

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ELECT POWER DIST & CONT FMEA NO 05-6 -2508 -2 REV:05/16/86

ASSEMBLY :FWD LCA 1, 2 CRIT.FUNC: 1R  
P/N RI :MC450-0018-0008 CRIT. HDW: 2  
P/N VENDOR: VEHICLE 102 103 104  
QUANTITY :2 EFFECTIVITY: X X X  
:TWO-ONE EACH FWD LCA 1&2 PHASE(S): PL LO X OO DO LS

REDUNDANCY SCREEN: A-PASS B-FAIL C-PASS  
PREPARED BY: APPROVED BY: APPROVED BY (NASA):  
DES R PHILLIPS DES *[Signature]* SSM *[Signature]*  
REL M HOVE REL *[Signature]* 7-14-85 REL *[Signature]*  
QE J COURSEN QE *[Signature]* 7-25-85 QE *[Signature]*

ITEM:

CONTROLLER, PYRO INITIATOR (PIC) - ET/ORB FORWARD 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 EXTERNAL TANK/ORBITER FORWARD ATTACH/RELEASE (SEPARATION) FUNCTION. 81V76A16PIC(A), 82V76A17PIC(B)

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 FORWARD 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.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ELECT POWER DIST & CONT FMEA NO 05-6 -2508 -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 FORWARD 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 FORWARD 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:

B, C, D) DISPOSITION AND RATIONALE

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

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-  
LIGHT MEC BITE RESPONDS TO COMMANDS, THE ARM COMMANDS CHARGE THE  
IC'S, AND THE GO / NO GO LOAD TESTS ARE SATISFIED. TEST IS PERFORMED  
ON ALL FLIGHTS.

OPERATIONAL USE

PYRO'S ARE NOT ARMED UNTIL OUTPUT REQUIRED.