

FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE
 NUMBER: 05-61A-2178 -X

SUBSYSTEM NAME: EPD&C - REMOTE MANIP. ARM

REVISION: 3 0206/85

PART DATA

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:FWD PCA 1	V070-763320
SRU	:CONTROLLER, REMOTE POWER	MC450-0017-1100
SRU	:CONTROLLER, REMOTE POWER	MC450-0017-2100
SRU	:CONTROLLER, REMOTE POWER	MC450-0017-3100
SRU	:CONTROLLER, REMOTE POWER	MC450-0017-4100

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
 CONTROLLER, REMOTE POWER, RPC 10 AMP, MAIN BUS A

REFERENCE DESIGNATORS: 81V78A22 RPC4

QUANTITY OF LIKE ITEMS: 1
 ONE

FUNCTION:
 FOLLOWING A CREW INITIATED COMMAND, THE RPC CONDUCTS ASSOCIATED 28 VDC
 MAIN BUS A TO THE MANIPULATOR CONTROLLER INTERFACE UNIT. THE RPC DESIGN
 INCORPORATES OVERCURRENT TRIP PROTECTION PLUS TIMED CURRENT LIMITING
 FOR TRANSIENT CONDITIONS. RESET IS ACCOMPLISHED THROUGH CONTROL
 SIGNAL REMOVAL AND REAPPLICATION.

FAILURE MODES EFFECTS ANALYSIS FMEA - CIL FAILURE MODE

NUMBER: 05-61A-2178-01

REVISION#: 3 06/25/97

SUBSYSTEM NAME: EPD&C - REMOTE MANIP. ARM

LRU: FWD PCA 1

CRITICALITY OF THIS

ITEM NAME: CONTROLLER, REMOTE POWER

FAILURE MODE: 1R2

FAILURE MODE:

LOSS OF OUTPUT, FAILS TO CONDUCT, FAILS TO TURN "ON"

MISSION PHASE: OO ON-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) PASS
	C) PASS

PASS/FAIL RATIONALE:

A)

B)

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:

FAILURE WILL RESULT IN LOSS OF MAIN A POWER TO RMS MCIU.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL FAILURE MODE
NUMBER: 05-61A-2178-01**

(B) INTERFACING SUBSYSTEM(S):

FAILURE WILL RESULT IN LOSS OF RMS MCIU AND PRIMARY MODE OF UNCRADLING, OPERATING AND RECRADLING RMS. INABILITY TO COMPLETE CAPTURE AND RIGIDIZATION IN AUTO END EFFECTOR MODE. THE BRAKES WILL COME ON AND SAFING WILL BE INDICATED. NO ARM RELATED DATA WILL BE DISPLAYED ON THE D&C PANEL. END EFFECTOR TALKBACKS WILL BE BARBER POLE. IF FAILURE OCCURS DURING OPERATION, ARM WILL STOP, ALL PRIME (AUTO) MODES EXCEPT DIRECT WILL BE LOST, AND END EFFECTOR PRIME MODES WILL BE LOST. IF CAPTURING A PAYLOAD, INCOMPLETE RIGIDIZATION CAN OCCUR RESULTING IN UNEXPECTED MOTION. IF MCIU IS LOST BEFORE RIGIDIZATION IS COMPLETE, THE CREW IS TRAINED TO SWITCH TO "END EFFECTOR MANUAL MODE" TO FULLY GRAPPLE PAYLOAD.

(C) MISSION:

FAILURE WILL RESULT IN LOSS OF MISSION SINCE BASELINE MISSION CANNOT BE PERFORMED IN RMS DIRECT OR BACKUP CONTROL MODES.

(D) CREW, VEHICLE, AND ELEMENT(S):

FAILURE COULD RESULT IN LOSS OF CREW OR VEHICLE DUE TO UNEXPECTED RMS OR PAYLOAD MOTION DUE TO INCOMPLETE RIGIDIZATION.

