FAILURE MODES EFFECTS ANALYSIS (FMEA) – CRITICAL HARDWARE
NUMBER: M5-6MR-B009-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 "FIXER OFF" COMMAND.

REFERENCE DESIGNATORS: 36V73A8A3SB2-87
36V73A8A3SB2-88

QUANTITY OF LIKE ITEMS: 2
(TWO)

FUNCTION:
PROVIDE THE "FIXER OFF" COMMAND STIMULI TO CLOSE THE APPROPRIATE CONTACTS IN THE DSCU TO IMPLEMENT THE "FIXER OFF" FUNCTION. THE FIXERS ARE ACTIVATED AFTER THE INITIAL DAMPING IS COMPLETE AND THE RING HAS ACHIEVED THE FORWARD POSITION AND ALIGNED. ONCE IN A STABLE POSITION, THE RING IS RETRACTED, WITH ITS LOAD, AS PART OF THE DOCKING SEQUENCE.

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL FAILURE MODE
NUMBER: M5-6MR-B009- 01

REVISION# 1 SEPT 1, 1995

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM
LRU: MC621-0087-0009 CRITICALITY OF THIS
ITEM NAME: PUSH BUTTON SWITCH 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) FAILS
C) FAILS

PASS/FAIL RATIONALE:
A)

B)
FIRST SWITCH FAILURE IS MASKED BY THE ASSOCIATED SWITCH
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 "FIXER OFF" COMMAND.

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

(C) MISSION:
FIRST SWITCH FAILURE - NO EFFECT.

FAILURE MODES EFFECTS ANALYSIS (FMEA) – CIL FAILURE MODE
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(D) CREW, VEHICLE, AND ELEMENT(S):
NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECTS:
FIRST FAILURE (AUTOMATIC DOCKING SEQUENCE FAILS) - THE AUTOMATIC DOCKING SEQUENCE IS THE PRIMARY MEANS TO TURN FIXERS OFF. THE AUTOMATIC SEQUENCE WOULD HAVE TO FAIL FIRST BEFORE THE MANUAL "FIXER OFF" COMMAND IS INITIATED. SECOND FAILURE (ONE OF TWO ASSOCIATED SWITCHES FAILS OPEN) - DISABLES ONE OF THREE PANEL COMMAND SIGNALS. DEGRADED MANUAL COMMAND REDUNDANCY. THIRD FAILURE (SECOND ASSOCIATED SWITCH FAILS OPEN) - LOSS OF CAPABILITY TO SUPPLY THE "FIXER OFF" COMMAND TO THE DSCU. LOSS OF CAPABILITY TO DEACTIVATE FIXERS WHEN RING IS EXTENDED TO IT'S INITIAL POSITION PRIOR TO CAPTURE. LOCKED FIXERS COULD IMPEDE CAPTURE RESULTING IN LOSS OF DOCKING CAPABILITIES.

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

(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:
N/A (THERE ARE NO WORKAROUNDS TO CIRCUMVENT THIS FAILURE.)

-DISPOSITION RATIONALE-

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

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

THE FIXERS CONTROL CIRCUIT 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:
NONE

- 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:			: 9/11/95