

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE
NUMBER: 05-6-2188 -X**

**SUBSYSTEM NAME: ELECTRICAL POWER DISTRIBUTION & CONTROL
REVISION: 0 05/03/88**

PART DATA

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	: MID PCA 1	V070-764400
LRU	: MID PCA 2	V070-764430
LRU	: MID PCA 3	V070-764450
SRU	: DIODE	JANTXV1N4246

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
DIODE, BLOCKING, 1 AMP - CONTROL CIRCUIT OF MAIN BUS TO ESSENTIAL BUS
REMOTE POWER CONTROLLER

REFERENCE DESIGNATORS: 40V76A25CR2
40V76A25CR4
40V76A26CR2
40V76A26CR4
40V76A27CR1
40V76A27CR4

QUANTITY OF LIKE ITEMS: 6
SIX

FUNCTION:
BLOCKING DIODES PREVENT REVERSE CURRENT FLOW FROM THE MAIN DC BUS/
ESSENTIAL BUS REMOTE POWER CONTROLLER CONTROL CIRCUIT TO THE OUTPUT OF
THE GROUND MULTIPLEXER/DEMUTIPLEXER (MDM) WHICH PROVIDES MAIN DC
BUS/ESSENTIAL BUS CONTROL DURING GROUND CHECKOUT.

FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE

NUMBER: 05-6-2188-02

REVISION#: 1 07/26/99

SUBSYSTEM NAME: ELECTRICAL POWER DISTRIBUTION & CONTROL

LRU: MID PCA 1, 2, 3

CRITICALITY OF THIS

ITEM NAME: DIODE

FAILURE MODE: 1R3

FAILURE MODE:

SHORT (END TO END)

MISSION PHASE:

PL	PRE-LAUNCH
LO	LIFT-OFF
OO	ON-ORBIT
DO	DE-ORBIT
LS	LANDING/SAFING

VEHICLE/PAYLOAD/KIT EFFECTIVITY:	102	COLUMBIA
	103	DISCOVERY
	104	ATLANTIS
	105	ENDEAVOUR

CAUSE:

STRUCTURAL FAILURE (MECHANICAL STRESS, VIBRATION), CONTAMINATION, ELECTRICAL STRESS, THERMAL STRESS, PROCESSING ANOMALY

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN

A) FAIL
B) N/A
C) PASS

PASS/FAIL RATIONALE:

A)
FAILS "A" SCREEN SINCE SHORTED DIODE TO MDM CIRCUITRY CANNOT BE DETECTED.

B)
"B" SCREEN IS "N/A" BECAUSE FAILURE OF AT LEAST TWO REMAINING PATHS IS READILY DETECTABLE IN FLIGHT (DIODE SHORT TO STRUCTURE, LOSS OF LAST ESSENTIAL BUS SOURCE, POWER CONTACTOR, REDUNDANT VALVE CLOSURE).

C)

- FAILURE EFFECTS -**(A) SUBSYSTEM:**

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL FAILURE MODE
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FIRST FAILURE - NO EFFECT. LOSS OF NORMAL ISOLATION FOR AN ESSENTIAL BUS CONTROL CIRCUIT FROM A GROUND MDM. SECOND FAILURE (SHORT TO GROUND IN MDM CIRCUITRY) - LOSS OF ONE OF THREE SOURCES TO AN ESSENTIAL BUS.

(B) INTERFACING SUBSYSTEM(S):
SAME AS (A)

(C) MISSION:
SAME AS (A)

(D) CREW, VEHICLE, AND ELEMENT(S):
SAME AS (A)

(E) FUNCTIONAL CRITICALITY EFFECTS:
POSSIBLE LOSS OF CREW/VEHICLE AFTER SIXTH FAILURE (ASSOCIATED FUEL CELL TO MAIN DC BUS POWER CONTACTOR FAILED CLOSED) DUE TO INABILITY TO "SAFE" A FUEL CELL. LOSS OF AN ESSENTIAL BUS (REQUIRES FOUR FAILURES - DIODE SHORT, SHORT TO GROUND IN MDM CIRCUITRY AND LOSS OF THE OTHER TWO ESSENTIAL BUS SOURCES) RESULTS IN LOSS OF THE ASSOCIATED FUEL CELL COOLANT PUMP AS WELL AS REDUNDANT CONTROL OF THAT FUEL CELL'S REACTANT VALVES. THIS NECESSITATES REMOVAL OF ALL LOAD FROM THE FUEL CELL IN ORDER TO RENDER IT SAFE. INABILITY TO REDUNDANTLY CLOSE REACTANT VALVES OR REMOVE THE BUS LOAD FROM THE FUEL CELL UNDER THESE CIRCUMSTANCES, WILL RESULT IN FUEL CELL OVERHEATING WITH SUBSEQUENT RUPTURE AND/OR EXPLOSION/FIRE.

-DISPOSITION RATIONALE-

(A) DESIGN:
REFER TO APPENDIX F, ITEM NO 3 - DIODE, AXIAL LEAD

(B) TEST:
REFER TO APPENDIX F, ITEM NO 3 - DIODE, AXIAL LEAD

GROUND TURNAROUND TEST
NONE

(C) INSPECTION:
REFER TO APPENDIX F, ITEM NO 3 - DIODE, AXIAL LEAD

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(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

- APPROVALS -

EDITORIALLY APPROVED
TECHNICAL APPROVAL

: BNA
: VIA APPROVAL FORM

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