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PRINT DATE: 15.12.96

FAILURE MODES EFFECTS ANALYSIS (FMEA) - GIL HARDWARE

NUMBER: M5-6SS-B029-X

SUBSYSTEM NAME: E - DOCKING SYSTEM

REVISION: 0 DEC. 1996

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	PFCU RSC-E	MC621-0087-0008 17KC.10KD2801A-0

PART DATA

**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
LINE REPLACEABLE UNIT (LRU) PFCU - PYROTECHNIC FIRE CONTROL UNIT.**

REFERENCE DESIGNATORS: 45V53A1A5

**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) -- CIL FAILURE MODE

NUMBER: M5-SSS-8028- 02

REVISION# 0 FEBDEC, 1997

SUBSYSTEM NAME: E - DOCKING SYSTEM

LRU: MC621-0087-0006

ITEM NAME: PFCU

CRITICALITY OF THIS

FAILURE MODE: 1R3

FAILURE MODE:

INADVERTENT PYROBOLT INITIATION OUTPUT.

MISSION PHASE:

OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 103 DISCOVERY
 104 ATLANTIS
 105 ENDEAVOUR

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) FAIL
 B) ~~N/A FAIL~~
 C) PASS

PASS/FAIL RATIONALE:

A)

MASKED BY 'SERIES' REDUNDANCY

B)

N/A - AT LEAST TWO REMAINING PATHES ARE DETECTABLE IN FLIGHT
~~NOT DETECTABLE BECAUSE THE OCU IS POWERED OFF~~

C)

METHOD OF FAULT DETECTION:

NONE.

MASTER MEAS. LIST NUMBERS:

NONE

- FAILURE EFFECTS -

(A) SUBSYSTEM:

DEGRADATION OF REDUNDANCY AGAINST PROVIDING PYROBOLT INITIATION.

(B) INTERFACING SUBSYSTEM(S):

FIRST FAILURE - NO EFFECT.

FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL FAILURE MODE
NUMBER: M5-655-8029-02

(C) MISSION:
NO EFFECT

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

(E) FUNCTIONAL CRITICALITY EFFECTS:
SHUTTLE MECHANISM CONTROL: POSSIBLE LOSS OF CREW OR VEHICLE AFTER FOUR FAILURES.

1) INTERNAL PFCU SWITCHING DEVICE INADVERTENTLY TRANSFERS AND PROVIDES POWER TO THE PYRO INITIATION BUSES. 2) ONE OF TWO ASSOCIATED SWITCHES FAILS CLOSED. POTENTIAL "ACTIVE HOOKS FIRING" COMMAND TO THE PFCU. 3) ONE RPC FAILS ON (40 AMPS - ANY OF FOUR BUSES) RESULTING IN POWER BEING PROVIDED TO THE PFCU. 4) PYRO LOGIC BUS "B" CIRCUIT BREAKER FAILS CLOSED RESULTING IN AN INADVERTENT PYRO FIRING. POSSIBLE VEHICLE SEPARATION OR LOSS OF HABITABLE VOLUME DUE TO UNWANTED "PYRO FIRE" COMMAND.

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

(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:
N/A (THERE ARE NO WORKAROUNDS TO CIRCUMVENT THESE FAILURES.)

-DISPOSITION RATIONALE-

(A) DESIGN:
REFER TO APPENDIX XB, ENERGIA HARDWARE.

(B) TEST:
REFER TO APPENDIX XB, ENERGIA HARDWARE.

PFCU CONTROL CIRCUIT OPERATION IS VERIFIED DURING GROUND CHECKOUT. ANY TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD.

(C) INSPECTION:
REFER TO APPENDIX XB, ENERGIA HARDWARE.

(D) FAILURE HISTORY:
REFER TO APPENDIX XB, ENERGIA HARDWARE.

(E) OPERATIONAL USE:
NONE

- APPROVALS -

PRODUCT ASSURANCE ENGR	:	M. NIKOLAYEVA	:
DESIGN ENGINEER	:	V. BERRUT	:
ASA SS/MA	:		:
ASA SUBSYSTEM MANAGER	:		:
SC MOD	:		:
ISA EPDC SS/MA	:		:
ISA EPDC SUBSYSTEM MANAGER	:		:

[Handwritten signatures and initials over approval lines]