CREW CAN PRECLUDE SENSITIVITY TO 2ND FAILURE.

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REFERENCES:

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DATE: SUBSYSTEM: MDAC ID:	10/30/86 DPS 226	HIGHEST	CRITICALITY FLIGHT: ABORT:	HDW/FUNC /NA /NA
ITEM: FAILURE MOD	RESISTOR E: NOT APPLICABLE			
LEAD ANALYS	T: H J LOWERY	SUBSYS LEAD:	B. ROBB	
BREAKDOWN H 1) DPS 2) GPC 3) RESIST 4) 5) 6) 7) 8) 9)	IERARCHY: OR			4
	CRI	TICALITIES		
FLIGHT PREL	PHASE HDW/FUNC AUNCH: /NA	C ABORT	HDW/FUN LS: /NA	IC .

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		
REDUNDANCY SCREENS:	A [NA]	B [NA]	C [NA]

LOCATION: PART NUMBER:

CAUSES: RESISTOR HAS BEEN REPLACED WITH A FUSE.

EFFECTS/RATIONALE: THIS RESISTOR HAS BEEN REPLACED WITH PART NUMBER ME451-0018-0300 (SEE FMEA #05-6S-BFUS1-1)

REFERENCES: FMEA NO. 05-65-BRES1-1 NASA-JSC FMEA CIL REVIEW COMMENTS.

DATE: 10/30/86 SUBSYSTEM: DPS MDAC ID: 227		н	GHEST	CRITICALI FLIGHT: ABORT:	
ITEM: FUSE FAILURE MODE: OPEN					
LEAD ANALYST: H J LOW	ERY	SUBSYS	LEAD:	B. ROBB	
BREAKDOWN HIERARCHY: 1) DPS 2) GPC 3) FUSE 4) 5) 6) 7) 8) 9)					
		TICALITI			
FLIGHT PHASE	HDW/FUNC		ABORT	HDW/	FUNC
PRELAUNCH:	3/1R		RTI	LS: 3/	'lR
LIFTOFF:	3/1R		TAI AOA	Li 3/	'lR 'lR
ONORBIT: DEORBIT:	3/1R 3/1R		AUA		'IR
LANDING/SAFING:			A1(J. J/	IR
REDUNDANCY SCREENS:	A[1]	В	[P]	C[I	P].
LOCATION: PART NUMBER:		·			
CAUSES: MECHANICAL FI	RACTURE		-		
EFFECTS/RATIONALE:					

REFERENCES: FMEA NO. 05-6S-BFUS1-1

REPORT DATE 12/20/86

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E-69

DATE: SUBSYSTEM: MDAC ID:		HIGHEST	CRITICALITY FLIGHT: ABORT:	HDW/FUNC 3/1R 3/1R		
ITEM: FAILURE MOD	ITEM: CONTROLLER, REMOTE POWER FAILURE MODE: LOSS OF OUTPUT					
LEAD ANALYS	I: H J LOWERY	SUBSYS LEAD:	B. ROBB			
BREAKDOWN H 1) DPS 2) GPC 3) CONTROL 4) 5) 6) 7) 8) 9)	IERARCHY: LLER, REMOTE POWER					
	CRIT	CALITIES				
LIFT ONORI DEORI	AUNCH: 3/1R	ABORT RTI TAI AOF ATC	LS: 3/1R L: 3/1R A: 3/1R			
REDUNDANCY	SCREENS: A [1]	B [P]	_ C [P]			

LOCATION: PART NUMBER:

CAUSES: TEMPERATURE STRESS, MECHANICAL FRACTURES, CONTAMINATION, DEBRIS

EFFECTS/RATIONALE:

ONE OF THREE REDUNDANT RPC IS DISABLED.

REFERENCES: FMEA NO. 05-6S-BRPC-1. NASA JSC FMEA CIL REVIEW COMMENTS.

DATE: SUBSYSTEM: MDAC ID:	10/30/86 DPS 229		HIGHEST	CRITICALITY FLIGHT: ABORT:	HDW/FUNC 3/3 3/3
ITEM: FAILURE MOD		ER, REMOTE PO PREMATURELY	OWER		
IEAD ANALYS	r: H J LOWERY	Y SUBS	YS LEAD:	B. ROBB	
(BREARDOWN H 1) DPS 2) GPC 3) CONTROL 4) 5) 6) 7) 8) 9)	IERARCHY: LLER, REMOTE	POWER	·		
		CRITICAL	ITIES	-	
LIFT ONOR DEOR	AUNCH: OFF: BIT:	DW/FUNC 3/3 3/3 3/3 3/3 3/3	ABORT RTI TAI AOJ ATO	L: 3/3 A: 3/3	NC

REDUNDANCY SCREENS: A [NA] B [NA] C [NA]

LOCATION: PART NUMBER:

CAUSES: TEMPERATURE STRESS, MECHANICAL FRACTURE, CONTAMINATION, DEBRIS

EFFECTS/RATIONALE: NONE. POWER WOULD BE APPLIED PREMATURELY.

REFERENCES: FMEA NO. 05-6S-BRPC1-2. NASA-JSC FMEA CIL REVIEW COMMENTS.

E-71

HIGHEST CRITICALITY HDW/FUNC DATE: 11/03/86 3/1R FLIGHT: SUBSYSTEM: DPS ABORT: 3/1R MDAC ID: 230 ITEM: DIODE FAILURE MODE: FAILS OPEN LEAD ANALYST: H J LOWERY SUBSYS LEAD: B. ROBB BREAKDOWN HIERARCHY: DPS 1) GPC 2) DIODE 3) 4) 5) 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE ABORT HDW/FUNC HDW/FUNC RTLS: 3/1R PRELAUNCH: 3/1R TAL: 3/1R LIFTOFF: 3/1R 3/1R 3/1R AOA: ONORBIT: 3/1R ATO: 3/1R DEORBIT: LANDING/SAFING: 3/1R REDUNDANCY SCREENS: A [1] B [F] C [P] LOCATION: PART NUMBER: CAUSES: THERMAL STRESS, CONTAMINATION, DEBRIS EFFECTS/RATIONALE: NONE ON FIRST/SECOND FAILURE. THREE RPC OUTPUTS ARE "OR" TOGETHER TO PROVIDE TRIPLY REDUNDANT POWER PATH TO CPU AND IOP. THREE FAILURES COULD CAUSE LOSS OF GPC. REFERENCES: 05-6S-BDIOX-1. NASA-JSC FMEA & CIL REVIEW COMMENTS.

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DATE: 11/03/86 SUBSYSTEM: DPS MDAC ID: 231	HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/lR ABORT: 3/lR				
ITEM: SWITCH, NORMAL- FAILURE MODE: PREMATURE OPERAT	TERM BACK-UP				
LEAD ANALYST: H J LOWERY	SUBSYS LEAD: B. ROBB				
BREAKDOWN HIERARCHY: 1) DPS 2) GPC 3) SWITCH, NORMAL-TERM BACKUP 4) 5) 6) 7) 8) 9)					
	CICALITIES				
FLIGHT PHASEHDW/FUNCPRELAUNCH:3/1RLIFTOFF:3/1RONORBIT:3/1RDEORBIT:3/1RLANDING/SAFING:3/1R	ABORT HDW/FUNC RTLS: 3/1R TAL: 3/1R AOA: 3/1R ATO: 3/1R				
REDUNDANCY SCREENS: A [1]	B[P] C[P]				
LOCATION: PART NUMBER:					
CAUSES: THERMAL STRESS, CONTAMINATION, DEBRIS					
EFFECTS/RATIONALE: WILL TERMINATE FC DATA BUS I/O ACTIVITY OF A GOOD GPC.					

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REFERENCES: FMEA 05-5-B15-1-1

REPORT DATE 12/20/86 E-73

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HIGHEST CRITICALITY HDW/FUNC 10/20/86 DATE: FLIGHT: 3/1R SUBSYSTEM: DPS 3/1R ABORT: MDAC ID: 232 SWITCH, GPC POWER ITEM: FAILURE MODE: NO OUTPUT SUBSYS LEAD: B. ROBB LEAD ANALYST: B. ROBB BREAKDOWN HIERARCHY: 1) DPS GENERAL PURPOSE COMPUTER (GPC) 2) POWER DISTRIBUTION 3) DRIVER MODULE CONTROLLER 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC · FLIGHT PHASE HDW/FUNC ABORT 3/1R 3/1R PRELAUNCH: RTLS: 3/1R 3/1R LIFTOFF: TAL: 3/1R ONORBIT: 3/1R AOA: DEORBIT: 3/1R ATO: 3/1R LANDING/SAFING: 3/1R REDUNDANCY SCREENS: A [1] B [P] C [P] LOCATION: PART NUMBER: CAUSES: INTERNAL COMPONENT EFFECTS/RATIONALE: LOSS ONE OF THREE REDUNDANT POWER SOURSES TO A GPC.

REFERENCES:

DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 300		ICALITY HDW/FUNC JGHT: 3/1R SORT: 3/1R
ITEM: KEYBOARD SWITCH FAILURE MODE: OPEN/CLOSED		
LEAD ANALYST: H J LOWERY S	UBSYS LEAD: B. R	OBB
BREAKDOWN HIERARCHY: 1) DPS 2) MULTIFUNCTIONAL CRT DISPLAY 3) KEYBOARD 4) SWITCH 5) 6) 7) 8) 9)	SYSTEM (MCDS)	
CRITI	CALITIES	
FLIGHT PHASE HDW/FUNC		HDW/FUNC
PRELAUNCH: 3/2R	RTLS:	3/1R
LIFTOFF: 3/1R	TAL:	3/1R
ONORBIT: 3/1R	AOA:	3/1R
DEORBIT: 3/1R	ATO:	3/1R
LANDING/SAFING: 3/1R		an an an an an an
REDUNDANCY SCREENS: A [1]	В[Р]	С[Р]
LOCATION: UPPER CREW AREA		

PART NUMBER:

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CAUSES: MECHANICAL FRACTURE/ CONTAMINATION/ DEBRIS

EFFECTS/RATIONALE:

LOSS OF INPUTTING COMMAND CAPABILITY. REDUNDANT HARDWARE WOULD NOT BE ACCESSIBLE DURING PERIODS OF ANTICIPATED HIGH ACCELERATION/DEACCELERATION FORCES. ie. 1. LIFT-OFF THROUGH MAIN ENGINE CUT-OFF - APPROXIMATELY 8 MIN 40 SEC; 2. ENTRY THROUGH SAFEING -APPROXIMATELY 400,000ft (TD -40 MIN) THROUGH SAFEING.

REFERENCES:

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DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 301		ITICALITY FLIGHT: ABORT:	HDW/FUNC 3/1R 3/1R
ITEM: X/Y DEFLECTION AMPLI FAILURE MODE: NO OUTPUT/ERRONEOUS/		PUT	
LEAD ANALYST: H J LOWERY SUBS	YS LEAD: B.	ROBB	
BREAKDOWN HIERARCHY: 1) DPS 2) MULTIFUNCTIONAL CRT DISPLAY SY 3) DISPLAY UNIT 4) X/Y DEFLECTION AMPLIFIERS 5) 6) 7) 8) 9)	STEM (MCDS)	·	
CRITICAL	ITIES		
FLIGHT PHASE HDW/FUNC	ABORT	HDW/FUN	C
PRELAUNCH: 3/2R	RTLS:	3/1R	
LIFTOFF: 3/1R ONORBIT: 3/1R DEORBIT: 3/1R	TAL: AOA:	3/1R	
ONORBIT: 3/1R DEORBIT: 3/1R			
DEORBIT: 3/1R	ATO:	3/1R	
LANDING/SAFING: 3/1R			
REDUNDANCY SCREENS: A [1]	B [P]	C[P]	
LOCATION: UPPER CREW AREA PART NUMBER:	•		•
CAUSES: TEMPERATURE STRESS/ CONTAM	INATION/ DEI	BRIS	
EFFECTS/RATIONALE: LOSS OF MONITORING CAPABILITY. RED ACCESSIBLE DURING PERIODS OF ANTICI ACCELERATION/DEACCELERATION FORCES.	PATED HIGH		
ie. 1. LIFT-OFF THROUGH MAIN ENGINE	CUT-OFF - A	PPROXIMATE	ELY 8 MIN

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40 SEC; 2. ENTRY THROUGH SAFEING -APPROXIMATELY 400,000ft (TD -40 MIN) THROUGH SAFEING.

