

CIL
EMU CRITICAL ITEMS LIST

12/24/91 SUPERSEDES 08/31/90

ANRLTS1:

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NAME P/N QTY	CRIT	FAILURE MODE & CAUSE	PARALLEL EFFECT	RATIONALE FOR ACCEPTANCE
CAUTION AND WARNING SYSTEM, ITEM 158 ----- SV705070-13 (1)	Z/Z	ISDFR07: Failure of one or more permanent memory locations. CAUSE: Electronic component failure.	END ITEM: Erroneous processing of CUS data except status. BITE INTERFACE: Activation of BITE Indicator on BCM and warning tone. All calculated values are suspect. MISSTOM: Terminate EVA. Loss of use of one EMO. CREW/VEHICLE: None.	A. Design - Established reliability capacitors and resistors are qualified to the requirements of applicable military specification and thermal shocked per Condition B Test Method 107 of MIL-STD-202. Microcircuits are qualified to the requirements of MIL-H-30510 and receive the burn-in of Class B parts per Method 5004 of MIL-STD-883. Transistors, diodes are qualified to the requirements of MIL-S-10500 and receive the burn-in of JANTRY level parts per the applicable methods, 1038, 1039, 1040 of MIL-STD-750. The electronic components are operating within the power detering requirements of SV827004. The printed circuit (PC) boards are fiberglass/epoxy per MIL-P-13969 type CP and manufactured in accordance with MSFC-STD-154. Parts mounting and soldering is per MSFC-STD-156 and NRC5300.4 (3A-1). The CUS is a mother/daughter board assembly. The daughter boards are held in place by metal card guides which also provide thermal transfer from the board heatinks to the CUS case. The top cover of the CUS exerts a downward force on the daughter boards to keep them properly seated in the mother board connectors. Flex tape (Kapton Insulated, flexible flat conductor) instead of conventional teflon coated wires is used to provide connections between the mother board and the external connectors. This prevents pinching of the conductor during item assembly. The PC board assemblies are conformal coated per MIL-A-64163 (Dow Corning RTV 3140) for environmental and humidity protection. Electrical connectors are environmentally sealed to prevent damage due to contamination and humidity. B. Test - Component Acceptance Test - Full functioning of the CUS is verified during Item ATP. Tests include continuity, logic flow, X-state sequencing, fault messages, warning and alert tones activation, and BITE activation. These tests are conducted upon completion of random vibration testing. PDA Test - The above electrical tests are repeated during PLSS PDA to verify CUS operation. The CUS is also operational during

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other PL55 PDA electrical tests such as sensor accuracy checks, Item 123 fan operation, Item 174 RTGS checkout, and solenoid valve actuation.

Certification Test -
The item completed the 15 year structural vibration and shock certification requirement during 18/83. EC's 42806-244 (add jumper wires, add diode CR221, change resistor R301), 42806-345-3 (eliminate interferences with PL53), 42806-738 (overstressed resistor R303 due to delta data logger, software change, diode VR201 rewriring), 42806-942 and 42806-942-1 (transistor Q201 lead stress relief) have been incorporated and certified by similarity or analysis since this configuration was tested.

C. Inspection -
Each circuit board, the flex tape, and connectors are inspected for damage and contamination prior to being placed into finished stores. The CWS assembly is inspected internally and externally for damage and contamination during item assembly and externally during ATP. All soldering is inspected by HS 4A and DCAS 0A per NBS300-4(3A-1).

D. Failure History -
J-EMU-15D-ADD1 (7-16-85) During PIA testing, several failures occurred:
BITE light did not come on after power switchover as required.
CWS failed the entire Logic Flow Test.
Buit failed the Tone Test.
The BITE light failure was due to a short circuit in the flex tape between battery power discrete and BITE light control line. The Logic Flow and Tone Test failures were due to a faulty EPROM in the CWS. Both the flex tape assembly and the faulty EPROM were replaced. Additional tests have been added to the CWS IPI and PDA via EC 42806-896.

E. Ground Turnaround -
Tested per FEMU-R-001, BDM bite light verification.

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ANALYST:

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
	2/2	150FM02:		<p>8. Operational Use - Crew Response - PreEVA: Trouble shoot problem, if no success, consider EMU 3 if available. Otherwise continue EVA prep. EVA: When CUS issues SITE warning message and tone indication, trouble shoot problem. EMU go to continue EVA if valid status list can be verified, otherwise terminate EVA. Training - Standard EMU training covers this failure mode. Operational Considerations - Flight rules define operational CUS as at least able to monitor a valid status list. EVA checklist procedures verify hardware integrity and systems operational status prior to EVA. Real Time Data system allows ground monitoring of EMU systems.</p>