

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL HARDWARE
NUMBER:M5-6SS-0114 -X**

SUBSYSTEM NAME: ISS DOCKING SYSTEM

REVISION: 0 02/27/98

PART DATA

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:MID PCA-1	VO70-764400
SRU	:GENERAL PURPOSE RELAY	MC455-0129-0004

**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
GENERAL PURPOSE RELAY, 25 AMP - PYRO POWER MAIN A +Y1 LOGIC BUS SIGNAL**

REFERENCE DESIGNATORS: 40V76A25A2K2

**QUANTITY OF LIKE ITEMS: 1
ONE**

**FUNCTION:
THE CONTACTOR PROVIDES POWER DISTRIBUTION AND ACTIVATION FOR ONE OF THE
TWO LOGIC BUSES IN THE PFCU.**

**REFERENCE DOCUMENTS: 1) VS70-953103, INTEGRATED SCHEMATIC - 53PA, PFCU
POWER DISTRIBUTION CONTROL CIRCUIT**

FAILURE MODES EFFECTS ANALYSIS FMEA - NON-CIL FAILURE MODE

NUMBER: M5-6SS-0114-02

REVISION#: 0 02/27/98

SUBSYSTEM NAME: ISS DOCKING SYSTEM

LRU: MID PCA-1

ITEM NAME: GENERAL PURPOSE RELAY

CRITICALITY OF THIS

FAILURE MODE: 1R3

FAILURE MODE:

CLOSED, FAILS TO OPEN, PREMATURELY CLOSES, SHORTS CONTACT-TO-CONTACT

MISSION PHASE: OO ON-ORBIT

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

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)

N/A - PYROTECHNIC SEPARATION IS CLASSIFIED AS STANDBY REDUNDANCY.

C)

METHOD OF FAULT DETECTION:

TELEMETRY CAN BE USED TO VERIFY POWER ON OR OFF FOR THE PSU 20 AMP BUSES, "PYROTECHNIC BUS STATUS (AP, BP, AND CP)" AND "PYRO CIRCUIT PROTECT CIRCUIT OFF" INDICATIONS IN THE APDS D&C PANEL.

MASTER MEAS. LIST NUMBERS: V53X0765E

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE
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V53X0766E
V53X0797E
V53X0798E
V53X0796E

CORRECTING ACTION: NONE

CORRECTING ACTION DESCRIPTION:

DESIGN FAULT TOLERANCE: "PYRO CIRCUIT PROTECTION OFF" SWITCHES PROVIDE REDUNDANCY AGAINST INADVERTENT PROTECHNIC SEPARATION.

- FAILURE EFFECTS -

(A) SUBSYSTEM:

DEGRADATION OF REDUNDANCY AGAINST INADVERTENT PYROTECHNIC SEPARATION.

(B) INTERFACING SUBSYSTEM(S):

FIRST FAILURE - NO EFFECT

(C) MISSION:

FIRST FAILURE - NO EFFECT.

(D) CREW, VEHICLE, AND ELEMENT(S):

FIRST FAILURE - NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECTS:

POSSIBLE LOSS OF CREW/VEHICLE AFTER SIX FAILURES:

- 1) RELAY FAILS CLOSED.
- 2) ONE OF TWO "PYRO CIRCUIT PROTECTION OFF" SWITCHES FAILS CLOSED (MULTIPLE CONTACTS) - UNWANTED "PYRO CIRCUIT PROTECTION OFF" COMMAND TO THE PFCU. DEGRADED PROTECTION AGAINST ACCIDENTAL PYROTECHNIC SEPARATION.
- 3) ONE RPC IN THE PYRO POWER CIRCUITRY FAILS ON.
- 4,5) TWO OF THREE PYROTECHNIC POWER CIRCUIT BREAKERS FAILS CLOSED.
- 6) ONE "ACTIVE" OR "PASSIVE" HOOKS FIRING SWITCH FAILS CLOSED (MULTIPLE CONTACTS). POSSIBLE VEHICLE SEPARATION OR LOSS OF HABITABLE VOLUME DUE TO UNWANTED PYRO "FIRE" COMMAND.

- TIME FRAME -

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE
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TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: MINUTES

TIME FROM DETECTION TO COMPLETED CORRECTING ACTION: N/A

**IS TIME REQUIRED TO IMPLEMENT CORRECTING ACTION LESS THAN TIME TO EFFECT?
N/A**

**RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT:
THE CREW CAN KEEP OPEN THE ASSOCIATED "PYRO CIRCUIT PROTECTION OFF"
SWITCH OR PROTECHNIC POWER CIRCUIT BREAKER AS PROTECTION AGAINST
ACCIDENTAL PYROTECHNIC SEPARATION.**

HAZARD REPORT NUMBER(S): ORBI 511

**HAZARD(S) DESCRIPTION:
LOSS OF HABITABLE ENVIRONMENT IN ODS/CREW MODULE.**

- APPROVALS -

SS&PAE
DESIGN ENGINEERING

: T. K. KIMURA
: C. J. ARROYO

: J. Kimura 4-13-98
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