FAILURE MODES EFFECTS ANALYSIS (FMEA) – CRITICAL HARDWARE
NUMBER: M5-6MR-B004-X

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM
REVISION: 1 SEPT 1, 1995

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	ENERGIA POWER PANEL	MC621-0087-0009
	RSC-E	СДИЮ.468.312.001
SRU	PUSH BUTTON SWITCH	PKZ-8 (AGO.360.212.TU)

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
PUSH-BUTTON SWITCHES(TWO DOUBLE POLE SWITCHES UNDER A SINGLE COVER CAP.) TWO POLE, MOMENTARY - APDS "RING-OUT" COMMAND.

REFERENCE DESIGNATORS: 36V73A8A3SB1-B5
36V73A8A3SB1-B6

QUANTITY OF LIKE ITEMS: 2
(TWO)

FUNCTION:
PROVIDE THE "RING OUT" COMMAND STIMULI TO CLOSE THE APPROPRIATE CONTACTS IN THE DSCU TO ENABLE THE TRANSMITTAL OF THE "RING OUT" COMMAND TO THE DMCU. THE DMCU ENABLES POWER TO THE RING MOTORS (M4 & M5) FOR RING EXTENSION AND RETRACTION FUNCTIONS.

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL FAILURE MODE
NUMBER: M5-6MR-B004- 01

REVISION# 1 SEPT 1, 1995

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM
LRU: MC621-0087-0009
ITEM NAME: PUSH BUTTON SWITCH

CRITICALITY OF THIS FAILURE MODE: 2R3

FAILURE MODE:
FAILS OPEN (MULTIPLE CONTACTS WITHIN ONE SWITCH)

MISSION PHASE:
OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 104 ATLANTIS

CAUSE:
A) PIECE PART FAILURE, B) CONTAMINATION, C) VIBRATION, D) MECHANICAL SHOCK, E) PROCESSING ANOMALY, F) THERMAL STRESS

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

CRITICALITY 1R2 DURING INTACT ABORT ONLY (AVIONICS ONLY)? NO

REDUNDANCY SCREEN
A) PASS
B) N/A
C) FAILS

PASS/FAIL RATIONALE:
A)

B)
N/A
C)
REDUNDANT FUNCTIONS ROUTED THROUGH THE SAME CONNECTOR.

METHOD OF FAULT DETECTION:
NONE.

MASTER MEAS. LIST NUMBERS: NONE

- FAILURE EFFECTS -

(A) SUBSYSTEM:
PARTIAL LOSS OF SWITCH CONTROL CAPABILITY FOR THE APDS "RING-OUT" COMMAND.

(B) INTERFACING SUBSYSTEM(S):
FIRST FAILURE - NO EFFECT. LOSS OF COMMAND REDUNDANCY.

(C) MISSION:
FIRST FAILURE - NO EFFECT.

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL FAILURE MODE
NUMBER: M5-6MR-B004- 01

(D) CREW, VEHICLE, AND ELEMENT(S):
NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECTS:
FIRST FAILURE (ONE OF TWO ASSOCIATED SWITCHES FAILS OPEN) - DISABLES ONE OF THREE PANEL COMMAND SIGNALS. NO EFFECT.
SECOND FAILURE (FAILURE OF ASSOCIATED SWITCH DISABLES THE REMAINING TWO PANEL COMMAND CHANNEL INPUTS TO THE DSCU) - INABILITY TO EXTEND THE DOCKING RING TO ITS INITIAL DOCKING POSITION USING NOMINAL PROCEDURES.

DESIGN CRITICALITY (PRIOR TO OPERATIONAL DOWNGRADE, DESCRIBED IN F): 2R3

(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:
~~THIRD FAILURE (INABILITY TO PERFORM IFM TO DRIVE RING MOTORS) - LOSS OF ALL RING CONTROL RESULTING IN LOSS OF CAPABILITY TO PERFORM DOCKING. LOSS OF MISSION OBJECTIVES WITH INABILITY TO PERFORM DOCKING.~~ NA

-DISPOSITION RATIONALE-

(A) DESIGN:
REFER TO APPENDIX C, ENERGIA HARDWARE.

(B) TEST:
REFER TO APPENDIX C, ENERGIA HARDWARE.

APDS PANEL OPERATION IS VERIFIED DURING GROUND CHECKOUT. ANY TESTING IS ACCOMPLISHED IN ACCORDANCE WITH OMRSD.

(C) INSPECTION:
REFER TO APPENDIX C, ENERGIA HARDWARE.

(D) FAILURE HISTORY:
REFER TO APPENDIX C, ENERGIA HARDWARE.

(E) OPERATIONAL USE:
AFTER SECOND FAILURE, IN-FLIGHT MAINTENANCE PROCEDURES DEVELOPED TO DRIVE THE RING MOTORS DIRECTLY FROM THE FEED-THROUGH CONNECTORS IN THE EXTERNAL AIRLOCK, USING THE ORBITER BREAKOUT BOX.

- APPROVALS -

PRODUCT ASSURANCE ENGR	:	M. NIKOLAYEVA	:
DESIGN ENGINEER	:	B. VAKULIN	:
NASA SS/MA	:		: 9/21/95
NASA SUBSYSTEM MANAGER	:		: 9/22/95
NASA EPD&C SUBSYSTEM MANAGER	:		: