

**CRITICAL ITEMS LIST**

PROJECT: SRMS  
ASS'Y NOMENCLATURE: END EFFECTOR

SYSTEM: MECHANICAL ARM SUBSYSTEM  
ASS'Y P/N: 51140E1470

SHEET: 1

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
3660	3	COMMUTATION SCANNER QTY-1 P/N 51140E517	<p>MODE: ALL THREE COMMUTATION OUTPUTS ARE UNDETERMINED</p> <p>CAUSE(S): (1) OPEN OR SHORT LED. (2) LOSS OF 5.1V. SUPPLY. (3) LOSS OF 10V SUPPLY. (4) FAILURE OF EEE PARTS. (5) DAMAGED FIBRE OPTICS.</p>	<p>END EFFECTOR MOTOR WILL NOT DRIVE. LOSS OF ABILITY TO CAPTURE/RELEASE (IN PRIME) OR RIGIDIZE/DERIGIDIZE PAYLOAD. ARM WILL STAY LIMP DURING AUTO CAPTURE SEQ.</p> <p>WORST CASE ----- UNEXPECTED PAYLOAD MOTION. INCOMPLETE CAPTURE/RELEASE SEQUENCE. UNABLE TO RELEASE PAYLOAD. CREW ACTION REQUIRED.</p> <p>REDUNDANT PATHS REMAINING ----- BACKUP EE RELEASE.</p>	<p>DESIGN FEATURES -----</p> <p>THE END EFFECTOR COMMUTATION SCANNER ASSEMBLY (CSA) IS A MAJOR BOUGHT-OUT-PART WHICH IS SUPPLIED BY BEI MOTION SYSTEMS AND MEETS OR EXCEEDS THE REQUIREMENTS OF SPAR-SG.454.</p> <p>TIES-13 TYPE LED IS PROCURED TO A JANTXV-EQUIVALENT LEVEL SPECIFICATION, THEN RESCREENED AGAIN TO INSURE THAT INFANT FAILURES ARE REMOVED. THE LED IS OPERATING AT A CURRENT STRESS RATIO OF 50/300, OR 0.2, WHICH IS A VERY LOW LEVEL. THIS MINIMIZES DEGRADATION OF THE LIGHT OUTPUT WITH TIME. THIS TYPE OF DEVICE HAS BEEN CHARACTERIZED WITH RESPECT TO RADIATION, AND THE EXPECTED DEGRADATION IS VERY NOMINAL (2-5%, FOR 7 YEARS IN GEOSYNCHRONOUS ORBIT).</p> <p>THE LED IS ASSEMBLED INTO AN ALUMINUM MOUNTING RING, USING A THERMALLY CONDUCTIVE EPOXY.</p> <p>DISCRETE SEMICONDUCTOR DEVICES SPECIFIED TO AT LEAST THE TX LEVEL OF MIL-S-19500. ALL DEVICES ARE SUBJECTED TO RE-SCREENING BY AN INDEPENDANT TEST HOUSE. SAMPLES OF ALL PROCURED LOTS/DATE CODES ARE SUBJECTED TO DESTRUCTIVE PHYSICAL ANALYSIS (DPA) TO VERIFY THE INTEGRITY OF THE MANUFACTURING PROCESSES. DEVICE STRESS LEVELS ARE, DERATED IN ACCORDANCE WITH SPAR-RMS-PA.003 AND VERIFIED BY DESIGN REVIEW.</p> <p>COMPARATORS AND OPERATIONAL AMPLIFIERS ARE STANDARD LINEAR INTEGRATED CIRCUITS WITH MATURE MANUFACTURING TECHNOLOGY. APPLICATION CONSTRAINTS ARE IN ACCORDANCE WITH SPAR-RMS-PA.003.</p> <p>ALL RESISTORS AND CAPACITORS USED IN THE DESIGN ARE SELECTED FROM ESTABLISHED RELIABILITY (ER) TYPES. LIFE EXPECTANCY IS INCREASED BY ENSURING THAT ALL ALLOWABLE STRESS LEVELS ARE DERATED IN ACCORDANCE WITH SPAR-RMS-PA.003. ALL CERAMIC AND ELECTROLYTIC CAPACITORS ARE ROUTINELY SUBJECTED TO RADIOGRAPHIC INSPECTION.</p> <p>CONNECTOR USED ARE TO GSFC SPECIFICATION S.311.P.4/9.</p> <p>CONTACTS USED ARE TO GSF SPEC.S.311.P.4/9.</p> <p>CRIMPING IS CONTROLLED TO SPAR PPS 9:17 WHICH EMBODIES MSC-SPEC-Q-1A.</p> <p>ALL EEE PARTS ARE PROCURED TO MILITARY SPECIFICATIONS OR EQUIVALENT. THE CIRCUITS EMBODY THE USE OF MH05300.4 (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.</p> <p>CERAMIC CAPACITORS ARE USED THROUGHOUT. THE BUS CAPACITORS ARE S LEVEL M39014.</p> <p>THE CURRENT LIMIT RESISTOR (LED 50MA) IS A TWO WATT RATING RWR80S TYPE DEVICE, OPERATING AT A STRESS LEVEL OF LESS THAN</p>	

PREPARED BY:

MFWG

SUPERCEDING DATE: 03 OCT 86

APPROVED BY:

DATE: 24 JUL 91

CIL REV: 3

**CRITICAL ITEMS LIST**

PROJECT: SRMS  
ASS'Y NOMENCLATURE: END EFFECTOR

SYSTEM: MECHANICAL ARM SUBSYSTEM  
ASS'Y P/N: 51140E1470

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
3660	3	COMMUTATION SCANNER QTY-1 P/N 51140E517	<p>MODE: ALL THREE COMMUTATION OUTPUTS ARE UNDETERMINED</p> <p>CAUSE(S): (1) OPEN OR SHORT LED. (2) LOSS OF 5.1V. SUPPLY. (3) LOSS OF 10V SUPPLY. (4) FAILURE OF EEE PARTS. (5) DAMAGED FIBRE OPTICS.</p>	<p>END EFFECTOR MOTOR WILL NOT DRIVE. LOSS OF ABILITY TO CAPTURE/RELEASE (IN PRIME) OR RIGIDIZE/DERIGIDIZE PAYLOAD. ARM WILL STAY LIMP DURING AUTO CAPTURE SEQ.</p> <p>WORST CASE ----- UNEXPECTED PAYLOAD MOTION. INCOMPLETE CAPTURE/RELEASE SEQUENCE. UNABLE TO RELEASE PAYLOAD. CREW ACTION REQUIRED.</p> <p>REDUNDANT PATHS REMAINING ----- BACKUP EE RELEASE.</p>		<p>0.1 TO GIVE A VERY LOW PROBABILITY OF FAILURE.</p> <p>THE FIBER OPTICS USED ON THE RMS COMM SCANNERS ARE A CUSTOM DESIGN, MANUFACTURED BY GALILEO ELECTRO-OPTICS CORPORATION.</p> <p>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.</p>

