

CRITICAL ITEMS LIST

PROJECT: SRMS
ASS'Y NOMENCLATURE: SI

SPAR AMPLIFIER

SYSTEM: ELECTRICAL SUBSYSTEM
ASS'Y P/N: 2114071177

SHEET: 1

ITEM REF.	REV.	NAME, QTY & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	RISK / FUNC. 2/IRAB CRITICALITY	RATIONALE FOR ACCEPTANCE
3020	0	CURRENT LIMITER QTY-6 SCHEMATIC 2563710	MODE: MOA BITE PERMANENT LOW. CAUSE(S): (1) U258 FATLS LOW.	WILL NOT DETECT REAL MOA FAILURE. WORST CASE LOSS OF MISSION. SUBSEQUENT FAILURE MAY CAUSE UNEXPECTED MOTION. UNANNUNCIATED. CREW ACTION REQUIRED. REDUNDANT PATHS REMAINING MOA RIMAWAY FAILURE	DESIGN FEATURES	THE DESIGN UTILIZES PROVEN CIRCUIT TECHNIQUES AND IS IMPLEMENTED USING CMOS LOGIC DEVICES. CMOS DEVICES OPERATE AT LOW POWER AND HENCE DO NOT EXPERIENCE SIGNIFICANT OPERATING STRESSES. THE TECHNOLOGY IS MATURE, AND DEVICE RELIABILITY HISTORY IS WELL DOCUMENTED. ALL STRESSES ARE ADDITIONALLY REDUCED BY DERATING THE APPROPRIATE PARAMETERS IN ACCORDANCE WITH SPAR-RMS-PA.003. SPECIAL HANDLING PRECAUTIONS ARE USED AT ALL STAGES OF MANUFACTURE TO PRECLUDE DAMAGE/STRESS DUE TO ELECTROSTATIC DISCHARGE.

RMS/ELEC - 701

PREPARED BY: MFUG

SUPERSEDING DATE: 11 SEP 86

APPROVED BY:

DATE:

CRITICAL ITEMS LIST

PROJECT: SMS
 ASS'Y NOMENCLATURE: SERVO POWER AMPLIFIER

SYSTEM: ELECTRICAL SUBSYSTEM
 ASS'Y P/N: 5114071177

SHEET: 2

P/N & REF.	REV.	NAME, QTY, & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	RPN / TUNC. 2/1RAB CRITICALITY	RATIONALE FOR ACCEPTANCE
3020	0	CURRENT LIMITER QTY: 6 SCHEMATIC 2563710	MODE: MDA BITE PERMANENT LOW. CAUSE(S): (1) U23D FAILS LOW.	WILL NOT DETECT REAL MDA FAILURE. WORST CASE ----- LOSS OF MISSION. SUBSEQUENT FAILURE MAY CAUSE UNEXPECTED MOTION. UNANNUNCIATED. CREW ACTION REQUIRED. REDUNDANT PATHS REMAINING ----- MDA RUNAWAY FAILURE		<p>ACCEPTANCE TESTS ----- THE SPA IS SUBJECTED TO THE FOLLOWING ENVIRONMENTAL TESTING AS AN SRU.</p> <ul style="list-style-type: none"> O VIBRATION: LEVEL AND DURATION - REFERENCE TABLE 4 O THERMAL: PLUS 70 DEGREES C TO -25 DEGREES C DURATION - 1 1/2 CYCLES <p>THE SPA IS THEN TESTED AS PART OF THE JOINTS ACCEPTANCE TESTS (VIBRATION AND THERMAL VACUUM TEST).</p> <p>THE SPA'S/JOINTS UNDERGO RMS SYSTEM TESTS (TP510 RMS STRONGBACK AND TP552 FLAT FLOOR TESTS) WHICH VERIFIES THE ABSENCE OF THE FAILURE MODE.</p> <p>QUALIFICATION TESTS ----- THE SPA IS SUBJECTED TO THE FOLLOWING SRU QUALIFICATION TEST ENVIRONMENTS. THE SPA WAS ALSO TESTED AS PART OF THE JOINT QUALIFICATION TESTS.</p> <ul style="list-style-type: none"> O VIBRATION: LEVEL AND DURATION - REFERENCE TABLE 4 O SHOCK: 20G/11 MS/3 AXES (6 DIRECTIONS) O THERMAL VAC: +81 DEGREES C TO -36 DEGREES C (6 CYCLES) 1X10⁻⁶ TORR O HUMIDITY: TESTED WITH THE SHOULDER JOINT O EMC: MIL-STD-461 AS MODIFIED BY SL-E-0002 (TEST CE01, CE03, CS01, CS02, CS06, RE01, RE02 (N/B), RS01) <p>FLIGHT CHECKOUT ----- PDORS OPS CHECKLIST (ALL VEHICLES) JSC 16987</p>

