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PRINT DATE: 10/26/95

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NONCRITICAL HARDWARE  
NUMBER: MS-6MR-0002-X**

**SUBSYSTEM NAME: ORBITER DOCKING SYSTEM**

**REVISION: 1 SEP 30, 1995**

	<b>PART NAME VENDOR NAME</b>	<b>PART NUMBER VENDOR NUMBER</b>
LRU	: DOCKING SYSTEM POWER PANEL	V828-730150
SRJ	: TOGGLE SWITCH	MC452-0102-7505

**PART DATA**

**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**  
SWITCHES, TOGGLE, 1P2P, MOMENTARY ON - SYSTEM 1 POWER MAIN A, AND SYSTEM 2 POWER MAIN B CONTROL.

**REFERENCE DESIGNATORS:** 36V73A7A3S1  
36V73A7A3S2

**QUANTITY OF LIKE ITEM: 2**  
(TWO)

**FUNCTION:**  
THE SWITCHES PROVIDE MANUAL ACTIVATION OF THE PNL MAIN A AND THE PNL MAIN B ODS POWER CIRCUITS.

**REFERENCE DOCUMENTS:** 1) ECN 104-25012A, ODS ELECTRICAL CHANGE NOTICE.  
2) CKB>=468=312=001, J.P. SCHEMATIC DIAGRAM - ANDROGYNOUS PERIPHERAL DOCKING SYSTEM (APDS) CONTROL PANEL PLU-APSS SCHEMATIC.  
3) V828-733002, SCHEMATIC DIAGRAM - D&C PANEL A7A3 AFT STATION  
4) VS70-953104, ODS INTEGRATED SCHEMATIC.  
5) 33Y.5212.005, "P. APDS CONTROL UNIT ELECTRICAL SCHEMATIC.

FAILURE MODES EFFECTS ANALYSIS (FMEA) - NONCRITICAL FAILURE MODE  
NUMBER: M5-6MR-0002- 01

REVISION# 1 SEP 30, 1995

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

LRU: MC452-0102-7605  
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:

VISUAL CUE FROM DS1 AND DS2. VISUAL INSPECTION OF AIRLOCK CENTERLINE FLOODLIGHTS AND TRUSS DOCKING LIGHTS AVAILABLE. VESTIBULE DE-PRESSURIZATION VALVE FUNCTIONAL STATUS AVAILABLE.

MASTER MEAS. LIST NUMBERS:      NONE

CORRECTING ACTION:  
NONE

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NONCRITICAL FAILURE MODE  
NUMBER: M5-6MR-0002-01**

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**- FAILURE EFFECTS -**

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**(A) SUBSYSTEM:**

LOSS OF CAPABILITY TO ACTIVATE ONE OF THE TWO ODS SYSTEM POWER CIRCUITS.

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

CASE 1: LOSS OF PNL A7A3 MAIN A POWER.

ODS FUNCTIONS LOST DUE TO S1 (SYSTEM 1 POWER CONTROL CIRCUIT) FAILURE  
INCLUDE: VESTIBULE DE-PRESSURIZATION VALVE FUNCTIONAL CAPABILITY (MAIN "A"  
BRANCH;) EXTERNAL AIRLOCK FLOODLIGHTS 1 & 4 ENABLE; TRUSS DOCKING LIGHT 1  
ENABLE; CENTERLINE PORT DOCKING LIGHT ENABLE; PNL "A" BUS (PARTIAL) ENABLE  
FOR THE APDS PANEL A8A3. DEGRADED DOCKING LIGHTS REDUNDANCY.  
DEGRADATION OF APDS LOGIC BUS REDUNDANCY.

CASE 2: LOSS OF PNL A7A3 MAIN B POWER.

ODS FUNCTIONS LOST DUE TO S2 (SYSTEM 2 POWER CONTROL CIRCUIT) FAILURE  
INCLUDE: VESTIBULE DE-PRESSURIZATION VALVE FUNCTIONAL CAPABILITY (MAIN "B"  
BRANCH;) EXTERNAL AIRLOCK FLOODLIGHTS 2 & 3 ENABLE; TRUSS DOCKING LIGHT 2  
ENABLE; CENTERLINE STBD DOCKING LIGHT ENABLE; PNL "B" BUS (PARTIAL) ENABLE  
FOR THE APDS PANEL A8A3. DEGRADED DOCKING LIGHTS REDUNDANCY.  
DEGRADATION OF APDS LOGIC BUS REDUNDANCY.

**(C) MISSION:**

FIRST FAILURE - NO EFFECT.

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

FIRST FAILURE - NO EFFECT.

**(E) FUNCTIONAL CRITICALITY EFFECTS:**

POSSIBLE LOSS CREW OR VEHICLE AFTER FIVETHREE OTHER FAILURES. 1) ONE OF  
TWO SWITCHES FAILS OPEN. DEGRADATION OF PNL BUS REDUNDANCY. DEGRADED  
CENTERLINE AND TRUSS DOCKING LIGHTS CAPABILITY. TWO REDUNDANT APDS  
LOGIC POWER BUS SOURCES REMAIN OPERATIONAL. 2) REMAINING SWITCH FAILS  
OPEN. DEGRADATION OF PNL BUS REDUNDANCY. LOSS OF CENTERLINE AND TRUSS  
DOCKING LIGHTS CAPABILITY. PAYLOAD OVERHEAD DOCKING FLOODLIGHT AND  
PAYLOAD BAY FLOODLIGHTS 1 AND 2 REMAIN OPERATIONAL. ONE APDS LOGIC BUS  
POWER SOURCE REMAINS OPERATIONAL. 3) ONE OF TWO MAIN C-LOGIC 2 & 3 BUSES  
CIRCUIT BREAKERS OR DIODE FAILS OPEN. LOSS OF ALL UNDOCKING CAPABILITY.  
LOSS OF TWO OF THREE APDS LOGIC BUSES DISABLES NOMINAL AND PYROTECHNIC  
SEPARATION SYSTEMS CONTROL. USE IFM TO DRIVE HOOKS OPEN THROUGH A  
BREAKOUT BOX. 4) FAILURE OF IFM TO OPEN HOOKS. PERFORM EVA TO REMOVE 96  
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/A

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

HAZARDS: DM2OHA04(F)

INABILITY TO SAFELY SEPARATE ORBITER FROM DOCKING MODULE OR MIR.

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- APPROVALS -

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PRODUCT ASSURANCE ENGINEERING : R. BLACKWELL  
DESIGN ENGINEERING : T. NGUYEN

*R. Blackwell*  
*T. Nguyen*