PRINT DATE: 03/08/90

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE

NUMBER: 05-688-2102-X

SUBSYSTEM NAME: EPD&C - BRAKE/ANTI SKID

REVISION : 2 03/08/90

		PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:	FWD PCA 1	V070-763320
LRU	:	FWD PCA 2	V07C-763340
SRU	:	DIODE	JANTXIN1204RA

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
DIODES, 12 AMP, POWER

REFERENCE DESIGNATORS: 81V76A22CR7
: 81V76A22CR8
: 82V76A23CR18
: 82V76A23CR19

QUANTITY OF LIKE ITEMS: 4
ONE PER RPC OUTPUT, FOUR PER VEHICLE

FUNCTION:
DIODES CR7 AND CR8 FORM AN OR GATE WITH INPUTS FROM AN RPC FROM MAIN BUSES A AND C TO FORM SUB-BUS C/A. UNINTERRUPTED POWER WILL BE PROVIDED TO THE BRAKE/SKID CONTROL BUS A EVEN IN THE EVENT OF A BUS FAILURE WHILE AT THE SAME TIME MAINTAINING ISOLATION BETWEEN BUSES A AND C IN THE EVENT OF A REMOTE POWER CONTROLLER (RPC) FAILURE (SHORTED). DIODES CR18 AND CR19 PERFORM THE SAME FUNCTION WITH MAIN BUSES B AND C TO PROVIDE POWER TO BRAKE/SKID CONTROL BOX B.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - BRAKE/ANTI SKID FMEA NO 05-6BB-2102 -2 REV:02/22/88

ASSEMBLY :FWD PCA-1, 2
P/N RI :JANTXIN1204RA
P/N VENDOR:
QUANTITY :4
:ONE PER RPC OUTPUT
:FOUR PER VEHICLE

CRIT. FUNC: 1R
CRIT. HDW: 3

VEHICLE EFFECTIVITY:	102	103	104
	X	X	X

PHASE(S): PL LO OO DO X LS

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

PREPARED BY:		APPROVED BY:	APPROVED BY (NASA):
DES	J HERMAN	DES	SSM
REL	H YEW	REL	REL
QE	W HIGGINS	QE	QE

EPDC SSM
EPD & Rel

ITEM:
DIODE, 12 AMP, POWER. 81V76A22-CR7 AND CR8, 82V76A23-CR18 AND CR19.

FUNCTION:
DIODES CR7 AND CR8 FORM AN OR GATE WITH INPUTS FROM AN RPC FROM MAIN BUSES A AND C TO FORM SUB-BUS C/A. UNINTERRUPTED POWER WILL BE PROVIDED TO THE BRAKE/SKID CONTROL BOX A EVEN IN THE EVENT OF A BUS FAILURE WHILE AT THE SAME TIME MAINTAINING ISOLATION BETWEEN BUSES A AND C IN THE EVENT OF A REMOTE POWER CONTROLLER (RPC) FAILURE (SHORTED). DIODES CR18 AND CR19 PERFORM THE SAME FUNCTION WITH MAIN BUSES B AND C TO PROVIDE POWER TO BRAKE/SKID CONTROL BOX B.

FAILURE MODE:
FAILS SHORTED

CAUSE(S):
STRUCTURAL FAILURE, MECHANICAL SHOCK, VIBRATION, ELECTRICAL STRESS, THERMAL STRESS, PROCESSING ANOMALY

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

(A) FIRST FAILURE - UNDER ADVERSE BUS VOLTAGE CONDITIONS REVERSE CURRENT WOULD FLOW THROUGH THE REMOTE POWER CONTROLLER (RPC) ASSOCIATED WITH THE FAILED DIODE TO THE ASSOCIATED MAIN BUS OF THE SUB-BUS.

(B,C,D) FIRST FAILURE - NO EFFECT.

(E) SECOND FAILURE (FAILED SHORTED DIODE ALSO SHORTS TO GROUND ON ANODE SIDE) WOULD CAUSE BOTH RPC'S TO FAIL AND LOSS OF THE ASSOCIATED SUB-BUS REDUCING THE AVAILABLE BRAKING FORCE TO FIFTY PERCENT. MULTIPLE FAILURES (FOUR DIODES SHORT TO GROUND ON ANODE SIDE) WILL CAUSE LOSS OF FOUR RPC'S AND LOSS OF ALL BRAKING FORCE RESULTING IN LOSS OF CREW/VEHICLE.

FAILS "B" SCREEN BECAUSE SHORTED ACTIVE REDUNDANT DIODE IS NOT DETECTABLE.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :EPD&C - BRAKE/ANTI SKID FMEA NO 05-6BB-2102 -2 REV:02/22/88

DISPOSITION & RATIONALE:
(A)DESIGN (B)TEST (C)INSPECTION (D)FAILURE HISTORY (E)OPERATIONAL USE:

(A-D) DISPOSITION AND RATIONALE
REFER TO APPENDIX F, ITEM NO. 2 - POWER DIODE.

(B) GROUND TURNAROUND TEST
VERIFY DIODE "OR" GATE FUNCTION AND ISOLATION CAPABILITY BY CYCLING THE THREE BRAKE SWITCHES AND MONITORING RPC OUTPUTS. TESTS ARE PERFORMED FOR EVERY FLIGHT AND LRU REPLACEMENT.

(E) OPERATIONAL USE
NONE