RMS/ELEC - 702

CRITICAL ITEMS LIST

PROJECT: SRMS
ASS'Y NOMENCLATURE:

POWER AMPLIFIER

SYSTEM: ELECTRICAL SUBSYSTEM
ASS'Y P/N: 51746F1177

SHEET: 3

ITEM REF.	REV.	NAME QTY & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT (W/ END ITEM)	HOUR 7 FUNC. 2/1RAD CRITICALITY RATIONALE FOR ACCEPTANCE
3020	0	CURRENT LIMITER QTY 6 SCHEMATIC 2563718	<p>MODE: HDA OUIE PERMANENT LOW.</p> <p>CAUSE(S): (1) U23B FAILS LOW.</p>	<p>WILL NOT DETECT REAL HDA FAILURE.</p> <p>WORST CASE</p> <p>LOSS OF MISSION. SUBSEQUENT FAILURE MAY CAUSE UNEXPECTED MOTION. UNANNUNCIATED. CREW ACTION REQUIRED.</p> <p>REDUNDANT PATHS REMAINING</p> <p>HDA RUNAWAY FAILURE</p>	<p>QA/INSPECTIONS</p> <p>UNITS ARE MANUFACTURED UNDER DOCUMENTED QUALITY CONTROLS. THESE CONTROLS ARE EXERCISED THROUGHOUT DESIGN PROCUREMENT, PLANNING, RECEIVING, PROCESSING, FABRICATION, ASSEMBLY, TESTING AND SHIPPING OF THE UNITS. MANDATORY INSPECTION POINTS ARE EMPLOYED AT VARIOUS STAGES OF FABRICATION ASSEMBLY AND TEST. GOVERNMENT SOURCE INSPECTION IS INVOKED AT VARIOUS CONTROL LEVELS.</p> <p>EEE PARTS INSPECTION IS PERFORMED AS REQUIRED BY SPAR-RMS-PA.003. EACH EEE PART IS QUALIFIED AT THE PART LEVEL TO THE REQUIREMENTS OF THE APPLICABLE SPECIFICATION. ALL EEE PARTS ARE 100% SCREENED AND BURNED IN, AS A MINIMUM, AS REQUIRED BY SPAR-RMS-PA.003, BY THE SUPPLIER. ADDITIONALLY, EEE PARTS ARE 100% RE-SCREENED IN ACCORDANCE WITH REQUIREMENTS, BY AN INDEPENDENT SPAR APPROVED TESTING FACILITY. DPA IS PERFORMED AS REQUIRED BY PA.003 ON A RANDOMLY SELECTED 5% OF PARTS, MAXIMUM 5 PIECES, MINIMUM 3 PIECES FOR EACH LOT NUMBER/DATE CODE OF PARTS RECEIVED.</p> <p>WIRE IS PROCURED TO SPECIFICATION MIL-W-22759 OR MIL-W-81301 AND INSPECTED AND TESTED TO NASA JSC8000 STANDARD NUMBER 95A.</p> <p>RECEIVING INSPECTION VERIFIES THAT ALL PARTS RECEIVED ARE AS IDENTIFIED IN THE PROCUREMENT DOCUMENTS, THAT NO PHYSICAL DAMAGE HAS OCCURRED TO PARTS DURING SHIPMENT, THAT THE RECEIVING DOCUMENTS PROVIDE ADEQUATE TRACEABILITY INFORMATION AND SCREENING DATA CLEARLY IDENTIFIES ACCEPTABLE PARTS.</p> <p>PARTS ARE INSPECTED THROUGHOUT MANUFACTURE AND ASSEMBLY AS APPROPRIATE TO THE MANUFACTURING STAGE COMPLETED. THESE INSPECTIONS INCLUDE,</p> <p>PRINTED CIRCUIT BOARD INSPECTION FOR TRACK SEPARATION, DAMAGE AND ADEQUACY OF PLATED THROUGH HOLES,</p> <p>COMPONENT MOUNTING INSPECTION FOR CORRECT SOLDERING, WIRE LOOPING, STRAPPING, ETC. OPERATORS AND INSPECTORS ARE TRAINED AND CERTIFIED TO NASA W80 5300.4(SA) STANDARD, AS MODIFIED BY JSC 0880A.</p> <p>CONFORMAL COATING INSPECTION FOR ADEQUATE PROCESSING IS PERFORMED USING ULTRAVIOLET LIGHT TECHNIQUES.</p> <p>POST P.C. BD. INSTALLATION INSPECTION, CLEANLINESS AND WORKMANSHIP (SPAR/GOVERNMENT REP. MANDATORY INSPECTION POINT)</p> <p>P.C. BD. INSTALLATION INSPECTION, CHECK FOR CORRECT BOARD INSTALLATION, ALIGNMENT OF BOARDS, PROPER CONNECTOR CONTACT MATING, WIRE ROUTING, STRAPPING OF WIRES ETC.,</p> <p>PRE-CLOSURE INSPECTION, WORKMANSHIP AND CLEANLINESS (SPAR/GOVERNMENT REP. MANDATORY INSPECTION POINT)</p> <p>PRE-ACCEPTANCE TEST INSPECTION, WHICH INCLUDES AN AUDIT OF LOWER TIER INSPECTION COMPLETION, AS BUILT CONFIGURATION VERIFICATION TO AS DESIGN ETC., (MANDATORY INSPECTION POINT)</p>

