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PRINT DATE: 09/05/90

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE

NUMBER: 05-6EE-2002-X

SUBSYSTEM NAME: EPO&C - ADP DEPLOY & HTR (02-4E)

REVISION : 3 08/31/90

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	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU :	PANEL C3A5	V070-730283
SRU :	SWITCH, TOGGLE	ME452-0102-7459

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:

SWITCH, TOGGLE - AIR DATA PROBE (ADP) LEFT AND RIGHT STOW, DEPLOY,
DEPLOY/HEATER CIRCUIT

REFERENCE DESIGNATORS: 35V73A3A558
: 35V73A3A559

QUANTITY OF LIKE ITEMS: 2
Two

FUNCTION:

PROVIDES MANUAL CONTROL OF AIR DATA PROBE STOW, DEPLOY AND HEATERS.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-GEE-2002-01

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SUBSYSTEM: EPD&C - ADP DEPLOY & HTR (02-4E)
LRU : PANEL C3A5
ITEM NAME: SWITCH, TOGGLE
REVISION# 3 08/31/90 R
CRITICALITY OF THIS FAILURE MODE: 1R2

FAILURE MODE:
FAILS TO OPEN, SHORT-TO-CASE (GROUND) (MULTIPLE CONTACT SETS)

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) PASS
C) PASS

PASS/FAIL RATIONALE:

- A)
- B)
- C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF ABILITY TO INITIATE STOW, DEPLOY OR HEATERS OF ONE OF TWO ADP CIRCUITS (WORST CASE FOR ONE SWITCH - LOSS OF FOUR CONTACT SETS).

(B) INTERFACING SUBSYSTEM(S):
THE AFFECTED ADP CANNOT BE DEPLOYED (OR STOWED) OR HEATED.

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(C) MISSION:
NO EFFECT - FIRST FAILURE, REMAINING ADP WILL COMPLETE FUNCTION.

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(D) CREW, VEHICLE, AND ELEMENT(S):
NO EFFECT - FIRST FAILURE, REMAINING ADP WILL COMPLETE FUNCTION.

(E) FUNCTIONAL CRITICALITY EFFECTS:
POSSIBLE LOSS OF CREW/VEHICLE DUE TO LOSS OF CAPABILITY TO OBTAIN AIR
PRESSURE DATA REQUIRED FOR SAFE DESCENT. AFTER FIRST FAILURE, REQUIRES
LOSS OF REDUNDANT ADP SYSTEM BEFORE EFFECT IS MANIFESTED.

- 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

DEPLOY RH AND LH ADP - DUAL MOTOR, TESTS DEPLOY OF RIGHT HAND AND LEFT
HAND ADP'S AND OPERATING TIMES.

ABOVE DUAL MOTOR TESTS ARE PERFORMED BY INFLIGHT CHECKOUT OR AFTER LRU
REPLACEMENT.

DEPLOY RH AND LH ADP - SINGLE MOTOR, TESTS DEPLOY OF RIGHT HAND AND
LEFT HAND ADP AND OPERATING TIMES.

STOW RH AND LH ADP - SINGLE MOTOR, TESTS STOW OF RIGHT AND LEFT HAND
ADP'S AND OPERATING TIMES.

ABOVE SINGLE MOTOR TESTS ARE PERFORMED PRIOR TO FLIGHT OR AFTER LRU
REPLACEMENT.

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

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

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(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	:	<u>TK Kimura</u> 9-14-90
DESIGN ENGINEERING	: J. KRAGER	:	<u>J. Krager</u> 9-13-90
QUALITY ENGINEERING	: E. GUTIERREZ	:	<u>E. Gutierrez</u> 9-13-90
NASA RELIABILITY	:	:	<u>John F. ...</u>
NASA SUBSYSTEM MANAGER	:	:	<u>R. Balcerunas</u> 10/12/90
NASA EPD&C RELIABILITY	:	:	<u>W. ...</u> 10-16-90
NASA QUALITY ASSURANCE	:	:	<u>W. ...</u> 10/1/90
NASA EPD&C SUBSYS MGR	:	:	<u>J. F. ...</u> 10/1/90