

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ELECT POWER DIST & CONT FMEA NO 05-6 -2509 -2 REV:05/16/88

ASSEMBLY :MEC, BAYS-4, 5
P/N RI :MC450-0018-0008
P/N VENDOR:
QUANTITY :4
:FOUR-TWO EACH MEC

VEHICLE 102 103 104
EFFECTIVITY: X X X
PHASE(S): PL LO X OO DO LS

CRIT.FUNC: 1R
CRIT. HDW: 2

PREPARED BY: DES R PHILLIPS
REL M HOVE
QE J COURSEN

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS
APPROVED BY: DES [Signature]
REL [Signature]
QE [Signature]

APPROVED BY (NASA): SSM [Signature]
REL [Signature]
QE [Signature]

ITEM:
CONTROLLER, PYRO INITIATOR (PIC) - RIGHT/LEFT ET/ORB AFT ATTACH
RELEASE

FUNCTION:
PROVIDES A SINGLE CHANNEL PYRO-FIRING CIRCUIT, AN INITIATOR RESISTANCE
TEST CIRCUIT, AND A PYRO-FIRING LOAD TEST CIRCUIT FOR THE CONTROL AND
CHECKOUT OF THE RIGHT/LEFT EXTERNAL TANK/ORBITER AFT ATTACH/RELEASE
(SEPARATION) FUNCTION. 54V76A13PIC7, PIC8; 55V76A14PIC7, PIC8

FAILURE MODE:
PREMATURE OUTPUT (FIRE 2)

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

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

(A) IF THE FIRE 2 OUTPUT TRANSISTOR FAILS SHORTED ("ON") PRIOR TO THE
PIC'S RECEIVING THE ARM AND/OR FIRE 1 COMMANDS, THE PIC WILL BE
INHIBITED FROM FIRING ITS ASSOCIATED PYRO INITIATOR.

(B) LOSS OF REDUNDANCY FOR ORBITER/ET AFT ATTACH STRUCTURAL
SEPARATION. NO EFFECT - THE REDUNDANT PIC/INITIATOR WILL COMPLETE
THE SEPARATION FUNCTION.

(C,D) FIRST FAILURE - NO EFFECT.

(E) POSSIBLE LOSS OF CREW/VEHICLE VIA ONE OF THE FOLLOWING SCENARIOS:

(1a) PREMATURE FIRE 2 OUTPUT FAILURE PRIOR TO VALID ARM AND/OR
FIRE 1 COMMAND RESULTING IN FAILURE OF THE PIC TO FIRE THE
ASSOCIATED INITIATOR.

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SUBSYSTEM :ELECT POWER DIST & CONT FMEA NO 05-6 -2509 -2 REV:05/16/88

EFFECT(S) ON (CONTINUED):

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

- (1b) FAILURE OF THE REDUNDANT PIC/INITIATOR RESULTING IN
LOSS OF ORBITER/ET AFT ATTACH STRUCTURAL SEPARATION.
- (2a) OVERVOLTAGE FAILURE IN A MEC (MASTER EVENTS CONTROLLER)
POWER SUPPLY RESULTING IN A PREMATURE OUTPUT OF ALL "ARM" AND
"FIRE 1" OUTPUT DRIVERS FOR THE ASSOCIATED CORE A OR CORE B
IN THAT MEC.
- (2b) PREMATURE FIRE 2 OUTPUT FAILURE RESULTING IN PREMATURE
ORBITER/ET AFT ATTACH STRUCTURAL SEPARATION.

"B" SCREEN FAILS SINCE THE FAILURE CANNOT BE DETECTED UNTIL USE OF THE
PIC IS REQUIRED.

DISPOSITION & RATIONALE:

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

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

REFER TO APPENDIX H, ITEM NO. 1 - PYRO INITIATOR CONTROLLER

(B) GROUND TURNAROUND TEST

VERIFY MEC 1 AND MEC 2 POWER REDUNDANCY (PS1, PS2) WITH THE MEC'S
POWERED BY EITHER ONE OF THE TWO POWER INPUTS. VERIFY THAT THE PRE-
FLIGHT MEC BITE RESPONDS TO COMMANDS, THE ARM COMMANDS CHARGE THE
PIC'S, AND THE GO/NO GO LOAD TESTS ARE SATISFIED. TEST IS PERFORMED
FOR ALL FLIGHTS.

(E) OPERATIONAL USE

PYRO'S ARE NOT ARMED UNTIL OUTPUT IS REQUIRED.