FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE
NUMBER: 05-6EB-2004-X

SUBSYSTEM NAME: EPD&C - PAYLOAD BAY DOORS
REVISION : 2 05/16/90

		PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:	MID MCA-4	V070-764500
LRU	:	MID MCA-1	V070-764520
LRU	:	MID MCA-2	V070-764530
LRU	:	MID MCA-3	V070-764550
LRU	:	MID MCA-1	V070-764610
LRU	:	MID MCA-2	V070-764620
LRU	:	MID MCA-3	V070-764630
LRU	:	MID MCA-4	V070-764640
SRU	:	RELAY, HYBRID	MC455-0135-0001
SRU	:	RELAY, HYBRID	MC455-0135-0002

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
RELAY, HYBRID, PAYLOAD BAY DOOR (PLBD) BUS POWER

REFERENCE DESIGNATORS:
: 40V76A117K66
: 40V76A117K78
: 40V76A118K37
: 40V76A118K39
: 40V76A118K42
: 40V76A118K54
: 40V76A119K20
: 40V76A119K22
: 40V76A120K8
: 40V76A120K20
: 40V76A120K29
: 40V76A120K41

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QUANTITY OF LIKE ITEMS: 12
TWELVE, 4/AC BUS SET-1, 2, AND 3

FUNCTION:
SEPARATE SOFTWARE COMMANDS CONTROL SERIES CONTACTS OF TWO HYBRID RELAYS FOR CONNECTING 3 PHASE AC BUS POWER TO SUB-FEEDER PAYLOAD BAY DOOR AC BUSES WITHIN THE MIO MCA'S

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FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-6EB-2004-01

REVISION# 2 05/16/90 R

SUBSYSTEM: EPD&C - PAYLOAD BAY DOORS
LRU :MID MCA-4
ITEM NAME: RELAY, HYBRID

CRITICALITY OF THIS FAILURE MODE:1R2

■ FAILURE MODE:
OPEN, FAILS TO CONDUCT, INADVERTENTLY OPENS, FAILS TO TRANSFER, SHORT TO STRUCTURE (GROUND), SHORT POLE-TO-POLE

MISSION PHASE:
OO ON-ORBIT
OO DE-ORBIT

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

■ 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) PASS
C) PASS

PASS/FAIL RATIONALE:
A)

B)

C)

- FAILURE EFFECTS -

■ (A) SUBSYSTEM:
FIRST FAILURE - LOSS OF TRANSFER FUNCTION TO CONTROL POWER OF ONE PLBD AC BUS

■ (B) INTERFACING SUBSYSTEM(S):
FIRST FAILURE - INABILITY TO USE ASSOCIATED MOTORS

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■ (C) MISSION:
FIRST FAILURE - NO EFFECT

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

■ (E) FUNCTIONAL CRITICALITY EFFECTS:
FIRST FAILURE - NO EFFECT. SECOND FAILURE (FAILURE OF HYBRID RELAY IN ASSOCIATED REDUNDANT CIRCUIT TO CONDUCT) WILL CAUSE LOSS OF AC POWER TO BOTH MOTORS. POSSIBLE LOSS OF MISSION IF DOORS CANNOT BE OPENED (2R3). POSSIBLE LOSS OF CREW/VEHICLE IF DOORS CANNOT BE CLOSED RESULTING IN UNSAFE CONFIGURATION FOR ENTRY (1R2).

- 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 POWER PATHS FROM AC BUSES TO PAYLOAD BAY DOOR/LATCH MOTORS BY: VERIFYING INITIAL MCA STATUS, SENDING THE OPEN/CLOSE OR LATCH/RELEASE COMMAND BY SOFTWARE OR SWITCH CYCLE AS APPROPRIATE, VERIFYING LIMIT-SWITCH OR TALKBACK STATUS WHERE AVAILABLE (E.G., READY-TO-LATCH DOOR INDICATIONS), AND MONITORING AC CURRENTS AND DOOR/LATCH OPERATING TIMES. TEST ARE PERFORMED INFLIGHT (GROUND CHECKOUT IF VALID FLIGHT DATA IS UNAVAILABLE) AND LRU RETEST PER TABLE V37Z00.000.

■ (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 IS REQUIRED FOR THE FIRST FAILURE. EVA CAPABILITY EXISTS TO CLOSE PAYLOAD BAY DOORS AFTER MULTIPLE FAILURES.

PRINT DATE: 05/17/90

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FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-6EB-2004-01

- APPROVALS -

RELIABILITY ENGINEERING	T. AI	
DESIGN ENGINEERING	T. BANMIDY	
QUALITY ENGINEERING	W. R. HIGGINS	
NASA RELIABILITY		
NASA SUBSYSTEM MANAGER		8/27/90
NASA QUALITY ASSURANCE		
NASA EPDC SUBSYS MGR		20 Aug 90
NASA EPDC Reliability		for S. Undead 8/24/90