

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE
NUMBER: 05-5-B23-1 -X**

SUBSYSTEM NAME: DATA PROCESSING SYSTEM (DPS)

REVISION: B 04/08/96

PART DATA

	PART NAME	PART NUMBER
	VENDOR NAME	VENDOR NUMBER
	: FLIGHT DECK	
LRU	: DISPLAY ELECTRONICS UNIT LOCKHEED	MC615-0008-0108, 0109, 0110 6239100-1D

**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
DISPLAY ELECTRONICS UNIT (DEU)**

REFERENCE DESIGNATORS: 30V73A40
30V73A41
30V73A42
30V73A43

QUANTITY OF LIKE ITEMS: 4
3 - FORWARD FLIGHT STATION
1 MISSION STATION

FUNCTION:

RECEIVES AND DECODES COMPUTER SUPPLIED STATIC AND DYNAMIC DATA.
RECEIVES, DECODES AND EXECUTES WHEN APPROPRIATE, DISPLAY REQUESTS
FROM THE KEYBOARD. PROVIDES READ ONLY MEMORY (ROM) FOR STORAGE OF
BACKGROUND AND INPUT INFORMATION FOR STORAGE OF FORMAT SKELETONS FOR
CRITICAL DISPLAYS. ALSO CONTROLS POWER TO THE KEYBOARDS AND DISPLAY
UNITS (DU)

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SUBSYSTEM NAME: DATA PROCESSING SYSTEM (DPS)

LRU: DISPLAY ELECTRONICS UNIT

ITEM NAME: DISPLAY ELECTRONICS UNIT

CRITICALITY OF THIS

FAILURE MODE: 1/1

FAILURE MODE:

ERRONEOUS OUTPUT

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:

VIBRATION, SHOCK, CONTAMINATION, PIECE-PART FAILURE , POWER LOSS OR
KEYBOARD ADAPTER.

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN	A) N/A
	B) N/A
	C) N/A

PASS/FAIL RATIONALE:

A)

B)

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF ONE DEU.

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(B) INTERFACING SUBSYSTEM(S):

NO EFFECT ON THE GENERAL PURPOSE COMPUTER (GPC). GPC CAN PERFORM A LIMITED SET OF REASONABLENESS TESTS AND WILL SEND A ERROR MESSAGE TO THE CREW TO INDICATE THAT THE DEU MESSAGE IS IN ERROR. DISPLAYS ERRONEOUS DATA ON ONE CATHODE RAY TUBE (CRT). ERRONEOUS OUTPUTS CAN CAUSE MIXED PERCEPTION (NON-UNIVERSAL I/O ON THE DISPLAY KEYBOARD (DK) BUSES) RESULTING IN THE LOSS OF THE REDUNDANT SET (RS). BACKUP FLIGHT SYSTEM (BFS) ENGAGE WILL BE REQUIRED FOR RECOVERY.

(C) MISSION:

POTENTIAL LOSS OF VEHICLE/CREW.

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

POTENTIAL LOSS OF VEHICLE/CREW.

(E) FUNCTIONAL CRITICALITY EFFECTS:

CRITICALITY 1/1 BECAUSE OF THE FOLLOWING REASON.

IF DEU OUTPUTS ERRONEOUS DATA TO GPC DUE TO INTERNAL KEYBOARD ADAPTER PAGE FAILURE, OR ANY DEU PROCESSING RELATED FAILURES (KEYBOARD RECEIVER OUTPUT HIGH), THE GPC MAY ACCEPT IT AS VALID DATA. EFFECTS MAY BE CATASTROPHIC.

-DISPOSITION RATIONALE-

(A) DESIGN:

PARTS ARE DERATED 25% TO ORBITER PROJECT PARTS LIST (OPPL) REQUIREMENTS. SOFTWARE SAFEGUARDS HAVE BEEN IMPLEMENTED AND BUILT IN TEST EQUIPMENT (BITE) INCORPORATED. DESIGN GENERATED FROM PREVIOUS DESIGNS OF DEL'S. DESIGN ALSO INCORPORATES RELIABILITY, MAINTAINABILITY, ENVIRONMENTAL AND TRANSPORTABILITY REQUIREMENTS AND OTHER DESIGN AND CONSTRUCTION PER SPECIFICATION MC815-0008.

(B) TEST:

ACCEPTANCE TEST PROCEDURE (TP6239100) (FACTORY TESTING FT6239100), WHICH INCLUDES ACCEPTANCE THERMAL TESTS (ATT), ACCEPTANCE VIBRATION TEST (AVT), EXAMINATION OF PRODUCT, FUNCTIONAL AND PERFORMANCE TEST, INSULATION RESISTANCE TEST, DIELECTRIC STRENGTH TEST, POWER VARIATION TEST AND FUNCTIONAL/CONTINUITY TEST ARE PERFORMED ON EACH UNIT.

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QUALIFICATION TESTING, INCLUDING POWER, ELECTROMAGNETIC COMPATIBILITY (EMC), CABIN ATMOSPHERE, THERMAL CYCLE, VIBRATION, ACCELERATION, THERMAL VACUUM, LIFE, LIGHTNING, AND SHOCK HAS BEEN PERFORMED.

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. RECEIVING INSPECTION PERFORMS ADDITIONAL PHYSICAL ANALYSIS OF MATERIAL.

ASSEMBLY/INSTALLATION

CRITICAL DIMENSIONS ARE VERIFIED BY INSPECTION AND RECORDED. TORQUE VERIFICATION TOOLS ARE USED BY INSPECTION. INSPECTION OF WIRE HARNESS IS PERFORMED DURING IN-PROCESS AND FINAL INSPECTION.

CRITICAL PROCESSES

INSPECTION VERIFIES CRIMPING OPERATION/CERTIFICATION. SOLDERING REQUIREMENTS PER NHB5300.4(3A) ARE VERIFIED BY INSPECTION.

TESTING

ALL ACCEPTANCE TESTS ARE WITNESSED BY DCAS AND LORAL QUALITY CONTROL AND/OR ROCKWELL SOURCE.

HANDLING/PACKAGING

CHECK FOR PROPER CONTAINERS AND CLEANLINESS IS MADE.

(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:

THERE ARE NO OPERATIONAL CONSTRAINTS OR SPECIAL CONFIGURATIONS POSSIBLE TO MINIMIZE THE EFFECTS OF THE FIRST FAILURE. AFTER THE FAILURE, FLIGHT PROCEDURES WILL CALL FOR A POWER CYCLE OF THE DEU AND/OR A DEU INITIAL PROGRAM LOAD (IPL). THERE ARE NO ACTIONS TO PROTECT AGAINST THE NEXT FAILURE. NO SPECIAL CREW TRAINING IS REQUIRED.

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- APPROVALS -

EDITORIALLY APPROVED	: RI	: <u><i>Paul Cooper</i></u>
EDITORIALLY APPROVED	: JSC	: <u><i>Tom Leary 7-31-96</i></u>
TECHNICAL APPROVAL	: VIA APPROVAL FORM	: 95-CIL-013_05-5