

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE

NUMBER: M5-RMR-B029-X

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

REVISION: 1 OCT, 1995

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	PFCU RSC-E	MC621-0087-0008 17RC=10> 2601F_J
PART DATA		

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

LINE REPLACEABLE UNIT (LRU) PFCU - PYROTECHNIC FIRE CONTROL UNIT

REFERENCE DESIGNATORS: 40V53A2A4

QUANTITY OF LIKE ITEMS: 1

(ONE)

FUNCTION:

THE PFCU CONTAINS THE COMMAND RECEPTION MODULE, THE RELAY MODULES REQUIRED TO ISSUE PYROBOLT INITIATION, AND THE INHIBIT CIRCUITS TO PRECLUDE UNWANTED FIRINGS. THE PFCU PROVIDES INITIATION OF TWO GROUPS (BUSES +NN1, AND +NN2) OF 12 INITIATORS WITH TWO BRIDGEWIRES PER INITIATOR AND ONE INITIATOR PER HOOK.

OUTPUT FUNCTIONS:

1. PROVIDES PYROBOLT ACTIVATION BUSES (+NN1 AND/OR +NN2.)
2. PROVIDES STATUS SIGNALS TO THE CONTROL PANEL AND TO THE DCU.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL FAILURE MODE
NUMBER: MS-GMR-B029-01**

REVISION# 0 OCT, 1995

**SUBSYSTEM NAME: ORBITER DOCKING SYSTEM
LRU: MC621-0087-0006
ITEM NAME: PFCU**

**CRITICALITY OF THIS
FAILURE MODE: 1R3**

**FAILURE MODE:
LOSS OF PYROBOLT INITIATION OUTPUT**

**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)
PYROTECHNIC SEPARATION SYSTEM IS CONSIDERED "STAND-BY" REDUNDANCY
C)**

**METHOD OF FAULT DETECTION:
NONE.**

MASTER MEAS. LIST NUMBERS: NONE

**CORRECTING ACTION:
NONE**

- FAILURE EFFECTS -

**(A) SUBSYSTEM:
DEGRADATION OF REDUNDANCY FOR PROVIDING PYROBOLT INITIATION.**

**(B) INTERFACING SUBSYSTEM(S):
LOSS OF CAPABILITY TO INITIATE ONE OF TWO REDUNDANT BRIDGEWIRE CIRCUITS.**

200

ORIGINAL

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(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) LOSS OF ONE OF TWO PYROBOLT INITIATION OUTPUTS. NO EFFECT. 2) LOSS OF REMAINING PYROBOLT INITIATION OUTPUT. LOSS OF PYROTECHNIC SEPARATION CAPABILITY. 3) ASSOCIATED HOOK FAILS TO UNLATCH DURING NOMINAL UNDOCKING SEQUENCE. UNABLE TO PERFORM NOMINAL UNDOCKING.

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 - COMPLETE LOSS OF ALL UNDOCKING CAPABILITY.

- 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 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

201

ORIGINAL