FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE
NUMBER: 05-6EE-2003-X

SUBSYSTEM NAME: EPD&C - ADP DEPLOY & RTR (02-4E)
REVISION : 3 0E :1/90

		PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:	PANEL C3A1	V070-730281
SRU	:	SWITCH, TOGGLE	ME452-0102-7201

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
SWITCH, TOGGLE - LEFT AND RIGHT AIR DATA PROBE (ADP) STOW "ENABLE/INHIBIT" CIRCUIT

REFERENCE DESIGNATORS: 35V73A3A1S19
: 35V73A3A1S20

QUANTITY OF LIKE ITEMS: 2
TWO

FUNCTION:
PROVIDES ENABLE/INHIBIT CONTROL OF ONE OF THE TWO SERIES 3-PHASE POWER STOW RELAYS FOR EACH OF THE LEFT AND RIGHT ADP.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-6EE-2003-02

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REVISION# 3 08/31/90 R
SUBSYSTEM: EPD&C - ADP DEPLOY & HTR (02-4E)
LRU :PANEL C3A1 CRITICALITY OF THIS
ITEM NAME: SWITCH, TOGGLE FAILURE MODE:1R3

FAILURE MODE:
FAILS CLOSED

MISSION PHASE:
DO DE-ORBIT
LS LANDING SAFING

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

CAUSE:
PIECE PART STRUCTURAL FAILURE, CONTAMINATION, 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)
FIRST FAILURE IS NOT DETECTABLE IN FLIGHT SINCE SWITCH SCANS ARE NOT INCORPORATED IN THIS CIRCUIT.

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
FIRST FAILURE - NO EFFECT - LOSS OF SERIES REDUNDANCY IN PREVENTING THE INADVERTENT STOW OF THE AFFECTED ADP.

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(B) INTERFACING SUBSYSTEM(S):
FIRST FAILURE - NO EFFECT. ONLY ONE OF THE TWO SERIES 3-PHASE POWER RELAYS TO THE ADP ACTUATOR IS ENERGIZED - BOTH SERIES RELAYS MUST BE ENERGIZED AND CLOSED IN ORDER TO "STOW."

(C) MISSION:
FIRST FAILURE - NO EFFECT, ONLY ONE OF THE TWO SERIES 3-PHASE POWER RELAYS TO THE ADP ACTUATOR IS ENERGIZED - BOTH SERIES RELAYS MUST BE ENERGIZED AND CLOSED IN ORDER TO "STOW."

(D) CREW, VEHICLE, AND ELEMENT(S):
FIRST FAILURE - NO EFFECT, ONLY ONE OF THE TWO SERIES 3-PHASE POWER RELAYS TO THE ADP ACTUATOR IS ENERGIZED - BOTH SERIES RELAYS MUST BE ENERGIZED AND CLOSED IN ORDER TO "STOW."

■ (E) FUNCTIONAL CRITICALITY EFFECTS:
POSSIBLE LOSS OF CREW/VEHICLE AFTER TWO OTHER FAILURES DUE TO LOSS OF CAPABILITY TO OBTAIN AIR PRESSURE DATA FOR A SAFE DESCENT. REQUIRES TWO FAILURES (TWO CONTACT SETS OF STOW/DEPLOY TOGGLE SWITCH FOR OTHER STOW RELAY FAILS SHORT, FAILURE OF REDUNDANT ADP). UPON DEPLOY/DEPLOY HEAT SWITCH ACTUATION, CROSS WIRING OF PHASES RESULTS IN TRIPPING AC POWER SOURCE.

- 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 -

STOW RH ADP - SINGLE MOTOR, TESTS STOW OF RIGHT HAND ADP AND OPERATING TIME.

STOW LH ADP - SINGLE MOTOR, TESTS STOW OF LEFT HAND ADP AND OPERATING TIME.

THE TESTS ABOVE ARE PERFORMED PRIOR TO EACH FLIGHT OR AFTER LRU REPLACEMENT.

(C) INSPECTION:
REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH

PRINT DATE: 09/05/90

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(D) FAILURE HISTORY:
REFER TO APPENDIX A, ITEM NO. 1 - TOGGLE SWITCH

(E) OPERATIONAL USE:
IF ALL AIR DATA IS LOST, CREW MUST MAINTAIN PITCH ATTITUDE WITHIN THETA LIMITS DISPLAYED ON CRT (REQUIRES MULTIPLE FAILURES).

- APPROVALS -

RELIABILITY ENGINEERING	T. K. KIMURA	9-14-90
DESIGN ENGINEERING	J. KRAGER	9/13/90
QUALITY ENGINEERING	E. GUTIERREZ	
NASA RELIABILITY		10/12/90
NASA SUBSYSTEM MANAGER		
NASA EPD&C RELIABILITY		
NASA QUALITY ASSURANCE		10/1/90
NASA EPD&C SUBSYS MGR		10/4/90