

**FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL HARDWARE**  
**NUMBER: M5-6SS-0601 -X**

**SUBSYSTEM NAME: ISS DOCKING SYSTEM**

**REVISION: 0 02/27/98**

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**PART DATA**

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	<b>PART NAME</b>	<b>PART NUMBER</b>
	<b>VENDOR NAME</b>	<b>VENDOR NUMBER</b>
LRU	:FPCA-1	VO00-7633X0
LRU	:FPCA-2	V070-7633X0
SRU	:REMOTE POWER CONTROLLER	MC450-0017-3100

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**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**  
 REMOTE POWER CONTROLLER, TYPE III, CLASS B, 10 AMP - EMU POWER  
 SUPPLY/BATTERY CHARGER BUS SELECT CIRCUIT

**REFERENCE DESIGNATORS:** 81V76A25RPC37  
 81V76A25RPC47  
 82V76A26RPC40  
 82V76A26RPC52

**QUANTITY OF LIKE ITEMS: 4**  
 (FOUR)

**FUNCTION:**  
 THE REMOTE POWER CONTROLLERS PROVIDE POWER DISTRIBUTION AND CIRCUIT  
 PROTECTION BETWEEN THE EXTRAVEHICULAR MOBILITY UNIT (EMU) EXTERNAL  
 AIRLOCK POWER CONNECTORS AND THE MAIN "A" AND MAIN "B" POWER SUPPLIES.

**REFERENCE DOCUMENTS:** 1) VS70-96009, INTEGRATED SCHEMATIC - 60DF1, AECS  
 EXTRAVEHICULAR MOBILITY UNIT/EXT AIRLOCK

**FAILURE MODES EFFECTS ANALYSIS FMEA – NON-CIL FAILURE MODE**

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SUBSYSTEM NAME: ISS DOCKING SYSTEM

LRU: FPCA-1 OR FPCA-2

ITEM NAME: REMOTE POWER CONTROLLER

CRITICALITY OF THIS

FAILURE MODE: 1R3

**FAILURE MODE:**

LOSS OF OUTPUT, FAILS TO CONDUCT, FAILS TO TURN "ON"

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) 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

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**CORRECTING ACTION DESCRIPTION:**

SWITCH TO ALTERNATE MAIN BUS. EACH EMU POWER SUPPLY CAN BE CONNECTED TO EITHER MAIN "A" OR MAIN "B" POWER.

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**- FAILURE EFFECTS -**

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**(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) LOSS OF OUTPUT OF RPC CONTROLLING BUS A(B) - LOSS OF ABILITY TO SWITCH POWER TO MAIN A(B). NO EFFECT, REDUNDANT RPC WILL BE ABLE TO PROVIDE POWER TO AFFECTED EMU POWER SUPPLY AND BATTERY CHARGER.
- 2) LOSS OF 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:**

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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.

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**- TIME FRAME -**

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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 CREW CAN USE THE EMU POWER SUPPLY AND BATTERY CHARGER BUS SELECT SWITCH TO POWER THE CIRCUIT FROM THE OTHER BUS (MAIN BUS A OR B).

HAZARD REPORT NUMBER(S): NONE

HAZARD(S) DESCRIPTION:  
NONE

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**- APPROVALS -**

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SS&PAE  
DESIGN ENGINEERING

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

: *J. Kimura 4-13-98*  
: *[Signature]*