

CRITICAL ITEMS LIST

PROJECT: SRMS (-5 MCTU INSTALLED)
 ASS'Y NOMENCLATURE: MOTOR MODULE

SYSTEM: MECHANICAL ARM SUBSYSTEM
 ASS'Y P/N: 51140E1214

SHEET: 3

FMEA REF.	FMEA REV.	NAME, QTY. & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT OR END ITEM	HOW / FUNC. 2/1R CRITICALITY RATIONALE FOR ACCEPTANCE SCREENS: A-PASS, B-PASS, C-PASS
4165	0	COMMUTATION SCANNER QTY-6 P/N 51140E1295	MODE: ONE COMMUTATOR OUTPUT FAILS HIGH OR LOW. CAUSE(S): (1) FIBRE OPTICS FAILURE. (2) PHOTOCCELL SHORT/OPEN CIRCUIT. (3) EEE PARTS FAILURE.	AUTOBRAKES ARE APPLIED. ARM COMES TO REST. LOSS OF COMPUTER SUPPORTED MODES. WORST CASE ----- UNEXPECTED MOTION ELECTRICALLY FROZEN. CREW ACTION REQ. REDUNDANT PATHS REMAINING ----- 1) AUTOBRAKES (FOR SAFING THE SYSTEM). 2) DIRECT DRIVE (FOR CONTINUING OPERATIONS).	QA/INSPECTIONS ----- UNITS ARE MAJOR BOUGHT OUT PARTS, MANUFACTURED, ASSEMBLED AND TESTED TO SPAR DRAWINGS AND SPECIFICATIONS UNDER DOCUMENTED QUALITY CONTROLS. THESE CONTROLS ARE EXERCISED THROUGHOUT DESIGN PROCUREMENT, PLANNING, PROCESSING, FABRICATION, ASSEMBLY QUALIFICATION AND ACCEPTANCE TESTING. MANDATORY INSPECTION POINTS ARE EMPLOYED AS APPROPRIATE AT VARIOUS LEVELS OF ASSEMBLY AND TEST. SPAR/GOVERNMENT SOURCE INSPECTION IS INVOKED ON THE SUPPLIER. 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 100X SCREENED AND BURNED IN, AS A MINIMUM, AS REQUIRED BY SPAR-RMS-PA.003, BY THE SUPPLIER. ADDITIONALLY, EEE PARTS ARE 100X 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 5X OF PARTS, MAXIMUM 5 PIECES, MINIMUM 3 PIECES FOR EACH LOT NUMBER/DATE CODE OF PARTS RECEIVED. WIRE IS PROCURED TO SPECIFICATION MIL-W-22759 OR MIL-W-81381 AND INSPECTED AND TESTED TO NASA JSCMB080 STANDARD NUMBER 95A. 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. PARTS ARE INSPECTED THROUGHOUT MANUFACTURE AND ASSEMBLY AS APPROPRIATE TO THE MANUFACTURING STAGE COMPLETED. THESE INSPECTIONS INCLUDE, PRINTED CIRCUIT BOARD INSPECTION FOR TRACK SEPARATION, DAMAGED OR LIFTING CIRCUIT PADS, CLEANLINESS ETC. COMPONENT MOUNTING INSPECTION FOR CORRECT SOLDERING, WIRE LOOPING, STRAPPING, ETC. OPERATORS AND INSPECTORS ARE TRAINED AND CERTIFIED TO NASA NHB 5300.4(3A) STANDARD, AS MODIFIED BY JSC 08800A. CONFORMAL COATING INSPECTION FOR ADEQUATE PROCESSING IS PERFORMED USING ULTRAVIOLET LIGHT TECHNIQUES. P.C. BD. INSTALLATION INSPECTION, CHECK FOR CORRECT BOARD INSTALLATION, ALIGNMENT OF BOARDS, PROPER CONNECTOR CONTACT MATING, WIRE ROUTING, STRAPPING OF WIRES ETC., PRE-CLOSURE INSPECTION, WORKMANSHIP AND CLEANLINESS (SPAR/GOVERNMENT REP. - MANDATORY INSPECTION POINT) UNITS ARE INSPECTED TO THE APPLICABLE SPAR INSPECTION TEST PROCEDURE (ITP) PRIOR TO MOTOR MODULE INTEGRATION. INSPECTIONS INCLUDE WORKMANSHIP, CLEANLINESS, DIMENSIONAL ETC.

