NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
DCM ELECTRONICS, ITEM 350 --- SV792291-27 (1)	2/1R3	350FM18: Tone control interface fails in "TONE OFF" state. CAUSE: Electrical wiring or electronic component failure.	END ITEM: Warning, status, or thruster. Tones are never actuated. GFE INTERFACE: Fails to provide audible failure warning when warning message is displayed. MISSION: Crew would not be alerted to subsequent failures and could not properly respond with corrective action. Loss of use of one EMU. CREW/VEHICLE: None for single failure. Possible loss of crewman with loss of CCC, oxygen or low vent flow.	A. Design - Semiconductor failure is minimized through the use of high reliability components. Established reliability capacitors (Level S) and resistors (Level R) are used and are qualified to the requirements of their respective MIL specs and thermal shocked per condition B of MIL-STD-202 Method 107. The transistors and 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, and 1040, of MIL-STD-750. The electronic components are operating within the power derating requirements of SVHS 7804. The printed circuit boards are polyimide per MIL-P-13949 Type GI and manufactured per SW-P-0006. Parts mounting and soldering is per MSFC-STD-136 and NHB5300. 4 (3A-1). The board assemblies are hard mounted to the DCM case to provide a thermal transfer path between the board heat sinks and the case to direct heat away from the electronic components. The board assemblies are also conformal coated per MIL-A-46146 (Dow Corning RTV 3140) for protection. All wiring used in the DCM is M22759/11 (teflon insulated). Soldering is per NHB5300. 4 (3A-1) and wire crimping is per SVHS 4909 (based on MSC-SPEC-Q-1A). All wires are strain relieved. Electrical connectors are environmentally sealed to prevent damage due to contamination and humidity. B. Test - In-Process: The DCM electronics assembly is tested during initial build-up; at the board assembly level, after the PC boards have been interwired after installation of the boards and wiring, and after installation of the front cover. These tests consists of continuity through the switches and wiring, voltage checks, functional check of all current limiter, and full operation of the DCM electronics. The tests insure proper operation of the DCM electronics. PDA: Vibration testing per SEMU-60-015 followed by continuity and full function, testing verifies the integrity of the solder joints and crimp connections in the DCM. The random vibration level for this test is 6.6 grms, for a duration of

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
	2/1RB	350FM18:		1 minute per axis for each of the three orthogonal axes.(JSC SPEC SP-T-0023).

Thermal vacuum testing followed by full functional electrical testing per SEMU-68-015 also verifies the solder joints as well as the acceptability of the components. The DCM is placed in a vacuum chamber at 1 x 10-3 torr. The DCM case temperature is cycled 3 times from 70 to 130 degree F. At the end of the third cycle, the temperature is held between 130 and 135 degree F for a minimum of four hours. The DCM display must remain on throughout the test. This verifies proper transfer of heat from the electronic to the DCM case to prevent overheating of components.

Certification:
The Liquid Crystal Display version of the DCM electronics assembly (Item 350, SV792291-7), as part of the full DCM Item 300 (Items 350 and 385 combined), was successfully subjected to levels of vibration and shock equivalent to those experienced over a fifteen (15) year life.

Random Flight Vibration	1.625 grms	48 min/axis
Sinusoidal Flight Vibration	1 grams	5-35 Hz ea. axis
Design Shock	6.5 grms	11 ms/peak

The LED display version of the DCM electronics Assembly (Item 350, SV792291-5) was subjected to certification testing between June and August of 1986 with the exception of EMI which occurred in September of 1985. The testing verified the integrity and flight worthiness of the redesign DCM configuration (Item 308, SV792296). The Item 350 completed qualification vibration (7.8 grms, 6 minutes per axis) as a separate item, and structural vibration (1.625 grms, 48 minutes per axis), and shock testing as part of the full DCM Item 300 (Item 350 combined with Item 385). The DCM/308 also completed the four hour thermal vacuum certification at 135 degree F and storage temperature testing at 35 degree F. No class I EC's have been incorporated into this version of the DCM since certification was completed.

C. Inspection -
100% inspection is all soldering (PC boards and wiring) by

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
	2/1RD	350FM10:		Hamilton Standard QA and BCAS QA. All board assemblies are inspected for damage and contamination. All wiring is inspected for damage, nicks in the insulation, wear, and, strain relief. The DCM is internally inspected after installation of the circuit boards and wiring to insure no damage has occurred during assembly. D. Failure History - None. E. Ground Turnaround - Proper tones operation is verified FEMU-R-001, Tones Test. F. Operational Use - Crew Response - Pre-EVA : If detected during programmed task check or airlock depress, troubleshoot problem. If no success, consider third EMU if available. Otherwise, continue EVA. rely on visual monitoring displayed messages. EVA : If detected during airlock depress, continue EVA. Rely on visual monitoring of displayed messages. Otherwise, no response, single failure not detectable by crew or ground. Special Training - Standard EMU training covers this failure mode. Operational Considerations - For single failure, no constraints. Flight rules define operational EMU CWS as at least able to monitor a valid status list. Real Time Data System allows ground monitoring of EMU systems.