

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

NUMBER: M5-6MR-8006-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-C009 CKB>=466-312-001
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 "APDS CIRCUIT PROTECTION OFF" COMMAND.

REFERENCE DESIGNATORS: 36V73ABA3S82-B1
36V73ABA3S82-B2

QUANTITY OF LIKE ITEMS: 2
(TWO)

FUNCTION:

PROVIDE THE "APDS CIRCUIT PROTECTION OFF" COMMAND STIMULI TO ENERGIZE THE APPROPRIATE RELAYS IN THE DOCKING SYSTEM CONTROL UNIT (DSCU). THE SWITCH IS USED AS A PROTECTIVE DEVICE WHICH PREVENTS THE IMPLEMENTATION OF INVOLUNTARY (OUT OF SEQUENCE) CRITICAL COMMANDS INTO THE DSCU. THE "APDS CIRCUIT PROTECTION OFF" SWITCH PREVENTS UNWANTED EXECUTION OF THE FOLLOWING COMMANDS: "RING OUT," "UNDOCKING," "OPEN LATCHES," AND "OPEN HOOKS."

FAILURE MODES EFFECTS ANALYSIS (FMEA) - NON-CIL FAILURE MODE
NUMBER: M5-6MR-B006-01

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 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)

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 "APDS CIRCUIT
 PROTECTION OFF" COMMAND.

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

28 ORIGINAL

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(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. DISABLES ONE OF THREE PANEL COMMAND SIGNALS NO EFFECT. DEGRADED MANUAL COMMAND REDUNDANCY. 2) THE SECOND ASSOCIATED SWITCH FAILS OPEN. LOSS OF CAPABILITY TO DISABLE THE APDS CIRCUIT PROTECTION. LOSS OF EXECUTION CAPABILITY FOR THE "RING OUT", "UNDOCKING", "OPEN LATCHES", AND "OPEN HOOKS" COMMANDS. LOSS OF MANUAL DOCKING AND NOMINAL UNDOCKING CAPABILITY 4) ONE PYROBOLT FAILS TO INITIATE LOSS OF CAPABILITY TO IMPLEMENT PYROTECHNIC SEPARATION. LOSS OF NOMINAL AND PYROTECHNIC SEPARATION CAPABILITY.

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

(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:
NONE. CRITICALITY UNCHANGED. WORKAROUNDS ADD TO REDANDANCY.

THIRD FAILURE (INABILITY TO PERFORM IFM TO DRIVE HOOKS OPEN) - ONE OR MORE HOOKS CANNOT BE OPENED.
FIFTH FAILURE (FAILURE OF EVA TO REMOVE BOLTS) - LOSS OF ALL UNDOCKING CAPABILITY.

- TIME FRAME -

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 IFM OR PERFORM EVA.

HAZARDS REPORT NUMBER(S): ORBI 401

HAZARD DESCRIPTION:
INABILITY TO SEPARATE ORBITER AND MIR.

- APPROVALS -

PRODUCT ASSURANCE ENGR

: M. NIKOLAYEVA

DESIGN ENGINEER

: B. VAKULIN