

FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE
 NUMBER: 05-5-B13-1 -X

SUBSYSTEM NAME: DATA PROCESSING SYSTEM (DPS)

REVISION: 0

04/16/86

PART DATA

| | PART NAME | PART NUMBER |
|-----|---|-------------------------------|
| | VENDOR NAME | VENDOR NUMBER |
| | : AFT BAYS 4 & 5 | |
| LRU | : DATA BUS ISOLATION AMP GEC-MARCONI | MC409-0019-0002 K600A50-02 |

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
 DATA BUS ISOLATION AMPLIFIER (DBIA)

REFERENCE DESIGNATORS: 54V72A24
 55V72A26

QUANTITY OF LIKE ITEMS: 2
 TWO

FUNCTION:

THE DBIA IS LOCATED ON THE LAUNCH DATA BUS STUBS FOR THE GROUND SUPPORT EQUIPMENT (GSE) AND SOLID ROCKET BOOSTER (SRB) INTERFACES. THE DBIA CONTAINS IDENTICAL CIRCUITRY FOR TRANSMIT, RECEIVE, LOGIC, CLOCK, COUPLING TRANSFORMERS, AND POWER SUPPLY FOR RETRANSMITTING DATA BUS SERIAL DIGITAL DATA TO/FROM THE GSE AND SRB LINE REPLACEABLE UNITS (LRU)

FAILURE MODES EFFECTS ANALYSIS FMEA - CIL FAILURE MODE

NUMBER: 05-5-B13-1-04

REVISION#: 0 04/16/96

SUBSYSTEM NAME: DATA PROCESSING SYSTEM (DPS)

LRU: DATA BUS ISOLATION AMP

ITEM NAME: DATA BUS ISOLATION AMP

CRITICALITY OF THIS

FAILURE MODE: 1R2

FAILURE MODE:

ALL CREDIBLE MODES. NO OUTPUT, ERRONEOUS OUTPUT.

MISSION PHASE:

PL PRE-LAUNCH

LO LIFT-OFF

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

CAUSE:

PIECE-PART FAILURE, VIBRATION, CONTAMINATION, TEMPERATURE, CHEMICAL REACTION.

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

| | |
|-------------------|---------|
| REDUNDANCY SCREEN | A) PASS |
| | B) FAIL |
| | C) PASS |

PASS/FAIL RATIONALE:

A)

B)

FAILS SCREEN B SINCE SOURCE OF ERRONEOUS OUTPUT CAN NOT BE IDENTIFIED.

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:

NO SINGLE FAILURE POINT IDENTIFIED THAT WOULD CAUSE LOSS OF A DBIA. ONE FAILURE WOULD RESULT IN LOSS OF A SINGLE CHANNEL.

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(B) INTERFACING SUBSYSTEM(S):

LOSS OF LAUNCH PROCESSING SYSTEM (LPS) OR SRB COMMUNICATION CHANNEL ON ONE OF TWO LAUNCH DATA BUSES. TWO FAILURES ARE REQUIRED TO PREVENT PREFLIGHT SRB IGNITION COMMANDS OR IN-FLIGHT SRB STATUS.

(C) MISSION:

NO EFFECT ON MISSION. TWO FAILURES WILL RESULT IN A LAUNCH DELAY.

(D) CREW, VEHICLE, AND ELEMENT(S):

POSSIBLE LOSS OF CREW/VEHICLE.

(E) FUNCTIONAL CRITICALITY EFFECTS:

CRITICALITY 1R2 BECAUSE OF THE FOLLOWING REASON:

DBIA FAILURES DO NOT POSE A HAZARD TO CREW OR VEHICLE DURING PRELAUNCH. DURING MISSION, IF DBIA IS IMPROPERLY TERMINATED, NON-UNIVERSAL I/O ERRORS CAN OCCUR (FROM "RINGING" NOISE EFFECT) CAUSING POTENTIAL LOSS OF PRIMARY AVIONICS SOFTWARE SYSTEM (PASS) REDUNDANT SET. DURING ASCENT OR ENTRY, BACK UP FLIGHT SYSTEM (BFS) ENGAGE IS THEN REQUIRED. IF 2ND FAILURE IS LOSS OF BFS, LOSS OF VEHICLE/CREW WILL RESULT.

-DISPOSITION RATIONALE-

(A) DESIGN:

ALL PARTS SELECTED FROM MF0004-400 ORBITER PROJECT PARTS LIST (OPPL) WHICH CALLS FOR JANXXV LEVEL PARTS, OR HAVE ADEQUATE DERATING FACTORS OF 25-30% ON RESISTORS, CAPACITORS AND OTHER COMPONENTS. ALL PARTS SCREENED AND BURNED-IN PRIOR TO ASSEMBLY. DESIGN ALSO INCORPORATES RELIABILITY, ENVIRONMENTAL AND TRANSPORTABILITY REQUIREMENTS AND OTHER DESIGNS AND CONSTRUCTION PER SPECIFICATION MC409-0020.

(B) TEST:

EACH UNIT SUBJECTED TO ACCEPTANCE TEST PROCEDURE (ATP) TEST E100F569E110 INCLUDING EXAMINATION OF PRODUCT, INSULATION RESISTANCE TEST, DIELECTRIC STRENGTH TEST, AND FUNCTIONAL AND PERFORMANCE TEST.

QUALIFICATION TEST (Y201A335Y010) COMPLETED AT SINGER INCLUDING ELECTROMAGNETIC COMPATIBILITY (EMC), LIFE, THERMAL CYCLE, ACOUSTICS, VIBRATION, THERMAL VACUUM, LIGHTNING AND SHOCK TESTS.

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

(C) INSPECTION:
RECEIVING INSPECTION
CERTIFICATES OF COMPLIANCE ARE IN RECEIVING INSPECTION FILES.

CONTAMINATION CONTROL
CLEAN ROOM IS MONITORED BY INSPECTION.

ASSEMBLY/INSTALLATION
POTTING PROCEDURE PER SINGER KEARFOTT INTERNAL PROCEDURE, WHICH IDENTIFIES CLEANLINESS REQUIREMENTS, IS VERIFIED BY INSPECTION. THE DATA BUS ISOLATION AMPLIFIERS ARE VISUALLY INSPECTED BY BOTH SINGER KEARFOTT INSPECTION AND ROCKWELL PROCUREMENT QUALITY REPRESENTATIVE.

CRITICAL PROCESSES
SOLDERING REQUIREMENTS PER NHBS300.4(3A) ARE VERIFIED BY INSPECTION.

TESTING
FUNCTIONAL TESTS ARE PERFORMED PRIOR TO AND AFTER POTTING AND DURING ATP. ALL ACCEPTANCE TESTS WITNESSED BY INSPECTION.

HANDLING/PACKAGING
PACKAGING AND PROTECTION VERIFIED BY INSPECTION.

(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.

(E) OPERATIONAL USE:
NONE.

- APPROVALS -

| | | |
|----------------------|---------------------|--------------------|
| EDITORIALLY APPROVED | : RI | <i>[Signature]</i> |
| EDITORIALLY APPROVED | : JSC | <i>[Signature]</i> |
| TECHNICAL APPROVAL | : VIA APPROVAL FORM | 96-CIL-013_05-5 |