

CRITICAL ITEMS LIST

PROJECT: SRMS
 ASS'Y NOMENCLATURE: SERVO POWER AMPLIFIER

SYSTEM: ELECTRICAL SUBSYSTEM
 ASS'Y P/N: 5114051177

SHEET: 1

CMA REF.	REV.	PART, QTY, & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	HOUR / TIME, P/P CRITICALITY	RATIONALE FOR ACCEPTANCE
2760	0	ENCODER DATA PROMESSOR Q1Y 6 SCHEMATIC 2563723 2563722	MODE: FROZEN POSITION DATA. CAUSE(S): (1) ENCODER CLOCK GENERATOR FAILS.	JOINT POSITION DATA WILL NOT UPDATE. DATA TRANSMITTED TO GPC CANNOT RESULT IN ERRONEOUS CMOS FROM GPC. ENCODER CHECK WILL DETECT. IN AUTO MODE GPC TO IDLE. WORST CASE UNEXPECTED MOTION INCORRECT POSITION DATA. CREW ACTION REQUIRED. REDUNDANT PATHS REMAINING N/A	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 - 363

PREPARED BY: HENG

SUBSCRIBING DATE: 11 SEP 86

APPROVED BY:

CRITICAL ITEMS LIST

PROJECT: SRMS
 ASS'Y NOMENCLATURE: SERVO MOTOR AMPLIFIER

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

SHEET: 2

ITEM REV.	REV.	NAME BY & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	RDM / TIME: 1/1 CRITICALITY	RATIONALE FOR ACCEPTANCE
2660	0	ENCODER DATA PROFESSOR 017 & SCHEMATIC 2563723 2563722	MODE: FROZEN POSITION DATA. CAUSE(S): (S) ENCODER CLOCK GENERATOR FAILS.	JOINT POSITION DATA WILL NOT UPDATE. DATA TRANSMITTED TO GPC COULD RESULT IN ERRONEOUS CMDS FROM GPC. ENCODER CHECK WILL DETECT. IN AUTO MODE GPC TO SOLE. WORST CASE UNEXPECTED MOTION INCORRECT POSITION DATA. CREW ACTION REQUIRED. REDUNDANT PATHS REMAINING N/A	ACCEPTANCE TESTS THE SPA IS SUBJECTED TO THE FOLLOWING ENVIRONMENTAL TESTING AS AN SRU. O VIBRATION: LEVEL AND DURATION - REFERENCE TABLE 4 O THERMAL: PLUS 70 DEGREES C TO -25 DEGREES C DURATION - 1 1/2 CYCLES THE SPA IS THEN TESTED AS PART OF THE JOINTS ACCEPTANCE TESTS (VIBRATION AND THERMAL VACUUM TEST). THE SPA'S/JOINTS UNDERGO RMS SYSTEM TESTS (TP518 RMS STRONGBACK AND TP552 FLAT FLOOR TESTS) WHICH VERIFIES THE ABSENCE OF THE FAILURE MODE. 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. 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 ENC: MIL-S10-461 AS MODIFIED BY SL-E-0002 (TEST CE01, CE03, CS01, CS02, CS06, RE01, RE02 (N/B), RS01) FLIGHT CHECKOUT PURS OPS CHECKLIST (ALL VERIFIES) JSC 16987	

RMS/ELEC - 364

PREPARED BY: MFUG

SUPERSEDED DATE: 11 SEP 86

APPROVED BY:

CRITICAL ITEM LIST

PROJECT: RMS
ASS'Y IDENTIFICATION: SERVO POWER AMPLIFIER

SYSTEM: ELECTRICAL SUBSYSTEM
ASS'Y P/N: 511201177

SHEET: 3

ENFA REF.	REV.	NAME QTY & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT OR END ITEM	HOW & TIME. T/I CRITICALITY	RATIONALE FOR ACCEPTANCE
2660	0	ENCODER DATA PROCESSOR QTY 6 SCHEMATIC 2563723 2563722	MODE: FROZEN POSITION DATA. CAUSE(S): (1) ENCODER CLOCK GENERATOR FAILS.	JOINT POSITION DATA WILL NOT UPDATE. DATA TRANSMITTED TO GPC (OHIO) RESULT IN ERRONEOUS ENDS FROM GPC. ENCODER CHECK WILL DETECT. IN AUTO MODE GPC TO IDLE. WORST CASE UNEXPECTED MOTION INCORRECT POSITION DATA. CREW ACTION REQUIRED. REDUNDANT PATHS REMAINING N/A	0A/INSPECTIONS	<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-81381 AND INSPECTED AND TESTED TO NASA JSCB000 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 WHB 5300.4(3A) STANDARD, AS MODIFIED BY JSC 0800A.</p> <p>CONFORMAL COATING INSPECTION FOR ADEQUATE PROCESSING IS PERFORMED USING IN TRAVIOLET 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 RIMPING, 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>

PREPARED BY: H1W1

SUPERSEDING DATE: 11 SEP 86

APPROVED BY:

