

PRINT DATE: 03/26/92

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE

NUMBER: 05-6DS-2006-X

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ATTACHES
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SUBSYSTEM NAME: EPDEC-DRAG CHUTE

REVISION : 0 03/26/92 W

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU :	DRAG CHUTE CONTROLLER ASSY	V070-755440
SRU :	CONTROLLER, HYBRID DRIVER	MC477-0262-3002

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

HYBRID DRIVER CONTROLLER (HDC), TYPE II - SECOND STAGE DEPLOY FIRE 2
COMMAND DRIVER, ONE SECOND DELAY

REFERENCE DESIGNATORS: 50V76A214AR3
: 50V76A215AR3

QUANTITY OF LIKE ITEMS: 2
TWO, ONE PER ASSEMBLY NO. 1 & NO. 2

FUNCTION:

UPON RECEIPT OF 28VDC SIGNAL FROM FIRST STAGE FIRE 2 COMMAND DRIVER, 1
SECOND STAGE DRIVER CAUSES A ONE SECOND DELAY OUTPUT TO THE ASSOCIATED
PIC. ONE SECOND DELAY IS REQUIRED TO CHARGE UP THE OUTPUT CAPACITORS

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-6DS-2006-01

REVISION: 0 03/26/92 W

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

CRITICALITY OF THIS
FAILURE MODE: 1E3

FAILURE MODE:
FAILS "ON", INADVERTENT OUTPUT

MISSION PHASE:
LO LEFT-OFF
DO DE-CRBIT

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 HEC OUTPUT TO DETECT THIS FAILURE.
C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
PREMATURE FIRE 2 SIGNAL TO ASSOCIATED PIC WHEN POWER SUPPLIED BY SECOND STAGE FIRE 1.

(B) INTERFACING SUBSYSTEM(S):
FIRST FAILURE - NO EFFECT

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(C) MISSION:
FIRST FAILURE - NO EFFECT

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(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 ALTITUDE 40-135 FEET COULD RESULT IN LOSS OF CREW/VEHICLE DUE TO INSUFFICIENT ENERGY TO REACH THE RUNWAY. REQUIRES TWO ADDITIONAL FAILURES (ARM HDC FAILS "ON" FOLLOWED BY SECOND STAGE FIRE 1 HDC FAILS "ON" ONE SECOND LATER) 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 SECOND STAGE F2 HDC DOES NOT FAIL "ON" BY VERIFYING THAT THE ASSOCIATED PIC DOES NOT FIRE WHEN ARM AND F1 SIGNALS ARE SUPPLIED THROUGH THE DRAG CHUTE SYSTEM. AN ALTERNATE METHOD OF DETECTION INVOLVES COMPARISON OF TIME DELAYS EXPERIENCED BY THE PIC'S DURING THE FUNCTIONAL TESTS. TESTS ARE PERFORMED EVERY FLOW IF DRAG CHUTE IS INSTALLED AND FOR IRLU RETEST PER TABLE V55200.000.

(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.

- APPROVALS -

RELIABILITY ENGINEERING: T. AI
DESIGN ENGINEERING : T. ROCKLINGTON

: *[Signature]*
: *[Signature]* 2/20/05
for

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

NUMBER: 05-6DS-2006-01

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

WRH
 8/25/92
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 [Signature] 4/8/92
 R.O. D'Amico 4/6/92
 [Signature] 4-8-92