REFERENCES:

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SUBSYSTEM: DPS FLIGHT: 3/	/FUNC /1R /1R		
ITEM: VIDEO AMPLIFIER FAILURE MODE: NO OUTPUT/ERRONEOUS/ERRATIC OUTPUT			
LEAD ANALYST: H J LOWERY SUBSYS LEAD: B. ROBB			
BREAKDOWN HIERARCHY: 1) DPS 2) MULTIFUNCTIONAL CRT DISPLAY SYSTEM (MCDS) 3) DISPLAY UNIT 4) VIDEO AMPLIFIER 5) 6) 7) 8) 9)			
CRITICALITIES			
CRITICALITIES FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC PRELAUNCH: 3/2R RTLS: 3/1R LIFTOFF: 3/1R TAL: 3/1R ONORBIT: 3/1R AOA: 3/1R DEORBIT: 3/1R ATO: 3/1R LANDING/SAFING: 3/1R	•		
REDUNDANCY SCREENS: A [1] B [P] C [P]			
LOCATION: UPPER CREW AREA PART NUMBER:			
CAUSES: TEMPERATURE STRESS/ CONTAMINATION/ DEBRIS EFFECTS/RATIONALE: LOSS OF MONITORING CAPABILITY. REDUNDANT HARDWARE WOULD NOT BE ACCESSIBLE DURING PERIODS OF ANTICIPATED HIGH ACCELERATION/DEACCELERATION FORCES. ie. 1. LIFT-OFF THROUGH MAIN ENGINE CUT-OFF - APPROXIMATELY 8 MIN 40 SEC; 2. ENTRY THROUGH SAFEING -APPROXIMATELY 400,000ft (TD -40 MIN) THROUGH SAFEING.			
REFERENCES:			

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DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 303		ITICALITY FLIGHT: ABORT:	HDW/FUNC 3/1R 3/1R
ITEM: CATHODE-RAY TUBE FAILURE MODE: NO OUTPUT/ERRONEOUS/	ERRATIC OUT	PUT	
LEAD ANALYST: H J LOWERY SUBS	YS LEAD: B.	ROBB	
BREAKDOWN HIERARCHY: 1) DPS 2) MULTIFUNCTIONAL CRT DISPLAY SY 3) DISPLAY UNIT 4) CATHODE-RAY TUBE 5) 6) 7) 8) 9)	STEM (MCDS)		
CRITICAL	ITIES	-	
FLIGHT PHASE HDW/FUNC PRELAUNCH: 3/2R LIFTOFF: 3/1R ONORBIT: 3/1R DEORBIT: 3/1R LANDING/SAFING: 3/1R	ABORT RTLS: TAL: AOA: ATO:	3/1R 3/1R	
REDUNDANCY SCREENS: A [1]	B [P]	С[Р]	
LOCATION: UPPER CREW AREA PART NUMBER:		-	·. • • • •
CAUSES: SHOCK/ TEMPERATURE STRESS/ VIBRATION/ CONTAMINATION/ DEBRIS	MECHANICAL	FRACTURE/	p
EFFECTS/RATIONALE: LOSS OF MONITORING CAPABILITY. RED ACCESSIBLE DURING PERIODS OF ANTICI ACCELERATION/DEACCELERATION FORCES. ie. 1. LIFT-OFF THROUGH MAIN ENGINE 40 SEC; 2. ENTRY THROUGH SAFEING -A MIN) THROUGH SAFEING.	PATED HIGH CUT-OFF - 2	PPROXIMATE	LY 8 MIN

REFERENCES:

E-78

DATE:10/03/86HIGHEST CRITICALITYHDW/FUNCSUBSYSTEM:DPSFLIGHT:3/1RMDAC ID:304ABORT:3/1R	:		
ITEM: HI AND LOW VOLTAGE POWER SUPPLIES FAILURE MODE: NO OUTPUT/ERRONEOUS/ERRATIC OUTPUT			
LEAD ANALYST: H J LOWERY SUBSYS LEAD: B. ROBB			
BREAKDOWN HIERARCHY: 1) DPS 2) MULTIFUNCTIONAL CRT DISPLAY SYSTEM (MCDS) 3) DISPLAY UNIT 4) HIGH AND LOW (+/-5, 15, 28 & 80 VDC) VOLTAGE POWER SUPPLIES 5) 6) 7) 8) 9)			
CRITICALITIES			
FLIGHT PHASEHDW/FUNCABORTHDW/FUNCPRELAUNCH:3/2RRTLS:3/1RLIFTOFF:3/1RTAL:3/1RONORBIT:3/1RAOA:3/1R			
LIFTOFF: 3/1R TAL: 3/1R			
ONORBIT: 3/1R AOA: 3/1R			
DEORBIT: 3/1R ATO: 3/1R LANDING/SAFING: 3/1R			
REDUNDANCY SCREENS: A [1] B [P] C [P]			
LOCATION: UPPER CREW AREA PART NUMBER:			
CAUSES: MECHANICAL FRACTURES/ CONTAMINATION/ DEBRIS			
EFFECTS/RATIONALE: LOSS OF MONITORING CAPABILITY. REDUNDANT HARDWARE WOULD NOT BE ACCESSIBLE DURING PERIODS OF ANTICIPATED HIGH ACCELERATION/DEACCELERATION FORCES. ie. 1. LIFT-OFF THROUGH MAIN ENGINE CUT-OFF - APPROXIMATELY 8 MIN 40 SEC; 2. ENTRY THROUGH SAFEING -APPROXIMATELY 400,000ft (TD -40 MIN) THROUGH SAFEING.			
REFERENCES:			

DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 305	HIGHEST	CRITICALITY FLIGHT: ABORT:	HDW/FUNC 3/1R 3/1R
ITEM: RPC FAILURE MODE: OPEN/CLOS	ED/PREMATURE OPERAT	ION	
LEAD ANALYST: H J LOWERY	SUBSYS LEAD:	B. ROBB	
BREAKDOWN HIERARCHY: 1) DPS 2) MULTIFUNCTIONAL CRT 3) DISPLAY UNIT 4) RPC 5) 6) 7) 8) 9)	DISPLAY SYSTEM (MC	DS)	•
	CRITICALITIES		
LIFTOFF: ONORBIT: DEORBIT:	W/FUNC ABORT	A: 3/1R	
REDUNDANCY SCREENS: A	[1] B[P]	C[P]	
LOCATION: UPPER CREA PART NUMBER:	AREA		
CAUSES: MECHANICAL FRAC	TURE/ CONTAMINATION/	DEBRIS	

EFFECTS/RATIONALE: LOSS OF MONITORING CAPABILITY. REDUNDANT HARDWARE WOULD NOT BE ACCESSIBLE DURING PERIODS OF ANTICIPATED HIGH ACCELERATION/DEACCELERATION FORCES. ie. 1. LIFT-OFF THROUGH MAIN ENGINE CUT-OFF - APPROXIMATELY 8 MIN 40 SEC; 2. ENTRY THROUGH SAFEING -APPROXIMATELY 400,000ft (TD -40 MIN) THROUGH SAFEING.

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DATE:10/03/86HIGHEST CRITICALITYHDW/FUNCSUBSYSTEM:DPSFLIGHT:3/1RMDAC ID:306ABORT:3/1R				
ITEM: MEMORY FAILURE MODE: NO OUTPUT/ERRONEOUS/ERRATIC OUTPUT				
LEAD ANALYST: H J LOWERY SUBSYS LEAD: B. ROBB				
BREAKDOWN HIERARCHY: 1) DPS 2) MULTIFUNCTIONAL CRT DISPLAY SYSTEM (MCDS) 3) DEU 4) MEMORY 5) 6) 7) 8) 9)				
CRITICALITIES				
FLIGHT PHASEHDW/FUNCABORTHDW/FUNCPRELAUNCH:3/2RRTLS:3/1RLIFTOFF:3/1RTAL:3/1RONORBIT:3/1RAOA:3/1RDEORBIT:3/1RATO:3/1RLANDING/SAFING:3/1RATO:3/1R				
REDUNDANCY SCREENS: A [1] B [P] C [P]				
LOCATION: UPPER CREW AREA PART NUMBER:				
CAUSES: CONTAMINATION/ DEBRIS				
EFFECTS/RATIONALE: LOSS OF MONITORING CAPABILITY. REDUNDANT HARDWARE WOULD NOT BE ACCESSIBLE DURING PERIODS OF ANTICIPATED HIGH ACCELERATION/DEACCELERATION FORCES. ie. 1. LIFT-OFF THROUGH MAIN ENGINE CUT-OFF - APPROXIMATELY 8 MIN 40 SEC; 2. ENTRY THROUGH SAFEING -APPROXIMATELY 400,000ft (TD -40 MIN) THROUGH SAFEING.				
REFERENCES:	-			

DATE:10/03/86HIGHEST CRITICALITYHDW/FUNCSUBSYSTEM:DPSFLIGHT:3/1RMDAC ID:307ABORT:3/1R	2
ITEM: KEYBOARD ADAPTER FAILURE MODE: NO OUTPUT/ERRONEOUS/ERRATIC OUTPUT	
LEAD ANALYST: H J LOWERY SUBSYS LEAD: B. ROBB	
BREAKDOWN HIERARCHY: 1) DPS 2) MULTIFUNCTIONAL CRT DISPLAY SYSTEM (MCDS) 3) DEU 4) KEYBOARD ADAPTER 5) 6) 7) 8) 9)	
CRITICALITIES	
FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC	
PRELAUNCH:3/2RRTLS:3/1RLIFTOFF:3/1RTAL:3/1RONORBIT:3/1RAOA:3/1R	
LIFTOFF: 3/1R TAL: 3/1R ONORBIT: 3/1R AOA: 3/1R DEORBIT: 3/1R ATO: 3/1R	
ONORBIT: 3/1R AOA: 3/1R	
DEORBIT: 3/1R ATO: 3/1R	
LANDING/SAFING: 3/1R	
REDUNDANCY SCREENS: A [1] B [P] C [P]	
LOCATION: UPPER CREW AREA PART NUMBER:	
CAUSES: CONTAMINATION/ DEBRIS	
EFFECTS/RATIONALE: LOSS OF INPUTTING COMMAND CAPABILITY. REDUNDANT HARDWARE WOULD NOT BE ACCESSIBLE DURING PERIODS OF ANTICIPATED HIGH ACCELERATION/DEACCELERATION FORCES. ie. 1. LIFT-OFF THROUGH MAIN ENGINE CUT-OFF - APPROXIMATELY 8 MIN	- . : T

40 SEC; 2. ENTRY THROUGH SAFEING -APPROXIMATELY 400,000ft (TD -40

REFERENCES:

MIN) THROUGH SAFEING.

