

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE

NUMBER: MO-AD1-R02-X

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SUBSYSTEM NAME: REMOTELY OPERATED ELECTRICAL UMBILICAL

REVISION : 1 02/11/91

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
■ ASSEM :	MID MCA-1	V070-764610
■ SRU :	RELAY, HYBRID	MC455-0135-0001
■ SRU :	RELAY, HYBRID	MC455-0135-0002

PART DATA

■ EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

■ REFERENCE DESIGNATORS: 40V76A117 - K41
 : 40V76A117 - K53
 : 40V76A119 - K44
 : 40V76A119 - K46

■ QUANTITY OF LIKE ITEMS: 4

■ FUNCTION:

PROVIDES CONTROL OF AC POWER APPLICATION TO DRIVE MOTOR FOR THE HOOK LATCH/UNLATCH FUNCTION. K41 AND K53 FOR SYSTEM 1, K44 AND K46 FOR SYSTEM 2.

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SUBSYSTEM: REMOTELY OPERATED ELECTRICAL UMBILICAL

ITEM NAME: RELAY, HYBRID

CRITICALITY OF THIS
FAILURE MODE:2R3

- FAILURE MODE:
SHORTED, ANY TWO OR MORE SETS OF CONTACTS.

MISSION PHASE:
00 ON-ORBIT

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

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

- CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

- REDUNDANCY SCREEN A) PASS
B) FAIL
C) PASS

PASS/FAIL RATIONALE:

- A)
PRELAUNCH CHECKOUT
- B)
TWO OR MORE PHASES COULD CAUSE MOTOR TO DRIVE. CANNOT CONFIRM RELAY FAILURE.
- C)
SEPARATION OF REDUNDANT ELEMENTS

- FAILURE EFFECTS -

- (A) SUBSYSTEM:
TWO OR MORE AC POWER PHASES WILL BE CONTINUOUSLY APPLIED TO ONE HOOK LATCH/UNLATCH ACTUATOR DRIVE MOTOR WHENEVER THREE PHASE AC POWER IS

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PRESENT.

- (B) INTERFACING SUBSYSTEM(S):
 IF UNDETECTED MOTOR WILL DRIVE AGAINST STOPS, OVERHEAT, AND FAIL. MOTOR DRIVE FOR THE SELECTED FUNCTION WOULD BE AT HALF SPEED. IF THE RELAY FOR OPPOSITE MOTOR ROTATION IS ACTIVATED CIRCUIT BREAKER WILL TRIP.
- (C) MISSION:
 NO EFFECT.
- (D) CREW, VEHICLE, AND ELEMENT(S):
 FIRST FAILURE - NO EFFECT.
- (E) FUNCTIONAL CRITICALITY EFFECTS:
 LOSS OF REDUNDANT RELAY IN THIS MODE WILL FAIL BOTH HOOK LATCH ACTUATOR DRIVE MOTORS AND REQUIRE USE OF EVA MECHANICAL ACTUATION TO ACCOMPLISH LATCH MOTION.

 - DISPOSITION RATIONALE -

- (A) DESIGN:
 REFER TO APPENDIX C, ITEM 1.
- (B) TEST:
 REFER TO APPENDIX C, ITEM 1.

 OMRSD: GROUND TURNAROUND;
 FREQUENCY OF CHECKOUT IS MISSION DEPENDENT. 3-PHASE AC MOTOR CIRCUITS VERIFY PROPER PHASE ROTATION AND MOTOR PHASE VOLTAGE.
- (C) INSPECTION:
 REFER TO APPENDIX C, ITEM 1.
- (D) FAILURE HISTORY:
 REFER TO APPENDIX C, ITEM 1.
- (E) OPERATIONAL USE:
 NONE

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- APPROVALS -

RELIABILITY ENGINEERING:	M. P. RAGUSA	<i>M.P. Ragusa</i>
DESIGN SUPERVISOR :	G. M. ANDERSON	<i>G.M. Anderson 6/16/91</i>
QUALITY ENGINEERING :	M. F. Mergen	<i>M.F. Mergen 6/15/91</i>
NASA RELIABILITY :		<i>6/26/91</i>
NASA SUBSYSTEM MANAGER :		<i>6/22/91</i>
NASA EPD&C RELIABILITY :		<i>H. Salazar Jimenez 6/21/91</i>
NASA QUALITY ASSURANCE :		<i>RO David Gontenat 6/12/91</i>
NASA EPD&C SUBSYS MGR :		<i>6/12/91</i>