

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ELECT POWER DIST & CONT FMEA NO 05-6 -2143 -4 REV:05/03/88

ASSEMBLY :AFT PCA-1 & 2	CRIT.FUNC:	1R
P/N RI :MC455-0129-0001	CRIT. HDW:	3
P/N VENDOR:	VEHICLE	102 103 104
QUANTITY :4	EFFECTIVITY:	X X X
:FOUR	PHASE(S):	PL LO X OO DO LS

PREPARED BY:	REDUNDANCY SCREEN:	A-FAIL B-FAIL C-PASS
DES R PHILLIPS	APPROVED BY:	APPROVED BY (NASA):
REL M HOVE	DES <i>S. P. Bussan</i>	SSM <i>W. C. Stang 5/12/88</i>
QE J COURSEN	REL <i>M. J. Clifton 5-6-88</i>	REL <i>D. J. ... 5/16/88</i>
	QE <i>J. L. ... 5/6/88</i>	QE <i>...</i>

ITEM:
RELAY, GENERAL PURPOSE - MAIN DC POWER LEFT/RIGHT SRB BUS POWER

FUNCTION:
TRANSFERS POWER BETWEEN SEPARATE MAIN DC BUSES TO AN SRB BUS. ALLOWS REDUNDANT MAIN DC BUS TO POWER EACH SRB DC BUS. SUPPLIES ORB MAIN BUS A, B, OR C TO THE RIGHT AND LEFT SRB BUSES A AND B. 54V76A132K8, K9; 55V76A132K9, K10

FAILURE MODE:
SHORT POLE-TO-POLE

CAUSE(S):
PIECE PART FAILURE, MECHANICAL SHOCK, VIBRATION, PROCESSING ANOMALY

EFFECT(S) ON:
(A)SUBSYSTEM (B)INTERFACES (C)MISSION (D)CREW/VEHICLE (E)FUNCTIONAL CRITICALITY EFFECT:

(A) IF A POLE-TO-POLE SHORT OCCURS BETWEEN ONE OF THE TWO POLES CARRYING SRB DC BUS POWER AND THE POLE WHICH PROVIDES, THROUGH A VOLTAGE DIVIDER NETWORK, FEEDBACK OF THE RELAY OUTPUT VOLTAGE TO THE SRB DC BUS FAILURE DETECTION LOGIC IN THE AFT HYBRID LOAD CONTROLLER, THEN THE SRB DC BUS VOLTAGE WILL BE INCORRECTLY SENSED.

(B) LOSS OF REDUNDANCY FOR ONE OF TWO SRB DC BUSES IF THE PRIMARY POWER FEED FROM ORBITER TO THAT SRB BUS FAILS.

(C,D) FIRST FAILURE - NO EFFECT. SRB BUSES HAVE REDUNDANT SOURCES FROM THE ORBITER AS WELL AS A REDUNDANT SRB DC BUS TO PROVIDE REQUIRED FUNCTIONS.

(E) POSSIBLE LOSS OF CREW/VEHICLE VIA THE FOLLOWING SCENARIO: (1) POLE-TO-POLE SHORT OF THE RELAY; (2) DEGRADED VOLTAGE ON THE PRIMARY SOURCE FROM THE ORBITER DC BUS TO THE ASSOCIATED SRB DC BUS WITH NO SWITCHOVER TO THE BACKUP SOURCE DUE TO INCORRECT SRB BUS VOLTAGE SENSING; (3) LOSS OF SECOND DC BUS ON THE SAME SRB RESULTING IN LOSS OF THRUST VECTOR CONTROL FOR ONE SRB. FAILS "A" SCREEN BECAUSE SRB BUS

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EFFECT(S) ON (CONTINUED):

(A)SUBSYSTEM (B)INTERFACES (C)MISSION (D)CREW/VEHICLE (E)FUNCTIONAL
CRITICALITY EFFECT:

SOURCE SWITCHOVER POINT CANNOT BE VERIFIED DURING GROUND TURNAROUND
WITHOUT EXPOSING THE ORBITER TO RISK OF DAMAGE DUE TO VARYING DC BUS
VOLTAGE BEYOND SPECIFICATION LIMITS. FAILS "B" SCREEN BECAUSE NO
INDICATION OF INCORRECT SRB BUS VOLTAGE SENSING IS PROVIDED.

DISPOSITION & RATIONALE:

(A)DESIGN (B)TEST (C)INSPECTION(D)FAILURE HISTORY (E)OPERATIONAL USE:

(A,B,C,D) DISPOSITION AND RATIONALE

REFER TO APPENDIX C, ITEM NO. 2 - GENERAL PURPOSE RELAY

(B) GROUND TURNAROUND TEST

NONE

(E) OPERATIONAL USE

NONE