

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL HARDWARE**

NUMBER: M5-6MR-8002-X

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

REVISION: 0 OCT, 1995

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	ENERGIA POWER PANEL RSC-E	MC621-0087-0009 CKB-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 "POWER-ON" COMMAND.

REFERENCE DESIGNATORS: 36V73A8A3SB1-B1.

36V73A8A3SB1-B2

QUANTITY OF LIKE ITEMS: 2  
(TWO)

**FUNCTION:**

PROVIDE THE "TURN-ON" COMMAND TO THE POWER SWITCHING UNIT (PSU.) THE PSU PROVIDES THE LOGIC BUSES TO THE DSCU, DMCU, PACU, AND THE LACU. THESE LOGIC BUSES ARE REQUIRED TO IMPLEMENT ALL DOCKING AND UNDOCKING OPERATIONS.

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE**  
**NUMBER: M5-6MR-B002-01**

REVISION# 0 OCT, 1995

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

LRU: MC621-0087-0009

ITEM NAME: PUSH BUTTON SWITCH

CRITICALITY OF THIS

FAILURE MODE: 1R3

**FAILURE MODE:**

FAILS OPEN (MULTIPLE CONTACTS WITHIN ONE SWITCH)

**MISSION PHASE:**

OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 104 ATLANTIS

**CAUSE:**

A) PIECE PART STRUCTURAL 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) PASS

**PASS/FAIL RATIONALE:**

A)

B)

FAILURE IS "MASKED" BY ASSOCIATED SWITCH

C)

**METHOD OF FAULT DETECTION:**

NONE.

**MASTER MEAS. LIST NUMBERS:**

NONE

**CORRECTING ACTION:**

NONE

**- FAILURE EFFECTS -**

**(A) SUBSYSTEM:**

PARTIAL LOSS OF SWITCH CONTROL CAPABILITY FOR THE APDS "POWER-ON" COMMAND.

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**(B) INTERFACING SUBSYSTEM(S):**

FIRST FAILURE - NO EFFECT. LOSS OF COMMAND REDUNDANCY.

**(C) MISSION:**

NO EFFECT.

**(D) CREW, VEHICLE, AND ELEMENT(S):**

FIRST FAILURE - NO EFFECT.

**(E) FUNCTIONAL CRITICALITY EFFECTS:**

POSSIBLE LOSS OF CREW OR VEHICLE AFTER FIVE FAILURES. 1) ONE OF TWO ASSOCIATED SWITCHES FAILS OPEN. DISABLES ONE OF THREE PANEL COMMAND SIGNALS. NO EFFECT. 2) FAILURE OF ASSOCIATED SWITCH DISABLES REMAINING TWO PANEL COMMAND CHANNEL INPUTS TO THE PSU. LOSS OF NOMINAL UNDOCKING CAPABILITY 4) ONE PYROBOLT FAILS TO INITIATE RESULTING IN LOSS OF CAPABILITY TO IMPLEMENT PYROTECHNIC SEPARATION. LOSS OF NOMINAL AND PYROTECHNIC SEPARATION CAPABILITY

**DESIGN CRITICALITY (PRIOR TO OPERATIONAL DOWNGRADE, DESCRIBED IN F): 1R3**

**(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:**

THIRD FAILURE (INABILITY TO PERFORM IFM TO DRIVE HOOKS OPEN) - ONE OR MORE HOOKS CANNOT BE OPENED.  
FIFTH FAILURE (INABILITY TO PERFORM EVA TO REMOVE 96 BOLTS HOLDING DOCKING BASE TO EXTERNAL AIRLOCK) - INABILITY TO SEPARATE ORBITER AND MIR RESULTING IN LOSS OF CREW AND VEHICLE.

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**- TIME FRAME -**

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TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: MINUTES

TIME FROM DETECTION TO COMPLETED CORRECTIVE ACTION: HOURS

TIME REQUIRED TO IMPLEMENT CORRECTIVE ACTION LESS THAN TIME TO EFFECT?

YES

RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT:

CREW WOULD HAVE SUFFICIENT TIME TO USE OR PERFORM EVA.

HAZARDS REPORT NUMBER(S) : ORBI 401A

HAZARD DESCRIPTION:

INABILITY TO SEPARATE ORBITER AND MIR.

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**- APPROVALS -**

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PRODUCT ASSURANCE ENGR  
DESIGN ENGINEER

: M. NIKOLAYEVA  
: B. VAKULIN

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