

SRB CRITICAL ITEMS LIST

SUBSYSTEM: ELECTRICAL AND INSTRUMENTATION

ITEM NAME: SRB OF Watertight Reusable Cable X02W4R P4, X02W6R P3, X02W10R P3 and X02W11R P3 or
SRB OF Throwaway Cable X02W4 P4, X02W6 P3, X02W10 P3 and X02W11 P3. (TVC A, B, C,
D Tilt Position Commands and Delta Ps)

PART NO.: 10400-0006, 10400-0656
10400-0008, 10400-0658
10400-0011, 10400-0661
10400-0012, 10400-0662

FM CODE: A11, A12

ITEM CODE: 50-04-X02

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-643, D-645

ANALYST: R. Smith/A. Craft

SHEET 1 OF 3

APPROVED: P. Kalia

FAILURE MODE AND CAUSES: (a) Loss of three of four Tilt Position commands and/or secondary DP in three out of four cables or (b) loss of two of four Tilt Position commands simultaneously in two out of four connectors for Function 1 due to:

- o For (a):
 - o One pin or wire open caused by: open solder, open wire, broken/bent pin, 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 caused by: connector not fully mated, improperly safety wired, improperly torqued, defective threads, mechanical overstress.
- o For (b):
 - o Two pins or wires open caused by: open solder, open wire, broken/bent pin, corroded pin.
 - 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 and/or secondary DP or two of four position commands simultaneously to Tilt actuator 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 - Tilt A, B, C, and D secondary delta pressure measurements B58P1315A through B58P1318A.
- 3) Pass - No credible causes.

RATIONALE FOR RETENTION:

A. DESIGN Per Appendix A Section # I & III

B. TESTING

- 1) VENDOR RELATED Per Appendix B Section # IA & IB
- 2) KSC RELATED Per Appendix B Section # IIA
- 3) SYSTEM/ UNIQUE FUNCTIONAL

Cables are tested during Assembly Checkout Operations (ACO) (Actuator Null, Linearity, and Polarity) per 10REQ-0021, para. 2.3.14. i. (Open, Short or Loss of Connector)

Cables are again tested during hotfire operations per 10REQ-0021, para. 2.3.16.

After transfer to SPC, Cables are tested during Shuttle flight control integration test per OMRSD File II, Vol. 1, requirement numbers S00000.650, .670, .680, .720, and .750 (SRB Actuator Tests).

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

C. INSPECTION

1) **VENDOR RELATED** Per Appendix C Section # I (Soldered Connector)

2) **KSC RELATED** Per Appendix C Section # IIA

D. FAILURE HISTORY

Failure Histories may be obtained from the PRACA database.

E. OPERATIONAL USE

Not applicable to this failure mode.