

FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE
NUMBER:05-6-2920 -X

SUBSYSTEM NAME: ELECTRICAL POWER DISTRIBUTION & CONTROL

REVISION: 0 04/09/98

PART DATA

	PART NAME	PART NUMBER
	VENDOR NAME	VENDOR NUMBER
LRU	:FPCA-1	VO70-7633X0
LRU	:FPCA-2	VO70-7633X0
SRU	:RESISTOR	RWR80S1211FR

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

RESISTOR, WIRE WOUND, 1.21K, 2W - EMU POWER SUPPLY/BATTERY CHARGER BUS
 SELECT CONTROL CIRCUIT

REFERENCE DESIGNATORS: 81V76A25R27
 82V76A26R89

QUANTITY OF LIKE ITEMS: 2
 (TWO)

FUNCTION:

CURRENT LIMITING RESISTOR. PROTECTS THE CONTROL INPUT OF RPC37, RPC47,
 RPC52, AND RPC40 FOR THE EXTRAVEHICULAR MOBILITY UNIT (EMU) 1 OR 2 POWER
 SUPPLY AND BATTERY CHARGER BUS SELECT CONTROL UNIT.

REFERENCE DOCUMENTS: 1) V570-960099, INTEGRATED SCHEMATIC - 60DF1,
 AECS EXTRAVEHICULAR MOBILITY UNIT/EXT AIRLOCK

**FAILURE MODES EFFECTS ANALYSIS FMEA - NON-CIL FAILURE MODE
NUMBER: 05-6-2920-01**

REVISION#: 0 04/09/98

SUBSYSTEM NAME: ELECTRICAL POWER DISTRIBUTION & CONTROL

LRU: FPCA-1 OR FPCA-2

CRITICALITY OF THIS

ITEM NAME: RESISTOR

FAILURE MODE: 1R3

FAILURE MODE:
FAILS OPEN

MISSION PHASE: OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY:	102	COLUMBIA
	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.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL FAILURE MODE
NUMBER: 05-6-2920-01****CORRECTING ACTION: MANUAL****CORRECTING ACTION DESCRIPTION:**

SWITCH BOTH EMU POWER CONNECTIONS TO THE ALTERNATE MAIN BUS.

- FAILURE EFFECTS -

(A) SUBSYSTEM:

LOSS OF REDUNDANCY. BOTH EMU POWER CONNECTIONS LOSE THE CAPABILITY TO BE CONNECTED TO ONE OF TWO MAIN BUSES.

(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 FOUR FAILURES:

- 1) RESISTOR FAILS OPEN - LOSS OF MAIN A(B) SOURCE TO BOTH EMU POWER SUPPLY AND BATTERY CHARGER CIRCUITS.
- 2) SECOND RESISTOR FAILS OPEN - LOSS OF MAIN B(A) SOURCE TO BOTH EMU POWER SUPPLY AND BATTERY CHARGER CIRCUITS - LOSS OF POWER TO ALL EMU'S. WORST CASE IF FAILURE OCCURS FOLLOWING AN INITIAL EVA WHERE SUBSEQUENT EVA MUST BE PERFORMED USING ONE EMU WITH THE SPARE BATTERY PACK.
- 3) LOSS OF THE SPARE BATTERY PACK FOR BOTH EMU'S - LOSS OF BOTH EMU'S WOULD PRECLUDE SUBSEQUENT EVA CAPABILITIES.
- 4) 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:**

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

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

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: HOURS

TIME FROM FAILURE OCCURRENCE TO DETECTION: MINUTES

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:

DESIGN FAULT TOLERANCE: THE SECOND POWER SUPPLY AND BATTERY CHARGER SERVICE POINT REMAINS OPERATIONAL ON THE SERVICE CONNECTION UNIT. THE EMU'S CAN TAKE TURNS TO CHARGE BATTERIES.

HAZARD REPORT NUMBER(S): NONE

HAZARD(S) DESCRIPTION:
NONE

- APPROVALS -

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T. Kimura 4-9-98
R. Phan 4-9-98