

**FAILURE MODES EFFECTS ANALYSIS (FMEA) - CRITICAL HARDWARE
NUMBER: M5-6MR-B028-X**

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

REVISION: 1 OCT, 1995

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	DSCU RSC-E	MC521-0087-1002 33Y.5212.005

PART DATA

**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
LINE REPLACEABLE UNIT (LRU) DSCU - DOCKING SYSTEM CONTROL UNIT.**

REFERENCE DESIGNATORS: 40V53A1A2

**QUANTITY OF LIKE ITEMS: 1
(ONE)**

FUNCTION:

THE DSCU IS USED TO IMPLEMENT THE AUTOMATED DOCKING SEQUENCE AND TO RECEIVE AND PROCESS THE COMMANDS FROM THE APDS CONTROL PANEL. THE UNIT PROVIDES TELEMETRY TO THE DCUs AND STATUS INDICATION TO THE APDS CONTROL PANEL.

OUTPUT FUNCTIONS:

1. PROVIDES HI-ENERGY DAMPERS POWER AND CONTROL.
2. PROVIDES CONTROL FOR DOCKING RING EXTENSION AND RETRACTION.
3. PROVIDES FIXERS POWER AND CONTROL.
4. PROVIDES HOOKS OPENING AND CLOSING CONTROL.
5. PROVIDES CAPTURE LATCHES OPENING AND CLOSING CONTROL.
6. PROVIDES TELEMETRY TO THE DCUs AND STATUS INDICATION TO THE APDS PANEL.

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

NUMBER: M5-6MR-B028-11

REVISION# 0 OCT, 1995

SUBSYSTEM NAME: ORBITER DOCKING SYSTEM

LRU: M0621-0087-1002

ITEM NAME: DSCU

CRITICALITY OF THIS FAILURE MODE: 1R3

FAILURE MODE:

LOSS OF CAPTURE LATCHES OPEN ACTIVATION SIGNAL (ONE OF THREE)

MISSION PHASE:

OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY: 104 ATLANTIS

CAUSE:

MULTIPLE INTERNAL COMPONENT FAILURES

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 OPEN ACTIVATION.

(B) INTERFACING SUBSYSTEM(S):

LOSS OF ONE OF THREE CAPTURE LATCH OPEN ACTIVATION SIGNALS TO THE LACU.

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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) LOSS OF ONE OF THREE CONTROL SIGNALS FOR THREE LATCH MOTORS. LOSS OF SIGNAL REDUNDANCY. 2) LOSS OF ONE OF TWO REMAINING ASSOCIATED CONTROL SIGNALS RESULTING IN LOSS OF NOMINAL LATCH OPENING CAPABILITY. 3) LOSS OF MANUAL UNBLOCKING DEVICE (1 OF 3) CAPABILITY RESULTING IN LOSS OF NOMINAL AND MANUAL CAPABILITY TO RELEASE CAPTURE LATCHES FOR VEHICLE SEPARATION.

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

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

FOURTH FAILURE (INABILITY TO PERFORM IFM TO DRIVE CAPTURE LATCHES) - THE CAPTURE LATCHES CANNOT BE OPENED.
FIFTH 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 TO REMOVE 96 BOLTS.

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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ORIGINAL