

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

**SUBSYSTEM NAME: ELECTRICAL POWER DISTRIBUTION & CONTROL**

**REVISION: 0 04/09/98**

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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	VO70-7633X0
LRU	:FPCA-2	VO70-7633X0
SRU	:RESISTOR	RWR80S1211FR

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**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 - CIL FAILURE MODE  
NUMBER: 05-6-2920-02

REVISION#: 0 04/09/98

SUBSYSTEM NAME: ELECTRICAL POWER DISTRIBUTION & CONTROL  
LRU: FPCA-1 OR FPCA-2  
ITEM NAME: RESISTOR

CRITICALITY OF THIS  
FAILURE MODE: 1R3

FAILURE MODE:  
FAILS SHORT (END TO END)

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) CONTAMINATION, C)  
ELECTRICAL STRESS, D) THERMAL STRESS, E) PROCESSING ANOMALY

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

CRITICALITY 1R2 DURING INTACT ABORT ONLY (AVIONICS ONLY)? NO

REDUNDANCY SCREEN A) FAIL  
B) FAIL  
C) PASS

PASS/FAIL RATIONALE:

A)  
SCREEN "A" FAILS BECAUSE THERE IS NO PROCEDURE TO DETECT THE RESISTOR  
FAILING SHORT (END TO END) DURING NORMAL GROUND TURNAROUND WITH NO  
VEHICLE DESIGN MODIFICATION.

B)  
SCREEN "B" FAILS BECAUSE RESISTOR FAILING SHORT (END TO END) IS NOT READILY  
DETECTABLE IN FLIGHT.

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:

LOSS OF ABILITY TO LIMIT CURRENT FROM THE CONTROL BUS DUE TO A DOWNSTREAM FAULT.

**(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 THREE FAILURES:

- 1) RESISTOR FAILS SHORT (END TO END) - LOSS OF ABILITY TO LIMIT THE CURRENT DRAWN FROM THE ASSOCIATED CONTROL BUS DUE TO A DOWNSTREAM ELECTRICAL FAULT.
- 2) SWITCH CONTACT SHORTS TO STRUCTURE (GROUND) DOWNSTREAM OF RESISTOR TYING AFFECTED CONTROL BUS AB1 (BC1) TO GROUND RESULTING IN LOSS OF REDUNDANCY. BOTH EMU POWER CONNECTIONS LOSE THE CAPABILITY TO BE CONNECTED TO ONE OF TWO MAIN BUSES. LOSS OF ONE CONTROL BUS.
- 3) LOSS OF SECOND CONTROL BUS - LOSS OF CONTROL POWER NECESSARY FOR THE OPERATION OF CRITICAL LOADS (REF. FMEA 05-6-2132-1).

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**- TIME FRAME -**

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TIME FROM FAILURE TO CRITICAL EFFECT: N/A

TIME FROM FAILURE OCCURRENCE TO DETECTION: N/A

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:**

DESIGN FAULT TOLERANCE: THREE FAILURES ARE REQUIRED BEFORE THE LOSS OF THE SECOND CONTROL BUS REQUIRED FOR THE OPERATION OF CRITICAL LOADS.

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**-DISPOSITION RATIONALE-**

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**(A) DESIGN:**

REFER TO APPENDIX E, ITEM NO. 3 - RWR60 RESISTOR

(B) TEST:  
REFER TO APPENDIX E, ITEM NO. 3 - RWR80 RESISTOR

GROUND TURNAROUND TEST  
ANY TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH  
OMRSD.

(C) INSPECTION:  
REFER TO APPENDIX E, ITEM NO. 3 - RWR80 RESISTOR

(D) FAILURE HISTORY:  
CURRENT DATA ON TEST FAILURES, FLIGHT FAILURES, UNEXPLAINED ANOMALIES, AND  
OTHER FAILURES EXPERIENCED DURING GROUND PROCESSING ACTIVITY CAN BE  
FOUND IN THE PRACA DATA BASE.

(E) OPERATIONAL USE:  
NONE

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- APPROVALS -

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SS&PAE  
SS&PAE MANAGER  
DESIGN ENGINEERING  
BNA SSM  
JSC MOD

*for* : T. K. KIMURA  
: P. A. STENGER  
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*D. D. Sovereign 4-9-98*  
*D. D. Sovereign 5 Apr 98*  
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