

CRITICAL ITEMS LIST

PROJECT: SMS (S MCIU INSTALLED)
 ASSY NOMENCLATURE: RCTD

SYSTEM: ELECTRICAL SUBSYSTEM
 ASSY P/N: 211557160-5

SHEET: 1

#MEA REF.	THEA REV.	NAME, QTY, & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT OR END ITEM	HOW / FUNC. 2/IR CRITICALITY	RATIONALE FOR ACCEPTANCE SCREENS: A-PASS, B-PASS, C-PASS
1805	0	MICROCOM- PUTER QTY. 1, SCHEMATIC 812806	<p>MODE: LOSS OF COMMUNICATION WITH GPC.</p> <p>CAUSE(S): MICRO COMP.</p> <p>1) RIP/TIP RESET SIGNAL FAILS. 2) LOSS OF POWER STATUS BIT TO GPC INTERFACE 3) ONE OR MORE OF THE FOLLOWING OUTPUT LINES OF DMA CONTROLLER FAIL: AEN FAILS LOW, IDW, IOR, MRD, MWR. 4) DMA CONTROLLER ADDRESS BUS FAILS. 5) DATA ACKNOWLEDGE LINE DACK OR DACKI FAIL. 6) DATA REQUEST DREQO OR DREQI LINES FAIL. 7) HOLD REQUEST HREQ OR HOLD ACKNOWLEDGE HACK LINES FAIL.</p> <p>COMPUTER INTERFACE QTY. 1, SCHEMATIC 812753</p>	<p>GPC OR MCIU WILL DETECT AND TERMINATE I/O. MCIU'S GPC WATCHDOG TIMER TIMES OUT. MCIU SAFING. ARM COMES TO REST. LOSS OF ALL COMPUTER SUPPORTED MODES. LOSS OF LIMPING DURING END EFFECTOR CAPTURE.</p> <p>WORST CASE UNEXPECTED MOTION, SIX JOINT RUNAWAY, AUTOBRAKES.</p> <p>REDUNDANT PATHS REMAINING</p> <p>1) MCIU SAFING (FOR SAFING THE SYSTEM). 2) DIRECT DRIVE (FOR CONTINUING OPERATIONS).</p> <p>COMPUTER I/O</p> <p>8) MIA FAILURE 9) LOSS OF MIA DATA BUS TO CPU. 10) SERIAL TO PARALLEL DATA BUS</p>	<p>DESIGN FEATURES</p> <p>TTL LOGIC DEVICES HAVE GOOD NOISE IMMUNITY, MANUFACTURING TECHNOLOGY, AND RELIABILITY HISTORY, ARE WELL ESTABLISHED AND DOCUMENTED. LIFE EXPECTANCY IS INCREASED BY ENSURING THAT ALL ALLOWABLE STRESS LEVELS ARE DERATED IN ACCORDANCE WITH SPAR-RMS-PA.003.</p> <p>THE MIA IS AN ORBITER COMMON-USE ITEM, PRODUCED TO ROCKWELL INTERNATIONAL SPECIFICATION MC 615-00100, AND IS CUSTOMER-SUPPLIED FOR SMS USE. THE DESIGN DETAILS OF THE MIA ARE PROPRIETARY TO THE SINGER COMPANY AND EEE PARTS USED IN ITS BUILD ARE NOT SUBJECT TO CONTROL OR MONITORING BY THE SPAR EEE PARTS PROGRAM.</p> <p>THE MIA IS LOCATED ON THE COMPUTER INTERFACE PRINTED CIRCUIT BOARD ASSEMBLY. 12 VDC POWER IS SUPPLIED TO THE MIA THROUGH A VOLTAGE REGULATOR WHICH OPERATES FROM A 16 VDC SUPPLY, GENERATED BY THE MCPC. THE REGULATOR CIRCUIT IS ALSO LOCATED ON THE COMPUTER INTERFACE PCB AND BASICALLY COMPRISES AN LM709 TYPE REGULATOR AND A 1MB29 ZENER REFERENCE DIODE. THESE EEE PARTS ARE CONTROLLED BY THE SPAR EEE PARTS PROGRAM.</p> <p>THE DESIGN UTILIZES PROVEN CIRCUIT TECHNIQUES AND IS IMPLEMENTED USING TTL AND CMOS LOGIC DEVICES.</p> <p>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.</p> <p>THE INTEL 8086 MICROPROCESSOR IS USED IN THIS DESIGN. THIS DEVICE, DESIGNED FOR USE IN CONJUNCTION WITH ITS CORRESPONDING HIGH RELIABILITY SUPPORT DEVICES, COMPRISES A PROCESSOR KERNEL PROVEN IN MANY HIGH RELIABILITY APPLICATIONS.</p>	

