

CRITICAL ITEMS LIST

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

SYSTEM: ELECTRICAL SUBSYSTEM
 ASS'Y P/N: 51155F160-5

SHEET: 1

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
2195	0	FAILURE DETECTOR QTY. 1. SCHEMATIC 012797	MODE: LOSS OF INTERNAL FRAME SYNC BITE. CAUSE(S): 1) PARTS FAILURE IN FRAME SYNC MONITOR CIRCUIT. 2) STATUS BUFFER INPUTS/ OUTPUTS FAIL 3) FRAME SYNC ABSENT INTERRUPT FAILS HIGH OR LOW.	FAILURE OF BITE CIRCUITRY. VERIFICATION TEST WILL FAIL. FRAME SYNC FAILURE DETECTOR NOT AVAILABLE. ALL MODES STILL AVAILABLE. WORST CASE ----- LOSS OF AUTOBRAKING. SYSTEM UNPROTECTED FROM RUNAWAY. ANNUNCIATED. REDUNDANT PATHS REMAINING ----- 1) MANUAL BRAKES (FOR SAFING THE SYSTEM). 2) DIRECT DRIVE (FOR CONTINUING OPERATIONS).	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.

PREPARED BY: MEWG

SUPERCEDING 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/N: 51155F160-5

SHEET: 2

FMEA REF.	FMEA REV.	NAME, QTY, & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	HDWR / FUNC. 2/1R CRITICALITY	RATIONALE FOR ACCEPTANCE SCREENS: A-PASS, B-PASS, C-PASS
2195	0	FAILURE DETECTOR QTY. 1. SCHEMATIC 812797	<p>MODE: LOSS OF INTERNAL FRAME SYNC BITE.</p> <p>CAUSE(S): 1) PARTS FAILURE IN FRAME SYNC MONITOR CIRCUIT. 2) STATUS BUFFER INPUTS/OUTPUTS FAIL 3) FRAME SYNC ABSENT INTERRUPT FAILS HIGH OR LOW.</p>	<p>FAILURE OF BITE CIRCUITRY. VERIFICATION TEST WILL FAIL. FRAME SYNC FAILURE DETECTOR NOT AVAILABLE. ALL MODES STILL AVAILABLE.</p> <p>WORST CASE ----- LOSS OF AUTOBRAKING. SYSTEM UNPROTECTED FROM RUNAWAY. ANNUNCIATED.</p> <p>REDUNDANT PATHS REMAINING ----- 1) MANUAL BRAKES (FOR SAFING THE SYSTEM). 2) DIRECT DRIVE (FOR CONTINUING OPERATIONS).</p>		<p>ACCEPTANCE TESTS ----- THE MCIU IS SUBJECTED TO THE FOLLOWING ACCEPTANCE ENVIRONMENTAL TESTING AS AN LRU.</p> <p>0 VIBRATION: LEVEL AND DURATION - REFERENCE TABLE 3.2</p> <p>0 THERMAL: +40 DEGREES C TO -16 DEGREES C (2 CYCLES)</p> <p>QUALIFICATION TESTS ----- THE MCIU IS SUBJECTED TO THE FOLLOWING LRU QUALIFICATION ENVIRONMENTS:</p> <p>0 VIBRATION: LEVEL AND DURATION - REFERENCE TABLE 3.2</p> <p>0 SHOCK: BY SIMILARITY TO -3 MCIU</p> <p>0 THERMAL: +51 DEGREES C TO -27 DEGREES C (10 CYCLES)</p> <p>0 HUMIDITY: BY SIMILARITY TO -3 MCIU</p> <p>0 EMC: MIL-STD-461 AS MODIFIED BY SL-E-0002 (TESTS CE01, CE03, CS01, CS06, RE02 (M/B), RS01, RS02)</p> <p>0 LIFE: 630 OPERATING HOURS 1000 POWER ON/OFF CYCLES</p> <p>FLIGHT CHECKOUT ----- PDRS OPS CHECKLIST (ALL VEHICLES) JSC 16987</p>

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PREPARED BY: MFWG SUPERCEDING 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/N: 511551180-5

SHEET: 3

FMEA REF.	FMEA REV.	NAME, QTY. & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT OR END ITEM	HOWR / FUNC. 2/1R CRITICALITY	RATIONALE FOR ACCEPTANCE SCREENS: A-PASS, B-PASS, C-PASS
2195	0	FAILURE DETECTOR QTY. 1. SCHEMATIC 812797	<p>MODE: LOSS OF INTERNAL FRAME SYNC BITE.</p> <p>CAUSE(S): 1) PARTS FAILURE IN FRAME SYNC MONITOR CIRCUIT. 2) STATUS BUFFER INPUTS/ OUTPUTS FAIL 3) FRAME SYNC ABSENT INTERRUPT FAILS HIGH OR LOW.</p>	<p>FAILURE OF BITE CIRCUITRY. VERIFICATION TEST WILL FAIL. FRAME SYNC FAILURE DETECTOR NOT AVAILABLE. ALL MODES STILL AVAILABLE.</p> <p>WORST CASE ----- LOSS OF AUTOBRAKING. SYSTEM UNPROTECTED FROM RUNAWAY. ANNUNCIATED.</p> <p>REDUNDANT PATHS REMAINING ----- 1) MANUAL BRAKES (FOR SAFING THE SYSTEM). 2) DIRECT DRIVE (FOR CONTINUING OPERATIONS).</p>	<p>QA/INSPECTIONS ----- DOCUMENTED QUALITY CONTROLS ARE EXERCISED THROUGHOUT DESIGN PROCUREMENT, PLANNING, RECEIVING, PROCESSING FABRICATION, ASSEMBLY, TESTING AND SHIPPING OF THE MCIU. GOVERNMENT SOURCE INSPECTION IS INVOKED 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.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 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 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 MHB 5300.4(3A-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: MWG

