FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CRITICAL HARDWARE
NUMBER: M5-6MR-B008-X

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

REVISION: 1 **SEPT 1, 1995**

		PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	:	ENERGIA POWER PANEL RSC-E	MC621-0087-0009 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 "CLOSE LATCHES" COMMAND.

REFERENCE DESIGNATORS: 36V73A8A3SB2-B5
36V73A8A3SB2-B6

QUANTITY OF LIKE ITEMS: 2
(TWO)

FUNCTION:
PROVIDE THE "CLOSE LATCHES" COMMAND STIMULI TO CLOSE THE APPROPRIATE CONTACTS IN THE DSCU TO IMPLEMENT THE "CLOSE LATCHES" FUNCTION. NOMINALLY, THE LATCHES ARE OPENED AND CLOSED AS PART OF THE AUTOMATIC DOCKING SEQUENCE. THE "CLOSE LATCHES" SIGNAL IS ROUTED BY THE DSCU TO THE LATCH ACTUATOR CONTROL UNIT (LACU) TO ENABLE THE CIRCUITS WHICH INITIATE THE CLOSE LATCH MOTIONS. ONE MOTOR FOR EACH LATCH (M1, M2, AND M3.)

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE
NUMBER: MS-6MR-B008- 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) PASS
C) PASS

PASS/FAIL RATIONALE:
A)
B)
C)

METHOD OF FAULT DETECTION:
"LATCHES OPEN" AND "LATCHES CLOSED" INDICATIONS IN THE D&C PANEL.

MASTER MEAS. LIST NUMBERS: V53X0783E

CORRECTING ACTION:
CREW CAN PERFORM AN APDS LOGIC BUS DROP. IN-FLIGHT MAINTENANCE PROCEDURES DEVELOPED TO DRIVE THE CAPTURE LATCH MOTORS DIRECTLY FROM THE FEED-THROUGH CONNECTORS IN THE EXTERNAL AIRLOCK, USING THE ORBITER BREAKTOUT BOX.

- FAILURE EFFECTS -

(A) SUBSYSTEM:
LOSS OF SWITCH CONTROL CAPABILITY FOR THE APDS "CLOSE LATCHES" CIRCUITS.

(B) INTERFACING SUBSYSTEM(S):
UNWANTED "CLOSE LATCHES" COMMAND.

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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) "CLOSE LATCHES" SWITCH FAILS CLOSED. TEMPORARY LOSS OF CAPABILITY TO ELECTRICALLY OPEN THE CAPTURE LATCHES. CREW WOULD PERFORM AN APDS LOGIC BUS DROP TO RECOVER DOCKING FUNCTIONS 2) ASSOCIATED SWITCH FAILS CLOSED RESULTING IN LOSS OF CAPABILITY TO ELECTRICALLY OPEN THE CAPTURE LATCHES. 3) MANUAL UNBLOCKING DEVICE FAILS TO RELEASE (1 OF 3.) LOSS OF CAPABILITY TO RELEASE THE LATCHES MANUALLY.

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

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

4) INABILITY TO PERFORM IFM TO DRIVE THE CAPTURE LATCH MOTORS - UNABLE TO DRIVE CAPTURE LATCHES OPEN.
5) FAILURE OF EVA TO REMOVE 96 BOLTS - LOSS OF ALL UNDOCKING CAPABILITY.

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

TIME FROM FAILURE OCCURRENCE TO DETECTION: HOURS

TIME FROM DETECTION TO COMPLETED CORRECTIVE ACTION: MINUTES

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 401A
HAZARD DESCRIPTION:
INABILITY TO SEPARATE ORBITER AND MIR.

- APPROVALS -

PRODUCT ASSURANCE ENGR : M. NIKOLAYEVA

DESIGN ENGINEER : B. VAKULIN

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