

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CRITICAL HARDWARE  
NUMBER: 05-6ED-2132-X**

SUBSYSTEM NAME: EPD&amp;C - ET UMBILICAL DOORS

REVISION: 5 08/24/93

	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

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**PART DATA**

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**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**  
RELAY, HYBRID, 4 POLE, NON-LATCH, LEFT AND RIGHT ORBITER/ET DOOR CLOSE LATCH - RELEASE CIRCUIT

**REFERENCE DESIGNATORS:** 54V76A114K19  
54V76A114K20  
55V76A115K11  
55V76A115K12  
55V76A115K58  
55V76A115K56  
56V76A116K14  
56V76A116K15

**QUANTITY OF LIKE ITEMS:** 8  
EIGHT

**FUNCTION:**  
THE HYBRID RELAYS ARE USED IN PAIRS TO CONNECT 3-PHASE AC POWER TO EACH ORB/ET LEFT AND RIGHT DOOR CLOSE LATCH ACTUATOR DRIVE FOR THE RELEASING OPERATION.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CRITICAL FAILURE MODE  
NUMBER: 05-6ED-2132-03**

REVISION# 5 08/24/93 R

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

CRITICALITY OF THIS  
FAILURE MODE: 1R3

**FAILURE MODE:**  
SHORTS CONTACT-TO-CONTACT (PHASE "B" OR PHASE "C")

**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 SCREEN "B" BECAUSE NO CAPABILITY EXISTS TO DETECT THE FAILED RELAY  
INFLIGHT.

C)

**- FAILURE EFFECTS -**

**(A) SUBSYSTEM:**  
FIRST FAILURE - NO EFFECT

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

**(C) MISSION:**  
FIRST FAILURE - NO EFFECT

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

(E) FUNCTIONAL CRITICALITY EFFECTS:  
POSSIBLE LOSS OF CREW/VEHICLE DUE TO STRUCTURAL DAMAGE CAUSED BY THERMAL EFFECTS IF DOOR CANNOT BE CLOSED AND LATCHED FOR SAFE ENTRY. REQUIRES TWO ADDITIONAL FAILURES: (1. SERIAL RELAY SHORTS CONTACT-TO-CONTACT WHICH RESULTS IN PHASE-TO-PHASE SHORT WHEN LATCH COMMAND IS PRESENT CAUSING AC CIRCUIT BREAKER TO TRIP RESULTING IN LOSS OF AC POWER TO ALL DOOR AND LATCH FUNCTIONS OF ASSOCIATED MOTOR CONTROLLER ASSEMBLY AND 2. LOSS OF REDUNDANT MOTOR) BEFORE EFFECT IS MANIFESTED.

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-DISPOSITION RATIONALE-

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(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  
NONE

(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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- APPROVALS -

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EDITORIALLY APPROVED  
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TECHNICAL APPROVAL

: RI  
: JSC  
: VIA CR

*[Handwritten signatures and initials]*  
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