E-82

DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 308	HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/1R ABORT: 3/1R
ITEM: SYMBOL GENERATOR FAILURE MODE: NO OUTPUT/ERRONEOUS,	/ERRATIC OUTPUT
LEAD ANALYST: H J LOWERY SUB	SYS LEAD: B. ROBB
BREAKDOWN HIERARCHY: 1) DPS 2) MULTIFUNCTIONAL CRT DISPLAY S 3) DEU 4) SYMBOL GENERATOR 5) 6) 7) 8) 9)	YSTEM (MCDS)
CRITICA FLIGHT PHASE HDW/FUNC PRELAUNCH: 3/2R LIFTOFF: 3/1R ONORBIT: 3/1R DEORBIT: 3/1R LANDING/SAFING: 3/1R	
REDUNDANCY SCREENS: A [1]	B[P] C[P]
LOCATION: UPPER CREW AREA PART NUMBER: CAUSES: CONTAMINATION/ DEBRIS	
EFFECTS/RATIONALE: LOSS OF MONITORING CAPABILITY. RE ACCESSIBLE DURING PERIODS OF ANTIC ACCELERATION/DEACCELERATION FORCES ie. 1. LIFT-OFF THROUGH MAIN ENGINI 40 SEC; 2. ENTRY THROUGH SAFEING - MIN) THROUGH SAFEING.	IPATED HIGH 5. E CUT-OFF - APPROXIMATELY 8 MIN

REFERENCES:

DATE: 10/ SUBSYSTEM: DPS MDAC ID: 309	/03/86	HIGHEST CI	RITICALITY FLIGHT: ABORT:	HDW/FUNC 3/1R 3/1R
	AIA NO OUTPUT/ERRONEC	OUS/ERRATIC OUT	IPUT	
LEAD ANALYST: H	J LOWERY S	SUBSYS LEAD: B	ROBB	
BREAKDOWN HIERAH 1) DPS 2) MULTIFUNCTI 3) DEU 4) MIA 5) 6) 7) 8) 9)	RCHY: IONAL CRT DISPLAY	SYSTEM (MCDS))	
	CRITI	CALITIES		
FLIGHT PHASE	HDW/FUNC		HDW/FUNC	3
PRELAUNCH		RTLS:		
LIFTOFF:	3/1R	TAL:	3/1R	
ONORBIT:	3/1R	AOA:	3/1R	
DEORBIT:		ATO:	3/1R	
LANDING/S			· •	
REDUNDANCY SCRE	CENS: A [1]	B [P]	С[Р]	
LOCATION: UF PART NUMBER:	PPER CREW AREA			
CAUSES: CONTAMI	INATION/ DEBRIS	na n	n Porena and Secondaria da Secondaria Secondaria da Secondaria	ye A sayar
ACCESSIBLE DURIN ACCELERATION/DEA ie. 1. LIFT-OFF 40 SEC; 2. ENTRY	ING CAPABILITY. IG PERIODS OF ANT ACCELERATION FOR THROUGH MAIN ENG & THROUGH SAFEING	ICIPATED HIGH DES. INE CUT-OFF -	APPROXIMATE	LY 8 MIN
MIN) THROUGH SAN	FEING.			

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DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 310	HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/1R ABORT: 3/1R
ITEM: CONTROL LOGIC FAILURE MODE: NO OUTPUT/ERRONE	OUS/ERRATIC OUTPUT
LEAD ANALYST: H J LOWERY	SUBSYS LEAD: B. ROBB
BREAKDOWN HIERARCHY: 1) DPS 2) MULTIFUNCTIONAL CRT DISPLA 3) DEU 4) CONTROL LOGIC 5) 6) 7) .8) 9)	Y SYSTEM (MCDS)
CRIT	ICALITIES
CRIT FLIGHT PHASE HDW/FUNC PRELAUNCH: 3/2R LIFTOFF: 3/1R ONORBIT: 3/1R DEORBIT: 3/1R LANDING/SAFING: 3/1R	ABORT HDW/FUNC RTLS: 3/1R TAL: 3/1R AOA: 3/1R ATO: 3/1R
REDUNDANCY SCREENS: A [1]	B[P] C[P]
LOCATION: UPPER CREW AREA PART NUMBER:	
CAUSES: CONTAMINATION/ DEBRIS	•
ACCESSIBLE DURING PERIODS OF AN ACCELERATION/DEACCELERATION FO ie. 1. LIFT-OFF THROUGH MAIN EN	
REFERENCES:	

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HIGHEST CRITICALITY HDW/FUNC DATE: 10/03/86 FLIGHT: 3/1R SUBSYSTEM: DPS ABORT: 3/1R MDAC ID: 311 POWER SUPPLIES ITEM: FAILURE MODE: NO OUTPUT/ERRONEOUS/ERRATIC OUTPUT SUBSYS LEAD: B. ROBB LEAD ANALYST: H J LOWERY BREAKDOWN HIERARCHY: 1) DPS MULTIFUNCTIONAL CRT DISPLAY SYSTEM (MCDS) 2) DEU 3) POWER SUPPLIES (+/-5, 12 & 15 VDC)4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE 3/2R 3/1R RTLS: PRELAUNCH: TAL: 3/1R 3/1R LIFTOFF: 3/1R 371R AOA: ONORBIT: DEORBIT: 3/1R ATO: 3/1R LANDING/SAFING: 3/1R REDUNDANCY SCREENS: A [1] B [P] C [P] LOCATION: UPPER CREW AREA . PART NUMBER: CAUSES: CONTAMINATION/ DEBRIS EFFECTS/RATIONALE: LOSS OF MONITORING CAPABILITY. REDUNDANT HARDWARE WOULD NOT BE ACCESSIBLE DURING PERIODS OF ANTICIPATED HIGH ACCELERATION/DEACCELERATION FORCES. ie. 1. LIFT-OFF THROUGH MAIN ENGINE CUT-OFF - APPROXIMATELY 8 MIN 40 SEC; 2. ENTRY THROUGH SAFEING -APPROXIMATELY 400,000ft (TD -40 MIN) THROUGH SAFEING.

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DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 312	HIGHEST CRITICALITY FLIGHT: ABORT:	HDW/FUNC 3/1R 3/1R
ITEM: RPC FAILURE MODE: OPEN/CLOSED/PREMATUR	RE OPERATION	
LEAD ANALYST: H J LOWERY SUB	SYS LEAD: B. ROBB	
BREAKDOWN HIERARCHY: 1) DPS 2) MULTIFUNCTIONAL CRT DISPLAY SY 3) DEU 4) RPC 5) 6) 7) 8) 9)	STEM (MCDS)	
CRITICAL	LITIES	
FLIGHT PHASE HDW/FUNC	ABORT HDW/FU RTLS: 3/1R	NC
PRELAUNCH: 3/2R	RTLS: 3/1R	
1.TFTOFF: $3/1R$	TAL: 3/1R AOA: 3/1R	
ONORBIT: 3/1R	AOA: 3/1R	
DEORBIT: 3/1R	ATO: 3/1R	
LANDING/SAFING: 3/1R		
REDUNDANCY SCREENS: A [1]	B[P] C[P]	
LOCATION: UPPER CREW AREA PART NUMBER:		
CAUSES: TEMPERATURE STRESS/ MECHAN DEBRIS	IICAL FRACTURE/ CONTA	MINATION/
EFFECTS/RATIONALE: LOSS OF MONITORING CAPABILITY. REI ACCESSIBLE DURING PERIODS OF ANTIC ACCELERATION/DEACCELERATION FORCES	IPATED HIGH	D NOT BE

ie. 1. LIFT-OFF THROUGH MAIN ENGINE CUT-OFF - APPROXIMATELY 8 MIN 40 SEC; 2. ENTRY THROUGH SAFEING -APPROXIMATELY 400,000ft (TD -40 MIN) THROUGH SAFEING.

REFERENCES:

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DATE: SUBSYSTEM: MDAC ID:	10/03/86 DPS 313		HIGHEST	CRITICALITY FLIGHT: ABORT:	HDW/FUNC 3/3 3/3
ITEM: FAILURE MOD	LOAD SWITC E: OPEN/CLOSI	CH ED/PREMATUF	RE OPERATI	ON	
LEAD ANALYS	T: H J LOWERY	SUBS	SYS LEAD:	B. ROBB	
BREAKDOWN H 1) DPS 2) MULTIF(3) DEU 4) LOAD S(5) 6) 7) 8) 9)	UNCTIONAL CRT	DISPLAY SY	STEM (MCI	DS)	
		CRITICAL	ITIES	-	
LIFT(ONORI DEORI	AUNCH: DFF: BIT: BIT:	W/FUNC 3/3 3/3 3/3 3/3 3/3 3/3	ABORT RTL TAL AOA ATO	: 3/3 : 3/3	c
REDUNDANCY S	SCREENS: A	[NA]	B [NA]	C [NA]	

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LOCATION: UPPER CREW AREA PART NUMBER:

CAUSES: MECHANICAL FRACTURE/ CONTAMINATION/ DEBRIS

EFFECTS/RATIONALE:

DEUS ARE NOT NORMALLY RELOADED DURING A MISSION. SWITCH IS NOT NEEDED.

DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 314	HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/1R ABORT: 3/1R
ITEM: FUNCTION SWITCH FAILURE MODE: OPEN/CLOSED/PREM	ATURE OPERATION
LEAD ANALYST: H J LOWERY	SUBSYS LEAD: B. ROBB
BREAKDOWN HIERARCHY: 1) DPS 2) MULTIFUNCTIONAL CRT DISPLA 3) DEU 4) FUNCTION SWITCH 5) 6) 7) 8) 9)	Y SYSTEM (MCDS)
CRIT	ICALITIES
FLIGHT PHASEHDW/FUNCPRELAUNCH:3/2RLIFTOFF:3/1RONORBIT:3/1RDEORBIT:3/1R	RTLS: 3/1R
LANDING/SAFING: 3/1R	
REDUNDANCY SCREENS: A [1]	B[P] C[P]
LOCATION: UPPER CREW AREA PART NUMBER:	. -
CAUSES: MECHANICAL FRACTURE/ C	ONTAMINATION/ DEBRIS

EFFECTS/RATIONALE: IMPROPER MAJOR FUNCTION IDENTIFICATION

REFERENCES:

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DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 315		ALITY HDW/FUNC HT: 3/1R T: 3/1R
ITEM: DATA BUS COUPLER (D FAILURE MODE: OPEN/SHORT	BC)	
LEAD ANALYST: H J LOWERY SUB	SYS LEAD: B. ROB	B
BREAKDOWN HIERARCHY: 1) DPS 2) MULTIFUNCTIONAL CRT DISPLAY S 3) DBC 4) 5) 6) 7) 8) 9)	YSTEM (MCDS)	
CRITICA	TTTES	
FLIGHT PHASE HDW/FUNC		DW/FUNC
PRELAUNCH: 3/2R	RTLS:	3/1R = 2 200
LIFTOFF: 3/1R		3/1R
LIFTOFF: 3/1R ONORBIT: 3/1R DEORBIT: 3/1R	TAL: AOA:	3/1R
DEORBIT: 3/1R	ATO:	3/1R
DEURBIT: 3/IR	ATO:	3/ IR
LANDING/SAFING: 3/1R		
REDUNDANCY SCREENS: A [1]	В[Р] С	[P]
LOCATION: ALL AV BAYS PART NUMBER:	and a second	• • • • • • • • • • • • • • • • • • •
CAUSES: MECHANICAL FRACTURE/ CONT.	•	S
EFFECTS/RATIONALE: LOSS OF DATA BUS. REDUNDANT HARDW. DURING PERIODS OF ANTICIPATED HIGH FORCES. ie. 1. LIFT-OFF THROUGH MAIN ENGINE	ARE WOULD NOT BE ACCELERATION/DE CUT-OFF - APPRO	ACCELERATION DXIMATELY 8 MIN
40 SEC; 2. ENTRY THROUGH SAFEING -	APPROXIMATELY 40	0,000ft (TD -40

MIN) THROUGH SAFEING.