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SHEET: 4

FMEA REF.	FMEA REV.	NAME, QTY, & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	HDMR / FUNC. 2/1R CRITICALITY RATIONALE FOR ACCEPTANCE SCREENS: A-PASS, B-PASS, C-PASS
4165	0	COMMUTATION SCANNER QTY-6 P/N 51140E1295	MODE: ONE COMMUTATOR OUTPUT FAILS HIGH OR LOW. CAUSE(S): (1) FIBRE OPTICS FAILURE. (2) PHOTOCCELL SHORT/OPEN CIRCUIT. (3) EEE PARTS FAILURE.	AUTOBRAKES ARE APPLIED. ARM COMES TO REST. LOSS OF COMPUTER SUPPORTED MODES. WORST CASE ----- UNEXPECTED MOTION ELECTRICALLY FROZEN. CREW ACTION REQ. REDUNDANT PATHS REMAINING ----- 1) AUTOBRAKES (FOR SAFING THE SYSTEM). 2) DIRECT DRIVE (FOR CONTINUING OPERATIONS).	INTEGRATION OF UNIT TO MOTOR MODULE - INSPECTIONS INCLUDE GROUNDING CHECKS, CONNECTOR FOR BENT PINS, VISUAL, CLEANLINESS, INTERCONNECT WIRING ETC. PRE-ACCEPTANCE TEST INSPECTION, WHICH INCLUDES AN AUDIT OF LOWER TIER INSPECTION COMPLETION, AS BUILT CONFIGURATION VERIFICATION TO AS DESIGN ETC., (MANDATORY INSPECTION POINT). 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). ACCEPTANCE TESTING (ATP) INCLUDES, AMBIENT, VIBRATION AND THERMAL-VAC TESTING, (SPAR/GOVERNMENT REP. - MANDATORY INSPECTION POINT) 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 (ITP) ETC. JOINT LEVEL PRE-ACCEPTANCE TEST INSPECTION, INCLUDES AN AUDIT OF LOWER TIER INSPECTION COMPLETION, AS BUILT CONFIGURATION VERIFICATION TO AS DESIGN ETC. JOINT LEVEL ACCEPTANCE TESTING (ATP) INCLUDES AMBIENT, VIBRATION AND THERMAL-VAC TESTING. (SPAR/GOVERNMENT REP. - MANDATORY INSPECTION POINT). 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. SRMS SYSTEMS TESTING - STRONGBACK AND FLAT FLOOR AMBIENT PERFORMANCE TEST. (SPAR/GOVERNMENT REP. - MANDATORY INSPECTION POINT)

