

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE

NUMBER: 05-6BA-2586-IM -X

SUBSYSTEM NAME: EPD&C - LANDING GEAR CONTROL

REVISION: 6 - 07/27/97

PART DATA

	PART NAME	PART NUMBER
	VENDOR NAME	VENDOR NUMBER
LRU	: FWD PCA 3	V070-763360
SRU	: RELAY, LATCHING	MC455-0128-0001

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
RELAY, LATCHING, LANDING GEAR DOWN CONTROL CIRCUIT (4P2P)

REFERENCE DESIGNATORS: 83V76A24K9
83V76A24K10

QUANTITY OF LIKE ITEMS: 2
TWO, FPCA 3

FUNCTION:

THE LANDING GEAR DOWN RELAYS ALONG WITH THE ARM RELAYS INITIATE PYRO UPLOCK RELEASE CIRCUITS FOR RELEASING LANDING GEAR UPLOCK HOOKS IF SYSTEM HYDRAULIC MALFUNCTION. THESE RELAYS ALSO USE TO INITIATE NOSE LANDING GEAR EXTENSION PYRO ASSIST CIRCUITS.

EDITORIALLY APPROVED : BNA
EDITORIALLY APPROVED : JSC
TECHNICAL APPROVAL : VIA APPROVAL FORM

: J.K. Kumura 7/27/97
: A. Seary
: 96-CIL-011_05-6BA

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

NUMBER: 05-6BA-2586-IM - 02

REVISION# 5 05/18/94

SUBSYSTEM NAME: EPD&C - LANDING GEAR CONTROL

LRU: FWD PCA 3

CRITICALITY OF THIS
FAILURE MODE: 1R2

ITEM NAME: RELAY, LATCHING

FAILURE MODE:

CLOSED, PREMATURELY CLOSES (TO SET POSITION)

MISSION PHASE:

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 "B" SCREEN BECAUSE RELAY FAILURE IS NOT FLIGHT DETECTABLE DUE TO PARALLEL REDUNDANCY.

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:

FIRST FAILURE - NO EFFECT

(B) INTERFACING SUBSYSTEM(S):

FIRST FAILURE - NO EFFECT

(C) MISSION:

FIRST FAILURE - NO EFFECT

(D) CREW, VEHICLE, AND ELEMENT(S):

FIRST FAILURE - NO EFFECT

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-6BA-2586-IM - 02

(E) FUNCTIONAL CRITICALITY EFFECTS:

AFTER SECOND FAILURE (DOWN RELAY ON THE SAME PIC CIRCUIT PREMATURELY CLOSES PRIOR TO OR WITHIN THE TIME FRAME OF THE FIRST FAILURE), INADVERTENT DEPLOYMENT OF THE LANDING GEAR WILL OCCUR WHEN THE ARM SWITCH IS ACTIVATED AS PART OF NORMAL PROCEDURE. POSSIBLE LOSS OF CREW/VEHICLE DUE TO INADVERTENT DEPLOYMENT OF THE LANDING GEAR WHEN THERE IS A LIGHT VEHICLE, LOW ON ENERGY AND STRONG HEAD WINDS WHICH CAUSES THE VEHICLE TO LAND SHORT OF RUNWAY.

-DISPOSITION RATIONALE-

(A) DESIGN:

REFER TO APPENDIX C, ITEM NO. 3 - LATCHING RELAY

(B) TEST:

REFER TO APPENDIX C, ITEM NO. 3 - LATCHING RELAY

GROUND TURNAROUND TEST

ANY TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD.

(C) INSPECTION:

REFER TO APPENDIX C, ITEM NO. 3 - LATCHING RELAY

(D) FAILURE HISTORY:

CURRENT DATA ON TEST FAILURES, FLIGHT FAILURES, UNEXPLAINED ANOMALIES, AND OTHER FAILURES EXPERIENCED DURING GROUND PROCESSING ACTIVITY CAN BE FOUND IN THE PRACA DATABASE.

(E) OPERATIONAL USE:

GEAR NORMALLY ARMED AT TWO THOUSAND FEET ALTITUDE WHICH ASSURES MAKING RUNWAY THRESHOLD EXCEPT FOR WORST CASE COMBINATION OF LIGHT VEHICLE, STRONG HEAD WIND AND LOW ENERGY. CREW TRAINS IN SHUTTLE TRAINING AIRCRAFT AT TWO THOUSAND FEET ALTITUDE TO COMPENSATE FOR INADVERTENT GEAR EXTENSION. FOR MULTIPLE POLE FAILURES, CREW WILL SEE "DOWN" PBI LIGHT ON AND GROUND WILL SEE THE ASSOCIATED TELEMETRY MEASUREMENT ON. CREW WILL THEN "ARM" AND "DOWN" AT A SAFE ALTITUDE.

- APPROVALS -

PAE MANAGER	:	K. L. PRESTON
PRODUCT ASSURANCE ENGR	:	R. K. MCGINNIS
DESIGN ENGINEERING	:	G. M. ANDERSON
NASA SSMA	:	
NASA SUBSYSTEM MANAGER	:	
NASA EPD&C SUBSYS MGR	:	
NASA EPDC SSMA	:	

<i>K.L. Preston</i>	5/24/94
<i>R.K. McGinnis</i>	
<i>G.M. Anderson</i>	
<i>David Ayer</i>	5/20/94
<i>Mark Fujitt</i>	6/23/94
<i>David Ayer</i>	6/20/94