

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE -
 NUMBER: 05-60S-2010-X

SUBSYSTEM NAME: EPD&C-DRAG CHUTE

REVISION : 1 04/23/92

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
■ LRU :	DRAG CHUTE CONTROLLER ASSY	V070-765440
■ SRU :	CONTROLLER, PIC	MC450-0018-0008

PART DATA

- EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
CONTROLLER, PYROTECHNIC INITIATOR - DEPLOY
- REFERENCE DESIGNATORS: 50V76A214(NO.1)
: 50V76A215(NO.1)
- QUANTITY OF LIKE ITEMS: 2
TWO,
ONE PER ASSEMBLY
- FUNCTION:
PROVIDES POWER TO NSI FOR DEPLOYMENT OF DRAG CHUTE. REQUIRES ARM, FIRE 1
AND FIRE 2 COMMANDS FOR INITIATION.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE

NUMBER: 05-60S-2010-02

REVISION# 1 04/23/92 R

SUBSYSTEM: EPD&C-DRAG CHUTE
 LRU :DRAG CHUTE CONTROLLER ASSY
 ITEM NAME: CONTROLLER, PIC

CRITICALITY OF THIS
 FAILURE MODE:1R3

- FAILURE MODE:
PREMATURE OUTPUT

MISSION PHASE:

LO LIFT-OFF
 DO DE-ORBIT

- VEHICLE/PAYLOAD/KIT EFFECTIVITY: 102 COLUMBIA
 : 103 DISCOVERY
 : 104 ATLANTIS
 : 105 ENDEAVOUR

- CAUSE:
PIECE PART FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK.
PROCESSING ANOMALY, THERMAL STRESS

- CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

- REDUNDANCY SCREEN A) PASS
 ■ B) FAIL
 ■ C) PASS

PASS/FAIL RATIONALE:

- A)
- B)
FAILS SCREEN "B" BECAUSE A PREMATURE PIC OUTPUT FAILURE IS NOT READILY
DETECTABLE UNLESS POWER IS APPLIED TO CHARGE CAPACITOR, AND RETURN PATH
IS PRESENT.
- C)

- FAILURE EFFECTS -

- (A) SUBSYSTEM:
PREMATURE OUTPUT FAILURE (Q10 HAS A COLLECTOR TO EMITTER SHORT) HAS NO
EFFECT WITHOUT POWER APPLIED TO CHARGE CAPACITOR AND RETURN PATH.

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■ (B) INTERFACING SUBSYSTEM(S):

FIRST FAILURE - NO EFFECT

■ (C) MISSION:

FIRST FAILURE - NO EFFECT

■ (D) CREW, VEHICLE, AND ELEMENT(S):

FIRST FAILURE - NO EFFECT

■ (E) FUNCTIONAL CRITICALITY EFFECTS:

POSSIBLE LOSS OF CREW/VEHICLE IF DRAG CHUTE IS PREMATURELY DEPLOYED CAUSING DEGRADATION OF VEHICLE CONTROL. DURING ASCENT, PREMATURE DEPLOYMENT COULD RESULT IN DAMAGE TO ENGINE BELL RECIRCULATION LINES RESULTING IN POTENTIAL LOSS OF CREW/VEHICLE. DURING LANDING, PREMATURE DEPLOYMENT AT ALTITUDES OF 40-135 FEET COULD RESULT IN LOSS OF CREW/VEHICLE DUE TO INSUFFICIENT ENERGY TO REACH THE RUNWAY. REQUIRES TWO ADDITIONAL FAILURES (QB HAS COLLECTOR TO EMITTER SHORT AND ARM HDC FAILS "ON") BEFORE EFFECT IS MANIFESTED.

- DISPOSITION RATIONALE -

■ (A) DESIGN:

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

■ (B) TEST:

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

GROUND TURNAROUND TEST

VERIFY DEPLOY PIC'S FOR PREMATURE OUTPUT CONDITION BY VERIFYING DEPLOY PIC FIRING FROM EACH OF THE COMMANDER AND PILOT SWITCHES VIA FUNCTIONAL AND/OR OUT OF SEQUENCE TESTS, AND THE GO/NO GO RESISTANCE LOAD TESTS ARE SATISFIED. TESTS ARE PERFORMED EVERY FLOW IF DRAG CHUTE IS INSTALLED AND FOR LRU RETEST PER TABLE V55Z00.000. ADDITIONAL TESTS TO VERIFY DEPLOY PIC'S FOR PREMATURE OUTPUT CONDITION ARE DONE EVERY FIFTH FLOW THROUGH THE PIC BITE CIRCUITRY VERIFICATION.

■ (C) INSPECTION:

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

■ (D) FAILURE HISTORY:

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

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■ (E) OPERATIONAL USE:
TBD

- APPROVALS -

RELIABILITY ENGINEERING: T. AI
DESIGN ENGINEERING : T. POCKLINGTON
QUALITY ENGINEERING : W. R. HIGGINS
NASA RELIABILITY :
NASA SUBSYSTEM MANAGER :
NASA EPD&C RELIABILITY :
NASA QUALITY ASSURANCE :
NASA EPD&C SUBSYS MGR :

: TA T. J. Lawrence 4/29/92
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