

SRB CRITICAL ITEMS LIST

SUBSYSTEM: ELECTRICAL AND INSTRUMENTATION

ITEM NAME: Integrated Electronic Assembly (IEA), Forward (Logic and Networks Distributor and OF Signal Conditioner)

PART NO.: 10400-0329

FM CODE: A08

ITEM CODE: 50-01-01-02

REVISION: Basic

CRITICALITY CATEGORY: 1R

REACTION TIME: Seconds

NO. REQUIRED: 1

DATE: March 1, 2002

CRITICAL PHASES: Boost

SUPERCEDES: March 31, 1998

FMEA PAGE NO.: D-10

ANALYST: C. Webster/S. Finnegan

SHEET 1 OF 3

APPROVED: S. Finnegan

CN 044

FAILURE MODE AND CAUSES: Loss of Orbiter C bus and Orbiter A or B bus power caused by:

- o Wiring harnesses, open or shorted
- o EMC filter, shorted (A or B Bus)
- o PBISs, shorted (A or B Bus)
- o Solid state switch, shorted (A or B Bus)
- o Transorb lightning suppression diode, shorted

FAILURE EFFECT SUMMARY: Loss of two SRM chamber pressure sensors leads to erroneous separation cue resulting in SRB recontact and loss of mission, vehicle and crew. (The failure effect identified assumes a worst case scenario involving a burn rate variation between SRMs of nearly 5 seconds and power source failures in the "slow" burning SRM. Second power source failure in this SRM is assumed to occur less than 5 seconds before "fast" burning SRM reaches 50 psi. This results in separation occurring 5 seconds early for the "slow" burning SRM.) One success path remains after the first failure. Operation is not affected until both paths are lost.

REDUNDANCY SCREENS AND MEASUREMENTS

- 1) Pass - Rate Gyro 3 SMRD Measurements B79X1(2)1845X, B79X1846X, B79X1(2)1848X and B79X1849X for Bus C, Voltage Measurements B76V1600C and B76V1601C for Buses A and B. SRM Chamber Pressure measurements B47P1300C, B47P1301C and B47P1302C.
- 2) Pass - Same as Screen No. 1.
- 3) Fail -Fail for wire harness only A and C power is routed together in the same harness assembly within the IEA.

RATIONALE FOR RETENTION:

A. DESIGN:

1. System Description

See Appendix A, Section 1, Paragraph (s) A & I

2.Component Description

See Appendix A, Section 2, Paragraph (s) A,B,C,D,E(1),F(1)(3)

B. TESTING

1)VENDOR RELATED:

See Appendix A, Section 3, Paragraph(s) A(1),(6) , (B)

2)KSC RELATED:

See Appendix A, Section 3, Paragraph B

3)SYSTEM FUNCTIONAL/FAILURE MODE UNIQUE:

Assembly Checkout (ACO) - ACO Forward Skirt Assembly Power Up verifies the A and B bus redundancy, per 10REQ-0021, para. 1.2.2.1.1. Integrity of SRM chamber pressure circuits are verified per 10REQ-0021, para. 1.2.2.19.2.3. These tests verify Forward IEA A, B, and C buses. (All Failure Causes)

Prelaunch Tests - Shuttle Interface Test (SIT) - The Orbiter to SRB power transfer to A and B busses is verified per OMRSD File II, Vol. 1, Requirement Number S00000.470. Operation of SRM chamber pressure transducer circuits A/B/C, transfer of power from Orbiter to SRB bus C, and Rate Gyro power-on are verified per OMRSD File II, Vol. 1, Requirement Numbers S00000.450,.475 and .640. These tests verify Forward IEA A, B and C buses. (All Failure Causes)

Terminal Countdown Demonstration Test (TCDDT) - The prelaunch SRB Forward IEA MDM functionality is verified per OMRSD File II, Vol. 1, Requirement Number S00FEO.185. The operation of the SRM chamber pressure transducer circuits A/B/C and SRB Rate Gyro power are verified per OMRSD File II, Vol. 1, Requirement Numbers S00FF0.180 and S00FF0.215. (All Failure Causes)

Launch Countdown - The prelaunch SRB Forward IEA MDM functionality is verified per OMRSD File II, Vol. 1, Requirement Number S00FE0.185. The operation of the SRM chamber pressure transducer circuits A/B/C and SRB Rate Gyro power are verified per OMRSD File II, Vol. 1, Requirement Numbers S00FF0.180 and S00FF0.215. (All Failure Causes)

Last Test of Failure Mode Prior to Launch - Launch Countdown tests per OMRSD File II, Vol. 1, Requirement Number S00FE0.185 verify pre-launch MDM functionality. The operation of the SRM chamber pressure transducer circuits A/B/C and SRB Rate Gyro power are verified per OMRSD File II, Vol. 1, Requirement Numbers S00FF0.180 and S00FF0.215. (All Failure Causes)

CN 044

C. INSPECTION

1)VENDOR RELATED:

See Appendix A, Section 4, Paragraph(s) A,B,C,D,E,F

2) KSC RELATED:

See Appendix A, Section 5, Paragraph(s) A.(1),A.(2)(a)(b),B.(1)(a)

D. FAILURE HISTORY

Failure Histories may be obtained from the PRACA database.

E. OPERATIONAL USE

Not applicable to this failure mode.

F. WAIVERS/DARS

See Appendix E, Paragraphs 1-5, 7-15.