

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE  
 NUMBER: 05-2G-21535 -X

SUBSYSTEM NAME: COMM & TRACK: S-BAND COMMUNICATIONS

REVISION: 0 01/05/88

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PART DATA

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PART NAME	PART NUMBER
VENDOR NAME	VENDOR NUMBER
LRU : PANEL A1A2	V070-730346
SRU : SWITCH, TOGGLE	ME452-0102-7201

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EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:  
 SWITCH, NSP CODING, RCV TOGGLE SWITCH, 2 POLE, 2 POSITION, NETWORK SIGNAL  
 PROCESSOR (NSP) CODING, UPLINK FUNCTION

REFERENCE DESIGNATORS: 36V73A1A2S22

QUANTITY OF LIKE ITEMS: 1  
 ONE TWO SWITCH POLES FOR TWO REDUNDANT CIRCUITS

FUNCTION:  
 SWITCHES THE S-BAND PM TO THE CODING MODE ("ON" POSITION) FOR UPLINK  
 WHEN THE GCIL IS IN THE PANEL MODE. ONE SWITCH POLE EACH IS DEDICATED TO  
 THE CONVOLUTIONAL DECODING CONTROL CIRCUIT OF THE 2 NSP'S. NOTE -  
 CONVOLUTIONAL ENCODING IS PROVIDED TO INCREASE LINK MARGIN. IT IS  
 REQUIRED FOR TDRSS.

## FAILURE MODES EFFECTS ANALYSIS FMEA - GIL FAILURE MODE

NUMBER: 05-2G-21535-02

REVISION#: 1 09/15/97

SUBSYSTEM NAME: COMM &amp; TRACK: S-BAND COMMUNICATIONS

LRU: PANEL A1A2

ITEM NAME: SWITCH, TOGGLE

CRITICALITY OF THIS  
FAILURE MODE: 2/2

## FAILURE MODE:

SHORT TO GROUND (INPUT) WORST CASE - CONTAMINANT OR LOOSE PART MOVES  
AND SEQUENTIALLY SHORTS SEVERAL INPUT TERMINALS TO CASE (GROUND).MISSION PHASE: LO LIFT-OFF  
OO ON-ORBIT  
DO DE-ORBITVEHICLE/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)

- FAILURE EFFECTS -

(A) SUBSYSTEM:

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DUE TO THE LOSS OF THE NSP SWITCH BUFFER DRIVERS (REF. FMEA 05- 6PG-21503-1), LOSS OF ALL S-BAND PM DOWNLINK IN GCIL "PANEL" MODE DUE TO LOSS OF THE "NSP ON" SIGNAL TO THE TRANSPONDERS.

**(B) INTERFACING SUBSYSTEM(S):**

LOSS OF PANEL MODE OPERATION, AND LOSS OF ENCRYPTION PROTECTION OF COMMANDS AND DATA.

**(C) MISSION:**

POSSIBLE LOSS OF MISSION DUE TO MDF DECISION AFTER LOSS OF "PANEL" "NSP ON" TO TRANSPONDERS. LOSS OF ENCRYPTION PROTECTION OF COMMANDS AND DATA.

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

NO EFFECT

**(E) FUNCTIONAL CRITICALITY EFFECTS:**

LOSS OF "PANEL" "NSP ON" WOULD REDUCE THE MISSION TO MDF. AFTER TWO FAILURES (THIS SWITCH, AND 1 GCIL PNL/CMD SWITCH) LOSS OF BOTH NSP, A NEXT PLS WOULD BE DECLARED.

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**-DISPOSITION RATIONALE-**

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**(A) DESIGN:**

REFER TO APPENDIX A, ITEM #1, TOGGLE SWITCH.

**(B) TEST:**

REFER TO APPENDIX A, ITEM #1, TOGGLE SWITCH.

**GROUND TURNAROUND TEST**

ANY TURNAROUND CHECKOUT TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD.

**(C) INSPECTION:**

REFER TO APPENDIX A, ITEM #1, TOGGLE SWITCH.

**(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.

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(E) OPERATIONAL USE:

NO CREW CORRECTIVE ACTION IS AVAILABLE TO RECOVER ENCRYPTION CAPABILITY.  
CREW ACTION IS REQUIRED TO REGAIN S-BAND IN GCIL COMMAND MODE OR TO USE  
THE UHF SYSTEM FOR VOICE COMMUNICATIONS.

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- APPROVALS -

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EDITORIALLY APPROVED	: BNA	: <i>J. Kamura 9/15/97</i>
EDITORIALLY APPROVED	: JSC	: <i>D. Nancy 10/8/97</i>
TECHNICAL APPROVAL	: VIA APPROVAL FORM	: 86-CIL-019_05-2G