FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE
NUMBER: 05-6ED-2126-X

1123

SUBSYSTEM NAME: EPD&C - ET UMBILICAL DOORS
REVISION : 2 08/06/90

		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	:	RELAY, HYBRID	MC455-0135-0001
■ SRU	:	RELAY, HYBRID	MC455-0135-0002

PART DATA

■ EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
RELAY, HYBRID, 4PDT, NON-LATCH

■ REFERENCE DESIGNATORS: 54V76A114K9
: 55V76A115K19
: 56V76A116K9

QUANTITY OF LIKE ITEMS: 3
THREE

FUNCTION:
SWITCHES MCA DC BUS POWER TO POWER IN TERMINALS OF HYBRID RELAYS WHEN COMMANDS ARE ISSUED BY THE GPC. THESE RELAYS ARE USED FOR DOOR CLOSE AND LATCH ARM COMMANDS DURING GPC AND RTC OPERATION. (USED IN THE EVENT OF AN RTLS ABORT AND/OR CONTINGENCY OPERATIONS.)

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-6ED-2126-02

REVISION# 2 09/07/90 R

SUBSYSTEM: EPD&C - ET UMBILICAL DOORS
LRU :AFT MCA-1
ITEM NAME: RELAY, HYBRID

CRITICALITY OF THIS FAILURE MODE:1R2

■ FAILURE MODE:
CLOSED, PREMATURE CLOSES, SHORTS CONTACT-TO-CONTACT

MISSION PHASE:
DO DE-ORBIT

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

■ CAUSE:
PIECE PART FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY, THERMAL STRESS

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN A) PASS
B) FAIL
C) PASS

PASS/FAIL RATIONALE:
A)

B)
FAILS "B" SCREEN BECAUSE NO OPERATIONAL STATUS IS AVAILABLE FOR THIS RELAY.

C)

- FAILURE EFFECTS -

■ (A) SUBSYSTEM:
FIRST FAILURE - INADVERTENT POWER TO ASSOCIATED HYBRID RELAYS

■ (B) INTERFACING SUBSYSTEM(S):
FIRST FAILURE - NO EFFECT

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■ (C) MISSION:
FIRST FAILURE - NO EFFECT

■ (D) CREW, VEHICLE, AND ELEMENT(S):
FIRST FAILURE - NO EFFECT

■ (E) FUNCTIONAL CRITICALITY EFFECTS:
AFTER SECOND FAILURE (ISOLATING DIODE SHORT END-TO-END OR ASSOCIATED HYBRID RELAY FAILS CLOSED), 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.

- DISPOSITION RATIONALE -

■ (A) DESIGN:
REFER TO APPENDIX C, ITEM NO. 1 - HYBRID RELAY

■ (B) TEST:
REFER TO APPENDIX C, ITEM NO. 1 - HYBRID RELAY

GROUND TURNAROUND TEST - VERIFY HYBRID RELAY FUNCTION THAT CONTROLS ET DOOR CLOSE AND LATCH ARM COMMANDS DURING GPC & RTC OPERATION. TESTS ARE PERFORMED FOR DOOR 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 C, ITEM NO. 1 - HYBRID RELAY

(D) FAILURE HISTORY:
REFER TO APPENDIX C, ITEM NO. 1 - HYBRID RELAY

(E) OPERATIONAL USE:
NONE

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1420

- APPROVALS -

RELIABILITY ENGINEERING	T. AI	
DESIGN ENGINEERING	J. KRAGER	
QUALITY ENGINEERING	W. R. HIGGINS	
NASA RELIABILITY		
NASA SUBSYSTEM MANAGER		
NASA EPD&C RELIABILITY		
NASA QUALITY ASSURANCE		
NASA EPD&C SUBSYS MGR		