

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE**  
**NUMBER: 05-6BA-2588A-IM -X**

**SUBSYSTEM NAME: EPD&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 ARM CONTROL CIRCUIT (4P2P)

**REFERENCE DESIGNATORS: 81V76A22K7**

**QUANTITY OF LIKE ITEMS: 1**  
 ONE

**FUNCTION:**  
 ONE ARM RELAY ALONG WITH THE TWO DOWN RELAYS ENABLE THE CIRCUIT FOR ENERGIZING THE LANDING GEAR EXTEND VALVE 1. THE ASSOCIATED LANDING GEAR DOWN RELAYS, WHEN COMMANDED, COMPLETES THE SERIES CIRCUIT AND ALLOWS FOR PROTECTION AGAINST PREMATURE FAILURES. UNLIKE REDUNDANCY IS PROVIDED FOR LANDING GEAR OPERATION.

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

**NUMBER: 05-6BA-2588A-IM- 01**

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

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

**LRU: FWD PCA 1**

**ITEM NAME: RELAY, LATCHING, K7**

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

**FAILURE MODE:**

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

**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 RELAY

**CAUSE:**

FOR OPEN: PIECE PART FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY, THERMAL STRESS  
 FOR SHORT TO STRUCTURE (GROUND): PIECE PART FAILURE, 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 "B" SCREEN BECAUSE RELAY SINGLE CONTACT STATUS CANNOT BE MONITORED IN FLIGHT.

C)

**- FAILURE EFFECTS -**

**(A) SUBSYSTEM:**

LOSS OF CAPABILITY TO ARM LANDING GEAR HYDRAULIC DEPLOY CIRCUIT.

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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 9/29/00</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>J. G. Quinn 9/27/00</i>
NASA DCE	:		<i>L. P. ... for S. Norris 288-4000</i>
MOD	:		<i>J. G. Quinn</i>
USA SAM	:		
USA ORBITER ELEMENT	:		

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S & R ENGINEERING ITM	: P. A. STENGER	<i>[Signature]</i> 9/22/00
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EPD&C SUBSYSTEM MANAGER	: R. L. PHAN	<i>[Signature]</i> 9/22/00
SR&QA		<i>[Signature]</i> 9/22/00
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