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DATE TIME

PREPARED BY: MFUG

SUPERSEDING DATE: NONE

DATE: 11 JUL 91

CTL REV: 0

CRITICAL ITEMS LIST

PROJECT: SRMS (5 MCUI INSTALLED)
 ASS'Y NOMENCLATURE: MCUI

SYSTEM: ELECTRICAL SUBSYSTEM
 ASS'Y P/N: 51155160-5

SHEET: 5

FMEA REF.	FMEA REV.	NAME, QTY, & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	HOWR / FUNC. Z/FIR CRITICALITY	RATIONALE FOR ACCEPTANCE SCREENS: A-PASS, B-PASS, C-PASS
1805	0	MICROCOM- PUTER QTY. 1. SCHEMATIC 812806	<p>MODE: LOSS OF COMMUNICA- TION WITH GPC.</p> <p>CAUSE(S): MICRO COMP.</p> <p>1) RIP/TIP RESET SIGNAL FAILS. 2) LOSS OF POWER STATUS BIT TO GPC INTERFACE 3) ONE OR MORE OF THE FOLLOWING OUTPUT LINES OF DMA CONTROLLER FAIL: AEM TAILS LOW, IEM, IOR, MRD, MYR. 4) DMA CONTROLLER ADDRESS BUS FAILS. 5) DATA ACKNOWLEDGE LINES BACKO OR BACKT FAIL. 6) DATA REQUEST DREQD OR DREQT LINES FAIL. 7) HOLD REQUEST HREQ OR HOLD ACKNOWLEDGE HACK LINES FAIL.</p> <p>COMPUTER INTERFACE QTY. 1. SCHEMATIC 812753</p>	<p>GPC OR MCUI WILL DETECT AND TERMINATE I/O. MCUI'S GPC WATCHDOG TIMER TIMES OUT. MCUI SAVING. ARM COMES TO REST. LOSS OF ALL COMPUTER SUPPORTED MODES. LOSS OF LUMPING DURING END EFFECTOR CAPTURE.</p> <p>WORST CASE UNEXPECTED MOTION. SIX JOINT RUNAWAY. AUTOBRAKES.</p> <p>REDUNDANT PATHS REMAINING</p> <p>1) MCUI SAFING (FOR SAFING THE SYSTEM). 2) DIRECT DRIVE (FOR CONTINUING OPERATIONS).</p> <p>COMPUTER I/F B) VIA FAILURE. 9) LOSS OF MIA DATA BUS TO CPU. 10) SERIAL TO PARALLEL DATA BUS</p>	<p>QA/INSPECTIONS</p> <p>DOCUMENTED QUALITY CONTROLS ARE EXERCISED THROUGHOUT DESIGN PROCUREMENT, PLANNING, RECEIVING, PROCESSING FABRICATION, ASSEMBLY, TESTING AND SHIPPING OF THE MCUI. GOVERNMENT SOURCE INSPECTION IS INVOLVED AT VARIOUS LEVELS OF COMPONENT ASSEMBLY AND TEST OPERATIONS. MANDATORY INSPECTION POINTS ARE EMPLOYED AT VARIOUS LEVELS OF ASSEMBLY AND TEST.</p> <p>EEE PARTS INSPECTION IS PERFORMED AS REQUIRED BY SPAR-RMS-PA.005. 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.005, 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, INSPECTED, AND TESTED TO SPAR-RMS-PA.003.</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 HRB 5300.4(3X-1) STANDARD.</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> <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</p>	

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PREPARED BY:

MFWG

SUPERSEDING DATE: NONE

DATE: 11 JUL 91

CIL REV: 0

CRITICAL ITEMS LIST

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

SYSTEM: ELECTRICAL SUBSYSTEM
 ASS'Y P/R: 51155F180-5

SHEET: 4

ITEM REF.	ITEM REV.	NAME, QTY, & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT OR END ITEM	HOW / FUNC. ?/A CRITICALITY	RATIONALE FOR ACCEPTANCE SCREENS: A-PASS, B-PASS, C-PASS
1805	0	MICROCOM-PUTER QTY. 1. SCHEMATIC 012806	CIRCUIT FAILS. 11) GPC INTERFACE STATUS WORD TO CPU BITS FAIL 12) RIP ON TIP SIGNAL FAILS HIGH OR LOW. 13) PARALLEL TO SERIAL DATA BUS CIRCUIT FAILS. 14) EOB INTERRUPT FAILS HIGH OR LOW. 15) LOSS OF SIGNAL ON I/O SYNC LINE	GPC ON MCIU WILL REJECT AND TERMINATE I/O. MCIU'S GPC WATCHDOG TIMER TIMES OUT. MCIU SAFING. ARM COMES TO REST. LOSS OF ALL COMPUTER SUPPORTED MODES. LOSS OF LIMPING DURING END EFFECTOR CAPTURE. WORST CASE ----- UNEXPECTED MOTION, SIX JOINT RUNAWAY. AUTOBRAKES. REDUNDANT PATHS REMAINING ----- 1) MCIU SAFING (FOR SAFING THE SYSTEM). 2) DIRECT DRIVE (FOR CONTINUING OPERATIONS).		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 TESTING (SPAR/GOVERNMENT REP. - MANDATORY INSPECTION POINT).
		COMPUTER INTERFACE QTY. 1. SCHEMATIC 012753				

PREPARED BY: HWG

SUPPLEMENTING DATE: NONE

DATE: 11 JUL 97 CIL REV: 0

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