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PRINT DATE: 10/26/95

FAILURE MODES EFFECTS ANALYSIS (FMEA) - NONCRITICAL HARDWARE  
NUMBER: M5-6MR-0020-X

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

REVISION: 1 SEP 30, 1995

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	: DOCKING SYSTEM POWER PANEL	V828-730150
SRU	: TOGGLE SWITCH	MC452-0102-7801

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:  
SWITCHES, TOGGLE, 3P2P, MAINTAINED ON - PSU POWER MN A AND B CONTROL  
CIRCUIT.

REFERENCE DESIGNATORS: 36V73A7A3S9  
36V73A7A3S10

QUANTITY OF LIKE ITEM: 2  
(TWO)

FUNCTION:  
THE SWITCHES PROVIDE MANUAL ACTIVATION OF THE PNL PSU MN A AND MN B  
POWER CIRCUIT.

REFERENCE DOCUMENTS: 1) ECN 104-25012A. ODS ELECTRICAL CHANGE NOTICE.  
2) CKB>=468312=001 \_ JTP. SCHEMATIC DIAGRAM -  
ANDROGYNOUS PERIPHERAL DOCKING SYSTEM (APDS)  
CONTROL PANEL PU-APSS SCHEMATIC.  
3) 33Y.5212.005.\*3. APDS CONTROL UNIT ELECTRICAL  
SCHEMATIC.  
4) VS70-953104. ODS INTEGRATED SCHEMATIC.  
5) V828-730002. SCHEMATIC DIAGRAM - J&C PANEL A7A3  
AFT STATION

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NONCRITICAL FAILURE MODE  
NUMBER: M5-6MR-0020- 01**

REVISION# 1 SEP 30, 1995

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM  
LRU: MC452-0102-7801  
ITEM NAME: TOGGLE SWITCH

CRITICALITY OF THIS  
FAILURE MODE: 1R3

FAILURE MODE:  
FAILS OPEN IN THE "ON" POSITION. FAILS CLOSED IN THE "OFF" POSITION, POLE-TO-  
POLE SHORT, SHORT TO CASE, SHORT TO GROUND

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

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

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

REDUNDANCY SCREEN A) PASS  
B) PASS  
C) PASS

PASS/FAIL RATIONALE:  
A)  
B)  
C)

METHOD OF FAULT DETECTION:  
TELEMETRY CAN BE USED TO VERIFY POWER FOR THE PSU 20 AMP BUSES.  
INDICATION IS OBTAINED BY SECONDARY MEANS.

MASTER MEAS. LIST NUMBERS: V53X0777E  
V53X0778E  
V53X0779E  
V53X0780E  
V53X0786E  
V53X0787E  
V53X0788E  
V53X0789E

CORRECTING ACTION:  
NONE

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NONCRITICAL FAILURE MODE  
NUMBER: M5-6MR-0020-01**

**REMARKS/RECOMMENDATIONS:**

FAILURE OF THIS CIRCUIT AFFECTS THE PERFORMANCE OF THE ANDROGYNOUS PERIPHERAL DOCKING ASSEMBLY (APDA).

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- FAILURE EFFECTS -

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**(A) SUBSYSTEM:**

LOSS OF CAPABILITY TO ACTIVATE ONE OF THE TWO PSU POWER CIRCUITS.

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

DEGRADED APDS PERFORMANCE. INCREASED ACTUATOR OPERATION TIME.

**(C) MISSION:**

NO EFFECT.

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

FIRST FAILURE - NO EFFECT.

**(E) FUNCTIONAL CRITICALITY EFFECTS:**

POSSIBLE LOSS OF CREW VEHICLE AFTER FIVE THREE FAILURES. 1) SWITCH FAILS OPEN. LOSS OF ONE PSU POWER ENABLE CIRCUIT. DEGRADED UNDOCKING CAPABILITY. REDUNDANT PATHS REMAINS OPERATIONAL. 2) SWITCH IN REDUNDANT POWER LEG FAILS OPEN. LOSS OF REMAINING PSU POWER ENABLE CIRCUIT. LOSS OF NOMINAL UNDOCKING CAPABILITY. 3) ONE PYROBOLT FAILS TO INITIATE RESULTING IN LOSS OF CAPABILITY TO IMPLEMENT PYROTECHNIC SEPARATION. LOSS OF NOMINAL AND PYROTECHNIC SEPARATION CAPABILITY. USE IFM TO DRIVE HOOKS OPEN THROUGH A BREAKOUT BOX. 4) FAILURE OF IFM TO OPEN HOOKS. PERFORM EVA TO REMOVE 95 BOLTS HOLDING DOCKING BASE TO EXTERNAL AIRLOCK. 5) FAILURE OF EVA TO REMOVE BOLTS. LOSS OF ALL UNDOCKING CAPABILITY.

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- TIME FRAME -

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TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: MINUTES

TIME FROM DETECTION TO COMPLETED CORRECTIVE ACTION: N/AMINUTES

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

HAZARDS: DM2OHA04(F)QDS-18.

INABILITY TO SAFELY SEPARATE ORBITER FROM DOCKING MODULE OR MIR.

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- APPROVALS -

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PRODUCT ASSURANCE ENGINEERING  
DESIGN ENGINEERING

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