(E) FUNCTIONAL CRITICALITY EFFECTS:

DESIGN CRITICALITY (PRIOR TO DOWNGRADE, DESCRIBED IN (F)): 1/1

(F) RATIONALE FOR CRITICALITY DOWNGRADE:

CRITICALITY DOWNGRADED FROM 1/1 TO 1R2 BECAUSE GROUND RULE CHANGE ALLOWS CONSIDERATION OF MANUAL IN-FLIGHT PROCEDURE IN DETERMINATION OF CRITICALITY.

-DISPOSITION RATIONALE-

(A) DESIGN:

REFER TO APENDIX B, ITEM NO. 2 - REMOTE POWER CONTROLLER

(B) TEST:

REFER TO APPENDIX B, ITEM NO. 2 - REMOTE POWER CONTROLLER

GROUND TURNAROUND TEST

CIRCUITS VERIFIED ON-LINE PER PARAGRAPHS:

- V54AN0.072 "SY DD SIGNAL VERIF"

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL FAILURE MODE
NUMBER: 05-61A-2176-01**

- V54AN0.074 "SD DD SIGNAL VERIF"
 - V54AN0.078 "ELBOW DD SIGNAL VERIF"
 - V54AN0.078 "WP DD SIGNAL VERIF"
 - V54AN0.080 "WY DD SIGNAL VERIF"
 - V54AN0.082 "WR DD SIGNAL VERIF"
 - V54AN0.084 "CAP/REL CMD VERIF FOR AUTO/MAN MODES"
 - V54AN0.088 "RIG/DERIG CMD VERIF FOR AUTO/MAN MODES"
- PRIOR TO MECHANICAL ARM INSTALLATION,
- V54AT0.001 "CONFIGURATION AND CHECKOUT"
 - V54AT0.002 "BRAKES ON/OFF SIGNAL VERIF"
 - V54AT0.004 "AUTO SAFING VERIF"
 - V54AT0.006 "EE AUTO CAPTURE VERIF"
 - V54AT0.008 "EE AUTO RELEASE VERIF"
 - V54AT0.010 "RHC INPUT VERIF"
 - V54AT0.012 "THC INPUT VERIF"
 - V54AT0.014 "CAUTION & WARNING VERIF"
 - V54AT0.016 "PORT ARM POWER FLAG VERIF"
- FOR EVERY RMS FLIGHT, AND LRU RETEST PER TABLE V54Z00.000.

(C) INSPECTION:

REFER TO APPENDIX B, ITEM NO. 2 - REMOTE POWER CONTROLLER

(D) FAILURE HISTORY:

REFER TO APPENDIX B, ITEM NO. 2 - REMOTE POWER CONTROLLER

(E) OPERATIONAL USE:

LOSS OF MCIU WILL BE NOTED BY LOSS OF I/O BETWEEN MCIU AND GPC. GPC WILL SUBSEQUENTLY BYPASS MCIU AND MCC INDICATIONS WILL BE GENERATED. MANUAL AUGMENTED RMS OPERATIONS WILL CEASE AND BRAKES WILL BE APPLIED.

SUBSEQUENT FAILURE OF OTHER DRIVE MODES WILL REQUIRE EVA OR JETTISON OF RMS FOR SAFE ENTRY.

IF POSSIBLE, PAYLOADS SHOULD BE CAPTURED/RELEASED IN POSITIONS WHERE INCOMPLETE RIGIDIZATION OR RELEASE WILL NOT ALLOW THE PAYLOAD TO ROTATE INTO ORBITER STRUCTURE.

- APPROVALS -

EDITORIALLY APPROVED	: RI	: <i>Robert Stoll</i> 6/25/97
EDITORIALLY APPROVED	: JSC	: <i>Sam Murray</i> 7/11/97
TECHNICAL APPROVAL	: VIA APPROVAL FORM	: 97-CIL-034_05-61A