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

SUBSYSTEM NAME: EPD&C - DPS&C

REVISION: 2 04/25/96

PART DATA

	PART NAME VENDOR NAME	PART NUMBER 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) –C/L 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- 01

REVISION#: 1 04/26/96

SUBSYSTEM NAME: EPD&C - DPS&C
LRU: FWD PCA 1, 2 & 3
ITEM NAME: DIODE

CRITICALITY OF THIS FAILURE MODE: 1R3

FAILURE MODE:
OPENS, FAILS TO CONDUCT, HIGH RESISTANCE.

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.

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 DIODES ARE NOT INSTRUMENTED.

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL FAILURE MODE
NUMBER: 05-6S-BDI02- 01

LOSS OF ONE OF THREE REDUNDANT POWER SOURCES TO A GENERAL PURPOSE COMPUTER (GPC).

(B) INTERFACING SUBSYSTEM(S):
LOSS OF THREE DIODES WOULD RESULT IN LOSS OF THAT GPC.

(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 DUE TO LOSS OF ONE GPC FOLLOWING THIRD FAILURE (LOSS OF ALL THREE ASSOCIATED DIODES). 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.

(D) FAILURE HISTORY:
FOR DISPOSITION AND RATIONALE , REFER TO APPENDIX F, ITEM NO. 1-DIODE.

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL FAILURE MODE
NUMBER: 05-6S-BDI02-01

CURRENT DATA ON TEST FAILURES, FLIGHT FAILURES, UNEXPLAINED ANOMALIES, AND OTHER FAILURES EXPERIENCED DURING GROUND PROCESSING ACTIVITY CAN BE FOUND IN THE PRACA DATABASE

(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	: Lael Gaston
EDITORIALLY APPROVED	: JSC	: Dan Fraley 7-31-96
TECHNICAL APPROVAL	: VIA APPROVAL FORM	: 96-CIL-013_05-6S