CIL
EMU CRITICAL ITEMS LIST

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12/24/91 SUPERSEDES 08/31/90 ANALYST:

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
CAUTION AND WARNING SYSTEM, ITEM 158 --- SV785070-15 (1)	2/2	150FMEA: BITE circuit fails "ON". CAUSE: Electronic component failure.	END ITEM: BITE indicator on DCM is continuously on. OFE INTERFACE: Indication of a CWS failure but unaccompanied by a warning tone or display backlighting. MISSION: Terminate EVA when BITE indicator is noticed during periodic status checks, or when tone sounds. CREW/VEHICLE: None.	A. Design - Established reliability capacitors and resistors are qualified to applicable military standards and thermal shocked per Condition B Test Method 107 of MIL-STD-202. Microcircuits are qualified to the requirements of MIL-M-38510 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-19500 and receive the burn-in of JANTXV level parts per the applicable Methods, 1038, 1039, 1040 of MIL-STD-750. The electronic components are operating within the power derating requirements of SVHS7004. The printed (PC) boards are fiberglass/epoxy per MIL-P-13949 type GF and manufactured in accordance with GR-P-0006. Parts mounting and soldering is per NSFC-STD-136 and NHB5300.4 (3A-1). The CWS is a mother/daughter board assembly. The daughter boards are held in place by metal card guides which also provide thermal transfer from the boards to the CWS case. The top cover of the CWS 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-46146 (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 CWS is verified during Item AIP tests included continuity, logic flow, A-state sequencing, fault simulation, verification of status and fault messages, warning and alert tones activation, and BITE activation. These tests are conducted upon completion of random vibration testing (6.1 grms). PDA Test - The above electrical tests are repeated during PLSS PDA to verify CWS operation. The CWS is also operational during

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	2/2	15BFM10:		other PL55 PDA electrical tests such as sensor accuracy checks, Item 123 Fan Operation, Item 174 RPDS checkout, and Solenoid Valve Actuation. Certification Test - The item completed the 15 year structural vibration and shock certification tests during 10/85. ECNs 42806-244 (add jumper wires, add diode CR221, change resistor R301), 42806-365-3 (eliminate interferences with PL55), 42806-718 (overstressed resistor R903 due to an improper interface circuit in the delta logger GFE, software change, diode VR201 rewiring) 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. Checkout Test - Proper operation of the CWS is verified during electrical PIA tests per FEMU-R-001 during such tests as Transducer and DCN Gauge Calibration Check (RPIA). A full CWS Logic Test is performed a minimum of one every two years per FEMU-R-001, CWS Logic Flow Test. 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 NA QA and NCAS QA per NHB5300.4 (3A-1). D. Failure History - J-EMU-150-ABBB (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, and Suit 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 were added to the CWS IPT and PDA via EC 42806-896.

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	2/2	DSOFM10:		E. Ground Turnaround - Tested per FEMU-R-001, bite light verification. F. Operational Use - Crew Response Pre/Post EVA: Verify status list operational. EMU go for EVA. Consider EMU 3 if available. EVA: Verify status list operational. Continue EVA. Rely on tone for future bite failure warning. Training: Standard training covers this failure mode. Operational Considerations: Flight rules define EMU go/no-go criteria related to CWS. EVA checklist procedures verify hardware integrity and systems operational status prior to EVA. Real Time Data System allows ground monitoring of EMU systems.