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FAILURE MODES EFFECTS ANALYSIS (FMEA) - CRITICAL HARDWARE

NUMBER: 05-6PR-61053 -X

SUBSYSTEM NAME: EPD&C - COMM. & TRACK

REVISION: 1 02/06/95

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	FWD PCA 3	V070-763360
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	MC450-0017-4200

*4100*  
*3/14/96*

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:  
RPC53, REMOTE POWER CONTROLLER EA-1 POWER (10 AMPS).

REFERENCE DESIGNATORS:

QUANTITY OF LIKE ITEMS: 1  
ONE

FUNCTION:

CONTROLS AND PROTECTS 28 VDC POWER CIRCUIT FOR THE ELECTRONICS ASSEMBLY- 1. RECEIVES CONTROL POWER FROM F2 AND SWITCHES POWER FROM MAIN C (150 AMP FUSES 40V76A33F11, F12). (FMEA # 05-6-2006). RPC53 IS IN FWD PCA 3. P/N MC450-0017-1100 OV102 P/N MC450-0017-2100 OV103 AND OV104.

- APPROVALS -

PAE MANAGER : K. L. PRESTON  
 PRODUCT ASSURANCE ENGR : N. HAFEZIZADEH  
 DESIGN ENGINEERING : G. SCHWARTZ  
 NASA EPD&C SUBSYS MGR :  
 NASA SUBSYS MGR :  
 NASA EPD&C SSMA :  
 NASA SSMA :

*K.L. Preston 4/21/95*  
*N. Hafezizadeh*  
*G. Schwartz 4-13-95*  
*3/14/96*  
 N/A  
*John Brubaker 3-16-96*  
 N/A

---SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : EPD&C - COMM. & TRACK. FMEA NO 05-6PR-51053 -1 REV:06/28/88

ASSEMBLY : FPCA-3		CRIT. FUNC: 1R
P/N RI : MC450-0017-1100,-2100 OR -3100		CRIT. HDW: 2
P/N VENDOR:	VEHICLE	102 103 104
QUANTITY : 1	EFFECTIVITY:	X X X
: ONE	PHASE(S):	PL LO OO X DO LS
:		

PREPARED BY:	REUNDANCY SCREEN: A-PASS B-PASS C-PASS
DES H D HADDAD	APPROVED BY: <i>[Signature]</i> 8/27/88
REL <i>[Signature]</i> 7-5-88 J Y HARADA	APPROVED BY (NASA): <i>[Signature]</i> 8/16/88
QE	REL <i>[Signature]</i> 8-30-88
	QE <i>[Signature]</i> 9/1/88
	EPDC REL <i>[Signature]</i> 9/8/88
	C&T <i>[Signature]</i> 9/14/88

ITEM: RPCS3, REMOTE POWER CONTROLLER EA-1 POWER (10 AMPS)

FUNCTION:  
 CONTROLS AND PROTECTS 28 VDC POWER CIRCUIT FOR THE ELECTRONICS ASSEMBLY-1. RECEIVES CONTROL POWER FROM F2 AND SWITCHES POWER FROM MAIN C (150 AMP FUSES 40V76A33F11,F12). (FMEA # 05-6-2006). RPCS3 IS IN FWD PCA 3. P/N MC450-0017-1100 OV102 P/N MC450-0017-2100 OV103 AND OV104.

FAILURE MODE:  
 LOSS OF OUTPUT, FAILS TO CONDUCT, FAILS TO TURN "ON"

CAUSE(S):  
 PIECE PART FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY, THERMAL STRESS.

EFFECT(S) ON:  
 (A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE

EFFECTS ON ABILITY TO CONTROL, POSITION, OR LOCK ANTENNA GIMBALS - 1R/2

- (A) NO EFFECT ON EPDC.
- (B) LOSS OF ABILITY TO LOCK GIMBALS, REAL-TIME DECISION REQUIRED TO PERFORM IN-FLIGHT MAINTENANCE PROCEDURES OR JETTISON THE DEPLOYED ASSEMBLY.
- (C,D) POSSIBLE LOSS OF CREW/VEHICLE AFTER TWO FAILURES IF DA CANNOT BE SECURED FOR REENTRY OR JETTISONED. REENTRY WITH GIMBALS UNLOCKED MAY CAUSE DAMAGE TO THE RADIATOR.

EFFECTS ON MISSIONS REQUIRING KU-BAND SYSTEM SUPPORT - 2/2

- (A) NO EFFECT ON EPDC.
- (B,C) LOSS OF ALL MISSION OBJECTIVES REQUIRING KU-BAND COMM DATA PROCESSING OR RENDEZVOUS RADAR.
- (D) NO EFFECT.

05-6PR-7

**SHUTTLE CRITICAL ITEMS LIST - ORBITER**

**SUBSYSTEM : EPD&C - COMM. & TRACK. FMEA NO 05-6PR-51053 -1 REV:06/28/88**

**EFFECTS ON PROVIDING DATA TO NSP FOR STATE VECTOR UPDATE - 1R/3**

**(A) NO EFFECT ON EPDC.**

**(B,C,D) LOSS OF ONE OF THREE REDUNDANT PATHS TO SUPPLY DATA TO NSP FOR STATE VECTOR UPDATE. UHF PROVIDES AN INDEPENDENT PATH FOR STATE VECTOR UPDATE. AFTER FOUR FAILURES POSSIBLE LOSS OF CREW/VEHICLE DUE TO LOSS OF STATE VECTOR UPDATE. NOTE- A SINGLE FAILURE OF A KU-BAND SPA DASH NUMBER -4001 CAN CAUSE THE LOSS OF POWER TO BOTH NSP'S, RESULTING IN ONLY ONE REMAINING PATH (UHF) TO UPDATE THE STATE VECTOR. THIS FAILURE CAN OCCUR DURING ANY MISSION PHASE. (KU-BAND POWERED ON OR OFF.)**

**DISPOSITION & RATIONALE:**

**(A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE**

**(A,B,C,D) REFER TO APPENDIX B, ITEM # 2, REMOTE POWER CONTROLLER**

**(B) TEST**

**GROUND TURNAROUND TEST- PERFORM RADAR SELF-TEST - PERFORMED EVERY FLIGHT.**

**(E) OPERATIONAL USE**

**WORKAROUND TO REGAIN ABILITY TO CONTROL, POSITION, OR LOCK ANTENNA GIMBALS**

**REAL-TIME DECISION TO PERFORM EA-1 ALTERNATE POWER IN-FLIGHT MAINTENANCE PROCEDURE TO LOCK THE GIMBALS AND STOW THE DA OR TO JETTISON THE DA.**

**WORKAROUND TO REGAIN SUPPORT OF MISSION OBJECTIVES**

**COMM: NONE. RADAR: ATTEMPT RENDEZVOUS WITH ALTERNATE SENSORS. USE BACK-UP RENDEZVOUS PROCEDURES.**

**WORKAROUND TO PROVIDE THE STATE VECTOR UPDATE**

**THE STATE VECTOR CAN BE UPDATED VIA THE NORMAL S-BAND COMMUNICATIONS LINK OR VIA UHF/AUDIO.**