

CRITICAL ITEMS LIST

PROJECT: SONS
ASSY NAME/DESCRIPTION: DDC PANEL

SYSTEM: DDC SUBSYSTEM
ASSY P/N: 51100231

SHEET: _____

PREL REF.	REV.	NAME, QTY & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	MODE / FUNC. 2/1RD CRITICALITY	RATIONALE FOR ACCEPTANCE
41	1	MODE SELECT SWITCH QTY 1 P/N MC 452-0093-5006 CD 32020 SHEET 2	MODE SWITCH CONTACT CONTINUOUSLY ON DIRECT DRIVE (NOTE(S): (1) MOUNTED DIRECT DRIVE CONTACT ON SUB WAFER.	NO EFFECT FOR THIS FAILURE. NO EFFECT IN DIRECT UNLESS AMS IN PARM WITH BRAKE SELECT ON AND SUBSEQUENT FAILURE TO SINGLE/DIRECT SWITCH CAUSING UNCOMMANDED ROTATION. WORST CASE LOSS OF MISSION. SUBSEQUENT FAILURE MAY CAUSE UNEXPECTED MOTION. UNANNOUNCED CREW ACTION REQUIRED. REDUNDANT PATHS REMAINING SINGLE BACKUP. A-110 AND 41000		DESIGN FEATURES ----- ROTARY SWITCHES USED ON THE DDC PANEL ARE HERMETICALLY SEALED AND OF A MATURE AND PROVEN DESIGN. THESE SWITCHES ARE IN COMMON USE ON THE ORBITER VEHICLE. THE SWITCHES ARE CONTROLLED BY ROCKWELL INTERNATIONAL SPECIFICATION MC 452-0049 AND HAVE BEEN QUALIFIED TO THE REQUIREMENTS OF THIS SPECIFICATION. ELECTRICAL CONNECTIONS TO THE SWITCH ARE ACHIEVED BY MEANS OF A MATING PAIR OF NG TYPE CIRCULAR CONNECTORS USING CRIMP STYLE CONTACTS. WIRING TO SWITCH CONNECTION UTILIZES NICKEL PLATED CONDUCTORS WITH A POLYIMIDE INSULATION. THE WIRING HARNESS IS DESIGNED TO BE CAPABLE OF SEPARATE TESTING (FOR INSULATION RESISTANCE DIELECTRIC STRENGTH, AND COMPATIBILITY). THIS SWITCH IS MOUNTED ON THE DDC PANEL BY MEANS OF THREE 6-32 FASTENERS. AFTER INSTALLATION AND TIGHTNING EACH SCREW HEAD IS STAINED TO THE PANEL USING A BLEND OF EPOXY ADHESIVE. A DOWEL PIN, INTEGRAL TO THE SWITCH BODY, ENGAGES WITH THE PANEL TO PROVIDE ROTATION RESTRAINT. ANALYSIS OF THE BASIC PANEL STRUCTURE HAS DEMONSTRATED THAT THERE ARE NO RESONANCES IN THE RELEVANT VIBRATION FREQUENCY SPECTRUM. THIS ANALYSIS HAS BEEN VERIFIED BY VIBRATION TESTING OF THE DDC PANEL ASSEMBLY. APPLICATION ANALYSIS HAS CONFIRMED THAT ADEQUATE ELECTRICAL STRESS MARGINS ARE ACHIEVED. AT THE PART LEVEL, QUALIFICATION/CERTIFICATION TESTING IS DEFINED BY ROCKWELL INTERNATIONAL SPECIFICATION MC452-0093. THIS TEST REQUIREMENT INCLUDES: INSULATION RESISTANCE, CONTACT DROP AT RATED CURRENT, RANDOM VIBRATION (40 MINUTES PER AXIS), SHOCK (200 G AXES), 25000 CYCLES ACTIVATION AT RATED DC CURRENT LEAKAGE AT ONE ATMOSPHERE DIFFERENTIAL PRESSURE. FOR SWITCH OPERATIONAL CYCLES REFER TO TABLE 13. ALL UNITS ARE SUBJECT TO ACCEPTANCE TESTS WHICH INCLUDE PRE-ACCEPTANCE RUN-IN, DIELECTRIC WITHSTANDING FOR PAGE CONDUCTANCE RESISTANCE, ACCEPTANCE VIBRATION, SEAL TEST, VISUAL EXAMINATION AND FINAL PERFORMANCE TEST.

