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.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-6BB-2102-01

REVISION# 2 03/08/90

SUBSYSTEM: EPD&C - BRAKE/ANTI SKID
LRU :FWD PCA 1
ITEM NAME: DIODE

CRITICALITY OF THIS FAILURE MODE:1R3

FAILURE MODE:
OPEN, FAILS TO CONDUCT, SHORTS TO STRUCTURE (GROUND)

MISSION PHASE:
DO DE-ORBIT

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

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

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN A) PASS
B) FAIL
C) PASS

PASS/FAIL RATIONALE:
A)

B)
FAILS "B" SCREEN BECAUSE DIODE FAILURE IS NOT READILY DETECTABLE.

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
FIRST FAILURE - LOSS OF REDUNDANCY. ONLY ONE BUS CAPABLE OF PROVIDING POWER TO THE ASSOCIATED BRAKE/SKID CONTROL BOX.

(B) INTERFACING SUBSYSTEM(S):
FIRST FAILURE - NO EFFECT

PRINT DATE: 03/08/90

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-6B8-2102-01

■ (C) MISSION:
FIRST FAILURE - NO EFFECT

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

■ (E) FUNCTIONAL CRITICALITY EFFECTS:
LOSS OF BOTH DIODES ON THE SAME SUB-BUS WOULD REDUCE THE BRAKING FORCE BY FIFTY PERCENT. LOSS OF CREW/VEHICLE WITH LOSS OF ALL FOUR DIODES AND ALL BRAKING FORCE.

- DISPOSITION RATIONALE -

(A) DESIGN:
REFER TO APPENDIX F, ITEM NO. 2 - POWER DIODE

■ (B) TEST:
REFER TO APPENDIX F, ITEM NO. 2 - POWER DIODE

GROUND TURNAROUND TEST - VERIFY DIODE "OR" GATE FUNCTION AND ISOLATION CAPABILITY BY CYCLING THE THREE BRAKE SWITCHES AND MONITORING THE RESPONSES OF ANTI-SKID SWITCH SCAN AND ANTI-SKID FAIL INDICATOR. TESTS ARE PERFORMED PER PARAGRAPHS:
- V51AF0.010 "BRAKE/SKID ELECTRICAL INTEGRITY TEST" (EVERY FLIGHT)
- V51AF0.011 "BRAKE/SKID POWER REDUNDANCY TEST" (EVERY FLIGHT)
AND LRU RETEST PER TABLE V51Z00.000.

(C) INSPECTION:
REFER TO APPENDIX F, ITEM NO. 2 - POWER DIODE

(D) FAILURE HISTORY:
REFER TO APPENDIX F, ITEM NO. 2 - POWER DIODE

(E) OPERATIONAL USE:
NONE

- APPROVALS -

RELIABILITY ENGINEERING: T. AI : TA Michael Chi Hsu 3-20-90
DESIGN ENGINEERING : Q. DANG : [signature] 3/21/90
QUALITY ENGINEERING : W. R. HIGGINS : [signature] 3/21/90
NASA RELIABILITY : [signature] 4/24/90
NASA SUBSYSTEM MANAGER : J.R. Bateman 4/24/90
NASA QUALITY ASSURANCE : [signature] 4/20/90
NASA ENGR Reliability : [signature] 4/23/90
NASA ENGR Subsys Mgr : [signature] for FHam