**CRITICAL ITEMS LIST**

PROJECT: SRMS  
ASS'Y NOMENCLATURE: END EFFECTOR

SYSTEM: MECHANICAL ARM SUBSYSTEM  
ASS'Y P/N: 51140E1470

SHEET: 3

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
3660	3	COMMUTATION SCANNER QTY-1 P/N 51140E517	<p>MODE: ALL THREE COMMUTATION OUTPUTS ARE UNDETERMINED</p> <p>CAUSE(S): (1) OPEN OR SHORT LED. (2) LOSS OF S.V. SUPPLY. (3) LOSS OF 10V SUPPLY. (4) FAILURE OF EEE PARTS. (5) DAMAGED FIBRE OPTICS.</p>	<p>END EFFECTOR MOTOR WILL NOT DRIVE. LOSS OF ABILITY TO CAPTURE/RELEASE (IN PRIME) OR RIGIDIZE/DERIGIDIZE PAYLOAD. ARM WILL STAY LIMP DURING AUTO CAPTURE SEQ.</p> <p>WORST CASE ----- UNEXPECTED PAYLOAD MOTION. INCOMPLETE CAPTURE/RELEASE SEQUENCE. UNABLE TO RELEASE PAYLOAD. CREW ACTION REQUIRED.</p> <p>REDUNDANT PATHS REMAINING ----- BACKUP EE RELEASE.</p>	<p>ACCEPTANCE TESTS ----- THE EE ASSEMBLY IS TESTED TO THE FOLLOWING ACCEPTANCE ENVIRONMENTS:</p> <ul style="list-style-type: none"> <li>O VIBRATION: LEVEL AND DURATION - REFERENCE TABLE 7</li> <li>O THERMAL VACUUM: +70 DEGREES C TO -25 DEGREES C (1 1/2 CYCLES) 1 X 10**6 TORR</li> </ul> <p>THE EE ASSEMBLY IS FURTHER TESTED IN THE IN THE RMS SYSTEM TEST (TP518 RMS STRONGBACK AND TP552 FLAT FLOOR TESTS) WHICH VERIFIES THE ABSENCE OF THE FAILURE MODE.</p> <p>QUALIFICATION TESTS ----- THE EE ASSEMBLY QUALIFICATION TESTING CONSISTED OF THE FOLLOWING ENVIRONMENTS:</p> <ul style="list-style-type: none"> <li>O VIBRATION: LEVEL AND DURATION - REFERENCE TABLE 7</li> <li>O SHOCK: 20G/11 MS - 3 AXES (6 DIRECTIONS)</li> <li>O THERMAL VACUUM: +81 DEGREES C TO -36 DEGREES C (6 CYCLES) 1 X 10**6 TORR</li> <li>O HUMIDITY: 95% RH (65 DEGREES C MAINTAINED FOR 6 HRS) (65 DEGREES C TO 30 DEGREES C IN 16 HRS). 10 CYCLES 240 HRS.</li> <li>O ENC: MIL-STD-461A AS MODIFIED BY SL-E-0002 (TEST CE01, CE03, CS01, CS02, CS06, RE02 (N/B))</li> <li>O STRUCTURAL STIFFNESS AND LOAD TEST</li> </ul> <p>FLIGHT CHECKOUT ----- PDRS OPS CHECKLIST (ALL VEHICLES) JSC 16987</p>

PREPARED BY: MEWG

MEWG

SUPERCEDING DATE: 03 OCT 86

APPROVED BY: \_\_\_\_\_

DATE: 24 JUL 91

CIL REV: 3

**CRITICAL ITEMS LIST**

PROJECT: SRMS  
ASS'Y NOMENCLATURE: END EFFECTOR

SYSTEM: MECHANICAL ARM SUBSYSTEM  
ASS'Y P/N: 51140E1470

SHEET: 4

FMEA REF.	FMEA REV.	NAME, QTY, & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	NDWR / FUNC. 2/1R CRITICALITY	RATIONALE FOR ACCEPTANCE SCREENS: A-PASS, B-PASS, C-PASS
3660	3	COMPUTATION SCANNER QTY-1 P/M 51140E517	<p>MODE: ALL THREE COMPUTATION OUTPUTS ARE UNDETERMINED</p> <p>CAUSE(S): (1) OPEN OR SHORT LED. (2) LOSS OF 5.1V. SUPPLY. (3) LOSS OF 10V SUPPLY. (4) FAILURE OF EEE PARTS. (5) DAMAGED FIBRE OPTICS.</p>	<p>END EFFECTOR MOTOR WILL NOT DRIVE. LOSS OF ABILITY TO CAPTURE/RELEASE (IN PRIME) OR RIGIDIZE/DERIGIDIZE PAYLOAD. ARM WILL STAY LIMP DURING AUTO CAPTURE SEQ.</p> <p>WORST CASE ----- UNEXPECTED PAYLOAD MOTION. INCOMPLETE CAPTURE/RELEASE SEQUENCE. UNABLE TO RELEASE PAYLOAD. CREW ACTION REQUIRED.</p> <p>REDUNDANT PATHS REMAINING ----- BACKUP EE RELEASE.</p>	<p>QA/INSPECTIONS -----</p> <p>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 ENVOCKED ON THE SUPPLIER.</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. OPA 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 JSCM0080 STANDARD NUMBER 95A.</p> <p>RECEIVING INSPECTION VERIFIES THAT THE HARDWARE RECEIVED IS AS IDENTIFIED IN THE PROCUREMENT DOCUMENTS, THAT NO DAMAGE HAS OCCURRED DURING SHIPMENT, AND THAT APPROPRIATE DATA HAS BEEN RECEIVED WHICH PROVIDES ADEQUATE TRACEABILITY INFORMATION AND 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, DAMAGED OR LIFTING CIRCUIT PADS, CLEANLINESS ETC.</p> <p>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.</p> <p>CONFORMAL COATING INSPECTION FOR ADEQUATE PROCESSING IS PERFORMED USING ULTRAVIOLET LIGHT TECHNIQUES.</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</p>	

