

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

NUMBER: M5-SMR-8016-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-4 (AGO.380.212.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 "PASSIVE HOOKS FIRING" COMMAND.

REFERENCE DESIGNATORS: 36V73A8A3SB6-B3  
36V73A8A3SB6-B4

QUANTITY OF LIKE ITEMS: 2  
(TWO)

**FUNCTION:**

PROVIDES THE "PASSIVE HOOKS FIRING" COMMAND STIMULI TO CLOSE THE APPROPRIATE RELAY COILS IN THE PYROTECHNIC FIRE CONTROL UNIT (PFCU).

REFERENCE DOCUMENTS: 1) ECN 104-25012A. ODS ELECTRICAL CHANGE NOTICE.  
2) CKB>-468312-001 \_J"P. SCHEMATIC DIAGRAM - ANDROGYNOUS PERIPHERAL DOCKING SYSTEM (APDS) CONTROL PANEL PU-APSS SCHEMATIC.  
3) 33Y.5212.005."3. APDS CONTROL UNIT ELECTRICAL SCHEMATIC.  
4) VS70-953104. ODS INTEGRATED SCHEMATIC.  
5) 17RC-10> 2601E \_J "P. PYRO FIRING CONTROL UNIT ELECTRICAL

**FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE  
NUMBER: M5-6MR-8016-02**

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 CLOSED (MULTIPLE CONTACTS WITHIN ONE SWITCH,) SHORTS TO GROUND

**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) PASS

**PASS/FAIL RATIONALE:**

A)

B)

FUNCTIONAL CRITICALITY 1R (FC 1R FAULT TOLERANT OR GREATER) WITH AT LEAST TWO REMAINING OPERATIONAL STATUS VERIFIED IN FLIGHT.

C)

**METHOD OF FAULT DETECTION:**

NONE.

**MASTER MEAS. LIST NUMBERS:**

V53X0766E  
V53X0766E

**CORRECTING ACTION:**

NONE.

**REMARKS/RECOMMENDATIONS:**

CURRENT ORBITER BASELINE INVOLVES USING ACTIVE HOOKS ONLY ON THE ORBITER HALF OF THE ODS. HOWEVER, IN OFF-NOMINAL SITUATIONS, THE MIR ACTIVE HOOKS WOULD BE UTILIZED TO COMPLETE THE INTERFACE.

**ORIGINAL**

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**- FAILURE EFFECTS -**

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**(A) SUBSYSTEM:**

LOSS OF SWITCH CONTROL CAPABILITY FOR THE PFCU "PASSIVE HOOKS FIRING" CIRCUITS.

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

UNWANTED "PASSIVE HOOKS FIRING" COMMAND TO THE PFCU.

**(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) A GANG OF SIX HOOKS ON THE ORBITER SIDE FAILS TO CLOSE REQUIRING USE OF THE MIR SIDE HOOKS TO COMPLETE THE INTERFACE. 2) ONE OF TWO ASSOCIATED SWITCHES FAILS CLOSED. POTENTIAL "ACTIVE HOOKS FIRING" COMMAND TO THE PFCU. 3) ONE RPC FAILS ON (40 AMPS - ANY OF FOUR BUSES) RESULTING IN POWER BEING PROVIDED TO THE PFCU. 4) INTERNAL PFCU SWITCHING DEVICE INADVERTENTLY TRANSFERS AND PROVIDES POWER TO THE PYRO INITIATION BUSES. 5) PYRO LOGIC BUS "B" CIRCUIT BREAKER FAILS CLOSED RESULTING IN AN INADVERTENT PYRO FIRING. POSSIBLE VEHICLE SEPARATION OR LOSS OF HABITABLE VOLUME DUE TO UNWANTED "PYRO FIRE" COMMAND.

DESIGN CRITICALITY (PRIOR TO OPERATIONAL DOWNGRADE, DESCRIBED IN F): N/A

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

N/A

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**- TIME FRAME -**

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TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: HOURS

TIME FROM DETECTION TO COMPLETED CORRECTIVE ACTION: N/A

TIME REQUIRED TO IMPLEMENT CORRECTIVE ACTION LESS THAN TIME TO EFFECT? N/A

RATIONALE FOR TIME TO CORRECTING ACTION VS TIME TO EFFECT: N/A

HAZARDS REPORT NUMBER(S): ORBI 511

**HAZARD DESCRIPTION:**

LOSS OF PRESSURE IN HABITABLE VOLUME.

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**- APPROVALS -**

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PRODUCT ASSURANCE ENGR  
DESIGN ENGINEER: M. NIKOLAYEVA  
: B. VAKULIN

  
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