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PRINT DATE: 04/23/92

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE

NUMBER: 05-605-2003-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, HYBRID DRIVER	MC477-0261-0002

PART DATA

- EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
HYBRID DRIVER CONTROLLER (HDC), TYPE I - FIRST STAGE DEPLOY FIRE 1
COMMAND DRIVER
- REFERENCE DESIGNATORS: 50V76A214AR1
: 50V76A215AR1
- QUANTITY OF LIKE ITEMS: 2
TWO, ONE PER ASSEMBLY NO. 1 & NO. 2
- FUNCTION:
UPON RECEIPT OF 28VDC SIGNAL FROM FIRE 1 COMMAND SWITCH, THE FIRST STAGE
HDC OUTPUT PERFORMS AS AN ENABLE TO THE SECOND STAGE DRIVER. THE FIRST
STAGE OUTPUT IS FED BACK TO MAINTAIN FIRE 1 COMMAND SIGNAL INITIATED BY
MOMENTARY PUSHBUTTON SWITCH.

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FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-6DS-2003-01

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

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CRITICALITY OF THIS
FAILURE MODE:1R3

- FAILURE MODE:
FAILS "ON", INADVERTENT OUTPUT

MISSION PHASE:

LD	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" SINCE THERE ARE NO DIRECT MEASUREMENTS ON HOC OUTPUT
TO DETECT THIS FAILURE.
- C)

- FAILURE EFFECTS -

- (A) SUBSYSTEM:
INADVERTENT INPUT SIGNAL TO SECOND STAGE FIRE 1 DRIVER

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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 (1ST STAGE FIRE 2 HOC AND ARM HOC INADVERTENTLY FAIL "ON") BEFORE EFFECT IS MANIFESTED.

- DISPOSITION RATIONALE -

■ (A) DESIGN:

REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER

■ (B) TEST:

REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER

GROUND TURNAROUND TEST

VERIFY THAT HOC DOES NOT FAIL "ON" BY VERIFYING THAT PIC DOES NOT FIRE WHEN SYSTEM IS PROPERLY ARMED AND POWER IS SUPPLIED TO THE F2 PORTION OF THE CIRCUIT. TESTS ARE PERFORMED EVERY FLOW IF DRAG CHUTE IS INSTALLED.

■ (C) INSPECTION:

REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER

■ (D) FAILURE HISTORY:

REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER

■ (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.

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

NUMBER: 05-6DS-2003-01

- 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 EPDC SSM :

: ~~TR T. J. Gavenon 4/24/92~~
 : ~~William Pocklington 4-24-92~~
 : ~~W. R. Higgins~~
 : ~~Raytheon 5/10/92~~
 : ~~5/11/92~~
 : M. Saleem Dwan 5/11/92
 : KO Great Start 5/6/92
 : B. Johnson 5-18-92