DATE: 10/03/8 SUBSYSTEM: DPS MDAC ID: 316	6 1		ITICALITY FLIGHT: ABORT:	HDW/FUNC 3/2R /NA
ITEM: DBIA FAILURE MODE: OPEN/3	SHORT/ERRONEOUS/	ERRATIC OU	TPUT	
LEAD ANALYST: H J LO	WERY SUBSY	S LEAD: B.	ROBB	
BREAKDOWN HIERARCHY: 1) DPS 2) MULTIFUNCTIONAL 3) DBIA 4) 5) 6) 7) 8) 9)	CRT DISPLAY SYS	TEM (MCDS)		
	CRITICALI	TIES		
FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFIN	HDW/FUNC 3/2R 3/2R /NA /NA G: /NA	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNG 3/2R /NA /NA /NA	2
REDUNDANCY SCREENS:	A[1] B	[NA]	С[Р]	
LOCATION: AV BAY PART NUMBER:	5		•	-
CAUSES: MECHANICAL	FRACTURE/ CONTAM	INATION/ D	EBRIS	

EFFECTS/RATIONALE: LOSS OF ONE COMMAND/DATA PATH

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REFERENCES:

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DATE: SUBSYSTEM: I MDAC ID: 3			HIGHEST C	RITICALITY FLIGHT: ABORT:	HDW/FUNC 3/3 3/3
ITEM: FAILURE MODE:		R			
LEAD ANALYST:	H J LOWE	RY SUI	SYS LEAD: B	ROBB	
BREAKDOWN HII 1) EPD&C 2) DPS&C 3) MCDS 4) RESISTOR 5) 6) 7) 8) 9)					
•		CRITICA	LITIES		
FLIGHT PH PRELAU LIFTOF ONORBI	JNCH:	HDW/FUNC 3/3 3/3 3/3 3/3 3/3	ABORT RTLS TAL: AOA:	: 3/3 3/3	
DEORBI	T: NG/SAFING:	3/3 3/3	ATO:		
REDUNDANCY SC	CREENS:	A [NA]	B [NA]	C [NA]	u da de la constant
LOCATION: PART NUMBER:			•		····· · · · · · · · · · · · · · · ·
CAUSES: THER	MAL STRESS	S, CONTAMINA	TION		
EFFECTS/RATIC NO EFFECT. F RESISTOR PROV STATUS "ON" O POWER "OFF" (POWER TO M VIDES SIGN DR "STBY".	AL THAT INDI	CATES THE M	CDS (DEU/DU)	UPTED.) POWER
REFERENCES:					

DATE: 10/27/80 SUBSYSTEM: DPS MDAC ID: 318	6		ITICALITY FLIGHT: ABORT:	HDW/FUNC 3/3 3/3
ITEM: RPC FAILURE MODE: PREMA	TURE OPERATION	ī		
LEAD ANALYST: H J LO	WERY SUI	BSYS LEAD: B.	ROBB	
BREAKDOWN HIERARCHY: 1) DPS 2) MCDS 3) DU 4) RPC 5) 6) 7) 8) 9)				
	CRITICA	LITIES		
FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING	HDW/FUNC 3/3 3/3 3/3 3/3 3/3	ABORT RTLS: TAL: AOA: ATO:		Ċ
REDUNDANCY SCREENS:	A [NA]	B [NA]	C [NA]	
LOCATION: PART NUMBER:	 	•	· . ,	
CAUSES: MECHANICAL H	RACTURE/CONTA	MINATION/DEB	RIS	

EFFECTS/RATIONALE: NONE. DU WILL HAVE POWER APPLIED PREMATURELY.

REFERENCES:

REPORT DATE 12/20/86

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DATE: 10/03 SUBSYSTEM: DPS MDAC ID: 319	6/86	HIGHEST C	RITICALITY FLIGHT: ABORT:	HDW/FUNC 3/3 3/3
ITEM: SWI FAILURE MODE: PRE	TCH, CRT POWER MATURE OPERATI			
LEAD ANALYST: H J	LOWERY S	UBSYS LEAD: H	B. ROBB	
BREAKDOWN HIERARCH 1) DPS 2) MULTIFUNCTION 3) DU 4) SWITCH, CRT H 5) 6) 7) 8) 9)	AL CRT DISPLAY	SYSTEM (MCDS	5)	· . ·
	CRITI	CALITIES		
FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAF	HDW/FUNC 3/3 3/3 3/3 3/3 3/3	ABORT RTLS TAL: AOA: ATO:	3/3 3/3	C
REDUNDANCY SCREENS	: A [NA]	B [NA]	C [NA]	•

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LOCATION: PART NUMBER:

CAUSES: MECHANICAL FRACTURE, CONTAMINATION

EFFECTS/RATIONALE: NONE. DU WILL HAVE POWER APPLIED PREMATURELY.

DATE: 10/03/86 HIGHEST CRITICALITY HE SUBSYSTEM: DPS FLIGHT: MDAC ID: 320 ABORT:	W/FUNC 3/3 3/3
ITEM: RPC FAILURE MODE: PREMATURE OPERATION	
LEAD ANALYST: H J LOWERY SUBSYS LEAD: B. ROBB	
BREAKDOWN HIERARCHY: 1) DPS 2) MULTIFUNCTIONAL CRT DISPLAY SYSTEM (MCDS) 3) DEU 4) CONTROLLER 5) 6) 7) 8) 9)	
CRITICALITIES	
FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC	
PRELAUNCH: 3/3 RTLS: 3/3	
LIFTOFF: 3/3 TAL: 3/3	
ONORBIT: 3/3 AOA: 3/3	
DEORBIT: 3/3 ATO: 3/3	
LANDING/SAFING: 3/3	
REDUNDANCY SCREENS: A [NA] B [NA] C [NA]	
LOCATION: PART NUMBER:	

CAUSES: TEMPERATURE STRESS/MECHANICAL FRACTURE/CONTAMINATION/DEBRIS

EFFECTS/RATIONALE:

NONE. DEU WILL HAVE POWER APPLIED PREMATURELY.

REFERENCES:

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DATE: 11/03/86 SUBSYSTEM: DPS MDAC ID: 321	HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/3 ABORT: 3/3
ITEM: DIODE, SUPPRESS FAILURE MODE: FAILS SHORTED	SOR
LEAD ANALYST: H J LOWERY	SUBSYS LEAD: B. ROBB
BREAKDOWN HIERARCHY: 1) DPS 2) MCDS 3) DEU 4) DIODE, SUPPRESSOR 5) 6) 7) 8) 9)	
CR	TICALITIES
FLIGHT PHASEHDW/FUNGPRELAUNCH:3/3LIFTOFF:3/3ONORBIT:3/3DEORBIT:3/3LANDING/SAFING:3/3	
REDUNDANCY SCREENS: A [NA]	B [NA] C [NA]
LOCATION:	

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PART NUMBER:

CAUSES: THERMAL STRESS, CONTAMINATION, DEBRIS

EFFECTS/RATIONALE: LACK OF SUPPRESSION OF DEU TO MDM REVERSE TRANSIENTS WOULD ENABLE PREMATURE "ON" INDICATION OF THE DEU.

REFERENCES: FMEA-05-6S-BDI01-1. NASA JSC FMEA & CIL REVIEW COMMENTS.

ITEM: SWITCH, CRT POWER FAILURE MODE: SHORT TO GROUND LEAD ANALYST: H J LOWERY SUBSYS LEAD: B. ROBB BREAKDOWN HIERARCHY: 1) DPS 2) MCDS 3) DU 4) SWITCH, CRT POWER 5) 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE HEW/FUNC ABORT HDW/FUNC PRELAUNCH: 3/1R RTLS: 3/1R LIFTOFF: 3/1R TAL: 3/1R 000RBIT: 3/1R AOA: 3/1R DEORBIT: 3/1R ATO: 3/1R LANDING/SAFING: 3/1R REDUNDANCY SCREENS: A [1] B [P] C [P] LOCATION: PART NUMBER: CAUSES: MECHANICAL SHOCK, CONTAMINATION, DEBRIS EFFECTS/RATIONALE: ACTIVATION OF ASSOCIATED OVERLOAD PROTECTIVE CIRCUITS. LOSS OF DU. REFERENCES: FMEA 05-6Q-2201-3. NASA-JSC FMEA & CIL REVIEW COMMENTS, 9-11-86.	SUBSYSTEM: MDAC ID:			HIGHEST	CRITICALITY FLIGHT: ABORT:	HDW/FUN 3/1R 3/1R
BREAKDOWN HIERARCHY: 1) DPS 3) DU 4) SWITCH, CRT POWER 5) 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC PRELAUNCH: 3/1R RTLS: 3/1R LIFTOFF: 3/1R TAL: 3/1R 0NORBIT: 3/1R AOA: 3/1R DEORBIT: 3/1R AOA: 3/1R LANDING/SAFING: 3/1R REDUNDANCY SCREENS: A [1] B [P] C [P] LOCATION: PART NUMBER: CAUSES: MECHANICAL SHOCK, CONTAMINATION, DEBRIS EFFECTS/RATIONALE: ACTIVATION OF ASSOCIATED OVERLOAD PROTECTIVE CIRCUITS. LOSS OF DU. REFERENCES: FMEA 05-6Q-2201-3. NASA-JSC FMEA & CIL REVIEW					•.	
<pre>1) DPS 2) MCDS 3) DU 4) SWITCH, CRT POWER 5) 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC PRELAUNCH: 3/1R RTLS: 3/1R LIFTOFF: 3/1R TAL: 3/1R ONORBIT: 3/1R AOA: 3/1R DEORBIT: 3/1R ATO: 3/1R LANDING/SAFING: 3/1R REDUNDANCY SCREENS: A [1] B [P] C [P] LOCATION: PART NUMBER: CAUSES: MECHANICAL SHOCK, CONTAMINATION, DEBRIS EFFECTS/RATIONALE: ACTIVATION OF ASSOCIATED OVERLOAD PROTECTIVE CIRCUITS. LOSS OF DU. REFFERENCES: FMEA 05-6Q-2201-3. NASA-JSC FMEA & CIL REVIEW COMMENTS. 9-11-86.</pre>	LEAD ANALYS	T: H J LOWER	Y S	UBSYS LEAD:	B. ROBB	
CRITICALITIES FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC PRELAUNCH: 3/1R RTLS: 3/1R LIFTOFF: 3/1R TAL: 3/1R ONORBIT: 3/1R AOA: 3/1R DEORBIT: 3/1R ATO: 3/1R REDUNDANCY SCREENS: A [1] B [P] C [P] LOCATION: PART NUMBER: CAUSES: MECHANICAL SHOCK, CONTAMINATION, DEBRIS EFFECTS/RATIONALE: ACTIVATION OF ASSOCIATED OVERLOAD PROTECTIVE CIRCUITS. LOSS OF DU. REFERENCES: FMEA 05-6Q-2201-3. NASA-JSC FMEA & CIL REVIEW COMMENTS. 9-11-86.	1) DPS 2) MCDS 3) DU 4) SWITCH 5) 6) 7) 8)					· · · · · · · · · · · · · · · · · · ·
FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC PRELAUNCH: 3/1R RTLS: 3/1R LIFTOFF: 3/1R TAL: 3/1R ONORBIT: 3/1R AOA: 3/1R DEORBIT: 3/1R AOA: 3/1R DEORBIT: 3/1R AOA: 3/1R REDUNDANCY SCREENS: A [1] B [P] C [P] LOCATION: PART NUMBER: CAUSES: MECHANICAL SHOCK, CONTAMINATION, DEBRIS EFFECTS/RATIONALE: ACTIVATION OF ASSOCIATED OVERLOAD PROTECTIVE CIRCUITS. LOSS OF DU. REFERENCES: FMEA 05-6Q-2201-3. NASA-JSC FMEA & CIL REVIEW	5)					
PRELAUNCH:3/1RRTLS:3/1RLIFTOFF:3/1RTAL:3/1RONORBIT:3/1RAOA:3/1RDEORBIT:3/1RATO:3/1RREDUNDANCY SCREENS:A [1]B [P]C [P]LOCATION:PART NUMBER:CAUSES:MECHANICAL SHOCK, CONTAMINATION, DEBRISEFFECTS/RATIONALE:ACTIVATION OF ASSOCIATED OVERLOAD PROTECTIVE CIRCUITS.LOSS OFDU.REFERENCES:FMEA 05-6Q-2201-3.NASA-JSC FMEA & CIL REVIEWCOMMENTS:9-11-86.11-86.	TT TOUM				HOW/FIIN	IC
LIFTOFF: 3/1R TAL: 3/1R ONORBIT: 3/1R AOA: 3/1R DEORBIT: 3/1R ATO: 3/1R LANDING/SAFING: 3/1R REDUNDANCY SCREENS: A [1] B [P] C [P] LOCATION: PART NUMBER: CAUSES: MECHANICAL SHOCK, CONTAMINATION, DEBRIS EFFECTS/RATIONALE: ACTIVATION OF ASSOCIATED OVERLOAD PROTECTIVE CIRCUITS. LOSS OF DU. REFERENCES: FMEA 05-6Q-2201-3. NASA-JSC FMEA & CIL REVIEW COMMENTS, 9-11-86.						
ONORBIT: 3/1R AOA: 3/1R DEORBIT: 3/1R ATO: 3/1R LANDING/SAFING: 3/1R REDUNDANCY SCREENS: A [1] B [P] C [P] LOCATION: PART NUMBER: CAUSES: MECHANICAL SHOCK, CONTAMINATION, DEBRIS EFFECTS/RATIONALE: ACTIVATION OF ASSOCIATED OVERLOAD PROTECTIVE CIRCUITS. LOSS OF DU. REFERENCES: FMEA 05-6Q-2201-3. NASA-JSC FMEA & CIL REVIEW COMMENTS, 9-11-86.						
DEORBIT: 3/1R ATO: 3/1R LANDING/SAFING: 3/1R REDUNDANCY SCREENS: A [1] B [P] C [P] LOCATION: PART NUMBER: CAUSES: MECHANICAL SHOCK, CONTAMINATION, DEBRIS EFFECTS/RATIONALE: ACTIVATION OF ASSOCIATED OVERLOAD PROTECTIVE CIRCUITS. LOSS OF DU. REFERENCES: FMEA 05-6Q-2201-3. NASA-JSC FMEA & CIL REVIEW COMMENTS. 9-11-86.						
LANDING/SAFING: 3/1R REDUNDANCY SCREENS: A [1] B [P] C [P] LOCATION: PART NUMBER: CAUSES: MECHANICAL SHOCK, CONTAMINATION, DEBRIS EFFECTS/RATIONALE: ACTIVATION OF ASSOCIATED OVERLOAD PROTECTIVE CIRCUITS. LOSS OF DU. REFERENCES: FMEA 05-6Q-2201-3. NASA-JSC FMEA & CIL REVIEW COMMENTS. 9-11-86.						
LOCATION: PART NUMBER: CAUSES: MECHANICAL SHOCK, CONTAMINATION, DEBRIS EFFECTS/RATIONALE: ACTIVATION OF ASSOCIATED OVERLOAD PROTECTIVE CIRCUITS. LOSS OF DU. REFERENCES: FMEA 05-6Q-2201-3. NASA-JSC FMEA & CIL REVIEW COMMENTS. 9-11-86.					-,	
PART NUMBER: CAUSES: MECHANICAL SHOCK, CONTAMINATION, DEBRIS EFFECTS/RATIONALE: ACTIVATION OF ASSOCIATED OVERLOAD PROTECTIVE CIRCUITS. LOSS OF DU. REFERENCES: FMEA 05-6Q-2201-3. NASA-JSC FMEA & CIL REVIEW COMMENTS. 9-11-86.	REDUNDANCY	SCREENS:	A[l]	B [P]	C[P]	
CAUSES: MECHANICAL SHOCK, CONTAMINATION, DEBRIS EFFECTS/RATIONALE: ACTIVATION OF ASSOCIATED OVERLOAD PROTECTIVE CIRCUITS. LOSS OF DU. REFERENCES: FMEA 05-6Q-2201-3. NASA-JSC FMEA & CIL REVIEW COMMENTS, 9-11-86.	LOCATION:	,		`		
EFFECTS/RATIONALE: ACTIVATION OF ASSOCIATED OVERLOAD PROTECTIVE CIRCUITS. LOSS OF DU. REFERENCES: FMEA 05-6Q-2201-3. NASA-JSC FMEA & CIL REVIEW COMMENTS. 9-11-86.	PART NUMBER			, -		-
EFFECTS/RATIONALE: ACTIVATION OF ASSOCIATED OVERLOAD PROTECTIVE CIRCUITS. LOSS OF DU. REFERENCES: FMEA 05-6Q-2201-3. NASA-JSC FMEA & CIL REVIEW COMMENTS. 9-11-86.	CAUSES. ME	CHANTCAL SHO		MINATION. DI	BRIS	
ACTIVATION OF ASSOCIATED OVERLOAD PROTECTIVE CIRCUITS. LOSS OF DU. REFERENCES: FMEA 05-6Q-2201-3. NASA-JSC FMEA & CIL REVIEW COMMENTS. 9-11-86.	CRUBED. ME	CIMITONI DIIO				
REFERENCES: FMEA 05-6Q-2201-3. NASA-JSC FMEA & CIL REVIEW	ACTIVATION	IONALE: OF ASSOCIATE	D OVERLOA	D PROTECTIV	E CIRCUITS.	LOSS OF
COMMENTS = 9-11-86		2			· · · · ·	
	REFERENCES: COMMENTS, 9	FMEA 05-60 -11-86.	-2201-3.		EA & CIL REV	IEW