SUPERCEDING DATE: NONE

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CIL REV: 0

CRITICAL ITEMS LIST

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

SYSTEM: ELECTRICAL SUBSYSTEM
 ASS'Y P/N: 51155F160-5

SHEET: 4

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
2195	0	FAILURE DETECTOR QTY. 1. SCHEMATIC 812797	MODE: LOSS OF INTERNAL FRAME SYNC BITE. CAUSE(S): 1) PARTS FAILURE IN FRAME SYNC MONITOR CIRCUIT. 2) STATUS BUFFER INPUTS/ OUTPUTS FAIL 3) FRAME SYNC ABSENT INTERRUPT FAILS HIGH OR LOW.	FAILURE OF BITE CIRCUITRY. VERIFICATION TEST WILL FAIL. FRAME SYNC FAILURE DETECTOR NOT AVAILABLE. ALL MODES STILL AVAILABLE. WORST CASE ----- LOSS OF AUTOBRAKING. SYSTEM UNPROTECTED FROM RUNAWAY. ANNUNCIATED. REDUNDANT PATHS REMAINING ----- 1) MANUAL BRAKES (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. - MANDITORY INSPECTION POINT).

PREPARED BY: MFWG SUPERCEDING DATE: NONE

DATE: 11 JUL 91 CIL REV: 0

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CRITICAL ITEMS LIST

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

SYSTEM: ELECTRICAL SUBSYSTEM
 ASS'Y P/N: 511557160-5

SHEET: 5

FMEA REF.	FMEA REV.	NAME, QTY, & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	HOUR / FUNC. 2/1R CRITICALITY	RATIONALE FOR ACCEPTANCE SCREENS: A-PASS, B-PASS, C-PASS
2195	0	FAILURE DETECTOR QTY. 1. SCHEMATIC 812797	MODE: LOSS OF INTERNAL FRAME SYNC BITE. CAUSE(S): 1) PARTS FAILURE IN FRAME SYNC MONITOR CIRCUIT. 2) STATUS BUFFER INPUTS/ OUTPUTS FAIL 3) FRAME SYNC ABSENT INTERRUPT FAILS HIGH OR LOW.	FAILURE OF BITE CIRCUITRY. VERIFICATION TEST WILL FAIL. FRAME SYNC FAILURE DETECTOR NOT AVAILABLE. ALL MODES STILL AVAILABLE. WORST CASE ----- LOSS OF AUTOBRAKING. SYSTEM UNPROTECTED FROM RUNAWAY. ANNUNCIATED. REDUNDANT PATHS REMAINING ----- 1) MANUAL BRAKES (FOR SAFING THE SYSTEM). 2) DIRECT DRIVE (FOR CONTINUING OPERATIONS).		FAILURE HISTORY ----- THERE HAVE BEEN NO FAILURES ASSOCIATED WITH THIS FAILURE MODE ON THE SRMS PROGRAM.

PREPARED BY: MFNG SUPERCEDING DATE: NONE

DATE: 11 JUL 91 CIL REV: 0

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CRITICAL ITEMS LIST

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

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

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
2195	0	FAILURE DETECTOR QTY. 1. SCHEMATIC 812797	<p>MODE: LOSS OF INTERNAL FRAME SYNC BITE.</p> <p>CAUSE(S): 1) PARTS FAILURE IN FRAME SYNC MONITOR CIRCUIT. 2) STATUS BUFFER INPUTS/OUTPUTS FAIL 3) FRAME SYNC ABSENT INTERRUPT FAILS HIGH OR LOW.</p>	<p>FAILURE OF BITE CIRCUITRY. VERIFICATION TEST WILL FAIL. FRAME SYNC FAILURE DETECTOR NOT AVAILABLE. ALL MODES STILL AVAILABLE.</p> <p>WORST CASE ----- LOSS OF AUTOBRAKING. SYSTEM UNPROTECTED FROM RUNAWAY. ANNUNCIATED.</p> <p>REDUNDANT PATHS REMAINING ----- 1) MANUAL BRAKES (FOR SAFING THE SYSTEM). 2) DIRECT DRIVE (FOR CONTINUING OPERATIONS).</p>	<p>OPERATIONAL EFFECT ----- LOSS OF DATA. AUTOBRAKES. LOSS OF COMPUTER SUPPORTED MODES. LOSS OF LIMPING. LOSS OF EE AUTO MODES. D&C DATA WILL BE INVALID. DIRECT DRIVE AND BACKUP AVAILABLE. EE MODE MANUAL AVAILABLE WITHOUT TALKBACKS.</p> <p>CREW ACTION ----- SELECT DIRECT DRIVE. USE EE MODE MANUAL. SINGLE/DIRECT DRIVE SWITCH SHOULD BE PULSED TO MAINTAIN PROPER RATES.</p> <p>CREW TRAINING ----- CREW IS TRAINED: TO ALWAYS OBSERVE WHETHER THE ARM IS RESPONDING PROPERLY TO COMMANDS. IF IT ISN'T, APPLY BRAKES. TO RECOGNIZE AND RESPOND TO ALL OFF-NOMINAL OPERATIONS OF THE END EFFECTOR.</p> <p>MISSION CONSTRAINT ----- NONE</p> <p>SCREEN FAILURES ----- N/A</p> <p>OMRSD OFFLINE ----- VERIFY NO BITE BITS SET DURING TEST.</p> <p>OMRSD ONLINE INSTALLATION ----- NONE</p> <p>OMRSD ONLINE TURNAROUND ----- VERIFY NO BITE ANNUNCIATIONS.</p>	

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 11 JUL 91

PREPARED BY: MFVG SUPERSEDING DATE: NONE

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