

SRB CRITICAL ITEMS LIST

SUBSYSTEM: ELECTRICAL AND INSTRUMENTATION

ITEM NAME: SRB OF Throwaway Cables X13W13 J46/P2 (J53/P2), X13W14 J42/P2 (J51/P2), X13W15 J41/P2 (J52/P2) and X13W16 J43/P2 (J56/P2) (TVC A, B, C, D Rock/Tilt Position Commands and Delta Ps; Rock/Tilt Servo Bypass)

PART NO.: 10400-0028
10400-0029
10400-0030
10400-0031

FM CODE: A10, A11

ITEM CODE: 50-04-X13

REVISION: Basic

CRITICALITY CATEGORY: IR

REACTION TIME: Immediate

NO. REQUIRED: 1 each

DATE: March 1, 1995

CRITICAL PHASES: Boost

SUPERCEDES: March 1, 1994

FMEA PAGE NO.: D-671, D-673

ANALYST: R. Smith/ A. Craft

SHEET 1 OF 2

APPROVED: P. Kalia

FAILURE MODE AND CAUSES: (a) Loss of 3 out of 4 Rock/Tilt Position commands and/or Servo Bypass command and/or DP Excitation in 3 out of 4 cables or (b) loss of 2 out of 4 Rock/Tilt Position commands simultaneously in 2 out of 4 connectors due to:

- o For (a):
 - o One pin or wire open caused by: open crimp or solder, open wire, broken/bent pin, unseated pin, broken pin locking mechanism, corroded pin.
 - o One pin or wire short to ground caused by: bent pin, contamination in connector, insulation breakdown, frayed shielding, abraded or cut insulation.
 - o Loss of connector P2 caused by: connector not fully mated, improperly safety wired, improperly torqued, defective threads, mechanical overstress.
 - o Loss of connectors J46 (J53), J42 (J51), J41 (J52) or J43 (J56) caused by: connector not fully mated. (Pullaway connectors)
- o For (b):
 - o Two pins or wires open caused by: open crimp or solder, open wire, broken/bent pin, corroded pin, unseated pin, broken pin locking mechanism.
 - o Two pins or wires short to ground caused by: bent pin, contamination in connector, insulation breakdown, frayed shielding, abraded or cut insulation.

FAILURE EFFECT SUMMARY: Loss of three of four Position commands or two of four position commands simultaneously to Rock and/or Tilt actuators resulting in loss of TVC leading to loss of mission, vehicle and crew. Two success paths remain after the first failure. Operation is not affected until all three paths are lost except in the case of simultaneous loss.

REDUNDANCY SCREENS AND MEASUREMENTS:

- 1) Pass - All cables are system tested during ground turnaround sequence.
- 2) Pass - Rock and Tilt A, B, C and D secondary delta pressure measurements B58P1311A through B58P1318A
- 3) Pass - No credible causes.

RATIONALE FOR RETENTION:

A. DESIGN Per Appendix A Section # III & IV

B. TESTING

- 1) **VENDOR RELATED** Per Appendix B Section # IB
- 2) **KSC RELATED** Per Appendix B Section # IIIB
- 3) **SYSTEM/ UNIQUE FUNCTIONAL**

Cables are again tested during Shuttle Flight Control Integrated Test per OMRSD File II, Vol. 1, requirement numbers S00000.650, .670, .680, .720 and .750 (SRB Actuator Tests). (Open, Short or Loss of Connector)

The last time cables are tested is during final countdown per OMRSD File II, Vol. 1, requirement number S00F50.030 (SRB Gimbal Test) at T-22 sec. (Open, Short or Loss of Connector)

C. INSPECTION

- 1) **VENDOR RELATED** Per Appendix C Section # I (Crimped & Soldered Connectors)
- 2) **KSC RELATED** Per Appendix C Section # IIIB Additional Connectors J41(J52), J42(J51), J43(J56) and 46(J53) are pullaway connectors. SPC measures clearance to verify connectors are fully mated. (Loss of connector)

D. FAILURE HISTORY

Failure Histories may be obtained from the PRACA database.

E. OPERATIONAL USE

Not applicable to this failure mode.