FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE
NUMBER: 05-688-2262-X

SUBSYSTEM NAME: EPD&C - BRAKE/ANTI SKID
REVISION : 2 03/08/90

		PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:	FWD LCA 1	MC450-0054-0001
LRU	:	FWD LCA 1	MC450-0054-0002
LRU	:	FWD LCA 2	MC450-0055-0001
LRU	:	FWD LCA 2	MC450-0055-0002
SRU	:	CONTROLLER, HYBRID DRIVER	MC477-0261-0002
SRU	:	CONTROLLER, HYBRID DRIVER	MC477-0263-0002

PART DATA

- EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
CONTROLLER, HYBRID DRIVER (HDC), TYPE I & III, MAIN LANDING GEAR NO WEIGHT-ON-WHEEL CIRCUIT/BRAKE-SKID CONTROL BOXES, A AND B

REFERENCE DESIGNATORS: 81V76A16AR(2)
: 81V76A17AR(2)

QUANTITY OF LIKE ITEMS: 4
TWO PER RELAY INPUT, FOUR PER VEHICLE

- FUNCTION:
PROVIDES THE CAPABILITY TO MONITOR THE WEIGHT-ON-WHEELS SENSORS AND PRODUCE A BRAKE INHIBIT SIGNAL VIA RELAYS (K9, K12, K13 FOR BOX A, AND K11, K16, K17 FOR BOX B) AND INHIBITING BRAKE APPLICATION UNTIL WEIGHT IS SENSED ON EITHER LEFT OR RIGHT MAIN LANDING GEAR WHEELS. 81V76A16-AR(2) (MC477-0261-0002), 81V76A17-AR(2) (MC477-0263-0002)

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-6BB-2262-02

REVISION# 2 03/08/90

SUBSYSTEM: EPO&C - BRAKE/ANTI SKID
LRU :FWD LCA 1 CRITICALITY OF THIS
ITEM NAME: CONTROLLER, HYBRID DRIVER FAILURE MODE:1R3

■ FAILURE MODE:
FAILS "ON", INADVERTENT OUTPUT (INDICATES FALSE NO WEIGHT-ON-WHEEL)

MISSION PHASE:
DO DE-ORBIT

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

■ CAUSE:
PIECE PART FAILURE, CONTAMINATION, VIBRATION, MECHANICAL SHOCK, PROCESSING ANOMALY, THERMAL STRESS

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 HDC FAILURE IS NOT FLIGHT DETECTABLE.

C)

- FAILURE EFFECTS -

■ (A) SUBSYSTEM:
FIRST FAILURE - ASSOCIATED RELAY WILL BE CLOSED BUT NO BRAKE INHIBIT SIGNAL IS APPLIED UNTIL TWO ADDITIONAL RELAYS ARE CLOSED.

■ (B) INTERFACING SUBSYSTEM(S):
FIRST FAILURE - NO EFFECT

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■ (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 INABILITY TO STOP THE VEHICLE. FOR TRANSATLANTIC ABORT LANDING (TAL), REQUIRES TWO ADDITIONAL FAILURES (NLG/REDUNDANT MG HDCS FAIL "ON") BEFORE EFFECT IS MANIFESTED. FOR NORMAL LANDING, REQUIRES FOUR ADDITIONAL FAILURES (NLG/REDUNDANT MG HDCS AND TWO POWER DIODES WHICH CAUSE LOSS OF THE OTHER 50% OF BRAKING CAPABILITY) BEFORE EFFECT IS MANIFESTED.

- DISPOSITION RATIONALE -

■ (A) DESIGN:
REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER

■ (B) TEST:
REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER

GROUND TURNAROUND TEST -
VERIFY HYBRID DRIVER OPERATION BY VERIFY THAT ANTI-SKID BRAKING SYSTEM WILL BE INHIBITED BEFORE EITHER LEFT, RIGHT, OR NOSE GEAR WOW. TEST IS PERFORMED PER PARAGRAPH V51AF0.046 "RH &/OR LH &/OR NOSE WOW/WONG SKD TST" EVERY THIRD FLIGHT UNTIL INSTALLATION OF CARBON BRAKES AND LRU RETEST PER TABLE V51Z00.000.

■ (C) INSPECTION:
REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER

■ (D) FAILURE HISTORY:
REFER TO APPENDIX B, ITEM NO. 1 - HYBRID DRIVER CONTROLLER

■ (E) OPERATIONAL USE:
AFTER THIRD FAILURE (LOSS OF 50% BRAKING CAPABILITY WITH ANTI-SKID ON), COMMANDER CAN SWITCH ANTI-SKID OFF TO OBTAIN ONE HUNDRED PERCENT MANUAL BRAKING WITHOUT ANTI-SKID PROTECTION.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-68B-2262-02

- APPROVALS -

RELIABILITY ENGINEERING	T. AI	TA Michael Clifton 3-20-90
DESIGN ENGINEERING	Q. DANG	3/20/90
QUALITY ENGINEERING	W. R. HIGGINS	3/22/90
NASA RELIABILITY		4/24/90
NASA SUBSYSTEM MANAGER		4/10/90
NASA QUALITY ASSURANCE		4/23/90

NASA Prog. Reliability:

NASA Engr. Subsys Mgr: