

CIL  
EMU CRITICAL ITEMS LIST

12/24/91 SUPERSEDES 08/31/90

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ANALYST:

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
CAUTION AND WARNING SYSTEM, ITEM 150 SV785970-13 (1)	2/2	ISDFM04: EMU time line (X-state) memory faults.  CAUSE: Electronic component failure.	EMD ITEM: Program will not sequence between "X" states to indicate whether crossbar is IV pressurized, IV unpressurized or EVA.  GFE INTERFACE: Erroneous warning messages displayed.  MISSION: Terminate EVA. Loss of use of one EMU.  CREW/VEHICLE: None.	A. Design - Established reliability capacitors and resistors are qualified to applicable military specification and thermal shocked per Condition B Test Method 287 of MIL-STD-202. Microcircuits are qualified to the requirements of MIL-H-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 JANTRY level parts per the applicable methods, 1030, 1039, 1040 of MIL-STD-750. The electronic components are operating within the power derating requirements of SV857004. The printed circuit (PC) boards are fiberglass/epoxy per MIL-P-13049 type GF and manufactured in accordance with NSFC-STD-154. Parts mounting and soldering is per NSFC-STD-156 and NAS3100.4 (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 board heat sinks 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 314H) 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 include continuity, logic flow, X-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.  PDA Test - The above electrical tests are repeated during PLSS PDA to

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	2/2	150FND4:		<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 RTDS checkout, and solenoid valve actuation.</p> <p><b>Certification Test -</b>          The item completed the 15 year structural vibration and shock certification requirement during 10/83. EC's 42806-244 (add jumper wires, add diode CR22), change resistor R3D1), 42806-345-3 (eliminate interferences with PLSS), 42806-710 (overstressed resistor R5U1 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.</p> <p><b>C. Inspection -</b>          Each circuit board, the flux 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 NS DA and DCAS DA per NHB5308.4(3A-1).</p> <p><b>D. Failure History -</b>          None.</p> <p><b>E. Ground Turnaround -</b>          Failure would be detected per FEMU-R-001, DCN display during vacuum chamber run.</p> <p><b>F. Operational Use -</b>  <b>Crew Response -</b> trouble shoot problem, if no success, consider EMU 3 if available. If memory can be determined to be x-state failure, no constraint, continue EVA, otherwise EMU go for SCU ops.</p> <p><b>EVA:</b> When CMS issues erroneous messages, trouble shoot with RTDS, continue EVA.</p>

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	2/2	ISOPND4:		<p>Training - No training specifically covers this failure mode.</p> <p>Operational Considerations - Flight rules define operational CMS as at least able to monitor a valid status list. EVA checklist procedures verify hardware integrity and system operational status prior to EVA. Real Time Data System allow ground monitoring of EMU systems.</p>