

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NONCRITICAL HARDWARE  
NUMBER: M5-6MR-0006-X**

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

REVISION: 1 SEP 30, 1995

|     | PART NAME<br>VENDOR NAME | PART NUMBER<br>VENDOR NUMBER |
|-----|--------------------------|------------------------------|
| LRU | : MPCA-1                 | V070-764400                  |
| LRU | : MPCA-2                 | V070-764430                  |
| LRU | : MPCA-3                 | V070-764450                  |
| SRU | : FUSE                   | MC451-0018-1000              |

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**PART DATA**


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**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**

FUSE, SUB-MINIATURE, 10 AMP - SYSTEM 1 POWER MAIN A, SYSTEM 2 POWER MAIN B,  
AND MAIN C.

**REFERENCE DESIGNATORS:**

40V76A25F36  
40V76A25F37  
40V76A25F38  
40V76A25F39  
40V76A26F36  
40V76A26F37  
40V76A26F38  
40V76A26F39  
40V76A27F25  
40V76A27F26  
40V76A27F27  
40V76A27F28

**QUANTITY OF LIKE ITEM: 12  
(TWELVE)**

**FUNCTION:**

PROVIDE DISTRIBUTION AND CIRCUIT PROTECTION FOR THE PNL MN A, PNL MN B,  
AND THE PNL MN C APDS LOGIC POWER CIRCUITS.

FAILURE MODES EFFECTS ANALYSIS (FMEA) - NONCRITICAL FAILURE MODE  
NUMBER: M5-6MR-0006- 01

REVISION# 1 OCT 23, 1995

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM  
LRU: MC451-0018-1000  
ITEM NAME: FUSE

CRITICALITY OF THIS  
FAILURE MODE: 1R3

FAILURE MODE:  
FAILS OPEN

MISSION PHASE:  
OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 104 ATLANTIS

CAUSE:  
A) PIECE PART STRUCTURAL FAILURE, B) CONTAMINATION, C) VIBRATION, D)  
MECHANICAL SHOCK, E) PROCESSING ANOMALY, F) THERMAL STRESS

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

CRITICALITY 1R2 DURING INTACT ABORT ONLY (AVIONICS ONLY)? NO

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

PASS/FAIL RATIONALE:  
A)

B)  
TWO REMAINING PATHS ARE DETECTABLE. ~~FIRST FAILURE NOT DETECTABLE~~  
~~MASKED BY PARALLEL POWER SOURCE.~~  
C)

METHOD OF FAULT DETECTION:  
FAILURE WOULD BE DETECTABLE AFTER FAILURE OF THE PARALLEL POWER  
SOURCE.

MASTER MEAS. LIST NUMBERS: NONE

CORRECTING ACTION:  
NONE

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NONCRITICAL FAILURE MODE  
NUMBER: M5-6MR-0006-01**

**- FAILURE EFFECTS -**

**(A) SUBSYSTEM:**

LOSS OF ONE REDUNDANT FUSE.

**(B) INTERFACING SUBSYSTEM(S):**

DEGRADATION OF APDS LOGIC BUS SOURCE REDUNDANCY.

**(C) MISSION:**

NO EFFECT.

**(D) CREW, VEHICLE, AND ELEMENT(S):**

FIRST FAILURE - NO EFFECT.

**(E) FUNCTIONAL CRITICALITY EFFECTS:**

POSSIBLE LOSS OF CREW VEHICLE AFTER SIX FOUR FAILURES. 1) FIRST FUSE FAILS OPEN. NO EFFECT. 2) SECOND FUSE IN SAME POWER LEG FAILS OPEN. PARTIAL LOSS OF ONE APDS LOGIC BUS REDUNDANCY FOR ONE OF THREE BUSES. REDUNDANT PATHS REMAIN OPERATIONAL. 3) MPCA CONTACTOR FAILS OPEN OR SHORTS TO GROUND. LOSS OF APDS LOGIC BUS REDUNDANCY. LOSS OF ONE OF THREE APDS LOGIC BUSES AND PARTIAL LOSS OF ONE OF THE TWO REMAINING APDS LOGIC BUSES. 4) ONE OF TWO MAIN LOGIC CIRCUIT BREAKERS OR DIODES IN DEGRADED LOGIC BUS FAILS OPEN RESULTING IN LOSS OF TWO OF THREE LOGIC BUSES. ~~LOSS OF ALL UNDOCKING CAPABILITY.~~ FAILURE OF TWO OF THREE APDS LOGIC BUSES DISABLES NOMINAL AND PYROTECHNIC SEPARATION SYSTEMS CONTROL. LOSS OF APDS PANEL CONTROL. USE IFM TO DRIVE HOOKS OPEN THROUGH A BREAKOUT BOX. 5) FAILURE OF IFM TO OPEN HOOKS. PERFORM EVA TO REMOVE 96 BOLTS HOLDING DOCKING BASE TO EXTERNAL AIRLOCK. 6) FAILURE OF EVA TO REMOVE BOLTS. LOSS OF ALL UNDOCKING CAPABILITY.

**- TIME FRAME -**

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: MINUTES

TIME FROM DETECTION TO COMPLETED CORRECTIVE ACTION: N/A

TIME REQUIRED TO IMPLEMENT CORRECTIVE ACTION LESS THAN TIME TO EFFECT?  
N/A

HAZARDS: DM20HA04(F).

INABILITY TO SAFELY SEPARATE ORBITER FROM DOCKING MODULE OR MIR.

**- APPROVALS -**

PRODUCT ASSURANCE ENGINEERING  
DESIGN ENGINEERING

:R. BLACKWELL :  
:T. NGUYEN :

*R. Blackwell*  
*T. Nguyen*