NAME P/N QTY	CRLT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
CAUTION AND WARNING SYSTEM, ITEM 150 ---------- SV785970-13 (1)	2/2	150FN09: failure in the microprocessor. CAUSE: Electronic component failure.	END ITEM: Erroneous processing of CWS data. GFE INTERFACE: Activation of BITE indicator on DCN and warning tone. All CWS data suspect. MISSION: Terminate EVA. Loss of use of one EMU. CREW/VEHICLE: None.	A. Design - Established reliability capacitors and resistors are qualified to the requirements of the applicable military specifications 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 SVHS7804. The printed circuit (PC) boards are fiberglass/epoxy per MIL-P-13949 type GF and manufactured in accordance with MSFC-STD-154. Parts mounting and soldering is per MSFC-STD-136 and NHG5300.4 (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 heatsinks 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 ATP 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

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
	2/2	150FH09;		

verify CWS operation. The CWS is also operational during
other PLSS PDA electrical tests such as sensor accuracy
checks, Item 123 Fan Operation, Item 174 AIDS Checkout, and
solenoid valve actuation.

Certification Test -
The item completed the 15 year structural vibration and
shock certification requirement during 10/83. EC's 42806-244
(add jumper wires, add diode CR221) change resistor R301),
42806-345-3 (eliminate interferences with PLSS), 42806-718
(overstressed resistor R303 due to delta logger, 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.

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 RS QA and DCAS QA per NHB5300.4
(3A-1).

D. Failure History -
J-EMU-180-019 (4-23-84) An unwarranted high suit pressure
message was generated during a manned chamber run. EC
42806-718 was issued to revise the CWS software to change
the software rules for resetting the suit pressure limits
during depressurization.

H-EMU-150-A003 (10-22-84) During PLSS PDA testing, no serial
data was available to the test rig from the CWS. The failure
was isolated to an address latch which had been damaged by
Electrostatic Discharge. Device handling procedures at the
device screening house (Associated Test Labs) were found
inadequate and were revised.

J-EMU-150-004 (9-4-85), J-EMU-150-005 (3-7-86), During
manned chamber runs on battery power, an inadvertent POR
message was generated when the 123 Fan was turned on due to
transient voltage drop in the 5.6V and 14.2 power supplies

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
	2/2	150FN09:		

to the CWS caused by the motor inrush current. No corrective action implemented because the the display recovers after 5 seconds and does not lock in the Power Restart message.

J-EMU-150-A001(5-9-86), The Bite light failed to illuminate during startup in the Battery power mode due to a short in the internal flex tape wiring. The CWS also failed the Logic Flow Test at low input voltages due to a failure in the U407 memory microcircuit . EC42806-896 and EC42806-718-7 add more thorough in process tests and CWS Acceptance Testing to detect these conditions.

H-EMU-150-D009 (11/10/93) - The CWS displayed an erroneous "PWR RESTART" message during powered vibration testing due to conductive loose particles in the analog board's U105 component cavity. Depending on its location, this conductive material causes momentary shorts between adjacent pins of the M2C819. EC 163402-553 imposes PIND testing to detect loose particles in the CWS board IC's and other cavity devices prior to installation.

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

F. Operational Use -
Crew Response -
PreEVA: Trouble shoot problem using RTDS, If no success, consider EMU 3 if available. EMU no go for EVA.
EVA: When CWS issues BITE indication and RTDS confirms invalid EMU BITE data, terminate EVA.
Training -
Standard EMU training covers this failure mode.
Operational Considerations -
Flight rules define operational CWS 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.