FAILURE MODES EFFECTS ANALYSIS (FMEA) — CIL HARDWARE
                                   NUMBER: 05-6S-BD102 -X

SUBSYSTEM NAME: EPD&C - DPS&C
                                          REVISION: 2   04/25/96

PART DATA	
PART NAME	PART NUMBER
VENDOR NAME	VENDOR NUMBER

LRU	: FWD PCA 1	V070-763320
LRU	: FWD PCA 2	V070-763340
LRU	: FWD PCA 3	V070-763360
SRU	: DIODE	JANTX1N1186R

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
DIODE, ISOLATION, STUD MOUNTED, 35 AMP

REFERENCE DESIGNATORS: 81V76A22CR32   (*IOP #4, FPCA #1)
                           81V76A22CR33   -   -   -
                           81V76A22CR34   -   -   -
                           81V76A22CR24   (*IOP #1, FPCA #1)
                           81V76A22CR25   -   -   -
                           81V76A22CR26   -   -   -
                           82V76A23CR31   (*IOP #2, FPCA #2)
                           82V76A23CR32   -   -   -
                           82V76A23CR33   -   -   -
                           82V76A23CR37   (*IOP #5, FPCA #2)
                           82V76A23CR38   -   -   -
                           82V76A23CR39   -   -   -
                           83V76A24CR22   (*IOP #3, FPCA #3)
                           83V76A24CR23   -   -   -
                           83V76A24CR24   -   -   -

                           * 5 GPC'S REPLACED 5 IOP'S IN THEIR POSITIONS,
                             WIRING TO DIODES FOR 5 CPU'S NO CONNECTION.

QUANTITY OF LIKE ITEMS: 15
FIFTEEN IN PCA 1, 2, & 3

FAILURE MODES EFFECTS ANALYSIS (FMEA) —CIL HARDWARE
NUMBER: 05-6S-BDI02-X

FUNCTION:
PROVIDES ISOLATION BETWEEN MAIN BUSES A, B, AND C IN THE TRIPLE REDUNDANT
POWER PATHS TO GENERAL PURPOSE COMPUTER (GPC) UNITS 1 THROUGH 5, AND
BACKUP FLIGHT CONTROLLER (BFC) LOGIC.

FAILURE MODES EFFECTS ANALYSIS FMEA — CIL FAILURE MODE
NUMBER: 05-6S-BDI02- 03

REVISION#:   1   04/26/96

SUBSYSTEM NAME: EPD&C - DPS&C
LRU: FWD PCA 1, 2 & 3   **CRITICALITY OF THIS**
ITEM NAME: DIODE   **FAILURE MODE: 1R3**

FAILURE MODE:
SHORTS (END TO END).

MISSION PHASE: PL   PRE-LAUNCH
                    LO   LIFT-OFF
                    OO   ON-ORBIT
                    DO   DE-ORBIT
                    LS   LANDING/SAFING

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

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

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN   A) PASS
                           B) FAIL
                           C) PASS

PASS/FAIL RATIONALE:
A)

B)
FAILS SCREEN "B" BECAUSE SHORTED DIODES ARE NOT DETECTABLE.

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL FAILURE MODE
NUMBER: 05-6S-BDI02- 03

NO EFFECT FIRST FAILURE. LOSS OF PROTECTION AGAINST ASSOCIATED POWER BUS
FAILURE.

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

(C) MISSION:
NO EFFECT FIRST FAILURE.

(D) CREW, VEHICLE, AND ELEMENT(S):
PRIMARY AVIONICS SOFTWARE SYSTEM (PASS): NO EFFECT FIRST FAILURE.

BACKUP FLIGHT SYSTEM (BFS) (PRE-ENGAGE): NO EFFECT FIRST FAILURE.

(E) FUNCTIONAL CRITICALITY EFFECTS:
CRITICALITY 1R3 BECAUSE FAILURE OF FIRST DIODE FOLLOWED BY A SHORT TO
GROUND OF SAME DIODE RESULTS IN THE LOSS OF OUTPUT OF ONE GPC.

DURING ASCENT/ENTRY, POSSIBLE LOSS OF CREW/ VEHICLE FOLLOWING THE LOSS
OF A GPC COUPLED WITH AN UNDETECTED FLIGHT CONTROL SYSTEM (FCS) FAILURE
COULD RESULT IN TWO HEALTHY PATHS BEING VOTED OUT. THIS COULD RESULT IN A
VOTING DILEMMA IN THE FCS (REFERENCE CIL 05-5-B11-1-1 & 05-1-FC6042-1).

-DISPOSITION RATIONALE-

(A) DESIGN:
FOR DISPOSITION AND RATIONALE, REFER TO APPENDIX F, ITEM NO. 1-DIODE.

(B) TEST:
FOR DISPOSITION AND RATIONALE, REFER TO APPENDIX F, ITEM NO. 1-DIODE.

GROUND TURNAROUND TEST. ALL TURNAROUND CHECKOUT TESTING IS
ACCOMPLISHED IN ACCORDANCE WITH OMRSD.

(C) INSPECTION:

FOR DISPOSITION AND RATIONALE, REFER TO APPENDIX F, ITEM NO. 1-DIODE.

FAILURE MODES EFFECTS ANALYSIS (FMEA) — CIL FAILURE MODE
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(D) FAILURE HISTORY:
CURRENT DATA ON TEST FAILURES, FLIGHT FAILURES, UNEXPLAINED ANOMALIES, AND
OTHER FAILURES EXPERIENCED DURING GROUND PROCESSING ACTIVITY CAN BE
FOUND IN THE PRACA DATABASE

FOR DISPOSITION AND RATIONALE, REFER TO APPENDIX F, ITEM NO. 1-DIODE.

(E) OPERATIONAL USE:
THERE ARE NO OPERATIONAL CONSTRAINTS PLACED ON THE ORBITER OR MISSION
ACTIVITIES PRIOR TO THE FAILURE OF THIS PART. THE DETECTION OF A FAILURE OF A
SINGLE PART IS NOT POSSIBLE. THEREFORE, NO ACTIONS ARE TAKEN AFTER THE
FAILURE. THE SYSTEM DESIGN PROVIDES REDUNDANT (3) POWER SOURCES FOR THE
GPC/BFC COMPLEX. EACH SOURCE IS DIODED TO THE OTHER TWO TO PROVIDE A
SINGLE POWER INPUT TO THE GPC, AND BFC. PROTECTION FOR A SINGLE FAILURE IS
PROVIDED BY HARDWARE DESIGN RATHER THAN OPERATIONAL USE OR
INTERVENTION. THERE IS NO SPECIAL CREW TRAINING REQUIRED.

- APPROVALS -

EDITORIALLY APPROVED   : RI
EDITORIALLY APPROVED   : JSC
TECHNICAL APPROVAL   : VIA APPROVAL FORM   : 96-CIL-013_05-6S