

FAILURE MODES EFFECTS ANALYSIS (FMEA) - CIL HARDWARE

NUMBER:05-6PH-24810 -X

SUBSYSTEM NAME: EPD&C - GROUND COMMAND INTERFACE LOGIC (GCIL)

REVISION: 1 08/24/97

PART DATA

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:PANEL A1A3	VO70-730347
SRU	:TOGGLE SWITCH	ME452-0102-7201

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

SWITCH, S-BAND FM CONTROL. TOGGLE SWITCH, 2 POLE, 2 POSITIONS. POSITIONS ARE CMD, PNL.

REFERENCE DESIGNATORS: 35V73A1A3S1

QUANTITY OF LIKE ITEMS: 1

ONE - 2 POLES PROVIDE DUAL REDUNDANCY

FUNCTION:

ENABLES GROUND (SOFTWARE) CONTROL OF THE S-BAND FM COMMUNICATIONS SYSTEM BY ENABLING ALL THE GCIL "COMMAND" DRIVERS THAT CONTROL THAT SYSTEM AND DISABLING THE CORRESPONDING "PANEL" DRIVERS THAT TRANSFER THE PANEL CONTROL SIGNALS. THIS IS DONE IN THE CMD POSITION BY SENDING TWO REDUNDANT "COMMAND" DRIVER ENABLE SIGNALS TO THE GCIL.

FAILURE MODES EFFECTS ANALYSIS FMEA - CIL FAILURE MODE

NUMBER: 05-6PH-24810-01

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SUBSYSTEM NAME: EPD&C - GROUND COMMAND INTERFACE LOGIC (GCIL)

LRU: PANEL A1A3

CRITICALITY OF THIS

ITEM NAME: TOGGLE SWITCH

FAILURE MODE: 2/2

FAILURE MODE:

FAILS SHORTED CASE TO GROUND. ANY TERMINAL SHORTS TO CASE (GROUND).
CATASTROPHIC SWITCH FAILURE.

MISSION PHASE:

PL PRE-LAUNCH
LO LIFT-OFF
OO ON-ORBIT
DO DE-ORBIT
LS LANDING/SAFING

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 102 COLUMBIA
103 DISCOVERY
104 ATLANTIS
105 ENDEAVOUR

CAUSE:

PIECE-PART STRUCTURAL FAILURE, CONTAMINATION, VIBRATION, MECHANICAL
SHOCK, PROCESSING ANOMALY

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN A) N/A
B) N/A
C) N/A

PASS/FAIL RATIONALE:

A)

B)

C)

REMARKS/RECOMMENDATIONS:

"CATASTROPHIC TOGGLE SWITCH FAILURE MODE" - IF A CONTAMINANT OR LOOSE
PART MOVES AND SHORTS TO GROUND THE INPUT TERMINALS, THE TWO GCIL
POWER CIRCUITS ARE NOT BLOWN PERMANENTLY BECAUSE THEY ARE PROTECTED
BY CIRCUIT BREAKERS, NOT FUSES.

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- FAILURE EFFECTS -

(A) SUBSYSTEM:

CATASTROPHIC SWITCH FAILURE RESULTS IN LOSS OF THE TWO REDUNDANT GCIL POWER CIRCUITS (MAIN BUS CIRCUIT BREAKERS 44, 49 OPEN), WORST CASE. GCIL DRIVERS FAIL SAFE TO THE PANEL CONTROL MODE.

(B) INTERFACING SUBSYSTEM(S):

COMMAND CAPABILITY LOST FOR PM, FM, TV, KU AND P/L. AFTER THIS ONE FAILURE, LOSE CAPABILITY TO POWER BOTH NSP'S BY THE GCIL "COMMAND" MODE. THE NSP'S CAN ONLY BE ACTIVATED BY THE "PANEL" MODE. ONE ADDITIONAL FAILURE (NSP ACTIVATE SWITCH) IS REQUIRED BEFORE ALL CAPABILITY IS LOST FOR ACTIVATING EITHER NSP.

(C) MISSION:

POSSIBLE LOSS OF MISSION DUE TO MINIMUM DURATION FLIGHT DECISION AFTER LOSS OF "COMMAND" ACTIVATION OF BOTH NSP'S.

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

NO EFFECT - FIRST FAILURE.

(E) FUNCTIONAL CRITICALITY EFFECTS:

AFTER LOSS OF "COMMAND" ACTIVATION OF BOTH NSP'S THE MISSION WOULD BE REDUCED TO MDF. IF THE "PANEL" ACTIVATION OF BOTH NSP FAILED, A NEXT PLS WOULD BE DECLARED.

-DISPOSITION RATIONALE-

(A) DESIGN:

REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH

(B) TEST:

REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH

GROUND TURNAROUND TEST

ANY TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD.

(C) INSPECTION:

REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH

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(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 DATA BASE.

(E) OPERATIONAL USE:

NONE NECESSARY. THE REDUNDANT COIL POWER CIRCUIT AND SWITCH "COMMAND" DRIVER ENABLE SIGNAL PERFORM THE FUNCTION OR THE SYSTEM REVERTS TO "PANEL" CONTROL OF SYSTEM FUNCTIONS.

- APPROVALS -

EDITORIALLY APPROVED	: BNA	<u>J. Kenna 8/24/97</u>
EDITORIALLY APPROVED	: JSC	<u>D. Searcy 9/30/97</u>
TECHNICAL APPROVAL	: VIA APPROVAL FORM	98-CIL-018_05-6PH