FAILURE MODES EFFECTS ANALYSIS (FMEA) – CRITICAL HARDWARE
NUMBER: M5-6MR-B025-X

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM
REVISION: 1 **OCT, 1995**

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	POWER SWITCHING UNIT (PSU) RSC-E	MC621-0087-1003 33Y.5114.007

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
LINE REPLACEABLE UNIT (LRU) PSU - APDS LOGIC AND POWER CONTROL, DISTRIBUTION, AND PROTECTION.

REFERENCE DESIGNATORS: 40V53A1A1

QUANTITY OF LIKE ITEMS: 1
(ONE)

FUNCTION:
THE PSU CONTROLS AND DISTRIBUTES THE APDS LOGIC BUSES. IT PROTECTS AND DISTRIBUTES THE APDS POWER BUSES. LOGIC AND MAIN POWER IS RECEIVED FROM THE ORBITER THROUGH CONNECTOR X3 AND RETURNED THROUGH CONNECTOR X4. THE LOGIC POWER BUSES ARE +IIIA, +IIIB, +IIIC AND THE POWER BUSES ARE +CIII1 AND CIII2. THE PSU PROVIDES THE FOLLOWING OUTPUTS:

OUTPUT FUNCTIONS:
1) POWER BUS +CIII1: RING MOTOR M4, PACU MOTORS M6 & M8, FIXERS 1 & 2, AND HI-ENERGY DAMPERS 1 & 2.
2) POWER BUS +CIII2: RING MOTOR M5, PACU MOTORS M7 & M9, FIXERS 3, 4, & 5, AND HI-ENERGY DAMPER 3.
3) LOGIC POWER BUSES +IIIA, +IIIB, +IIIC ARE PROVIDED UNFUSED TO THE LACU, PACU-1, PACU-2, DSCU, AND THE DMCU.

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FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE
NUMBER: M5-6MR-B025- 03

REVISION# 0 OCT, 1995

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM
LRU: MC621-0087-1003
ITEM NAME: POWER SWITCHING UNIT

CRITICALITY OF THIS FAILURE MODE: 1R3

FAILURE MODE:
INADVERTENT ACTIVATION OF ONE OF THREE LOGIC BUSES.

MISSION PHASE:
OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 104 ATLANTIS

CAUSE:
MULTIPLE INTERNAL COMPONENT FAILURES

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

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

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

PASS/FAIL RATIONALE:
A)

B)
FUNCTIONAL CRITICALITY 1R (FOUR FAULT TOLERANT OR GREATER) WITH AT LEAST TWO REMAINING OPERATIONAL STATUS VERIFIED IN FLIGHT.
C)

METHOD OF FAULT DETECTION:
NONE.

MASTER MEAS. LIST NUMBERS: NONE

CORRECTING ACTION:
NONE.

- FAILURE EFFECTS -

(A) SUBSYSTEM:
DEGRADATION OF REDUNDANCY AGAINST INADVERTENT LOGIC BUS ACTIVATION.

(B) INTERFACING SUBSYSTEM(S):
FIRST FAILURE - NO EFFECT.

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FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE
NUMBER: M5-6MR-B025- 03

(C) MISSION:
NO EFFECT.

(D) CREW, VEHICLE, AND ELEMENT(S):
FIRST FAILURE - NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECTS:
POSSIBLE LOSS OF CREW OR VEHICLE AFTER SEVEN FAILURES. 1, 2) TWO INTERNAL SWITCHING DEVICES FAIL CLOSED. NO EFFECT. 3, 4) TWO APDS CONTROL PANEL POWER (A8A3) CIRCUIT BREAKERS FAIL CLOSED. 4, 5) TWO APDS POWER (A8A3) CIRCUIT BREAKERS FAIL CLOSED. 6) "APDS PROT CIRC OFF" SWITCH FAILS CLOSED IN THE A8A3 PANEL. LOSS OF ALL PROTECTION AGAINST AN INADVERTENT SEPARATION COMMAND. 7) "HOOKS OPEN" SWITCH FAILS CLOSED RESULTING IN POTENTIAL LOSS OF PRESSURIZED ENVIRONMENT.

DESIGN CRITICALITY (PRIOR TO OPERATIONAL DOWNGRADE, DESCRIBED IN F): N/A

(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:
N/A

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: HOURS

TIME FROM DETECTION TO COMPLETED CORRECTIVE ACTION: N/A

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

RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT:
N/A

HAZARDS REPORT NUMBER(S) : ORBI 511
HAZARD DESCRIPTION:
LOSS OF PRESSURE IN HABITABLE VOLUME.

- APPROVALS -

PRODUCT ASSURANCE ENGR : M. NIKOLAYEVA

DESIGN ENGINEER : B. VAKULIN

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