

FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL HARDWARE

NUMBER: M5-6MR-B019-X

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

REVISION: 0 OCT, 1995

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	ENERGIA POWER PANEL RSC-E	MC621-0087-0009 CKB>=468=312=001
SRU	CIRCUIT BREAKER	Az2-5 (S>3.619.242.TU)

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

PNL A8A3, CIRCUIT BREAKER (8.5 AMPS TRIPPING CURRENT,) APDS (+Ac, +Cc, +Bc)
POWER BUS CONTROL

REFERENCE DESIGNATORS: 36V73A8A3F1
36V73A8A3F5
36V73A8A3F9

QUANTITY OF LIKE ITEMS: 3
(THREE)

FUNCTION:

PROVIDE PROTECTION, CONTROL, AND DISTRIBUTION FOR THE APDS CONTROL LOGIC CIRCUITRY BUSES (+Ac, +Cc, +Bc.) THESE BUSES ARE PROVIDED TO THE POWER SWITCHING UNIT (PSU.) THE PSU DISTRIBUTES THEM AS +WA, +Wb, AND +WB TO THE DOCKING MECHANISM CONTROL UNIT (DMCU) FOR DOCKING RING MOTOR LOGIC CONTROL. THE PSU ALSO DISTRIBUTES THE BUSES (+WA, +Wb, +WB) TO THE LATCH ACTUATOR CONTROL ASSEMBLY (LACU) FOR LOGIC CONTROL OF THE CAPTURE LATCHES. THE (+WA, +Wb, +WB) BUSES ARE ALSO DISTRIBUTES TO THE PRESSURIZATION ACTUATOR CONTROL UNITS (PACUs 1 & 2) FOR LOGIC CONTROL OF THE HOOKS 1 & 2. ALSO, THESE BUSES ARE PROVIDED TO THE DSCU FOR COMMAND IMPLEMENTATION AND APDS ESSENTIAL AUTOMATIC AND MANUAL FUNCTIONS AND INITIALIZATION OF THE APDS SYSTEM.

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LRU: MC821-0087-0009

ITEM NAME: CIRCUIT BREAKER

CRITICALITY OF THIS FAILURE MODE: 1R3

FAILURE MODE:

FAILS OPEN, FAILS TO CONDUCT, INADVERTENTLY OPENS, FAILS TO TRANSFER

MISSION PHASE:

OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 104 ATLANTIS

CAUSE:

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

CRITICALITY 1M 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:

PANEL INDICATION FOR THE APDS POWER BUSES (+Ac, +Cc, +Bc.)

MASTER MEAS. LIST NUMBERS:

- V53X0790E**
- V53X0791E**
- V53X0792E**

CORRECTING ACTION:

NONE.

- FAILURE EFFECTS -

(A) SUBSYSTEM:

DISABLES PROTECTION, CONTROL AND DISTRIBUTION FOR ONE OF THE THREE APDS LOGIC BUSES (+Ac, +Cc, +Bc.)

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(B) INTERFACING SUBSYSTEM(S):
DISABLES ONE OF THREE CAPTURE LATCHES.

(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 FIVE FAILURES. 1) ONE OF THREE
CIRCUIT BREAKERS FAILS OPEN. DISABLES ONE OF THREE CAPTURE LATCHES. 2)
CAPTURE LATCH MANUAL UNBLOCKING DEVICE FAILS TO RELEASE ASSOCIATED
CAPTURE LATCH RESULTING IN LOSS OF NOMINAL UNDOCKING CAPABILITY.
PYROTECHNIC SEPARATION CANNOT BE USED TO OPEN THE CAPTURE LATCHES.

DESIGN CRITICALITY (PRIOR TO OPERATIONAL DOWNGRADE, DESCRIBED IN F): 1R2

(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:
THIRD FAILURE (INABILITY TO PERFORM IFM TO DRIVE CAPTURE LATCHES) - THE
CAPTURE LATCHES CANNOT BE OPENED.
FOURTH FAILURE (INABILITY TO EXTEND DOCKING RING) - INABILITY TO ENABLE
SEPARATION WITH A SINGLE CLOSED CAPTURE LATCH.
FIFTH FAILURE (INABILITY TO PERFORM EVA TO REMOVE 96 BOLTS HOLDING DOCKING
BASE TO EXTERNAL AIRLOCK) - INABILITY TO SEPARATE ORBITER AND MIR RESULTING
IN LOSS OF CREW AND VEHICLE.

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS
TIME FROM FAILURE OCCURRENCE TO DETECTION: MINUTES
TIME FROM DETECTION TO COMPLETED CORRECTIVE ACTION: HOURS
TIME REQUIRED TO IMPLEMENT CORRECTIVE ACTION LESS THAN TIME TO EFFECT?
YES

RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT:
CREW WOULD HAVE SUFFICIENT TIME TO PERFORM IFM OR EVA.
HAZARDS REPORT NUMBER(S): ORBI 401A
HAZARD DESCRIPTION:
INABILITY TO SEPARATE ORBITER AND MIR.

- APPROVALS -

PRODUCT ASSURANCE ENGR

M. NIKOLAYEVA

DESIGN ENGINEER

B. VAKULIN

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