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DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 400		HIGHEST CF	RITICALITY FLIGHT: ABORT:	HDW/FUNC 3/2R 3/2R
ITEM: Tape t: FAILURE MODE: Loss of	ransport mechan f Output	nism		
LEAD ANALYST: K. Piet	z SUBSYS	LEAD: B. F	Robb	
BREAKDOWN HIERARCHY: 1) DPS 2) MASS MEMORY UNIT: 3) Tape transport me 4) 5) 6) 7) 8) 9)			. •	
	CRITICAL	TIES		
FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 3/2R 3/2R 3/2R /NA	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC /NA 3/2R 3/2R 3/2R	, ,
REDUNDANCY SCREENS:	A [2]	B [P]	C [P]	

LOCATION: Av Bay 1,2 PART NUMBER: MC 615-0005

CAUSES: Worn tape or foreign matter on tape, Motor failure (worn brushes, etc.), Worn heads, Failure of negator spring causing Tape slippage due to incorrect tension.

EFFECTS/RATIONALE:

If both MMUs fail, OPS 2 and 3 software cannot be loaded. However, OPS 3 can be uplinked or BFS engaged for entry.

REFERENCES:

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HIGHEST CRITICALITY HDW/FUNC 10/03/86 DATE: 3/2R FLIGHT: SUBSYSTEM: DPS 3/2R ABORT: MDAC ID: 401 Tape transport mechanism ITEM: FAILURE MODE: Erroneous Output LEAD ANALYST: K. Pietz SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: DPS 1) MASS MEMORY UNITS (MMU) 2) 3) Tape transport mechanism 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC HDW/FUNC ABORT FLIGHT PHASE RTLS: /NA 3/2R PRELAUNCH: 3/2R TAL: 3/2R LIFTOFF: 3/2R 3/2R AOA: ONORBIT: ATO: 3/2R /NA DEORBIT: LANDING/SAFING: /NA B [P] C [P] **REDUNDANCY SCREENS:** A [2] LOCATION: Av Bay 1,2 PART NUMBER: MC 615-0005 CAUSES: Worn tape or foreign matter on tape, Tape slippage due to incorrect tension. EFFECTS/RATIONALE: If both MMUs fail, OPS 2 and 3 software cannot be loaded. However, OPS 3 can be uplinked or BFS engaged for entry.

REFERENCES:

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DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 402	HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/2R ABORT: 3/2R
ITEM: Read electronics FAILURE MODE: Loss of Output	
LEAD ANALYST: K. Pietz SUBSYS	LEAD: B. Robb
BREAKDOWN HIERARCHY: 1) DPS 2) MASS MEMORY UNITS (MMU) 3) Read electronics 4) 5) 6) 7) 8) 9)	
CRITICALI	
FLIGHT PHASE HDW/FUNC PRELAUNCH: 3/2R LIFTOFF: 3/2R ONORBIT: 3/2R DEORBIT: /NA LANDING/SAFING: /NA	ABORT HDW/FUNC RTLS: /NA TAL: 3/2R AOA: 3/2R ATO: 3/2R
REDUNDANCY SCREENS: A [2]	B[P] C[P]
LOCATION: Av Bay 1,2 PART NUMBER: MC 615-0005	
CAUSES: Electrical failure	
EFFECTS/RATIONALE: If both MMUs fail, OPS 2 and 3 softw However, OPS 3 can be uplinked or BF	rare cannot be loaded. FS engaged for entry.
REFERENCES:	

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DATE: 10/03, SUBSYSTEM: DPS MDAC ID: 403	/86		TICALITY LIGHT: BORT:	HDW/FUNC 3/2R 3/2R
ITEM: Rea FAILURE MODE: Err	d electronics oneous Output			
LEAD ANALYST: K. P	ietz SUBSY	S LEAD: B. RO	bb	
BREAKDOWN HIERARCH 1) DPS 2) MASS MEMORY U 3) Read electron 4) 5) 6) 7) 8) 9)	NITS (MMU)			
	CRITICA	TTTTTS		
FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAF	HDW/FUNC 3/2R 3/2R 3/2R /NA	ABORT RTLS: TAL: AOA: ATO:	HDW/FUN /NA 3/2R 3/2R 3/2R	C
REDUNDANCY SCREEN	S: A [2]	В[Р]	C[P]	
LOCATION: AV B PART NUMBER: MC 6	ay 1,2 15-0005			-
CAUSES: Electrica	l failure			
EFFECTS/RATIONALE: If both MMUs fail, However, OPS 3 can	OPS 2 and 3 soft	tware cannot :	be loaded	l .

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REFERENCES:

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HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/2R ABORT: 3/2R	
LEAD: B. Robb	
TTTES	
ABORT HDW/FUNC	
RTLS: /NA	
ATO: $3/2R$	
B [P] C [P]	
- · · ·	
ware cannot be loaded. DFS engaged for entry.	
	FLIGHT: 3/2R ABORT: 3/2R LIEAD: B. Robb LITIES ABORT HDW/FUNC RTLS: /NA TAL: 3/2R AOA: 3/2R ATO: 3/2R

DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 405	HIGHEST CRITICALITY FLIGHT: ABORT:	HDW/FUNC 3/2R 3/2R
ITEM: MIA FAILURE MODE: Erroneous Output		
LEAD ANALYST: K. Pietz SUBSYS	LEAD: B. Robb	
BREAKDOWN HIERARCHY: 1) DPS 2) MASS MEMORY UNITS (MMU) 3) MIA 4) 5) 6) 7) 8) 9)	·	
CRITICAL	ITIES	
FLIGHT PHASE HDW/FUNC PRELAUNCH: 3/2R LIFTOFF: 3/2R ONORBIT: 3/2R DEORBIT: /NA LANDING/SAFING: /NA	ABORT HDW/FUN RTLS: /NA TAL: 3/2R AOA: 3/2R ATO: 3/2R	
REDUNDANCY SCREENS: A []	B[P] C[P]	
LOCATION: AV Bay 1,2 PART NUMBER: MC 615-0005	•	<u>.</u>
CAUSES: Electrical failure		-
EFFECTS/RATIONALE: If both MMUs fail, OPS 2 and 3 soft However, OPS 3 can be uplinked or B		

REFERENCES:

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HDW/FUNC HIGHEST CRITICALITY DATE: 10/03/86 3/2R FLIGHT: SUBSYSTEM: DPS 3/2R ABORT: MDAC ID: 406 ITEM: Write electronics FAILURE MODE: Loss of Output SUBSYS LEAD: B. Robb LEAD ANALYST: K. Pietz BREAKDOWN HIERARCHY: 1) DPS 2) MASS MEMORY UNITS (MMU) 3) Write electronics 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC FLIGHT PHASE HDW/FUNC ABORT RTLS: /NA PRELAUNCH: 3/2R 3/2R 3/2R TAL: LIFTOFF: 3/2R AOA: ONORBIT: 3/2R 3/2R ATO: DEORBIT: /NA LANDING/SAFING: /NA REDUNDANCY SCREENS: A [2] B [P] C [P] LOCATION: Av Bay 1,2 PART NUMBER: MC 615-0005 CAUSES: Electrical failure

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EFFECTS/RATIONALE: If the ability to write to MMUs were lost, the mission could be terminated early. No danger to crew or vehicle.

DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 407	5	F	LIGHT:	HDW/FUNC 3/2R 3/2R
ITEM: RPC FAILURE MODE: Failed	l Open			
LEAD ANALYST: K. Piet	z SUBSYS	EAD: B. RC	dde	
BREAKDOWN HIERARCHY: 1) DPS 2) MASS MEMORY UNIT 3) Power supply 4) RPC 5) 6) 7) 8) 9)	rs (mmu)			
	CRITICAL			
	STEM: DPS FLIGHT: 3/2R ID: 407 ABORT: 3/2R RPC RE MODE: Failed Open ANALYST: K. Pietz SUBSYS LEAD: B. Robb DOWN HIERARCHY: DPS MASS MEMORY UNITS (MMU) Power supply RPC CRITICALITIES LIGHT PHASE HDW/FUNC ABORT HDW/FUNC PRELAUNCH: 3/2R RTLS: /NA LIFTOFF: 3/2R TAL: 3/2R ONORBIT: 3/2R AOA: 3/2R DEORBIT: J/2R AOA: 3/2R IANDING/SAFING: /NA DANCY SCREENS: A [1] B [P] C [P] ION: AV Bay 1,2 NUMBER: MC 615-0005 S: Broken contact TS/RATIONALE: th MMUS fail, OPS 2 and 3 software cannot be loaded. er, OPS 3 can be uplinked or BFS engaged for entry.			
	3/2R	AOA:		
DEORBIT:	/NA		3/2R	
REDUNDANCY SCREENS:	A [1]	B [P]	C[P]	
CAUSES: Broken conta	ict			
EFFECTS/RATIONALE: If both MMUs fail, 0 However, OPS 3 can be	PS 2 and 3 soft a uplinked or 1	ware cannot BFS engaged 1	be loaded for entry.	•
REFERENCES:				

REPORT DATE 12/20/86

E-105

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HIGHEST CRITICALITY HDW/FUNC DATE: 10/03/86 FLIGHT: 3/2R SUBSYSTEM: DPS ABORT: 3/2R MDAC ID: 408 Switch ITEM: FAILURE MODE: Failed Open SUBSYS LEAD: B. Robb LEAD ANALYST: K. Pietz BREAKDOWN HIERARCHY: 1) DPS 2) MASS MEMORY UNITS (MMU) 3) Power supply Switch 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC FLIGHT PHASE HDW/FUNC ABORT /NA PRELAUNCH: 3/2R RTLS: 3/2R LIFTOFF: 3/2R TAL: ONORBIT: 3/2RAOA: 3/2R DEORBIT: /NA ATO: 3/2R LANDING/SAFING: /NA REDUNDANCY SCREENS: A [1] B [P] C [P] LOCATION: Av Bay 1,2 ·· ·· · 2-1 PART NUMBER: MC 615-0005 CAUSES: Broken contact EFFECTS/RATIONALE: If both MMUs fail, OPS 2 and 3 software cannot be loaded. However, OPS 3 can be uplinked or BFS engaged for entry. **REFERENCES:**

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SUBSYS	STEM: ID:	10/03/8 DPS 409	6	HIGHEST CR	ITICALITY FLIGHT: ABORT:	HDW/FUNC 3/3 3/3
		Switc E: Faile	h d Closed (o	n)		
LEAD	ANALYSI	C: K. Pie	tz SU	BSYS LEAD: B. R	ddo	
1) I 2) N 3) I	DPS	IERARCHY: MORY UNI Supply	TS (MMU)			
			CRIT	ICALITIES		
F	LIFTC ONORE DEORE	UNCH: DFF: BIT:	HDW/FUNC 3/2R 3/3 3/3 /NA	ABORT RTLS: TAL: AOA: ATO:	3/3 3/3	IC
REDUNI	DANCY S	CREENS:	A [NA]	B [NA]	C [NA]	
LOCAT: PART 1	ION: NUMBER:	Av Bay MC 615	-0005			
CAUSES	s: Str	ay parti	cle			
EFFEC: None	TS/RATI	ONALE:	·			

REFERENCES: .

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REPORT DATE 12/20/86 E-107

HIGHEST CRITICALITY HDW/FUNC DATE: 10/03/86 3/2R FLIGHT: SUBSYSTEM: DPS 3/2R ABORT: MDAC ID: 410 ITEM: Control logic FAILURE MODE: Loss of Output SUBSYS LEAD: B. Robb LEAD ANALYST: K. Pietz BREAKDOWN HIERARCHY: 1) DPS MASS MEMORY UNITS (MMU) 2) 3) Control logic 4) 5) 6) 7) 8) 9) CRITICALITIES ABORT HDW/FUNC FLIGHT PHASE HDW/FUNC RTLS: /NA PRELAUNCH: 3/2R3/2R 3/2R LIFTOFF: TAL: 3/2R AOA: ONORBIT: 3/2R/NA 3/2R DEORBIT: ATO: LANDING/SAFING: /NA REDUNDANCY SCREENS: A [2] B [P] C [P] LOCATION: Av Bay 1,2 MC 615-0005 PART NUMBER: CAUSES: Electrical failure EFFECTS/RATIONALE:

If both MMUs fail, OPS 2 or 3 software cannot be loaded. However, OPS 3 can be uplinked or BFS engaged for entry.

HDW/FUNC HIGHEST CRITICALITY 10/03/86 DATE: FLIGHT: 3/2R SUBSYSTEM: DPS 3/2R ABORT: MDAC ID: 411 ITEM: Control logic FAILURE MODE: Erroneous Output LEAD ANALYST: K. Pietz SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: 1) DPS MASS MEMORY UNITS (MMU) 2) 3) Control logic 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC HDW/FUNC ABORT FLIGHT PHASE · /NA PRELAUNCH: 3/2R RTLS: 3/2R LIFTOFF: 3/2R TAL: 3/2R ONORBIT: 3/2R AOA: DEORBIT: /NA ATO: 3/2R /NA LANDING/SAFING: REDUNDANCY SCREENS: A [2] B[P] C[P] Av Bay 1,2 LOCATION: PART NUMBER: MC 615-0005 CAUSES: Electrical failure EFFECTS/RATIONALE: If both MMUs fail, OPS 2 or 3 software cannot be loaded. However, OPS 3 can be uplinked or BFS engaged for entry. **REFERENCES:**

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E-109

HIGHEST CRITICALITY HDW/FUNC 10/03/86 DATE: 3/2R FLIGHT: SUBSYSTEM: DPS 3/2R MDAC ID: 412 ABORT: ITEM: Power supply FAILURE MODE: Fails out of tolerance or Interrupt LEAD ANALYST: K. Pietz SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: 1) DPS 2) MASS MEMORY UNITS (MMU) 3) Power supply 4) 5) 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC /NA PRELAUNCH: 3/2R RTLS: 3/2R 3/2R LIFTOFF: TAL: ONORBIT: 3/2R AOA: 3/2R DEORBIT: /NA ATO: 3/2R /NA LANDING/SAFING: REDUNDANCY SCREENS: A [2] B [P] C[P] Av Bay 1,2 LOCATION: PART NUMBER: MC 615-0005 CAUSES: Electrical failure EFFECTS/RATIONALE: If both MMUs fail, OPS 2 and 3 software cannot be loaded. However, OPS 3 can be uplinked or BFS engaged for entry. Neither of these options require the use of MMUs.

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DATE: 10/20/86 SUBSYSTEM: DPS MDAC ID: 413		HIGHEST (CRITICALITY FLIGHT: ABORT:	HDW/FUNC 3/2R 3/2R
ITEM: RESIST FAILURE MODE: FAILS (OR, CURRENT LI OPEN	MITER		
LEAD ANALYST: B. ROBB	SUBSYS	LEAD: B. F	ROBB	n. A. 11
BREAKDOWN HIERARCHY: 1) DPS 2) MASS MEMORY UNIT 3) POWER DISTRIBUTION 4) RESISTOR, CURRENT 5) 6) 7) 8) 9)	ON			
	CRITICAL	ITIES		
FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 3/2R 3/2R 3/2R 3/2R 3/2R	ABORT RTLS TAL: AOA: ATO:	5: 3/2R 3/2R 3/2R	
REDUNDANCY SCREENS:	A [1]	B [P]	C[P]	
LOCATION: PART NUMBER:				
CAUSES: VIBRATION, S	HOCK, PIECE PA	RT FAILURE	E ,	
EFFECTS/RATIONALE: LOSS CONTROL AND USE (GOOD MMU.	OF ONE MMU. L	OAD GPC OR	MCDS WITH R	EMAINING

REFERENCES:

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REPORT DATE 12/20/86 E-111

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DATE: 10/30/86 SUBSYSTEM: DPS MDAC ID: 414	HIGHEST	CRITICALITY FLIGHT: ABORT:	HDW/FUNC 3/2R 3/2R
ITEM: CONTROLLER, REMOTE FAILURE MODE: LOSS OF OUTPUT	POWER		
LEAD ANALYST: H J LOWERY SUP	BSYS LEAD:	B. ROBB	
BREAKDOWN HIERARCHY: 1) DPS 2) MMU 3) CONTROLLER, REMOTE POWER 4) 5) 6) 7) 8) 9)			
CRITICA			
FLIGHT PHASE HDW/FUNC PRELAUNCH: 3/2R LIFTOFF: 3/2R ONORBIT: 3/2R DEORBIT: 3/2R LANDING/SAFING: 3/2R	ABORT RTI TAI AOA ATC	us: 3/2R J: 3/2R A: 3/2R	
REDUNDANCY SCREENS: A [1]	B [P]	C[P]	
LOCATION: PART NUMBER:			
CAUSES: TEMPREATURE STRESS, MECHA DEBRIS	NIÇAL FRAC	TURE, CONTAM	INATION,
EFFECTS/RATIONALE: NONE. BFS GPC AND A FROZEN PRIMAR OVERLAY DURING ORBIT BEFORE ENTRY.		OT REQUIRE I	PL OR

REFERENCES: FMEA NO. 05-6S-BRPC2-1. NASA-JSC FMEA CIL REVIEW COMMENTS.

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REPORT DATE 12/20/86 E-112

DATE: SUBSYSTEM: D MDAC ID: 4	PS	HIGHEST CF	RITICALITY FLIGHT: ABORT:	HDW/FUNC 3/3 3/3
ITEM: FAILURE MODE:	IPL Source Switch Fails open			
LEAD ANALYST:	T. B. Cribbs	SUBSYS LEAD:	B. Robb	
3) Central	RARCHY: Purpose Computer (GI Processing Unit (CPU ial Program Load (II	J)	itch	
	CRITIC	CALITIES		
FLIGHT PH PRELAU LIFTOF ONORBI DEORBI LANDIN	ASE HDW/FUNC NCH: 3/3 F: 3/3 T: 3/3	ABORT RTLS: TAL: AOA: ATO:	3/3 3/3	c
REDUNDANCY SC	REENS: A [NA]	B [NA]	C [NA]	
LOCATION: PART NUMBER:	Panel 06		-	• •
CAUSES: IPL due to contam	selector switch is s ination	shorted or pov	ver source	is lost
failure could delay. During though the MM	itch is used at pre- cause loss of a mis flight the GPC's ar U is used to retriev e IPL loading the er	ssion opportur e not typical ve new memory	hity due to ly re-IPL' overlays (launch ed, even as
REFERENCES:	JSC 18820, JSC 11174	, JSC 12770		

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HIGHEST CRITICALITY HDW/FUNC DATE: 11/10/86 3/3 SUBSYSTEM: DPS FLIGHT: ABORT: 3/3 MDAC ID: 416 CONTROLLER, REMOTE POWER ITEM: FAILURE MODE: PREMATURE OPERATION LEAD ANALYST: T. B. Cribbs SUBSYS LEAD: B. Robb BREAKDOWN HIERARCHY: 1) DPS 2) MMU CONTROLLER, REMOTE POWER 3) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE 3/3 PRELAUNCH: RTLS: 3/3 3/3 LIFTOFF: 3/3 TAL: 3/3 ONORBIT: 3/3 AOA: DEORBIT: ATO: 3/3 3/3 LANDING/SAFING: 3/3 REDUNDANCY SCREENS: A [NA] B [NA] C [NA] LOCATION: PART NUMBER: CAUSES: MECHANICAL SHOCK, CONTAMINATION, DEBRIS EFFECTS/RATIONALE: NO EFFECT. PREMATURE TURN ON. REFERENCES: 05-6S-BRPC2-1. NASA-JSC FMEA & CIL REVIEW COMMENTS, 9-19-86.