**CRITICAL ITEMS LIST**

PROJECT: SRMS  
ASS'Y NOMENCLATURE: END EFFECTOR

SYSTEM: MECHANICAL ARM SUBSYSTEM  
ASS'Y P/N: 51140E170

SHEET: 5

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
3660	3	COMMUTATION SCANNER QTY-1 P/W 51140E517	<p>MODE: ALL THREE COMMUTATION OUTPUTS ARE UNDETERMINED</p> <p>CAUSE(S): (1) OPEN OR SHORT LED. (2) LOSS OF 5.1V. SUPPLY. (3) LOSS OF 10V SUPPLY. (4) FAILURE OF EEE PARTS. (5) DAMAGED FIBRE OPTICS.</p>	<p>END EFFECTOR MOTOR WILL NOT DRIVE. LOSS OF ABILITY TO CAPTURE/RELEASE (IN PRIME) OR RIGIDIZE/DERIGIDIZE PAYLOAD. ARM WILL STAY LIMP DURING AUTO CAPTURE SEQ.</p> <p>WORST CASE ----- UNEXPECTED PAYLOAD MOTION. INCOMPLETE CAPTURE/RELEASE SEQUENCE. UNABLE TO RELEASE PAYLOAD. CREW ACTION REQUIRED.</p> <p>REDUNDANT PATHS REMAINING ----- BACKUP EE RELEASE.</p>		<p>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, VIBRATION AND THERMAL-VAC TESTING, (SPAR/GOVERNMENT REP. - MANDATORY INSPECTION POINT)</p> <p>INTEGRATION OF UNIT TO MOTOR MODULE - INSPECTIONS INCLUDE GROUNDING CHECKS, CONNECTOR FOR BENT PINS, VISUAL, CLEANLINESS, INTERCONNECT WIRING ETC.</p> <p>MOTOR MODULES ARE TESTED TO THE REQUIREMENTS OF SPAR-TM.1624 WHICH INCLUDES, CONTINUITY AND ISOLATION CHECKS, STICTION, COMMUTATOR TIMING, AMBIENT AND THERMAL TESTING. (SPAR/GOVERNMENT REP. - MANDATORY INSPECTION POINT).</p> <p>INTEGRATION OF MOTOR MODULE TO END EFFECTOR LRU - INSPECTIONS INCLUDE GROUNDING CHECKS, CONNECTORS FOR BENT OR PUSHBACK CONTACTS, INCONNECT WIRING ETC.</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>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>

PREPARED BY: M/WG

SUPERCEDING DATE: 03 OCT 86

APPROVED BY: \_\_\_\_\_

DATE: 24 JUL 91

CIL REV: 3

**CRITICAL ITEMS LIST**

PROJECT: SRMS  
ASS'Y NOMENCLATURE: END EFFECTOR

SYSTEM: MECHANICAL ARM SUBSYSTEM  
ASS'Y P/N: 51140E1470

SHEET: 6

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
3660	3	COMMUTATION SCANNER QTY-1 P/N 51140E517	<p>MODE: ALL THREE COMMUTATION OUTPUTS ARE UNDETER- MINED</p> <p>CAUSE(S): (1) OPEN OR SHORT LED. (2) LOSS OF 5.1V. SUPPLY. (3) LOSS OF 10V SUPPLY. (4) FAILURE OF EEE PARTS. (5) DAMAGED FIBRE OPTICS.</p>	<p>END EFFECTOR MOTOR WILL NOT DRIVE. LOSS OF ABILITY TO CAPTURE/RELEASE (IN PRIME) OR RIGIDIZE/ DERIGIDIZE PAYLOAD. ARM WILL STAY LIMP DURING AUTO CAPTURE SEQ.</p> <p>WORST CASE ----- UNEXPECTED PAYLOAD MOTION. INCOMPLETE CAPTURE/RELEASE SEQUENCE. UNABLE TO RELEASE PAYLOAD. CREW ACTION REQUIRED.</p> <p>REDUNDANT PATHS REMAINING ----- BACKUP EE RELEASE.</p>		<p>FAILURE HISTORY ----- THE FOLLOWING FAILURE ANALYSIS REPORT(S) ARE RELEVANT:</p> <p>FAR 5004: S/N 201 MAY 79</p> <p>DESCRIPTION ----- COULD NOT TIME MOTOR DUE TO INCORRECT ALIGNMENT OF MOTOR ROTOR CODE WHEEL</p> <p>CORRECTIVE ACTION ----- ECN ECR 1789, 1941, 11041, 11046</p> <p>FAR 5006: S/N 202 MAY 79</p> <p>DESCRIPTION ----- MOTOR PHASING INCORRECT DUE TO INCORRECT ALIGNMENT OF MOTOR ROTOR/CODEWHEEL</p> <p>CORRECTIVE ACTION ----- ECR 11041, 11046 TO CLARIFY BUILD</p>

