FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE
NUMBER: 05-6DS-2001-X

SUBSYSTEM NAME: EPD&C-DRAG CHUTE
REVISION : 1 04/23/92

		PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
■ LRU	:	PANEL F2	V070-730400
■ LRU	:	PANEL F3	V070-730401
■ SRU	:	SWITCH, PUSHBUTTON	ME452-0061-7198

PART DATA

■ **EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**
SWITCH, PUSHBUTTON - DEPLOY COMMAND (4P2P)

■ **REFERENCE DESIGNATORS:** 34V73A2S11
: 34V73A3S9

■ **QUANTITY OF LIKE ITEMS:** 2
TWO, ONE PER PANEL F2 & F3

■ **FUNCTION:**
PROVIDES MANUAL CONTROL OF 28VDC FROM CONTROL BUS TO PIC-DEPLOY CIRCUIT. ACTUATION SWITCH LIGHT COMES ON AFTER THE SWITCH IS ACTIVATED. TWO IDENTICAL SWITCHES PROVIDE REDUNDANT CONTROL POWER TO COMMANDER AND PILOT. CIRCUIT DESIGN ALLOWS EITHER OF ARM OR DEPLOY SWITCHES TO BE ACTUATED FIRST.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-6DS-2001-02

REVISION# 1 04/23/92 R

SUBSYSTEM: EPD&C-DRAG CHUTE
LRU :PANEL F2
ITEM NAME: SWITCH, PUSHBUTTON

CRITICALITY OF THIS FAILURE MODE:1R3

■ FAILURE MODE:
FAILS CLOSED, PREMATURE CLOSURE, CONTACT-TO-CONTACT SHORT (FAILS ONE POLE AT A TIME)

MISSION PHASE:
LO LIFT-OFF
OO DE-ORBIT

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

■ CAUSE:
PIECE PART STRUCTURAL FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY

■ 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 SINGLE POLE FAILURE CANNOT BE MONITORED INFLIGHT UNLESS THE SECOND POLE FAILED.

■ C)

- FAILURE EFFECTS -

■ (A) SUBSYSTEM:
EITHER FIRE 1 OR FIRE 2 COMMAND IS PREMATURELY GIVEN.

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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 (REMAINING POLE FAILS CLOSED AND ARM HDC FAILS "ON") BEFORE EFFECT IS MANIFESTED.

- DISPOSITION RATIONALE -

- (A) DESIGN:
  REFER TO APPENDIX A, ITEM NO. 3 - PUSHBUTTON SWITCH

- (B) TEST:
  REFER TO APPENDIX A, ITEM NO. 3 - PUSHBUTTON SWITCH

  GROUND TURNAROUND TEST
  VERIFY THAT ONE POLE OF THE PUSHBUTTON SWITCH IS NOT CLOSED BY VERIFYING THAT PICS DO NOT FIRE WHEN THE SYSTEM IS PROPERLY ARMED AND POWER IS SUPPLIED TO THE OTHER POLE OF THE PUSHBUTTON SWITCH. TESTS ARE PERFORMED EVERY FLOW IF DRAG CHUTE IS INSTALLED.

- (C) INSPECTION:
  REFER TO APPENDIX A, ITEM NO. 3 - PUSHBUTTON SWITCH

- (D) FAILURE HISTORY:
  REFER TO APPENDIX A, ITEM NO. 3 - PUSHBUTTON SWITCH

- (E) OPERATIONAL USE:
  IN THE EVENT OF PREMATURE DEPLOYMENT OF DRAG CHUTE, TIME PERMITTING, CREW WILL ARM AND JETTISON THE DRAG CHUTE. THE JETTISON WILL RELEASE THE DRAG CHUTE FROM THE ATTACH/JETTISON MECHANISM AND THEREBY PRECLUDE DEGRADATION OF VEHICLE CONTROL AND/OR STRUCTURAL DAMAGE TO THE ORBITER.

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- APPROVALS -

RELIABILITY ENGINEERING	T. AI	TA T. J. Kacena 4/29/92
DESIGN ENGINEERING	T. POCKLINGTON	4-29-92
QUALITY ENGINEERING	W. R. HIGGINS	5/19/92
NASA RELIABILITY		5/19/92
NASA SUBSYSTEM MANAGER		5/11/92
NASA EPD&C RELIABILITY		RO 5/6/92
NASA QUALITY ASSURANCE		5-18-92
NASA EPD&C SSM		