NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
ELECTRICAL POWER HARNESS, ITEM 151 --- SV789151-4 (1)	2/2	151FM13: Electrical open or short, receiver volume control HI/WIPER/LO lines. CAUSE: Cable chafing against connector shell or shield. Improper connector strain relief. Faulty connection between connector and lead wires.	END ITEM: Electrical open or short to ground in receiver A1 and R2/R3 volume control HI/WIPER/LO lines. SFE INTERFACE: Loss of receiving communications. MISSION: Terminate EVA. CREW/VEHICLE: Terminate EVA.	A. Design - Open and short circuits in any of the circuits in the Item 151 harness are minimized by the following: Conductors are hard potted in Stycast 2651 in the area that they interface with the metal backshells to minimize their movement and chance of shorting to the backshell. The conductors are strain relieved at the connector/harness interface with a molded rubber backshell. This minimizes the effects of cable tension on the individual conductors. Conductors are sheathed within a woven Nomex outer layer. This holds the cables together to share any loading. Each connector/adapter ring interface is locked in place to prevent rotation by a mechanical and adhesive lock. #22 and #24 AWG Teflon insulated wires provide electrical and mechanical properties to prevent wire breakage and to help prevent shorting. Wire crimping per SVSH4909 (based on NSFC-Spec-C-1A). B. Test - Component Acceptance: The harness is acceptance tested per the following tests of A1-EMU-151 to insure there are no workmanship problems which would cause actual or potential open or short circuits. Pull Test - This test subjects each connector/harness interface to a specific pull test (9 pounds) designed to exceed any stress encountered in actual use. The insulation resistance between each conductor and the ground circuit is measured during the test to insure there is no shorting. The test is followed by a continuity check of each conductor path to insure there are no open circuits. Continuity Test - The resistance of each circuit is measured to insure there are no open circuits or high resistance paths. Insulation Resistance/Dielectric Strength Testing - The harness is tested for short circuits or low resistance paths between each conductor to the shield circuit(s) and between each conductor to each other conductor by insulation resistance and dielectric strength measurements at 200 VDC and 205 VAC respectively. PDA Test - An open or short circuit in the receiver volume control HI/wiper or LO/lines would be detected during the Audio Test portion of PLSS PDA testing per Para. 6.0 of SEMU-60-010.

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Certification Test -
This item completed the 15 year structural vibration and shock certification requirement during 10/83. EC's 42806-527-2 (insulation resistance check during Pull Test) and 42806-865 (remove crimp splices) have been incorporated and certified by test since this configuration was certified.

C. Inspection -
During harness manufacturing, the following inspections are performed:
Visual inspection of conductors prior to potting operations to insure there are no damaged conductors and that the conductors are routed properly.
Visual inspection of the harness prior to and after rubber boot molding process to insure there are no damaged conductors which could cause an open or short circuit.
In-process electrical checkout of the harness before and after potting and molding to insure there are no open or short circuits.
Visual inspection of the conductors prior to application of the outer sheath to insure there are no damaged conductor that could cause an open or short circuit. Connector contact crimp samples are made prior to and after crimping and subjected to pull testing to insure the crimping tools are operating properly. This insures there will not be any high resistance problems at the contacts.

D. Failure History -
The following NOR's were issued for Item 151 due to open circuits.
H-EMU-151-0001 (7-8-83)
Intermittent open due to a broken wire at the P12 connector during acceptance testing. This failure was caused by a workmanship problem. The corrective action taken was to add a visual inspection prior to molding.

H-EMU-151-0002 (12-14-83) Intermittent open due to a broken wire at the P3 connector during acceptance testing due to a workmanship problem. The corrective action taken was to issue EC 42806-527 which fixes the angular location of the P3 adapter ring slot to insure proper wire exit and EC

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	2/2	151FN13:		42806-527-2 which requires that a pull test be performed to detect opens or shorts. 8-EMU-151-F001 (12/13/93) EMU #3 did not receive transmissions from in-cabin crewmembers during STS-61 due to an intermittent harness connection caused by improper crimping. Two changes to ensure proper harness builds in the future have been made: 1) Crimp sample test sheets will now be retained with build books for future harness builds. 2) To ensure proper adhesion of viton and stycast to the teflon wires on future harness builds, visual inspection will verify the post etch color of dark brown rather than a "visible color change". The following RDR's were issued for Item 151 failures caused by short circuits: 4-EMU-151-D003 (8-27-84) Short circuits between a P3 connector conductor and the adapter ring caused by an improper rework that rotated the connector adapter ring/connector assembly 20 deg. relative to the molded rubber form. This forced the conductors against the adapter ring slot edge and a short circit resulted. EC's 42806-527 and 527-2 have been issued to specify an angular location requirement between the adapter ring slot and the master keyway and to pull test each connector/harness interface. J-EMU-151-004 and J-EMU-151-005 (6-12-85) - Both failures occurred during an ETA Airlock Power Supply Functional Test. The failures were caused by a short circuit between the EVC power/battery sense (+) lines and case ground (connector body). The failure caused the power return line in the DCM to fuse open. The failure investigation found that a crimp splice within the molded backshell was not sufficiently covered by shrink tubing. The exposed portion of the crimp was allowed to come in contact with the connector body. Corrective Action: Class I EC 42806-527 created the SV789151-3 harness configuration by adding a connector pull test requirement to the acceptance test requirements. Class I EC 42806-865 created the SV789151-4 harness configuration by eliminating the two crimp splices in the P9 connector, to prevent them from shorting to case.

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E. Ground Turnaround -
Tested per FEMU-R-001, SEMU Pre-flight Communications and Biomed Check.

F. Operational Use -
Crew Response - PreEVA: Trouble shoot problem. Consider third EMU if available. If hardline is available, EMU is go for SCU. Continue EVA prep. Otherwise, terminate EVA prep. EVA: When loss of minimum comm occurs, terminate EVA.
Training - Standard training covers this failure mode.
Operational Considerations - EVA checklist procedures verify hardware integrity and system operational status prior to EVA. Flight rules require that EVA be terminated if two-way communication between each EV crewmember and orbiter, either direct or through relay, is unavailable.