**CRITICAL ITEMS LIST**

PROJECT: SRMS  
ASS'Y NOMENCLATURE: END EFFECTOR

SYSTEM: MECHANICAL ARM SUBSYSTEM  
ASS'Y P/N: 51140E1470 SHEET: 7

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
3660	3	COMMUTATION SCANNER QTY-1 P/N 51140E517	<p>MODE: ALL THREE COMMUTATION OUTPUTS ARE UNDETERMINED</p> <p>CAUSE(S): (1) OPEN OR SHORT LED. (2) LOSS OF 5.1V. SUPPLY. (3) LOSS OF 10V SUPPLY. (4) FAILURE OF EEE PARTS. (5) DAMAGED FIBRE OPTICS.</p>	<p>END EFFECTOR MOTOR WILL NOT DRIVE. LOSS OF ABILITY TO CAPTURE/RELEASE (IN PRIME) OR RIGIDIZE/BERIGIDIZE PAYLOAD. ARM WILL STAY LIMP DURING AUTO CAPTURE SEQ.</p> <p>WORST CASE ----- UNEXPECTED PAYLOAD MOTION. INCOMPLETE CAPTURE/RELEASE SEQUENCE. UNABLE TO RELEASE PAYLOAD. CREW ACTION REQUIRED.</p> <p>REDUNDANT PATHS REMAINING ----- BACKUP EE RELEASE.</p>	<p>OPERATIONAL EFFECTS -----</p> <p>EE DOES NOT OPERATE NOMINALLY WHEN COMMANDED. ARM REMAINS LIMP UNTIL EE MODE SWITCH IS TURNED OFF DURING AN AUTO CAPTURE SEQUENCE.</p> <p>CREW ACTION -----</p> <p>FOR ANY OFF NOMINAL OPERATION OF THE EE, THE EE MODE SWITCH SHOULD BE TURNED OFF. ATTEMPT TO CAPTURE IN THE ALTERNATE MODE. IF THE SNARES REMAIN OPEN, MANEUVER ARM AWAY FROM PAYLOAD. IF THE SNARES ARE PARTIALLY CLOSED, ATTEMPT RELEASE USING A PRIMARY EE MODE. IF SNARES OPEN, MANEUVER THE ARM AWAY FROM THE PAYLOAD. IF SNARES DON'T OPEN, ATTEMPT TO RELEASE IN BACKUP MODE. IF SNARES OPEN, MANEUVER ARM AWAY FROM THE PAYLOAD. MANEUVER ORBITER AWAY FROM PAYLOAD. IF SNARES CANNOT BE OPENED, IN ANY MODE, EVA CAN BE USED TO RELEASE THE PAYLOAD OR THE ARM/PAYLOAD COMBINATION CAN BE JETTISONED.</p> <p>CREW TRAINING -----</p> <p>CREW WILL BE TRAINED TO RECOGNIZE OFF NOMINAL EE OPERATIONS AND TO MANEUVER THE ORBITER AWAY FROM A FREE FLYING PAYLOAD AT ANY TIME DURING ARM OPERATIONS.</p> <p>MISSION CONSTRAINT -----</p> <p>WHEN CAPTURING A FREE FLYING PAYLOAD, THE EE MUST BE FAR ENOUGH AWAY FROM STRUCTURE TO PROHIBIT CONTACT REGARDLESS OF PAYLOAD ROTATIONS. THE EE MODE SWITCH SHOULD BE PLACED BACK IN THE OFF POSITION IMMEDIATELY AFTER THE SPEC DRIVE TIME HAS ELAPSED.</p> <p>OMRSD OFFLINE -----</p> <p>VERIFY CORRECT TIME TO CAPTURE.</p> <p>OMRSD ONLINE INSTALLATION -----</p> <p>NONE</p> <p>OMRSD ONLINE TURNAROUND -----</p> <p>VERIFY CORRECT TIME TO CAPTURE.</p>

PREPARED BY: MFWG SUPERCEDING DATE: 03 OCT 86 APPROVED BY: \_\_\_\_\_ DATE: 24 JUL 91 CIL REV: 3