DATE: 11/10/86 SUBSYSTEM: DPS MDAC ID: 417	HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/2R ABORT: 3/2R
ITEM: SWITCH, IPL FAILURE MODE: SWITCH SHORT, BOTH	IPL OUTPUTS ARE TRUE.
LEAD ANALYST: H J LOWERY SUBS	SYS LEAD: B. Robb
BREAKDOWN HIERARCHY: 1) DPS 2) MMU 3) SWITCH, IPL 4) 5) 6) 7) 8) 9)	• .
CRITICAL	
FLIGHT PHASE HDW/FUNC	ABORT HDW/FUNC
PRELAUNCH: 3/2R	RTLS: 3/2R
LIFTOFF: 3/2R	TAL: 3/2R AOA: 3/2R ATO: 3/2R
ONORBIT: 3/2R	AOA: $3/2R$
DEORBIT: 3/2R	ATO: 3/2R
LANDING/SAFING: 3/2R	
REDUNDANCY SCREENS: A [1]	B[P] C[P]
LOCATION: PART NUMBER:	
CAUSES: MECHANICAL SHOCK, CONTAMIN	NATION, DEBRIS
EFFECTS/RATIONALE: LOSS OF GPC IF IN HALT MODE.	
REFERENCES: 05-5-B16-1-1. NASA-JS	C FMEA & CIL REVIEW COMMENTS,

REPORT DATE 12/20/86 E-115

9-19-86.

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DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 501	HIGHEST C	RITICALITY FLIGHT: ABORT:	HDW/FUNC 3/lR 3/lR
ITEM: CIA FAILURE MODE: LOSS OF OUTPUT TO MA	IN ENGINE	ON ONE CHAN	NEL
LEAD ANALYST: B. ROBB SUBSYS	LEAD: B. R	OBB	
BREAKDOWN HIERARCHY: 1) DPS 2) ENGINE INTERFACE UNIT (EIU) 3) CONTROLLER INTERFACE ADAPTER 4) 5) 6) 7) 8) 9)		· · · · · · · · · · · · · · · · · · ·	
CRITICAL	TTTES		
FLIGHT PHASE HDW/FUNC PRELAUNCH: 3/2R LIFTOFF: 3/1R ONORBIT: /NA DEORBIT: /NA LANDING/SAFING: /NA	ABORT RTLS TAL: AOA: ATO:	3/1R	
REDUNDANCY SCREENS: A [1]	B[P]	C[P]	•
LOCATION: AV BAY 4,5,6 PART NUMBER:	•,	•	e de la composition de la comp
CAUSES: CONTROLLER INTERFACE ADAPT	ER FAILS		

EFFECTS/RATIONALE: LOSS OF THROTTLE COMMANDS, SHUTDOWN COMMANDS, LIMIT INHIBIT/ENABLE COMMANDS, GPC SHUTDOWN COMMANDS, AND MPS DUMP COMMANDS. LOSS OF ONE OF THREE COMMAND PATHS WILL BE VOTED INVALID. NO EFFECT ON ENGINE OPERATIONS.

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DATE:10/03/86HIGHEST CRITICALITYHDW/FUNCSUBSYSTEM:DPSFLIGHT:3/1RMDAC ID:502ABORT:3/1R
ITEM: MIA FAILURE MODE: LOSS OF OUTPUT TO MAIN ENGINE ON ONE CHANNEL
LEAD ANALYST: B. ROBB SUBSYS LEAD: B. ROBB
BREAKDOWN HIERARCHY: 1) DPS 2) ENGINE INTERFACE UNIT (EIU) 3) MULTIPLEXER INTERFACE ADAPTER 4) 5) 6) 7) 8) 9)
CRITICALITIES
FLIGHT PHASEHDW/FUNCABORTHDW/FUNCPRELAUNCH:3/2RRTLS:3/1RLIFTOFF:3/1RTAL:3/1RONORBIT:/NAAOA:3/1RDEORBIT:/NAATO:3/1RLANDING/SAFING:/NAATO:3/1R
REDUNDANCY SCREENS: A [1] B [P] C [P]
LOCATION: AV BAY 4,5,6 PART NUMBER:
CAUSES: MULTIPLEXER INTERFACE ADAPTER FAILS
EFFECTS/RATIONALE: LOSS OF THROTTLE COMMANDS, SHUTDOWN COMMANDS, LIMIT INHIBIT/ENABLE COMMANDS, GPC SHUTDOWN COMMANDS, AND MPS DUMP COMMANDS. LOSS OF ONE OF THREE COMMAND PATHS WILL BE VOTED INVALID. NO EFFECT ON ENGINE OPERATIONS.
REFERENCES:

REPORT DATE 12/20/86 E-117

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DATE:	10/03/86	HIGHEST	CRITICALITY	HDW/FUNC
SUBSYSTEM:	DPS		FLIGHT:	3/1R
MDAC ID:	503		ABORT:	3/1R

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ITEM: POWER CONTROL SWITCH FAILURE MODE: LOSS OF OUTPUT TO MAIN ENGINE ON ANY OF THREE COMMAND CHANNELS

LEAD ANALYST: B. ROBB SUBSYS LEAD: B. ROBB

BREAKDOWN HIERARCHY:

1)	DPS	
2)	ENGINE INTERFACE UNIT	(EIU)
3)	POWER CONTROL SWITCH	
4)		
5)		
6)		
7)		
8)		
9)		

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	/NA	AOA:	3/1R
DEORBIT:	/NA	ATO:	3/1R
LANDING/SAFING	: /NA		·

REDUNDANCY SCREENS: A [1] B [P] C [P]

LOCATION: AV BAY 4,5,6 PART NUMBER:

CAUSES: EIU POWER CONTROL SWITCH FAILS OPEN

EFFECTS/RATIONALE: LOSS OF ALL COMMANDS AND STATUS OF THE ENGINE FOR THIS FAILURE MODE THE LOSS OF THE ENTIRE EIU WILL RESULT IN ENGINE SHUTDOWN BY CREW BY SWITCHING AC POWER TO THE ENGINE TO OFF POSITION.

REFERENCES:

E-118

DATE: 10/03/86 SUBSYSTEM: DPS MDAC ID: 504	HIGHES	T CRITICALITY HDW/FUNC FLIGHT: 3/1R ABORT: 3/1R
ITEM: INTERN FAILURE MODE: LOSS (COMMAND CHANNELS	AL POWER SUPPLIES OF OUTPUT TO MAIN ENGI	NE ON ANY OF THREE
LEAD ANALYST: B. ROBE	SUBSYS LEAD: B	. ROBB
BREAKDOWN HIERARCHY: 1) DPS 2) ENGINE INTERFACE 3) INTERNAL POWER S 4) 5) 6) 7) 8) 9)		
	CRITICALITIES	
FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING	HDW/FUNC ABOR 3/2R R 3/1R T /NA A /NA A	T HDW/FUNC TLS: 3/1R AL: 3/1R OA: 3/1R TO: 3/1R
REDUNDANCY SCREENS:	A[1] B[P]	C [P]

LOCATION: AV BAY 4,5,6 PART NUMBER:

CAUSES: INTERNAL POWER SUPPLIES FAIL

EFFECTS/RATIONALE: LOSS OF THROTTLE COMMANDS, SHUTDOWN COMMANDS, LIMIT INHIBIT/ENABLE COMMANDS, GPC SHUTDOWN COMMANDS, AND MPS DUMP COMMANDS. THE LOSS OF THE ENTIRE EIU WILL RESULT IN ENGINE SHUTDOWN BY CREW BY SWITCHING AC POWER TO THE ENGINE TO OFF POSITION.

REFERENCES:

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DATE:	10/03/86	HIGHEST	CRITICALITY	HDW/FUNC
SUBSYSTEM:	DPS		FLIGHT:	3/1R
MDAC ID:	505		ABORT:	3/1R

ITEM: CONTROLLER INTERFACE ADAPTER FAILURE MODE: LOSS OF OUTPUT TO ONE OR THREE GPC ON STATUS OF ENGINES.

LEAD ANALYST: B. ROBB SUBSYS LEAD: B. ROBB

BREAKDOWN HIERARCHY:

1) DPS
2) ENGINE INTERFACE UNIT (EIU)
3) CONTROLLER INTERFACE ADAPTER
4)
5)
6)
7)
8)
9)

CRITICALITIES			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	/NA	AOA:	3/1R
DEORBIT:	/NA	ATO:	3/1R
LANDING/SAFING	: /NA		

REDUNDANCY SCREENS: A [1] B [P] C [P]

LOCATION: - AV BAY 4,5,6 PART NUMBER:

CAUSES: CONTROLLER INTERFACE ADAPTER FAILURE

EFFECTS/RATIONALE:

NO MAIN ENGINE MONITORING BY ONE OR THREE OF FOUR GPCS. MCC CONFIRMS COMMAND PATH GOOD BY MONITORING 3-G THROTTLE CONTROL. IF ENGINE IS NOT OPERATING, THE PUSHBUTTON FOR THE ENGINE MUST BE USED TO INFORM GUIDANCE FOR PREVALVE CLOSURES. FLIGHT RULE 2-17 PRECLUDES RESTRINGING DURING POWERED ASCENT THROUGH MECO.

DATE:	10/03/86	HIGHEST	CRITICALITY	HDW/FUNC
SUBSYSTEM:	DPS		FLIGHT:	3/3
MDAC ID:	506		ABORT:	3/1R

ITEM: OIE FAILURE MODE: LOSS OF OUTPUT TO S-BAND, MAINTENANCE RECORDER, OR LPS T-0 UMBILICAL

LEAD ANALYST: B. ROBB SUBSYS LEAD: B. ROBB

BREAKDOWN HIERARCHY:

1) DPS
2) ENGINE INTERFACE UNIT (EIU)
3) OPERATIONAL INTERFACE ELEMENT
4)
5)
6)
7)
8)
9)

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FLIGHT PHASE PRELAUNCH:	HDW/FUNC 3/2R	ABORT RTLS:	HDW/FUNC 3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT: DEORBIT:	/NA /NA	AOA: ATO:	3/1R 3/1R
LANDING/SAFING			

REDUNDANCY SCREENS: A [NA] B [NA]

B [NA] C [NA]

LOCATION: AV BAY 4,5,6 PART NUMBER:

CAUSES: OPERATIONAL INTERFACE ELEMENT FAILURE

EFFECTS/RATIONALE:

NO FM DATA RECORDING, NO MCC STATUS MONITORING OF ENGINE EXCEPT IN DOWNLIST DATA FROM GPC.

DATE: SUBSYSTEM: MDAC ID:	10/20/86 DPS 507	HIGH		ICALITY H IGHT: ORT:	HDW/FUNC 2/1R 2/1R
ITEM: FAILURE MOD	CIRCUIT, EI E: ALL CREDIBL		SHORTS		
LEAD ANALYS	T: B. ROBB	SUBSYS LEAD:	B. ROBB		
3) POWER	IERARCHY: INTERFACE UNIT DISTRIBUTION I, EIU POWER	(EIU)		 	
		CRITICALITIES	ĺ		
LIFT ONOR DEOR	AUNCH: 3/ OFF: 2/ BIT: /	3 1R	RTLS: TAL: AOA: ATO:	HDW/FUNC 2/1R 2/1R 2/1R 2/1R 2/1R	

REDUNDANCY SCREENS: A [1] B [F] C [P]

LOCATION: / PART NUMBER:

CAUSES: PIECE PART FAILURE, SHOCK, VIBRATION

EFFECTS/RATIONALE:

THE LOSS OF ONE OF TWO REDUNDANT CIRCUITS WILL NOT EFFECT THE EIU. THE LOSS OF BOTH CIRCUITS WILL CAUSE LOSS OF EIU TO MAIN ENGINE INTERFACE. MAIN ENGINE WOULD HAVE TO BE MANUALLY SHUT DOWN AT MECO.

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DATE: 11/03/86 SUBSYSTEM: DPS MDAC ID: 508	HIGHEST	CRITICALITY HDW/FUNC FLIGHT: 1/1 ABORT: 1/1
ITEM: EIU FAILURE MODE: ERRONEO	US OUTPUT	
LEAD ANALYST: H J LOWE	RY SUBSYS LEAD:	B. ROBB
BREAKDOWN HIERARCHY: 1) DPS 2) EIU 3) 4) 5) 6) 7) 8) 9)	·	
	CRITICALITIES	
FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC ABORT 1/1 RT 1/1 TA /NA AO /NA AT /NA	LS: 1/1 L: 1/1 A: /NA
REDUNDANCY SCREENS:	A[1] B[F]	C [P]

LOCATION: PART NUMBER:

CAUSES: THERMAL STRESS, CONTAMINATION, DEBRIS

EFFECTS/RATIONALE:

ERRONEOUS OUTPUT MAY CAUSE THE GPC'S TO THINK THAT THE ENGINE HAS SHUT DOWN OR THE ENGINE TO CHANGE ITS THROOTLE SETTING, EITHER OF WHICH COULD BE CATASTROPHIC.

REFERENCES: NASA-JSC FMEA & CIL REVIEW COMMENTS.

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IND	EPENDENT	ORBITER	ASSESS	MENT
ORBITER	SUBSYSTE	EM ANALY	SIS WOR	KSHEET

DATE: 11/03/86 SUBSYSTEM: DPS MDAC ID: 509	HIC		ICALITY IGHT: ORT:	HDW/FUNC 1/1 1/1
ITEM: SWITCH, PO FAILURE MODE: SHORT BOT	OWER H CONTACTS TO (GROUND		
LEAD ANALYST: H J LOWERY	SUBSYS	LEAD: B. RO	OBB	
BREAKDOWN HIERARCHY: 1) DPS 2) EIU 3) SWITCH, POWER 4) 5) 6) 7) 8) 9)				
	CRITICALITI			
FLIGHT PHASE HDV				
PRELAUNCH:	1/1	RTLS:		
LIFTOFF:	//1 /NA /NA	TAL:	1/1	
ONORBIT: DEORBIT:	/ NA / NA	AOA: ATO:	/NA /NA	
LANDING/SAFING:	/NA /NA	AIO:	/NA	
REDUNDANCY SCREENS: A	[1] B[F]	C[P]	
LOCATION: PART NUMBER:				and and an and a second se Second second s
CAUSES: THERMAL STRESS,	CONTAMINATION,	DEBRIS	la deserta a 17	
EFFECTS/RATIONALE:				

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EFFECTS/RATIONALE: LOSS OF SWITCH CAUSES LOSS OF THAT EIU. LOSS OF EIU CAUSES LOSS OF COMMAND CAPABILITY TO THAT MAIN ENGINE. RESULTS COULD BE CATASTROPHIC.

REFERENCES: NASA-JSC FMEA & CIL REVIEW COMMENTS.

REPORT DATE 12/20/86

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APPENDIX F

NASA FMEA TO IOA WORKSHEET CROSS REFERENCE/RECOMMENDATION

This section provides a cross reference between the NASA FMEA and corresponding IOA analysis worksheet(s) included in Appendix E. The Appendix F identifies: NASA FMEA Number, IOA Assessment Number, NASA criticality and redundancy screen data, and IOA recommendations.

Appendix F Legend

Code Definition

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- 1 IOA recommends changing the second failure mode described in the effects field.
- 2 IOA recommends deleting the IOA failure mode.

APPENDIX F

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NASA FMEA TO IOA WORKSHEET CROSS REFERENCE / RECOMMENDATIONS

IDENTIFIERS		RS NASA			COMMENDATIONS #		
NASA FMEA ND:	IDA Assessment	CRIT HW/F	SCREEN A B C	CRIT HW/F	SCREEN A B C	OTHER (SEE LEGEND CODE)	ISSUE
	DPS-205	2 /1R	PPP	*======================================	********	1	X
05-5 -B01-1-2	DPS-206	3 /1R	P P P		1		
05-5 -B02-1-1	DP5-201	2 /1R	PPP			1	X
05-5 -B02-1-2	DP5-202	3 /1R	PPP				
	DPS-204						
05-5 -802-1-3	DPS-225	2 /1R 2 /1R	P P P	3 /1R	РРР	1	X
05-5 -B03-1-1	DP5-120 DP5-121	2 / IR =		3 / 1R	PPP	-	
	DP5-128		•	3 /1R	ррр	•	- 1
05-5 -B03-1-2	DP5-122	2 /1R	РРР				1
•••••	DP5-123		•				
	DP5-126		•				
-	DP5-127	1					1
05-5 -B03-2-1	DP5-100	2 /1R	PPP	3 /1R	PPP	1	X
F	DP5-101	n		3 /1R	РРР	μ	
•	DP5-108		Π	3 /1R	PPP	•	
05-5 -B03-2-2	DP5-102	2 /1R	PPP				-
-	DP5-103						
•	DPS-106		-			. •	
- 05-5 -B03-4-1	DP5-107 DP5-180	3 /2R	PNP			,	
03+3 -803-4-1	DP5-180	372N •					
	DPS-188		•				
05-5 -803-4-2	DP5-182	3 /2R	PNP	2			
*	DPS-183		•	1			
	DPS-186	•	•				
•	DPS-187	. •					
05-5 -B03-5-1	DPS-140	2 /1R	PPP				
H	DPS-141		•				
•	DPS-148						ł
05-5 -B03-5-2	DPS-142	2 /1R	PPP				
	DPS-143						
	DPS-146 DPS-147		•			-	
05-5 -B04-2-1	DPS-400	3 / 2R	РРР				
VJ-J -BV-Z-I	DP5-401		•				
•	DPS-402	•	•				
•	DP5-403	•	•				
•	DPS-404	•	•		ĺ		
•	DP5-405	•	•				
	DPS-406	•	•				
•	DP5-407	_					
•	DP5-410			1			
	DP5-412	7 / ~ ~					
05-5 -B04-2-2	DP5-411	3 /2R	PPP				
05-5 -808-1-1	DP5-501	2 /1R		H	1		1

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APPENDIX F NASA FMEA TO IDA WORKSHEET CROSS REFERENCE / RECOMMENDATIONS

IDENTIFIERS NASA			IDA RECOMMENDATIONS \$				
NASA FMEA NO:	IDA Assessment	CRIT HW/F	SCREEN A B C	CRIT HW/F	SCREEN A B C	OTHER (SEE LEGEND CODE)	ISSUE
;===============;; ;;	DPS-502	********	*				
11	DP5-503	п	4		•		
n	DP5-504	41	•		l		
Ħ	DPS-505	ч	•				
u	DP5-506	π					
05-5 -B13-1-4	DP5-316	3 /2R	PNP		Ì		
05-5 -B14-1-1	DP5-315	2 /1R	PPP				
05-5 -B15-1-1	DPS-231	3 /1R	PPP				
05-5 -B15-1-3	DPS-211	3 /1R	PPP				
05-5 -B16-1-1	DPS-220	3 /2R	PPP				
05-5 -B17-1-1	DPS-210	2 /1R	PPP		ļ		
05-5 -B18-1-1	DP5-221	2/2	PPP				
05-5 -B18-1-2	DPS-222	3/3	PPP				
05-5 -919-1-1	DP5-223	3 /3	PPP				
05-5 -819-1-2	DP5-224	2/2	PPP				
05-5 -B20-i-i	DPS-415	2 / 2	PPP				1
05-5 -B21-1-1	DPS-301	3 /1R	PPP				1
	Db2-303	•	•				
05-5 -B21-1-2	DPS-302	3 /1R	PPP				
•	· DPS-304	-	•/				
05-5 -B22-1-1	DPS-300	2 /1R	PPP		1		
05-5 -B23-1-1	DPS-30BA	3 /1R	PPP				
05-5 -B23-1-2	DPS-306	3 /1R	PPP				
•	DPS-307			ļ			ł
	DPS-308						
	DPS-309						
Π	DPS-310	, r			· .		
π	DP5-311						
05→5 -B23-1-3	DP5-307A	2 ·/ 1R	PPP			•	
05-5 -B24-1-1	DP5-300B	2 /1R	PPP			-	
05-5 -B24-1-2	DPS-300A	3 /2R	PPP		1		
05-5 -B25-1-3	DP5-313	3 /1R	PPP				
05-5 -B26-1-1	DP5-314A	3 /1R	PPP				
05-5 -B26-1-2	DPS-314	3 /1R	PPP				
05-5 -B26-1-3	DPS-314B	3 /1R	PPP				
05-5 -B27-1-1	DPS-218	2/2					1
05-5 -B27-2-1	DPS-219	3/3 2/1R	P P P P F P	ł			
05-65-BCKT1-1	DPS-507	a -	PPP				
05-65-BCKT2-1	DPS-316A	3/3	PPP	1			
05-65-BDID1-1	DPS-312A						
05-65-BDID1-2	DP5-321	3/3 3/1R	PFP				
05-65-BDIDX-1		1	PPP				
05-65-BDMC1-1	1	3 /1R	PPP				
05-65-BDMC1-2	DPS-214	3/3	PPP	1			
05-65-BFUS1-1		3 /1R	PPP	1			
05-65-BFUS2-1	DPS-312C	3 /1R		l.		l	

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APPENDIX F NASA FMEA TO IDA WORKSHEET CROSS REFERENCE / RECOMMENDATIONS

IDENTIFIE	IRS	NASA		ASA IOA RECOMMENDATIONS #			
NASA Fmea no:	IDA Assessment	CRIT HW/F	SCREEN A B C	CRIT HW/F	SCREEN A B C	OTHER (SEE LEGEND CODE)	ISSUE
======================================	DP5-226	/ NA	N N N		*********	▋▋▓▓▋▋▋▋▋₿₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩	
05-65-BRE52-1	DPS-413	3 /2R	PPP				
05-65-BRES3-1	DP5-190	3 /1R	PFP				
05-65-BRE54-1	DP5-317	3/3	PPP				
05-65-BRPC1-1	DP5-228	3 /1R	PPP				
05-65-BRPC1-2	DP5-229	3/3	P P P P P P				
05-6S-BRPC2-1	DPS-414	3 /2R 3 /1R	PPP				
05-65-BRPC3-1	DP5-191 DP5-192	2 \2	PNP				t t
05-65-BRPC3-2 05-65-BRPC4-1	DPS-305	3/1R	PPP				
05-65-BRPC4-2	DP5-318	2 / 3	PPP				
05-65-BRPC5-1	DP5-312	3 /1R	PPP				
05-65-BRPC5-2	DP5-320	2 \2	PPP				
05-65-B5W1 -1	DP5-232	3 /1R	PPP				
05-65-85W1 -2	DP5-216	3/3	ррр				
05-65-B5W1 -3	DPS-217	2 /1R	PPP				
05-65-B5W2 -1	DPS-408	3 /2R	PPP				
05-65-B5W2 -2	DPS-409	3/3	PPP				
05-6S-B5₩3 -1	DPS-193	3 /1R	PFP				
05-65-B5W3 -2	DPS-194	3/3	PNP				
05-65-B5W4 -1	DPS-312B	3 /1R	PPP		1		
05-65-BSW4 -2	DPS-319	2 \2	PPP				
05-45-BSW4 -3	DP5-322	3_/1R	P.P.P				
05-65-BSW5 -3	DPS-195	3 /1R	P F P P F P				
EIU-1 (NEW)	DPS-508 DPS-509	$\frac{1}{1}$ /1	PFP				
EIU-2 (NEW) MMU-1 (NEW)	DP5-416	2 / 3					
MMU-2 (NEW)	DPS-417	3 / 2R	PPP				
NONE	DRS-104					2	
NDNE	DP5-105					2.2	
NONE	DPS-124	1			-	2	i
NONE	DP5-125	1			į l	2	
NONE	DPS-144	1				2	
NONE	DPS-145	/				2	
NONE	DPS-184					2	
NONE	DPS-185					2	
NONE	DPS-203					2	
NONE	DPS-207	/				2 2	
NONE	DP5-208					2	
NONE	DPS-209 DPS-213				Ť	2	
NONE	DE2-712					•	
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