

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE  
 NUMBER: 05-GED-2252-X

SUBSYSTEM NAME: EPDBC - ET UMBILICAL DOORS

REVISION : 2 08/06/90

1458

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU :	AFT MCA-1	V070-765410
LRU :	AFT MCA-2	V070-765420
LRU :	AFT MCA-3	V070-765430
LRU :	AFT MCA-3	V070-765600
LRU :	AFT MCA-2	V070-765620
LRU :	AFT MCA-1	V070-765630
SRU :	DIODE	JANTXV1N4246

## PART DATA

- EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:  
 DIODE, BLOCKING, LEFT AND RIGHT DOOR CLOSE CONTROL STIMULI CIRCUIT ISOLATION
- REFERENCE DESIGNATORS:
  - : 54V76A114A2CR64
  - : 55V76A115A1CR77
  - : 56V76A116A2CR9
  - : 56V76A116A2CR37
- QUANTITY OF LIKE ITEMS: 4  
 FOUR
- FUNCTION:  
 PROVIDES REDUNDANT POWER PATH TO THE HYBRID RELAY AND ISOLATES THE ARM COMMAND LOGIC POWER FROM THE CONTROL LOGIC SIGNAL POWER TO PREVENT INADVERTENT OPERATION OF THE RELAY.

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SUBSYSTEM: EPD&C - ET UMBILICAL DOORS  
LRU :AFT MCA-1  
ITEM NAME: DIODE

CRITICALITY OF THIS  
FAILURE MODE:1R2

■ FAILURE MODE:  
SHORT (END TO END)

MISSION PHASE:  
DO DE-ORBIT

■ 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

REUNDANCY SCREEN A) PASS  
B) FAIL  
C) PASS

PASS/FAIL RATIONALE:  
A)

■ B)  
FAILS "B" SCREEN BECAUSE DIODE FAILURE IS NOT READILY DETECTABLE  
INFLIGHT.

C)

- FAILURE EFFECTS -

■ (A) SUBSYSTEM:  
FIRST FAILURE - LOSS OF ISOLATION BETWEEN ARM COMMAND LOGIC POWER  
SOURCE AND MANUAL PANEL SWITCH POWER SOURCE

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- (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:  
AFTER SECOND FAILURE (INADVERTENT GPC COMMAND), DOOR DRIVE WOULD FUNCTION AGAINST CENTERLINE LATCHES CAUSING DAMAGE TO LINK MECHANISM AND POSSIBLY RESULTING IN INABILITY TO CLOSE DOOR (DOOR LINKAGE MAY NOT WITHSTAND STALL TORQUE WITHIN 8 1/2 DEGREES FROM OPEN POSITION). POSSIBLE LOSS OF CREW/VEHICLE IF DOORS CANNOT BE CLOSED RESULTING IN STRUCTURAL DAMAGE DUE TO THERMAL EFFECTS DURING RE-ENTRY.

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 - DISPOSITION RATIONALE -  
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- (A) DESIGN:  
REFER TO APPENDIX F, ITEM NO. 3 - DIODE
- (B) TEST:  
REFER TO APPENDIX F, ITEM NO. 3 - DIODE  
  
GROUND TURNAROUND TEST.  
VERIFY DIODE FUNCTION THAT ISOLATES ARM COMMAND LOGIC POWER FROM THE CONTROL LOGIC SIGNAL POWER DURING GPC & RTC OPERATION. TESTS ARE PERFORMED FOR CLOSE AND LATCH ARM COMMANDS GENERATED BY SOFTWARE AND ON/OFF RESPONSE FROM ASSOCIATED HYBRID RELAYS. VERIFY NO CHANGE IN MCA ON/OFF STATUS OTHER THAN THAT WHICH IS ASSOCIATED WITH EACH SOFTWARE COMMAND (STIMULI). TESTS ARE PERFORMED FOR EVERY FLIGHT AND LRU RETEST PER TABLE V56Z00.000.
- (C) INSPECTION:  
REFER TO APPENDIX F, ITEM NO. 3 - DIODE
- (D) FAILURE HISTORY:  
REFER TO APPENDIX F, ITEM NO. 3 - DIODE
- (E) OPERATIONAL USE:  
NONE

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- APPROVALS -

RELIABILITY ENGINEERING:	T. AI	: <i>TA M. [unclear] 8-20-90</i>
DESIGN ENGINEERING	: J. KRAGER	: <i>J. M. [unclear] 8-16-90</i>
QUALITY ENGINEERING	: W. R. HIGGINS	: <i>W. R. Higgins 8-29-90</i>
NASA RELIABILITY	:	: <i>D. M. [unclear] 10/25/90</i>
NASA SUBSYSTEM MANAGER	:	: <i>R. M. Balaraman 10/25/90</i>
NASA EPD&C RELIABILITY	:	: <i>F. [unclear] 10-24-90</i>
NASA QUALITY ASSURANCE	:	: <i>K. D. [unclear] 9/28/90</i>
NASA EPD&C SUBSYS MGR	:	: <i>F. [unclear] 10/25/90</i>