RMS/ELEC - 703

PREPARED BY: MFG

SUPERSEDING DATE: 11 SEP 86

APPROVED BY:

DATE:

CRITICAL ITEMS LIST

PROJECT: SRMS
 ASS'Y NOMENCLATURE: SERVO POWER AMPLIFIER

SYSTEM: ELECTRICAL SUBSYSTEM
 ASS'Y P/N: 51140F1177

SHEET: 4

P/N & REF.	REV.	NAME, QTY, & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	R/R / FUNC. 2/FRAB CRITICALITY RATIONALE FOR ACCEPTANCE
3020	0	CURRENT LIMITER QTY: 4 SCHEMATIC 2563718	MODE: NDA BITE PERMANENT LOW. CAUSE(S): (1) U258 FAILS LOW.	WILL NOT DETECT REAL NDA FAILURE. WORST CASE ----- LOSS OF MISSION. SUBSEQUENT FAILURE MAY CAUSE UNEXPECTED MOTION. UNANNUNCIATED. CREW ACTION REQUIRED. REDUNDANT PATHS REMAINING ----- NDA RUNAWAY FAILURE	<p>A TEST READINESS REVIEW (TRR) WHICH INCLUDES VERIFICATION OF TEST PERSONNEL, TEST DOCUMENTS, TEST EQUIPMENT CALIBRATION/ VALIDATION STATUS AND HARDWARE CONFIGURATION IS CONVENED BY QUALITY ASSURANCE IN CONJUNCTION WITH ENGINEERING, RELIABILITY, CONFIGURATION CONTROL, SUPPLIER AS APPLICABLE, AND THE GOVERNMENT REPRESENTATIVE, PRIOR TO THE START OF ANY FORMAL TESTING (ACCEPTANCE OR QUALIFICATION).</p> <p>ACCEPTANCE TESTING (ATP) INCLUDES AMBIENT PERFORMANCE, THERMAL AND VIBRATION TESTING, (SPAR/GOVERNMENT REP. - MANDATORY INSPECTION POINT).</p> <p>INTEGRATION OF UNIT TO JOINT SRU - INSPECTIONS INCLUDE GROUNDING CHECKS, CONNECTORS FOR BENT OR PUSHBACK CONTACTS, VISUAL, CLEANLINESS, INTERCONNECT WIRING AND POWER UP TEST TO THE APPROPRIATE JOINT INSPECTION TEST PROCEDURE (IIP) ETC.</p> <p>JOINT LEVEL PRE-ACCEPTANCE TEST INSPECTION, INCLUDES AN AUDIT OF LOWER TIER INSPECTION COMPLETION, AS BUILT CONFIGURATION VERIFICATION TO AS DESIGN ETC.</p> <p>JOINT LEVEL ACCEPTANCE TESTING (ATP) INCLUDES AMBIENT, VIBRATION AND THERMAL-VAC TESTING, (SPAR/GOVERNMENT REP. - MANDATORY INSPECTION POINT).</p> <p>SRMS SYSTEMS INTEGRATION, THE INTEGRATION OF MECHANICAL ARM SUBASSEMBLIES AND THE FLIGHT CABIN EQUIPMENT TO FORM THE SRMS. INSPECTIONS ARE PERFORMED AT EACH PHASE OF INTEGRATION WHICH INCLUDES GROUNDING CHECKS, THRU WIRING CHECKS, WIRING ROUTING, INTERFACE CONNECTORS FOR BENT OR PUSH BACK CONTACTS ETC.</p> <p>SRMS SYSTEMS TESTING - STRONGBACK AND FLAT FLOOR AMBIENT PERFORMANCE TEST. (SPAR/GOVERNMENT REP. - MANDATORY INSPECTION POINT)</p>

