FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL HARDWARE
NUMBER: M5-6MR-B026-X

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM
REVISION: 0 OCT. 1995

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	LACU RSC-E	MC621-0087-1004 33Y.5212.007

PART DATA

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
LINE REPLACEABLE UNIT (LRU) LATCH ACTUATOR CONTROL UNIT (LACU) - CAPTURE LATCH MOTORS LOGIC AND POWER CONTROL.

REFERENCE DESIGNATORS: 40V53A2A1

QUANTITY OF LIKE ITEMS: 1
(ONE)

FUNCTION:
PROVIDES CAPTURE LATCHES ACTUATORS CONTROL. THE UNIT PROVIDES LATCH MOTOR CONTROL VIA COMMANDS FROM THE DSCU FOR AUTOMATIC SEQUENCE IMPLEMENTATION, OR COMMANDS FROM THE CONTROL PANEL FOR MANUAL OPERATIONS.

OUTPUT FUNCTIONS:
1) LATCH MOTOR CONTROL: PLUS/MINUS POWER FOR LATCH CLOSING/OPENING.
2) LATCHES "OPEN" FEEDBACK SIGNAL TO INITIATE AUTOMATIC "RING IN" OPERATION (AFTER HOOK CLOSURE.)
3) SIGNALS TO THE DCU AND CONTROL PANEL FEEDBACKS THROUGH THE DSCU: MOTORS ON, LATCHES CLOSED/OPEN.

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FAILURE MODES EFFECTS ANALYSIS (FMEA) – NON-CIL FAILURE MODE
NUMBER: M5-6MR-B026- 01

REVISION# 0 OCT, 1995

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM
LRU: MC621-0087-1004
ITEM NAME: LATCH ACTUATION CONTROL UNIT

CRITICALITY OF THIS FAILURE MODE: 1R3

FAILURE MODE:
LOSS OF MOTOR CONTROL FOR ALL CAPTURE LATCH FUNCTIONS.

MISSION PHASE:
OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 104 ATLANTIS

CAUSE:
INTERNAL COMPONENT FAILURE(S)

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:
DEGRADATION OF REDUNDANCY FOR CAPTURE LATCH MOTOR CONTROL.

(B) INTERFACING SUBSYSTEM(S):
NO EFFECT.

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FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL FAILURE MODE
NUMBER: MS-6MR-B028- 01

(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 SIX FAILURES. 1) LOSS OF ONE OF THREE CAPTURE LATCHES CONTROL SIGNALS. DEGRADED REDUNDANCY. 2) SECOND ASSOCIATED CAPTURE LATCHES CONTROL SIGNAL RESULTING IN LOSS OF CAPABILITY TO OPEN 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): 1R3

(F) RATIONALE FOR CRITICALITY CATEGORY DOWNGRADE:
FOURTH FAILURE (INABILITY TO PERFORM IFM TO DRIVE CAPTURE LATCHES OPEN) - THE CAPTURE LATCHES CANNOT BE OPENED.
FIFTH FAILURE (INABILITY TO EXTEND DOCKING RING) - INABILITY TO ENABLE SEPARATION WITH A SINGLE CLOSED CAPTURE LATCH.
SIXTH 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.

- 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 PERFORM IFM OR 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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