

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE**

NUMBER: 05-6BA-2584B-IM -X

SUBSYSTEM NAME: EPD&amp;C - LANDING GEAR CONTROL

REVISION: 0

08/22/00

**PART DATA**

	<b>PART NAME</b>	<b>PART NUMBER</b>
	<b>VENDOR NAME</b>	<b>VENDOR NUMBER</b>
LRU	: FWD PCA 1	VO70-763320
SRU	: RELAY, LATCHING	MC455-0128-0001

**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:**

RELAY, LATCHING, LANDING GEAR DOWN CONTROL CIRCUIT (4P2P)

REFERENCE DESIGNATORS: 81V76A22K8

QUANTITY OF LIKE ITEMS: 1

ONE, FPCA-1

**FUNCTION:**

THE TWO SERIES DOWN RELAYS (K6 AND K8) WITH ONE ARM RELAY (K7) ACTUATES THE CIRCUIT FOR THE LANDING GEAR EXTEND VALVE 1. PROTECTION AGAINST PREMATURES AND REDUNDANCY PROVIDED WITHIN LANDING GEAR CIRCUITS. COMMON RESET TO ALL LANDING GEAR DOWN AND ARM RELAYS.

**FAILURE MODES EFFECTS ANALYSIS FMEA -- CIL FAILURE MODE**

**NUMBER: 05-6BA-2584B-IM- 01**

**REVISION#: 0 09/22/00**

**SUBSYSTEM NAME: EPD&C - LANDING GEAR CONTROL**

**LRU: FWD PCA 1**

**ITEM NAME: RELAY, LATCHING, K8**

**CRITICALITY OF THIS  
FAILURE MODE: 1R2**

**FAILURE MODE:**

OPEN, FAILS TO CONDUCT (ONE CONTACT SET), FAILS TO TRANSFER (TO SET POSITION)

**MISSION PHASE: LS LANDING/SAFING**

**VEHICLE/PAYLOAD/KIT EFFECTIVITY:** 102 COLUMBIA  
103 DISCOVERY  
104 ATLANTIS  
105 ENDEAVOUR  
EFFECTIVE AFTER LANDING GEAR MOD -  
(K6 RELAY CHANGED TO DOWN FUNCTION)

**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 SINGLE CONTACT STATUS CANNOT BE MONITORED IN FLIGHT.

C)

**- FAILURE EFFECTS -**

**(A) SUBSYSTEM:**

LOSS OF CAPABILITY TO CLOSE K8 RELAY (DOWN) WHEN COMMANDED.

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**(B) INTERFACING SUBSYSTEM(S):**  
LOSS OF CAPABILITY TO DEPLOY LANDING GEAR HYDRAULICALLY.

**(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 DUE TO LOSS OF CAPABILITY TO EXTEND LANDING GEAR AFTER SECOND FAILURE (LOSS OF BACKUP PYRO RELEASE OF LANDING GEAR, I.E. FAILURE OF UPLOCK RELEASE THRUSTER OR PYRO-PRESSURE CARTRIDGE).

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**-DISPOSITION RATIONALE-**

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**(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:**  
NONE

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- APPROVALS -

S & R ENGINEERING	:	M. D. DUMETZ / G. T. TATE	: <i>M. Dumetz</i>
S & R ENGINEERING ITM	:	P. A. STENGER	: <i>P. Stenger 9/22/00</i>
DESIGN ENGINEERING	:	J. L. PECK	: <i>J. Peck 9/27/00</i>
EPD&C SUBSYSTEM MANAGER	:	R. L. PHAN	: <i>R. Phan 9/27/00</i>
SR&QA	:		: <i>L. Phelan for S. Morris 25 Sep 00</i>
NASA DCE	:		: <i>J. G. Hill</i>
MOD	:		:
USA SAM	:		:
USA ORBITER ELEMENT	:		:

PAGE: 4

PRINT DATE: 09/22/00

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- APPROVALS -

S & R ENGINEERING	:	M. D. DUMETZ / G. T. TATE	:	<i>[Signature]</i>
S & R ENGINEERING ITM	:	P. A. STENGER	:	<i>[Signature]</i> 9/27/00
DESIGN ENGINEERING	:	J. L. PECK	:	<i>[Signature]</i> 9/27/00
EPD&C SUBSYSTEM MANAGER	:	R. L. PHAN	:	<i>[Signature]</i> 9/27/00
SR&QA	:		:	<i>[Signature]</i> 9/27/00
NASA DCE	:		:	<i>[Signature]</i> 9/27/00
MOD	:		:	<i>[Signature]</i> 9/27/00
USA SAM	:		:	<i>[Signature]</i> 9/27/00
USA ORBITER ELEMENT	:		:	<i>[Signature]</i> 9/28/00

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- APPROVALS -

S & R ENGINEERING	: M. D. DUMETZ / G. T. TATE	<i>[Signature]</i>
S & R ENGINEERING ITM	: P. A. STENGER	<i>[Signature]</i> 9/21/00
DESIGN ENGINEERING	: J. L. PECK	<i>[Signature]</i> 9/27/00
EPD&C SUBSYSTEM MANAGER	: R. L. PHAN	<i>[Signature]</i> 9/27/00
SR&QA	:	<i>[Signature]</i> 9/27/00
NASA OCE	:	<i>[Signature]</i> 9/27/00
MOD	:	<i>[Signature]</i> 9/27/00
USA SAM	:	<i>[Signature]</i> 9/27/00
USA ORBITER ELEMENT	:	<i>[Signature]</i> 10/2/00