

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

NUMBER: M5-6MR-8020-X

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

REVISION: 0 OCT, 1985

| | PART NAME VENDOR NAME | PART NUMBER VENDOR NUMBER |
|-----|------------------------------|-------------------------------------|
| LRU | ENERGIA POWER PANEL RSC-E | MC621-0087-0009 CKB>=468=512=001 |
| SRU | CIRCUIT BREAKER | Az2-2 (8>3.619.242 TU) |

PART DATA**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**

PNL A8A3, CIRCUIT BREAKER (4.2 AMPS TRIPPING CURRENT,) APDS (+An, +<n, +Bn)
PFCU LOGIC BUS CONTROL.

REFERENCE DESIGNATORS: 36V73A8A3F2
36V73A8A3F6
36V73A8A3F10

QUANTITY OF LIKE ITEMS: 3
(THREE)

FUNCTION:

PROVIDE PROTECTION, CONTROL, AND DISTRIBUTION FOR THE APDS PYROTECHNIC SEPARATION LOGIC BUSES (+An, +<n, +Bn) THESE BUSES ARE PROVIDED TO THE PYROTECHNIC FIRING CONTROL UNIT (PFCU). WITHIN THE PFCU, THE BUSES ARE DISTRIBUTED TO CONFIGURE THE PYROTECHNIC SEPARATION ELEMENTS (ACTIVE AND PASSIVE HOOKS.) IN ADDITION, THE BUSES ARE ENERGIZED WHEN PYROTECHNIC CIRCUIT CHECKOUT IS REQUIRED.

REFERENCE DOCUMENTS: 1) ECN 104-25012A, ODS ELECTRICAL CHANGE NOTICE.
2) CKB>=468312=001 _ J'P. 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) 17RC=10> 2601F _ J'P. PYRO FIRING CONTROL UNIT ELECTRICAL

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

NUMBER: M5-6MR-8020-01

REVISION# 0 OCT, 1995

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

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 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)

PYROTECHNIC SEPARATION SYSTEM IS CONSIDERED STAND-BY.

C)

METHOD OF FAULT DETECTION:

DISPLAYS AND TELEMETRY DATA. "PYROTECHNIC BUS STATUS (+An, +<n, +Bn)" AND "PYRO CIRCUIT PROTECTION OFF" INDICATIONS IN THE D&C PANEL.

MASTER MEAS. LIST NUMBERS:

V53X0796E

V53X0797E

V53X0798E

CORRECTING ACTION:

NONE.

- FAILURE EFFECTS -**(A) SUBSYSTEM:**DISABLES PROTECTION, CONTROL AND DISTRIBUTION FOR ONE OF THREE APDS
PYROTECHNIC BUSES (+An, +<n, +Bn.)

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**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL FAILURE MODE
NUMBER: M5-6MR-B020-01**

(B) INTERFACING SUBSYSTEM(S):
DEGRADED PYROTECHNIC BUS REDUNDANCY.

(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 FOUR FAILURES. 1) ONE OF THREE
CIRCUIT BREAKERS FAILS OPEN. DEGRADED PYROTECHNIC BUS REDUNDANCY. 2) ONE
OF TWO REMAINING ASSOCIATED CIRCUIT BREAKERS FAILS OPEN. DISABLES TWO OF
THREE PYROTECHNIC BUSES. LOSS OF CAPABILITY TO IMPLEMENT PYROTECHNIC
SEPARATION. 3) ONE OF TWELVE HOOKS FAILS TO OPEN (REF. M8-1MR-BM001-04).
LOSS OF CAPABILITY TO IMPLEMENT NOMINAL SEPARATION.

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

(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:
NONE. CRITICALITY UNCHANGED. WORKAROUNDS ADD TO REDUNDANCY.

4) FAILURE OF EVA TO REMOVE 96 BOLTS - LOSS OF ALL UNDOCKING CAPABILITY.

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: HOURS

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 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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