PREPARED BY: WHE

SUPERSEDING DATE: 21 OCT 87

APPROV

DATE: _____

CRITICAL ITEMS LIST

PROJECT: RMS
 ASST NOMENCLATURE: DDC PANEL

SYSTEM: OBE SUBSYSTEM
 ASSY P/N: 51100 371

SHEET: 2

ITEM REF.	REV.	NAME, REV. & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END USER	HAZAR / FUNC. S/IMP CRITICALITY	NATIONALS FOR ACCEPTANCE
41	1	MODE SELECT SWITCH OFF P P/R NO 452-0013-3106 EB 32020 SHEET 2	<p>MODE: SWITCH CONTACT CONTINUOUSLY ON DIRECT DRIVE</p> <p>CAUSE(S): (1) SHORTED DIRECT DRIVE CONTACT ON 28V WIPER.</p>	<p>NO EFFECT FOR THIS FAILURE. NO EFFECT IN DIRECT UNLESS RMS IN PARK WITH BRAKE SELECT ON AND SUBSEQUENT FAILURES TO SINGLE/DIRECT SWITCH CAUSING UNCOMPROMISED MOTION.</p> <p>WORST CASE</p> <p>LOSS OF POSITION, SUBSEQUENT FAILURE MAY CAUSE UNEXPECTED MOTION. UNANNOUNCED CREW ACTION REQUIRED.</p> <p>REDUNDANT PATHS REMAINING</p> <p>SINGLE, BACKUP, AUTO AND MANUAL.</p>		<p>ACCEPTANCE TESTS</p> <p>THE HARDWARE ITEM IS SUBJECT TO THE FOLLOWING ACCEPTANCE ENVIRONMENTAL TESTS AS PART OF THE DDC PANEL ASSEMBLY.</p> <p>• VIBRATION: LEVEL AND DURATION - REFERENCE TABLE 1</p> <p>• THERMAL: +110 DEGREES F TO PLUS 10 DEGREES F (2 CYCLES - 9.5 HRS/CYCLE.)</p> <p>THE DDC PANEL ASSEMBLY IS FURTHER TESTED AS PART OF THE RMS SUBSYSTEM TESTS (TP520 RMS STRENGTH TEST AND TP552 FLAT FLOOR TEST) WHICH VERIFIES THE ABSENCE OF THE FAILURE MODE.</p> <p>QUALIFICATION TESTS</p> <p>THE SWITCH ITEM HAS BEEN QUALIFIED FOR ORBITER USE. THE DDC PANEL ASSEMBLY HAS BEEN SUBJECT TO THE FOLLOWING QUALIFICATION TEST ENVIRONMENTS.</p> <p>• VIBRATION: LEVEL AND DURATION - REFERENCE TABLE 1</p> <p>• SHOCK: 20G/14 MS - 3 AXES (6 DIRECTIONS)</p> <p>• THERMAL: 130 DEGREES F TO -23 DEGREES F (12 HRS PER CYCLE) (6 CYCLES)</p> <p>• HUMIDITY: 95% (120 DEGREES F TO 62 DEGREES F CYCLE (IN 16 HRS) 10 CYCLES TOTAL.</p> <p>• EMC: MIL-STD-461 AS MODIFIED BY SL-E-0002 (TEST CE01, CE02, CE03, CS01 (DC/AC), CE03, CS01 (DC/AC), CS02, CS04, RE02 (R/W), RS02, RS03, RS04)</p> <p>FLIGHT CHECKOUT</p> <p>PARK OPS CHECKLIST (ALL VEHICLES) JSC 16003</p>

