

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL HARDWARE
NUMBER: M5-6SS-0602 -X**

SUBSYSTEM NAME: ISS DOCKING SYSTEM

REVISION: 0 02/27/98

PART DATA

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:FPCA-1	VO70-7633X0
LRU	:FPCA-2	VO70-7633X0
SRU	:DIODE	JANTX1N1188R

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

DIODES, POWER, 35 AMP - EMU POWER SUPPLY/BATTERY CHARGER SOURCE BUS
SELECT POWER CIRCUIT

REFERENCE DESIGNATORS: 81V76A25CR43
81V76A25CR44
81V76A25CR45
81V76A25CR46

QUANTITY OF LIKE ITEMS: 4
(FOUR)

FUNCTION:

THESE DIODES PROVIDE ISOLATION BETWEEN MAIN A AND MAIN B WHEN AN
EXTRAVEHICULAR MOBILITY UNIT (EMU) POWER SUPPLY SOURCE IS SWITCHED, AND
DISTRIBUTION ISOLATION FROM MAIN A OR MAIN B BUS TO THE EMU POWER
SUPPLIES.

REFERENCE DOCUMENTS: 1) VS70-960099, SHT 60DF1 - SCHEMATIC DIAGRAM -
AECS EXTRAVEHICULAR MOBILITY UNIT/ EXT AIRLOCK.

FAILURE MODES EFFECTS ANALYSIS FMEA – NON-CIL FAILURE MODE

NUMBER: M5-6SS-0602-01

REVISION#: D 02/27/98

SUBSYSTEM NAME: ISS DOCKING SYSTEM

LRU: FPCA-1 OR FPCA-2

ITEM NAME: DIODE

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

FAILS OPEN, FAILS TO CONDUCT, SHORT TO STRUCTURE

MISSION PHASE: OO ON-ORBIT

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

CAUSE:

A) STRUCTURAL FAILURE (MECHANICAL STRESS, VIBRATION), B) ELECTRICAL STRESS, C) THERMAL STRESS, D) PROCESSING ANOMALY

CRITICALITY 1/1 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:

VISUAL CUE FROM VOLTAGE AND CURRENT METERS LOCATED ON THE AW18H PANEL.

CORRECTING ACTION: MANUAL

**FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL FAILURE MODE
NUMBER: M5-6SS-0602-01**

CORRECTING ACTION DESCRIPTION:

SWITCH TO ALTERNATE MAIN BUS. EACH EXTRAVEHICULAR MOBILITY UNIT (EMU) POWER SUPPLY CAN BE CONNECTED TO EITHER MAIN "A" OR MAIN "B" POWER.

- FAILURE EFFECTS -

(A) SUBSYSTEM:

LOSS OF REDUNDANCY. A REDUNDANT PATH CAN PROVIDE POWER FROM THE ALTERNATE MAIN BUS.

(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 FIVE FAILURES:

- 1) DIODE FAILS OPEN IN OUTPUT OF RPC CONTROLLING BUS A(B) - LOSS OF ABILITY TO CONDUCT POWER FROM MAIN A(B). NO EFFECT, REDUNDANT RPC WILL BE ABLE TO PROVIDE MAIN B(A) POWER TO AFFECTED EMU POWER SUPPLY AND BATTERY CHARGER.
- 2) DIODE FAILS OPEN IN OUTPUT OF REDUNDANT RPC CONTROLLING BUS B(A). LOSS OF ABILITY TO PROVIDE POWER TO AFFECTED EMU POWER SUPPLY AND BATTERY CHARGER. SECOND EMU POWER SUPPLY AND BATTERY CHARGER REMAINS.
- 3) SWITCH FAILS OPEN AND LOSES THE CAPABILITY TO PROVIDE CONTROL POWER TO THE RPC'S OF THE SECOND EMU POWER SUPPLY AND BATTERY CHARGER - LOSS OF ABILITY TO PROVIDE EMU POWER AND TO CHARGE BATTERIES. WORST CASE IF FAILURE OCCURS FOLLOWING AN INITIAL EVA WHERE SUBSEQUENT EVA MUST BE PERFORMED USING ONE EMU WITH THE SPARE BATTERY PACK.
- 4) LOSS OF THE SPARE BATTERY PACK FOR BOTH EMU'S - LOSS OF BOTH EMU'S WOULD PRECLUDE SUBSEQUENT EVA CAPABILITIES.
- 5) A FAILURE NECESSITATING AN EVA TO PREVENT A POTENTIAL CATASTROPHIC SITUATION - INABILITY TO PERFORM A CONTINGENCY EVA TO CORRECT A CRIT 1 CONDITION COULD RESULT IN LOSS OF CREW/VEHICLE.

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

(F) RATIONALE FOR CRITICALITY DOWNGRADE:

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE
NUMBER: M5-6SS-0602-01**

ALTHOUGH THE CRITICALITY REMAINS UNCHANGED AFTER WORKAROUNDS CONSIDERATION (ALLOWED PER CR S050107W), THEY ARE PROVIDING ADDITIONAL FAULT TOLERANCE TO THE SYSTEM.

AFTER THE FIFTH FAILURE (FAILURE NECESSITATING AN EVA TO PREVENT A POTENTIAL CATASTROPHIC SITUATION) - INABILITY TO PERFORM CONTINGENCY EVA (SIXTH FAILURE) TO CORRECT A CRIT 1 CONDITION COULD RESULT IN LOSS OF CREW AND VEHICLE.

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: DAYS

TIME FROM DETECTION TO COMPLETED CORRECTING ACTION: MINUTES

**IS TIME REQUIRED TO IMPLEMENT CORRECTING ACTION LESS THAN TIME TO EFFECT?
YES**

**RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT:
THE REDUNDANT EMU POWER SUPPLY AND BATTERY CHARGER BUS SELECT SWITCH CAN BE USED TO SWITCH TO THE OTHER BUS (MAIN BUS A OR B).**

HAZARD REPORT NUMBER(S): NONE

**HAZARD(S) DESCRIPTION:
NONE**

- APPROVALS -

SS&PAE
DESIGN ENGINEERING

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

: *J. Kimura 4-13-98*
: *C. Arroyo*