PREPARED BY: MFVG SUPERCEDING DATE: NONE

DATE: 11 JUL 91 CIL REV: 0

EXPEDITE PROCESSING

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PROJECT: SRMS (-5 MCIU INSTALLED)
 ASS'Y NOMENCLATURE: MOTOR MODULE

SYSTEM: MECHANICAL ARM SUBSYSTEM
 ASS'Y P/N: 51140E1214

SHEET: 1

FMEA REF.	FMEA REV.	NAME, QTY, & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	HOWR / FUNC. 2/1R CRITICALITY RATIONALE FOR ACCEPTANCE SCREENS: A-PASS, B-PASS, C-PASS
4165	0	COMMUTATION SCANNER QTY-6 P/N 51140E1295	MODE: ONE COMMUTATOR OUTPUT FAILS HIGH OR LOW. CAUSE(S): (1) FIBRE OPTICS FAILURE. (2) PHOTOCELL SHORT/OPEN CIRCUIT. (3) EEE PARTS FAILURE.	AUTOBRAKES ARE APPLIED. ARM COMES TO REST. LOSS OF COMPUTER SUPPORTED MODES. WORST CASE UNEXPECTED MOTION ELECTRICALLY FROZEN. CREW ACTION REQ. REDUNDANT PATHS REMAINING ----- 1) AUTOBRAKES (FOR SAFING THE SYSTEM). 2) DIRECT DRIVE (FOR CONTINUING OPERATIONS).	DESIGN FEATURES ----- THE JOINT COMMUTATION SCANNER ASSEMBLY (CSA) IS A MAJOR BOUGHT-OUT-PART WHICH IS SUPPLIED BY BEI MOTION SYSTEMS AND MEETS OR EXCEEDS THE REQUIREMENTS OF SPECIFICATION SPAR-SG.467. THE FIBER OPTICS USED ON THE RMS COMM SCANNERS ARE A CUSTOM DESIGN, MANUFACTURED BY GALILEO ELECTRO-OPTICS CORPORATION. THE FIBRE OPTIC BUNDLES ARE SECURED AT EACH END BY METAL RINGS AND EPOXY. THE BUNDLE LENGTHS ARE SUPPORTED BY A FLEXIBLE WOVEN GLASS TUBE AND A STAINLESS STEEL SPRING. STRESS RELIEF ARE USED AT THE ANCHOR POINTS. THE CURRENT CONFIGURATION PHOTOCELL IS ASSEMBLED AT BEI USING SPAR-APPROVED PROCEDURES. IT IS SCREENED AND QUALIFIED PER A BEI SCD (905-16816) TO STRESS LEVELS FAR IN EXCESS OF MISSION LIMITS. ALL EEE PARTS ARE PROCURED TO MILITARY SPECIFICATIONS OR EQUIVALENT. THE CIRCUITS EMBODY THE USE OF NH85300.4 (3A) SOLDERING, WITH NO PLATED-THRU HOLES (Z WIRES ARE USED WHERE NECESSARY) AND ALL LAP SOLDER JOINTS. THE EMI FILTER IS PURCHASED TO AN SCD (905-15181), WHICH INCORPORATES RESCREENING INCLUDING THERMAL SHOCK, BURN-IN, AND HERMETICITY TESTING, AS WELL AS X-RAY OF ALL UNITS. CERAMIC CAPACITORS ARE USED THROUGHOUT. THE BUS CAPACITORS ARE S LEVEL #39014. THE CURRENT LIMIT RESISTOR (LED 50MA) IS A TWO WATT RATING RWR60S TYPE DEVICE, OPERATING AT A STRESS LEVEL OF LESS THAN 0.7 TO GIVE A VERY LOW PROBABILITY OF FAILURE.

EXPEDITE
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PREPARED BY: MFWG

SUPERSEDING DATE: NONE

RMS/MECH - 306

DATE: 11 JUL 91

CIL REV: 0

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PROJECT: SRMS (-5 MCIU INSTALLED)
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SHEET: 2

FMEA REF.	FMEA REV.	NAME, QTY, & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	HWR / FUNC. 2/1R CRITICALITY RATIONALE FOR ACCEPTANCE SCREENS: A-PASS, B-PASS, C-PASS
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PREPARED BY:

MEWG

SUPERCEDING DATE: NONE

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SHEET: 5

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PREPARED BY: MFMG

SUPERCEDING DATE: NONE

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DATE: 11 JUL 91

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CRITICAL ITEMS LIST

PROJECT: SRMS (-5 NCIU INSTALLED)
 ASS'Y NOMENCLATURE: MOTOR MODULE

SYSTEM: MECHANICAL ARM SUBSYSTEM
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SHEET: 6

FMEA REF.	FMEA REV.	NAME, QTY, & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	HOWR / FUNC. 2/1R CRITICALITY RATIONALE FOR ACCEPTANCE SCREENS: A-PASS, B-PASS, C-PASS
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PREPARED BY: MFNG SUPERCEDING DATE: NONE

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