PREPARED BY: RMS

SUPERSEDING DATE: 21 OCT 92

APPROVED BY: _____

RMS/D&C 12

DATE: _____

CRITICAL ITEMS LIST

PROJECT: SRS
ASSY NAME/CLAYTON: OEC PANEL

SYSTEM: OEC SUBSYSTEM
ASSY P/N: 5142111

SHEET: _____

PREC. REF.	REV.	DATE BY & CHANGING REF. DESCRIPTION	FAILURE MODE AND CAUSE	FAILURE EFFECT OR END USE	HAZ / FUNC. / IIR / CRITICALITY	RATIONALE FOR ACCEPTANCE
11	1	MODE SELECT SWITCH OFF 4 P/N NO 452-0093-5106 ED 92020 SHEET 2	MODE: SWITCH CONTACT CONTINUOUSLY ON DIRECT DRIVE CAUSES: (S) SHORTED DIRECT DRIVE CONTACT ON 20V WPP4.	NO EFFECT FOR THIS FAILURE. NO EFFECT IN DIRECT UNLESS HAS IN PWR WITH BRKKE SELECT ON AND SUBSEQUENT FAILURES TO SINGLE/DIRECT SWITCH ERASING UNCORRELATED NOTION. WORST CASE LOSS OF POSITION. SUBSEQUENT FAILURE MAY CAUSE UNEXPECTED MOTION. UNCORRELATED CORN ACTION REQUIRED. REUNDANT PATHS REMAINING SINGLE, DIRECT, AND MANUAL		QA/INSPECTIONS ----- HERMETICALLY SEALED ROTARY SWITCHES ARE PROCURED TO ROCKWELL SPECIFICATION RC452-0049, AS REQUIRED BY CAE SPEC. PS 87840. CAE PART NO. PS87840. QUALIFICATION AND ACCEPTANCE TESTING OF SWITCHES IS PERFORMED TO R1. SPEC. RC452-0049. RECEIVING INSPECTION VERIFIES THAT SWITCHES RECEIVED ARE AS IDENTIFIED IN THE PROCUREMENT DOCUMENTS. THAT NO PHYSICAL DAMAGE HAS OCCURRED TO SWITCHES DURING SHIPMENT. THAT THE RECEIVING DOCUMENTS PROVIDE ADEQUATE TRACEABILITY INFORMATION AND ACCEPTANCE TEST DATA IDENTIFIES ACCEPTABLE PARTS. PARTS ARE INSPECTED THROUGHOUT MANUFACTURE AND ASSEMBLY AS APPROPRIATE TO THE MANUFACTURING STAGE COMPLETED. THESE INSPECTIONS INCLUDE: COMPONENT MOUNTING TO FRONT PANEL INSPECTION. CRIMPING OF CONTACTS TO SWITCH CONNECTOR. WIRE ROUTING. STRESS RELIEF OF WIRES ETC. OPERATORS AND INSPECTORS TRAINED AND CERTIFIED FOR CRIMPING AND SOLDERING OPERATIONS TO CAE SPEC PD 90155.01 AND NASA MM 5300.4 (1A) STANDARD, AS MODIFIED BY JSC ORD004. PRE-BEST INSPECTION OF OEC PANEL ASSY INCLUDES AN AUDIT OF LOWER TIER INSPECTION COMPLETION, AS BUILT CONFIGURATION VERIFICATION OR AS DESIGN ETC. (SPAR/GOVERNMENT REP. - 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 CONDUCTED 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 PERFORMANCE, THERMAL AND VIBRATION TESTING. (SPAR/GOVERNMENT REP. - MANDATORY INSPECTION POINT). INTEGRATION OF OEC PANEL, AHC, TMC AND M:IB INSPECTIONS ARE PERFORMED AT EACH STAGE OF INTEGRATION, WHICH INCLUDES GROUNDING CHECKS, INTER CONNECT CABLE VERIFICATION, CONNECTOR INSPECTION FOR WERT OR PUSHBACK CONTACTS ETC. SRS SYSTEM PERFORMANCE TESTING (SPTP) INCLUDES AN AMBIENT PERFORMANCE TEST. (MANDATORY INSPECTION POINT). SRS SYSTEMS INTEGRATION, THE INTEGRATION OF MECHANICAL AND SUBASSEMBLIES AND THE TIGHT CARBON EQUIPMENT TO FORM THE SRS. INSPECTIONS ARE PERFORMED AT EACH PHASE OF INTEGRATION WHICH INCLUDES GROUNDING CHECKS, THERM WIRING CHECKS, WIRING ROUTING, INTERFACE CONNECTORS FOR WERT OR PUSHBACK CONTACTS ETC. SRS SYSTEMS TESTING - SPANDBACK AND FLAT FLOOR AMBIENT PERFORMANCE TEST. (SPAR/GOVERNMENT REP. - MANDATORY INSPECTION POINT)

