

PAGE: 1

PRINT DATE: 08/07/90

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE
NUMBER: 05-6ED-2250-X

1447

SUBSYSTEM NAME: EPD&C - ET UMBILICAL DOORS

REVISION : 2 08/06/90

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU :	EPD&C DIODE BOX ASSY 1, 2 & 3	V070-765380
SRU :	DIODE	JANTXVIN4246

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
DIODE, GENERAL PURPOSE, 1AMP, 400V - RECTIFIER, OR CIRCUIT MOM STIMULI
(EXTERNAL TANK DOOR FUNCTIONS DURING GPC MODE)

REFERENCE DESIGNATORS: 54V76A207A1CR13
: 54V76A207A1CR14
: 54V76A207A1CR15
: 54V76A207A1CR16
: 54V76A207A1CR17
: 54V76A207A1CR18
: 54V76A207A1CR19
: 54V76A207A1CR20
: 54V76A207A2CR3
: 54V76A207A2CR4
: 54V76A207A2CR5
: 54V76A207A2CR6
: 54V76A207A2CR7
: 54V76A207A2CR8
: 54V76A207A2CR9
: 54V76A207A2CR10
: 54V76A207A2CR11
: 54V76A207A2CR12
: 54V76A207A2CR13
: 54V76A207A2CR14
: 54V76A207A3CR13
: 54V76A207A3CR14
: 54V76A207A3CR15
: 54V76A207A3CR16
: 55V76A208A1CR13
: 55V76A208A1CR14
: 55V76A208A1CR15
: 55V76A208A1CR16

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NUMBER: 05-6ED-2250-X

1440

: 55V76A208A3CR3
: 55V76A208A3CR4
: 55V76A208A3CR5
: 55V76A208A3CR6
: 55V76A208A3CR9
: 55V76A208A3CR10
: 55V76A208A3CR11
: 55V76A208A3CR12
: 55V76A208A3CR13
: 55V76A208A3CR14
: 55V76A208A3CR15
: 55V76A208A3CR16
: 55V76A208A3CR17
: 55V76A208A3CR18
: 55V76A208A3CR19
: 55V76A208A3CR20
: 56V76A209A1CR1
: 56V76A209A1CR2
: 56V76A209A1CR3
: 56V76A209A1CR4
: 56V76A209A1CR5
: 56V76A209A1CR6
: 56V76A209A1CR7
: 56V76A209A1CR8
: 56V76A209A1CR9
: 56V76A209A1CR10
: 56V76A209A1CR13
: 56V76A209A1CR14
: 56V76A209A1CR15
: 56V76A209A1CR16
: 56V76A209A3CR13
: 56V76A209A3CR14
: 56V76A209A3CR15
: 56V76A209A3CR16

QUANTITY OF LIKE ITEMS: 62
SIXTY-TWO

FUNCTION:

PROVIDES ISOLATION BETWEEN "OR" CIRCUITED MDM STIMULI FOR REQUIRED EXTERNAL TANK UMBILICAL DOOR FUNCTIONS DURING ABORTS - DOOR DRIVE, "ARM" AND "CLOSE" COMMANDS - CENTERLINE LATCHES, "STOW" COMMANDS AND "LOCK (DEPLOY)" COMMANDS - CLOSE LATCHES "ARM" AND "LATCH" COMMANDS.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL FAILURE MODE
NUMBER: 05-6ED-2250-01

REVISION# 2 09/07/90 R

1417

SUBSYSTEM: EPD&C - ET UMBILICAL DOORS
LRU :EPD&C DIODE BOX ASSY 1, 2 & 3
ITEM NAME: DIODE

CRITICALITY OF THIS
FAILURE MODE:IR3

■ FAILURE MODE:
OPEN, FAILS TO CONDUCT

MISSION PHASE:
DO DE-ORBIT

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

■ CAUSE:
STRUCTURAL FAILURE (MECHANICAL STRESS, VIBRATION), ELECTRICAL STRESS,
THERMAL STRESS, PROCESSING ANOMALY

CRITICALITY 1/1 DURING INTACT ADORT ONLY? NO

REDUNDANCY SCREEN A) PASS
B) FAIL
C) PASS

PASS/FAIL RATIONALE:
A)

■ B)
FAILS "B" SCREEN BECAUSE OF NO OPERATIONAL STATUS BEING MONITORED FOR
THIS DIODE. GPC COMMANDS ARE SENT SIMULTANEOUSLY. FIRST FAILURE NOT
DETECTABLE.

C)

- FAILURE EFFECTS -

■ (A) SUBSYSTEM:
FIRST FAILURE - LOSS OF ONE OF TWO MOM STIMULI CONTROL TO ONE ACTUATOR
MOTOR DURING GPC MODE

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NUMBER: 05-6ED-2250-01

1449

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

- (C) MISSION:
FIRST FAILURE - NO EFFECT

- (D) CREW, VEHICLE, AND ELEMENT(S):
FIRST FAILURE - NO EFFECT

(E) FUNCTIONAL CRITICALITY EFFECTS:

LOSS OF ALL CAPABILITY TO CLOSE OR SECURE A DOOR PRIOR TO RE-ENTRY RESULTS IN POSSIBLE LOSS OF CREW/VEHICLE DUE TO STRUCTURAL DAMAGE CAUSED BY THERMAL EFFECTS. REQUIRES TOTAL OF FOUR FAILURES (1. MANUAL OPERATION IS LOST, 2. ONE OF TWO REDUNDANT DIODES FAILS, 3. SECOND REDUNDANT DIODE FAILS, 4. REDUNDANT MOTOR CIRCUIT FAILS) BEFORE EFFECT IS MANIFESTED.

- DISPOSITION RATIONALE -

- (A) DESIGN:
REFER TO APPENDIX F, ITEM NO. 3 - DIODE

- (B) TEST:
REFER TO APPENDIX F, ITEM NO. 3 - DIODE

GROUND TURNAROUND TEST

VERIFY DIODE ISOLATION CAPABILITY. TESTS ARE PERFORMED FOR VARIOUS COMMANDS GENERATED BY SOFTWARE AND ON/OFF RESPONSE FROM ASSOCIATED HYBRID RELAYS. VERIFY NO CHANGE IN MCA ON/OFF STATUS OTHER THAN THAT WHICH IS ASSOCIATED WITH EACH SOFTWARE COMMAND (STIMULI). TESTS ARE PERFORMED INFLIGHT AND LRU RETEST PER TABLE V56200.000.

- (C) INSPECTION:
REFER TO APPENDIX F, ITEM NO. 3 - DIODE

- (D) FAILURE HISTORY:
REFER TO APPENDIX F, ITEM NO. 3 - DIODE

- (E) OPERATIONAL USE:
NONE

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NUMBER: 05-6ED-2250-01

1449

- APPROVALS -

RELIABILITY ENGINEERING: T. AI
 DESIGN ENGINEERING : J. KRAGER
 QUALITY ENGINEERING : W. R. HIGGINS
 NASA RELIABILITY :
 NASA SUBSYSTEM MANAGER :
 NASA EPD&C RELIABILITY :
 NASA QUALITY ASSURANCE :
 NASA EPD&C SUBSYS MGR :

: *J.A. Miller 8/20/90*
 : *J. Krager 9/4/90*
 : *W.R. Higgins 8/24/90*
 : *D.W. McFallon 10/24/90*
 : *R.M. Balestrino 10/25/90*
 : *L. Liguori 10/24/90*
 : *K.A. Bland 9/28/90*
 : *Z.L. Jones for E/Man 256/90*