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FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE
NUMBER: 05-61A-2004-X

SUBSYSTEM NAME: EPD&C - REMOTE MANIP. ARM

REVISION : 2 07/23/90

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
■ LRU	: MID PCA 1	V070-764400
● SRU	: FUSE	ME451-0016-2050 ✓
■ SRU	: FUSE	ME451-0016-3050 ✓

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
FUSE (50 AMP) STARBOARD AND PORT REMOTE MANIPULATOR ARM CONTROL CIRCUIT

REFERENCE DESIGNATORS: 40V76A25A2F26
: 40V76A25A2F27

QUANTITY OF LIKE ITEMS: 2
TWO, ONE/PORT OR STARBOARD

FUNCTION:
CONDUCTS SYS 1 PRIMARY CIRCUIT CURRENT AND PROVIDES CIRCUIT PROTECTION
FOR THE STARBOARD AND PORT REMOTE MANIPULATOR ARM I/F CIRCUIT.

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FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-6IA-2004-01

SUBSYSTEM: EPD&C - REMOTE MANIP. ARM
LRU :MID PCA I
ITEM NAME: FUSE

REVISION# 2 07/23/90 R

CRITICALITY OF THIS
FAILURE MODE:1/1

■ FAILURE MODE:
FAILS OPEN, FAILS TO CONDUCT

MISSION PHASE:
00 ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 102 COLUMBIA
: 103 DISCOVERY
: 104 ATLANTIS

■ CAUSE:
STRUCTURAL FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK,
PROCESSING ANOMALY, THERMAL STRESS

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN A) N/A
B) N/A
C) N/A

PASS/FAIL RATIONALE:

A)

B)

C)

- FAILURE EFFECTS -

■ (A) SUBSYSTEM:
FAILURE WILL INTERRUPT POWER TO THE PRIMARY RMS CONTROL BUS.

(B) INTERFACING SUBSYSTEM(S):
FAILURE WILL PREVENT USE OF THE PRIMARY RMS CONTROL SYSTEM WHEN
REQUIRED. FAILURE DURING PAYLOAD CAPTURE OR RELEASE MAY ALLOW CAPTURE
BUT INCOMPLETE RIGIDIZATION OF PAYLOAD WITH RMS END EFFECTOR. THE
BRAKES WILL COME ON AND SAFING WILL BE INDICATED. NO ARM RELATED DATA

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WILL BE DISPLAYED ON THE D&C PANEL EXCEPT TEMPERATURE DATA. END EFFECTOR TALKBACKS WILL BE BARBER POLE. IF FAILURE OCCURS DURING OPERATION, ARM WILL STOP, ALL PRIME MODES WILL BE LOST, AND END EFFECTOR PRIME MODES WILL BE LOST. IF CAPTURING A PAYLOAD, INCOMPLETE RIGIDIZATION CAN OCCUR RESULTING IN UNEXPECTED MOTION.

- (C) MISSION:
FAILURE WILL RESULT IN LOSS OF MISSION SINCE BASELINE MISSION CANNOT BE PERFORMED WITH THE BACKUP RMS CONTROL SYSTEM.
- (D) CREW, VEHICLE, AND ELEMENT(S):
FAILURE COULD RESULT IN LOSS OF CREW OR VEHICLE DUE TO UNEXPECTED RMS OR PAYLOAD MOTION DUE TO INCOMPLETE RIGIDIZATION.

(E) FUNCTIONAL CRITICALITY EFFECTS:

- DISPOSITION RATIONALE -

- (A) DESIGN:
REFER TO APPENDIX D, ITEM NO. 3 - FUSE, HIGH CURRENT
 - (B) TEST:
REFER TO APPENDIX D, ITEM NO. 3 - FUSE, HIGH CURRENT
- GROUND TURNAROUND TEST
CIRCUIT VERIFIED ON LINE PER PARAGRAPHS:
- V54ANO.012 "PORT MN A (PRIMARY) POWER VERIF"
- V54ANO.041 "PORT PRIMARY POWER DEADFACE VERIF"
PRIOR TO MECHANICAL ARM INSTALLATION,
- V54ATO.016 "PORT ARM POWER FLAG VERIF"
FOR EVERY RMS FLIGHT, AND LRU RETEST PER TABLE V54Z00.000.
- (C) INSPECTION:
REFER TO APPENDIX D, ITEM NO. 3 - FUSE, HIGH CURRENT ✓
 - (D) FAILURE HISTORY:
REFER TO APPENDIX D, ITEM NO. 3 - FUSE, HIGH CURRENT

(E) OPERATIONAL USE:
FAILURE WILL BE NOTED BY INABILITY TO SELECT AFFECTED RMS ON PRIME POWER. PAYLOADS SHOULD BE CAPTURED/RELEASED IN POSITIONS WHERE INCOMPLETE RIGIDIZATION OR RELEASE WILL NOT ALLOW THE PAYLOAD TO ROTATE INTO ORBITER STRUCTURE.

SUBSEQUENT FAILURE OF THE BACKUP RELEASE SYSTEM WILL REQUIRE IMMEDIATE JETTISON OF RMS TO PREVENT LOSS OF VEHICLE DUE TO UNCONTROLLABLE

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PAYLOAD MOTION. FOR UNLOADED RMS OPERATIONS, SUBSEQUENT LOSS OF BACKUP
RMS DRIVE SYSTEM MAY REQUIRE EVA OR JETTISON OF RMS FOR SAFE ENTRY.

- APPROVALS -

RELIABILITY ENGINEERING:	T. AI	:	<u>TA Alford Cl. Am</u>
DESIGN ENGINEERING	: D. SOVEREIGN	:	<u>DS S. J. Clifton 8/4/90</u>
QUALITY SUPERVISGR	: J. COURSEN	:	<u>J. Courson 8-10-90</u>
NASA RELIABILITY	: J. Grissam	:	<u>J. Grissam 9/20/90</u>
NASA SUBSYSTEM MANAGER	: G. Giers	:	<u>G. Giers 10/10/90</u>
NASA EPD&C RELIABILITY	:	:	<u>M. Salzman 9/26/90</u>
NASA QUALITY ASSURANCE	:	:	<u>KD Brent Clifton 9/10/90</u>
NASA EPD&C SUBSYS MGR	: F. ALANS	:	<u>B. Clifton for EA 10-16-90</u>
NASA RMS OPERATIONS	: D. Palleschi	:	<u>D. Palleschi</u>