PREPARED BY: MWC

SUPERSEDING DATE: 21 OCT 87

APPROV

DATE: _____

CRITICAL ITEMS LIST

PROJECT: SRS
 ASS'Y MANUFACTURE: DC PANEL

SYSTEM: OLC SUBSYSTEM
 ASS'Y P/N: 51100391

SHEET: 4

P/N REF.	REV.	NAME, QTY & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	MODE / FUNC. Z/MS CRITICALITY	RATIONALE FOR ACCEPTANCE
01	1	BRAKE SELECT SWITCH Q14 P/N PN 432- 0043-3108 ED 92020 SHEET 2	MODE: SWITCH CONTACT CORRECTLY ON DIRECT ORIVE CAUSE(S): (1) SHORTED DIRECT BRAKE CONTACT ON 28V WIPER.	NO EFFECT FOR THIS FAILURE. NO EFFECT IN DIRECT UNLESS WPS IN PARK WITH BRAKE SELECT ON AND SUBSEQUENT FAILURE TO SPRINK/DIRECT SWITCH CAUSING UNCOMMANDED MOTION. WORST CASE LOSS OF MISSION. SUBSEQUENT FAILURE MAY CAUSE UNEXPECTED MOTION. UNANNOUNCED CIRCUITRY REQUIRED. REDUNDANT PATHS REMAINING SINGLE BACKUP, AUTO AND MANUAL		FAILURE HISTORY ----- THE FOLLOWING FAILURE ANALYSIS REPORT(S) ARE RELEVANT: PAR 4810: S/N 001 FEB 80 DESCRIPTION ----- DEFECT FAILURE TO INADEQUATE WELDING CORRECTIVE ACTION ----- REPAIRED, TRAINED OPERATORS

PREPARED BY: BMS

SUPERSEDING DATE: 28 OCT 82

NOTE:

CRITICAL ITEMS LIST

PROJECT: SRMS
 ASS'Y NAME/CONTAINER: OIC FRAME

SYSTEM: OIC SUBSYSTEM
 ASS'Y P/N: 2114131

SHEET 5

ITEM REF.	REV.	NAME, QTY, & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	HOW / PWR. 2/IMP CRITICALITY	RATIONALE FOR ACCEPTANCE
01	1	MODE SELECT SWITCH QTY 1 P/N NE 452-0037-5104 EQ 92820 SHEET 2	MODE: SWITCH CONTACT CONTINUOUSLY ON DIRECT ONLINE CAUSE(S): (1) SHORTED DIRECT DRIVE CONTACT ON 28V WIPER.	NO EFFECT FOR THIS FAILURE. NO EFFECT IN DIRECT UNLESS RMS IN PARK WITH BRAKE SELECT ON AND SUBSEQUENT FAILURES TO SINGLE/DIRECT SWITCH CAUSING UNCOMMANDED MOTION. WORST CASE ----- LOSS OF MISSION. SUBSEQUENT FAILURE MAY CAUSE UNEXPECTED MOTION. MANUCCIATED CREW ACTION REQUIRED. REDUNDANT PATHS REMAINING ----- SINGLE, BACKUP, AND AIA MANUAL	2/IMP	OPERATIONAL EFFECTS ----- NONE WITH THIS FAILURE. NO EFFECT IS DIRECT UNLESS RMS IN PARK WITH BRAKE SELECT ON AND SUBSEQUENT FAILURES TO SINGLE/DIRECT SWITCH CAUSING UNCOMMANDED MOTION. ALL MODES OPERATIONAL. FOR SUBSEQUENT FAILURES SINGLE AND BACKUP AVAILABLE. AIRBRAKES WILL STOP RMS MOTION FOR SUBSEQUENT FAILURE. CREW ACTION ----- NONE. CREW TRAINING ----- NONE. MISSION CONSTRAINTS ----- NONE. SCREEN FAILURES ----- N: NO ORBITER ANNUNCIATION ON DISPLAY. DMSO OFFLINE ----- OPERATE ROTARY MODE SELECT SWITCH IN ALL POSITIONS. VERIFY CORRECT BITS IN DATA BUS. DMSO ONLINE INSTALLATION ----- NONE. DMSO ONLINE PERFORMANCE ----- NONE.

PREPARED BY: WNG

SUPERSEDING DATE: 21 OCT 93

APPROV

DATE: