

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE****NUMBER: M0-AD1-R01 -X****SUBSYSTEM NAME: REMOTELY OPERATED ELECTRICAL UMBILICAL****REVISION: 1** 02/11/91**PART DATA**

	<b>PART NAME</b>	<b>PART NUMBER</b>
	<b>VENDOR NAME</b>	<b>VENDOR NUMBER</b>
ASSY	: MID MCA-1	V070-764610
ASSY	: MID MCA-4	V070-764640
SRU	: RELAY, HYBRID	MC455-0135-0001
SRU	: RELAY, HYBRID	MC455-0135-0002

**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**

**REFERENCE DESIGNATORS:** 40V76A117 - K19  
 40V76A117 - K21  
 40V76A117 - K24  
 40V76A117 - K36  
 40V76A118 - K65  
 40V76A119 - K73  
 40V76A119 - K75  
 40V76A119 - K77

**QUANTITY OF LIKE ITEMS:** 8**FUNCTION:**

PROVIDES CONTROL OF AC POWER APPLICATION TO DRIVE MOTOR FOR THE SWING ARM DRIVE FUNCTION. K77, K65, K36 AND K24 FOR SYSTEM 1, K19, K21, K73 AND K75 FOR SYSTEM 2.

**FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE**

**NUMBER: M0-AD1-R01- 03**

**REVISION#: 2 01/07/02**

**SUBSYSTEM NAME: REMOTELY OPERATED ELECTRICAL UMBILICAL**

**LRU:**

**CRITICALITY OF THIS**

**ITEM NAME: RELAY, HYBRID**

**FAILURE MODE: 2R3**

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**FAILURE MODE:**

SHORTED - ANY SINGLE SET OF CONTACTS

**MISSION PHASE:**

OO 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**

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**REDUNDANCY SCREEN**

- A) PASS
- B) FAIL
- C) PASS

**PASS/FAIL RATIONALE:**

**A)**

PRELAUNCH CHECKOUT

**B)**

ONE PHASE WILL NOT CAUSE MOTOR TO DRIVE - CANNOT CONFIRM RELAY FAILURE.

**C)**

PHYSICAL AND ELECTRICAL ISOLATION OF REDUNDANT ELEMENTS.

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**- FAILURE EFFECTS -**

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**(A) SUBSYSTEM:**

ONE AC POWER PHASE WILL BE CONTINUOUSLY APPLIED TO THE ASSOCIATED DRIVE MOTOR WHENEVER THREE PHASE AC POWER IS PRESENT.

**(B) INTERFACING SUBSYSTEM(S):**

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THE DRIVE MOTOR COULD OVERHEAT AND FAIL. A FAILED MOTOR WOULD CAUSE SUBSEQUENT ARM DRIVE FUNCTIONS TO BE AT HALF SPEED. IF THE RELAY FOR OPPOSITE MOTOR ROTATION IS ACTIVATED CIRCUIT BREAKER COULD TRIP.

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

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

**(E) FUNCTIONAL CRITICALITY EFFECTS:**  
LOSS OF REDUNDANT CONTROL RELAY IN THIS MODE WILL FAIL BOTH SWING ARM ACTUATOR DRIVE MOTORS WHICH WOULD REQUIRE USE OF EVA MECHANICAL ACTUATION TO ACCOMPLISH SWING ARM MOTION.

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**-DISPOSITION RATIONALE-**

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**(A) DESIGN:**  
REFER TO APPENDIX C, ITEM 1.

**(B) TEST:**  
REFER TO APPENDIX C, ITEM 1.

GROUND TURNAROUND:  
OMRSD - ANY TURNAROUND TEST CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDING WITH OMRSD

**(C) INSPECTIon:**  
REFER TO APPENDIX C, ITEM 1.

**(D) FAILURE HISTORY:**

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CURRENT DATA ON TEST FAILURES, FLIGHT FAILURE, UNEXPLAINED ANOMALIES, AND OTHER FAILURE EXPERIENCED DURING GROUND PROCESSING ACTIVITY CAN BE FOUND IN THE PRACA DATA BASE.

**(E) OPERATIONAL USE:**  
EVA WORK AROUND CAN BE USED TO ACCOMPLISH SWING ARM MOTION.

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**- APPROVALS -**

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S&R ENGINEER.	:A. NGUYEN	:/s/A. Nguyen_____
CARGO/INTEG ITM.	:J. CAPALENI	:/s/J. Capaleni_____
DESIGN ENGINEERING	:D. HAEHLKE	:/s/D. Haehlke_____
SSM	:P. REESE	:/s/P. Reese_____
MOD	:K. SMITH	:/s/K. Smith_____
USA/SAM	:R. SMITH	:/s/S.R. Smith_____
USA CARGO/INTG ELEMENT	:H. MALTBY	:/s/H. Maltby_____
USA ORBITER ELEMENT	:S. LITTLE	:/s/S. Little_____