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EMU CRITICAL ITEMS LIST

12/24/91 SUPERSEDES 06/31/90

ANALYST:

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NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
CAUTION AND WARNING SYSTEM, ITEM 150 ----- SV78597D-13 (1)	2/2	150FM03: BITE failure in A/D converter.  CAUSE: Electronic component failure.	END ITEM: One or more BIT's in the 10 BIT word never change state.  GPE INTERFACE: BITE indicator turns on.  MISSION: Terminate EVA. Loss of use of one EMU.  CREW/VEHICLE: None.	A. Design - Established reliability capacitors and resistors are qualified to the applicable military specification and thermal shocked per condition B Test Method 107 of MIL-STD-202. Microcircuits are qualified to the requirements of MIL-M-38518 and receive the burn-in of Class B parts per Method 5006 of MIL-STD-883. Transistors, diodes are qualified to the requirements of MIL-S-19540 and receive the burn in of JAN1KV level parts per the applicable methods, 1038, 1039, 1040 of MIL-STD-750. The electronic components are operating within the power derating requirements of SWS 7804. The printed circuit (PC) boards are fiberglass/epoxy per MIL-P-13949 type DF and manufactured in accordance with MSFC-STD-154. Parts mounting and soldering is per MSFC-STD-154 and MSC308.4 (3A-1). The CMS 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 CMS case. The top cover of the CMS 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 (Now Corning RTV 3148) 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 CMS is verified during Item RTP Tests include continuity, logic flow, n-state and fault messages, warning and alert tones activation, and BITE activation. These tests are conducted upon completion of random vibration testing.  PBA Test - The above electrical tests are repeated during PLSB POR to

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ANALYSIS:

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	2/2	150FH03:		<p>verify CMS operation. The CMS is also operational during other PLSS PDA electrical tests such as sensor accuracy checks, Item 123 Fan operation, Item 174 #105 checkout, and solenoid valve actuation.</p> <p><b>Certification Test -</b> The item completed the 15 year structural vibration and shock certification requirements during 10/91. EC's 42806-244 (add jumper wires, add diode CR221, change resistor R101), 42886-345-3 (eliminate interferences with PLSS), 42806-710 (overstressed resistor R105 due to delta data logger, software change, diode VR201 rewrapping) 42806-942 and 42886-942-1 (transistor Q201 lead stress relief) have been incorporated and certified by similarity or analysis since this configuration was tested.</p> <p><b>C. Inspection -</b> Each circuit board, the flex tape, and connectors are inspected for damage and contamination prior to being placed into finished stores. The CMS assembly is inspected internally and externally for damage and contamination during item assembly and externally during ATP. All soldering is inspected by HS SA and DCAS SA per NHB5300.4 (3A-7).</p> <p><b>D. Failure History -</b> None.</p> <p><b>E. Ground Turnaround -</b> Tested per FEMU-R-601, DCN bite tight verification during vacuum chamber run.</p> <p><b>F. Operational Use -</b> Crew Response - Trouble shoot problem, if no success, consider EMU 5 if available. If memory can be determined to be x-state failure, no constraint, continue EVA. Otherwise EMU go for SOL ops. EVA: When CMS issues erroneous messages, troubleshoot with RIMS, continue EVA. Training - No training specifically covers this failure mode.</p>

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	2/2	150FM03:		Operational considerations - flight rules define operational CMS be 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.