RMS/ELEC - 704

PREPARED BY: MUG

SUPERSEDING DATE: 11 SEP 86

APPROVED BY:

CRITICAL ITEM LIST

PROJECT: SRMS
ASSY NOMENCLATURE:

POWER AMPLIFIER

SYSTEM: ELECTRICAL SUBSYSTEM
ASSY P/N: 51140/1177

SHEET: 5

ITEM REF.	REV.	NAME, QTY & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	RISK / FUNC. 2/1RAD CRITICALITY	RATIONALE FOR ACCEPTANCE
3020	0	CURRENT LIMITER QTY-6 SCHEMATIC 2563718	MODE: MOA BITE PERMANENT LOW. CAUSE(S): (1) U238 FAILS LOW.	WILL NOT DETECT REAL MOA FAILURE. WORST CASE LOSS OF MISSION. SUBSEQUENT FAILURE MAY CAUSE UNEXPECTED MOTION. UNANNUNCIATED. CREW ACTION REQUIRED. REDUNDANT PATHS REMAINING MOA RUNAWAY FAILURE	FAILURE HISTORY	THERE HAVE BEEN NO FAILURES ASSOCIATED WITH THIS FAILURE MODE ON THE SRMS PROGRAM.

RMS/ELEC - 705

PREPARED BY: MFMG

SUPERCEDING DATE: 11 SEP 86

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CRITICAL ITEMS LIST

PROJECT: SRMS
 ASS'Y NOMENCLATURE: SERVO POWER AMPLIFIER

SYSTEM: ELECTRICAL SUBSYSTEM
 ASS'Y P/N: 51140F1177

SHEET: 6

TREA REF.	REV.	NAME, QTY & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	HDMR / FUNC. 2/IRAB CRITICALITY	RATIONALE FOR ACCEPTANCE
3020	0	CURRENT LIMITER QTY: 6 SCHEMATIC 2563718	MODE: MDA BITE PERMANENT LOW. CAUSE(S): (1) U23B FAILS LOW.	WILL NOT DETECT REAL MDA FAILURE. WORST CASE LOSS OF MISSION. SUBSEQUENT FAILURE MAY CAUSE UNEXPECTED MOTION. UNANNUNCIATED. CREW ACTION REQUIRED. REDUNDANT PATHS REMAINING MDA RUNAWAY FAILURE	OPERATIONAL EFFECTS NONE. ARM WILL NOT STOP AUTOMATICALLY AFTER A SUBSEQUENT FAILURE. UNANNUNCIATED. CREW ACTION APPLY BRAKES TO STOP ARM AFTER RUNAWAY OCCURS. CREW TRAINING THE CREW WILL BE TRAINED TO ALWAYS OBSERVE WHETHER THE ARM IS RESPONDING PROPERLY TO COMMANDS. IF IT ISN'T, APPLY BRAKES. MISSION CONSTRAINT OPERATE UNDER VERNIER RATES WITHIN 10 FT OF STRUCTURE. THE OPERATOR MUST BE ABLE TO DETECT THAT ARM IS RESPONDING TO COMMANDS VIA WINDOW AND/OR CCTV DURING ALL ARM OPERATIONS. IF FAILURE OF FUNCTION IS DETECTED COMPUTER SUPPORTED MODES SHOULD NOT BE USED. AUTOTRAJECTORIES MUST BE DESIGNED TO COME NO CLOSER THAN 5 FT FROM STRUCTURE. SCREEN FAILURES A: INDEPENDENT PATH NOT INSTRUMENTED. B: INDEPENDENT PATH NOT INSTRUMENTED. OMRSD OFFLINE NONE OMRSD ONLINE INSTALLATION NONE OMRSD ONLINE TURNAROUND NONE	

RMS/ELEC - 706

PREPARED BY: MTWG

SUPERSEDING DATE: 11 SEP 86

APPROVED BY: _____