RMS/ELEC - 365

CRITICAL ITEMS LIST

PROJECT: SRMS
 ASS'Y NUM/CLAS: SERVO POWER AMPLIFIER

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

SHEET: 6

P/N REF.	REV.	NAME, QTY & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	HOUR / TIME: 1/1 CRITICALITY	RATIONALE FOR ACCEPTANCE
2660	-0	ENCODED DATA PROXIMITY QTY 8 SCHEMATIC 2563723 2563722	MODE: FROZEN POSITION DATA. CAUSE(S): (1) ENCODER CLOCK GENERATOR FAILS.	JOINT POSITION DATA WILL NOT UPDATE. DATA TRANSMITTED TO GPC COULD RESULT IN ERRONEOUS CMD'S FROM GPC. ENCODER CHECK WILL DETECT. IN AUTO MODE GPC TO TDL. WORST CASE UNEXPECTED MOTION INCORRECT POSITION DATA. CREW ACTION REQUIRED. REDUNDANT PATHS REMAINING N/A		<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 SAU - 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 (ITP) 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 - 366

PREPARED BY: HFM

SUPPLEMENTING DATE: 11 SEP 84

APPROVED BY:

CRITICAL ITEMS LIST

PROJECT: SRMS

ASS'Y NOMENCLATURE: SERVO POWER AMPLIFIER

SYSTEM: ELECTRICAL SUBSYSTEM

ASS'Y P/N: 51120FT177

SHEET: 5

PMA REF.	REV.	NAME QTY & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	HOUR 7 FURC. 1/1 CRITICALITY RATIONALE FOR ACCEPTANCE
2660	0	ENCODER DATA PROCESSOR QTY: 6 SCHEMATIC 2563723 2563722	MODE: FROZEN POSITION DATA. CAUSE(S): (1) ENCODER CCLK GENERATOR FAILS.	JOINT POSITION DATA WILL NOT UPDATE. DATA TRANSMITTED TO GPC (W/O) RESULT IN ERRONEOUS CMDS FROM GPC. ENCODER CHECK WILL DETECT. IN AUTO MODE GPC TO IDLE. WORST CASE UNEXPECTED MOTION INCORRECT POSITION DATA. CREW ACTION REQUIRED. REDUNDANT PATHS REMAINING N/A	FAILURE HISTORY THERE HAVE BEEN NO FAILURES ASSOCIATED WITH THIS FAILURE NONE ON THE SRMS PROGRAM.

PREPARED BY: HEMG

SUPPLEMENTING DATE: 11 SEP 86

APPROVED BY:

RMS/ELEC - 367

CRITICAL ITEMS LIST

PROJECT: SANS
 ASS'Y NOMENCLATURE: SERVO POWER AMPLIFIER

SYSTEM: ELECTRICAL SUBSYSTEM
 ASS'Y P/N: 517407177

SHEET: 6

ITEM REF	REV.	NAME, QTY & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	HOUR / TIME / 1/1 CRITICALITY	RATIONALE FOR ACCEPTANCE
2660	1	ENCODER DATA PROCESSOR QTY: 6 SCHEMATIC 2561722 2561722	MODE: FROZEN POSITION DATA. CAUSE(S): (1) ENCODER CLOCK GENERATOR FAILS.	JOINT POSITION DATA WILL NOT UPDATE. DATA TRANSMITTED TO GPC COULD RESULT IN ERRONEOUS CMOS FROM GPC. ENCODER CHECK WILL DETECT. IN AUTO MODE GPC TO IDLE. WORST CASE UNEXPECTED MOTION INCORRECT POSITION DATA. CREW ACTION REQUIRED. REDUNDANT PATHS REMAINING N/A		<p>OPERATIONAL EFFECTS</p> <p>ARM DOES NOT RESPOND PROPERLY TO HAND CONTROLLER COMMANDS. CREW INHERENTLY COMPENSATES FOR ANY UNDESIRED ARM TRAJECTORY.</p> <p>CREW ACTION</p> <p>APPLY BRAKES.</p> <p>CREW TRAINING</p> <p>THE CREW WILL BE TRAINED TO OBSERVE WHETHER THE ARM IS RESPONDING PROPERLY TO COMMANDS. IF IT ISN'T, APPLY BRAKES.</p> <p>MISSION CONSTRAINT</p> <p>OPERATE UNDER VERMIER RATES WITHIN 10 FT OF STRUCTURE. THE OPERATOR MUST BE ABLE TO DETECT THAT THE ARM IS RESPONDING PROPERLY TO COMMANDS VIA WINDOW AND/OR CCTV VIEWS DURING ALL ARM OPERATIONS.</p> <p>SCREEN FAILURES</p> <p>N/A</p> <p>OMRSD OFFLINE</p> <p>DRIVE EACH JOINT VERIFY MOTOR RATE AGREES WITH ENCODER CHANGE</p> <p>OMRSD ONLINE INSTALLATION</p> <p>NONE</p> <p>OMRSD ONLINE TURNAROUND</p> <p>DRIVE EACH JOINT. VERIFY CHANGE IN ENCODER (SMALL).</p>

RMS/ELEC - 368

PREPARED BY: MYG

SUPERCEDING DATE: 06 OCT 97

APPROVED BY: _____

DATE: _____