

ASSY NOMENCLATURE: RMS IFM D&C KIT

SYSTEM: REMOTE MANIPULATOR SYSTEM

REVISION: B

ASSY P/N SED33103306-304

SUBSYSTEM: RMS IFM D&C KIT

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CRITICAL ITEMS LIST

FMEA		NAME, QTY & DRAWING REF DESIGNATION	CRIT'Y/ REQ'D NO SCREENS	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	RATIONALE FOR ACCEPTANCE
REF	REV					
5080	B	DIRECT DRIVE COMMAND SIGNAL CIRCUIT, QTY. 1 (SET OF RESISTORS (R1, R3), ZENER DIODES (D1, D2), AND CAPACITOR (C1)) SIE33103307	1/1 A - N/A B - N/A C - N/A	<p>Mode: Short circuit of zener diode D2</p> <p>Cause: • structural failure • mechanical stress • vibration • electrical stress • resistor R1 fails short.</p>	<p>With "pos" drive command, joint will drive in "neg" direction. With "neg" drive command, joint will not move.</p> <p><u>Worst Case</u> Unexpected motion Wrong joint direction Crew action required</p>	<p>1. DESIGN The part is a glass enclosed, silicon zener diode, type 1ANTX 1N753A, manufactured by Motorola and qualified to MIL-S-19500. Resistor R1 is a fixed, wire wound, established reliability part, type RWR 8957500F8, manufactured by Dale and qualified to MIL-R-39007</p> <p>2. TEST</p> <p>a. QUALIFICATION/CERTIFICATION</p> <p>(1) The zener diode is qualified to MIL-S-19500/127 by Motorola. The resistor is qualified to MIL-R-39007 by Dale.</p> <p>(2) The zener diode and resistor, while installed in the RMS IFM D&C kit, have been subjected to the following qualification environmental tests: Vibration: X, Y, and Z axes - duration 15 min./axis. Spectrum: 20 to 80 Hz + 3 db/Oct 80 to 350 Hz 0.067 g²/Hz 350 to 2000 Hz -3 db/Oct Shock: 20 g sawtooth pulse, 11 ms duration, 3 axes (6 directions)</p> <p>b. ACCEPTANCE</p> <p>The zener diode and resistor, while installed in the RMS IFM D&C kit, have been subjected to the following acceptance environmental tests Vibration: X, Y, and Z axes - duration 3 min./axis. Spectrum: 20 to 80 Hz + 3 db/Oct 80 to 350 Hz 0.04 g²/Hz 350 to 2000 Hz -3 db/Oct Shock: 20 g sawtooth pulse, 11 ms duration, 3 axes (6 directions)</p> <p>c. TURNAROUND</p> <p>The RMS IFM D&C kit is visually inspected for damage between missions and will be functionally tested before every mission to assure readiness for use</p>

PREPARED BY: J. P. Grisham

SUPERSEDING DATE 10/89

APPROVED BY: R. L. Moore

DATE 9/50

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CRITICAL ITEMS LIST

FMEA		NAME, QTY & DRAWING REF DESIGNATION	CRITY/ REQD/ND SCREENS	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END-ITEM	RATIONALE FOR ACCEPTANCE
REF	REV					
5080	B	DIRECT DRIVE COMMAND SIGNAL CIRCUIT, QTY. 1 (SET OF RESISTORS (R1, R3), ZENER DIODES (D1, D2), AND CAPACITOR (C1)) SED3103307	1/1 A - N/A B - N/A C - N/A	<p>Mode: Short circuit of zener diode D2</p> <p>Cause: <ul style="list-style-type: none"> • structural failure • mechanical stress • vibration • electrical stress • resistor R1 fails short </p>	<p>With "pos" drive command, joint will drive in "neg" direction. With "neg" drive command, joint will not move.</p> <p><u>Worst Case</u> Unexpected motion. Wrong joint direction. Crew action required.</p>	<p>3. <u>INSPECTION:</u></p> <ol style="list-style-type: none"> a. The zener diodes are inspected during manufacture to the requirements of MIL-S 19500. The resistors are inspected during manufacture to the requirement of MIL-R 39007. b. Receiving inspection verifies: (1) that the zener diodes and resistors received are as identified in the procurement documents, (2) that no physical damage has occurred to the zener diodes or resistors during shipment, (3) that the receiving documents provide adequate traceability information, and (4) acceptance test data identify acceptable parts. c. Parts are inspected throughout manufacture and assembly as appropriate to the manufacturing stage completed. These inspections include: (1) component mounting to the front panel of the kit, (2) soldering components, (3) wire routing, (4) stress relief of wires, etc. d. A test readiness review, which includes verification of test personnel, test documents, test equipment calibration/validation status, and hardware configuration, is covered by the Quality Assurance and Engineering Division in conjunction with the Engineering Directorate and Reliability and Maintainability Division. e. Acceptance Test Procedure (ATP) is observed and verified per procedure. <p>4. <u>FAILURE HISTORY:</u></p> <p>There have been no failures associated with this failure mode on the RMS IFM D&C kit program. NSTS Program part failure history indicates no reported failures for this device. A review of GIDEP prior military part failure history reveals that no uncorrected generic issues exist.</p> <p>5. <u>OPERATIONAL EFFECTS:</u></p> <p>Joint does not respond properly to commands. Joint will drive in the negative direction when a positive drive command and will not drive with a negative drive command.</p> <p>6. <u>CREW ACTION:</u></p> <p>Remove command. Select backup mode.</p>

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FMEA		NAME, QTY & DRAWING REF DESIGNATION	CNTY/ REDUND SCREENS	FAILURE MODE AND CAUSE	FAILURE EFFECT OR END ITEM	RATIONALE FOR ACCEPTANCE
REF	REV					
5080	B	DIRECT DRIVE COMMAND SIGNAL CIRCUIT, QTY. 1 (SET OF RESISTORS (R1, R3), ZENER DIODES (D1, D2), AND CAPACITOR (C1)) SIE33103307	1/1 A - N/A B - N/A C - N/A	Mode: Short circuit of zener diode D2 Cause: • structural failure • mechanical stress • vibration • electrical stress • resistor R1 fails short	With "pos" drive command, joint will drive in "neg" direction. With "neg" drive command, joint will not move. <u>Worst Case</u> Unexpected motion. Wrong joint direction Crew action required	7. <u>CREW TRAINING.</u> The crew will be trained to always observe whether the arm is responding properly to commands. If it is not, the command will be removed. 8. <u>MISSION CONSTRAINT.</u> The crew must be able to detect whether the arm is responding properly to commands via window and/or CCTV views during all arm operation

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