

# FAILURE MODE EFFECTS ANALYSIS/CRITICAL ITEMS LIST

FMEA NUMBER: EC PORT2-3      ORIGINATOR: JSC      PROJECT: EDFT-03

PART NAME: RU LATCH	LRU/ORU PART NUMBER: SED39126454-301	QUANTITY: 1
PART NUMBER: SDD39126436-301	LRU/ORU PART NAME: PRUM ASSY	SYSTEM: GFE
LSC CONTROL NO: N/A	DRAWING/REF DESIGNATOR: SEE P/N	SUBSYSTEM: EVA
ZONE/LOCATION: PORT 2	EFFECTIVITY/AFFECT STAGE: STS-72	

### CRITICALITY:

CRITICAL ITEM: Yes      SUCCESS PATHS: 2  
 CRITICALITY CATEGORY: 1R/2      SUCCESS PATH REMAINING: 1

END ITEM NAME: N/A  
 END ITEM FUNCTIONAL: N/A  
 END ITEM CAPABILITY: N/A  
 END ITEM FAILURE TOLERANCE: N/A

### REDUNDANCY SCREENS:

- A/1. C/O PRELAUNCH: Pass
2. C/O ON ORBIT: N/A for NSTS
- B/3. DETECTION FLIGHT CREW: Pass
4. DETECTION GROUND CREW: N/A
- C/5. LOSS OF REDUNDANCY FROM SINGLE CAUSE: Pass

FUNCTION: The RU latch captures the PRUM RU Latch hook when the RU is inserted into the PRUM. This prevents the RU from being removed from the PRUM until the latch pin is activated to open the latch.

FAILURE MODE CODE: N/A for NSTS.

FAILURE MODE: Latch pin jammed.

CAUSE: Contamination, galling, Piece part defect, wear.

REMAINING PATHS: 1      EFFECT/MISSION PHASE: EVA  
 EVA bolts.

CORRECTIVE ACTION: Remove EVA bolts securing PRUM and jettison PRUM and RU.

### -FAILURE EFFECTS-

END ITEM/LRU/ORU/ASSEMBLY: Latch pin does not deactivate latch. RU stuck in PRUM.

SUBSYSTEM/NEXT ASSEMBLY/INTERFACE: N/A

SYSTEM/END ITEM/MISSION: Partial loss of DTO.

CREW/VEHICLE: Unable to secure PLB if RU is deployed. RU PRUM cannot sustain landing loads in this configuration. Vehicle damage will occur unless the RU and PRUM are jettisoned.

# FAILURE MODE EFFECTS ANALYSIS/CRITICAL ITEMS LIST

FMEA NUMBER: EC-PORT2-3      ORIGINATOR: JSC      PROJECT: EDFT-03

PART NAME: RU LATCH	LRU/ORU PART NUMBER: SED39126454-301	QUANTITY: 1
PART NUMBER: SDD39126436-301	LRU/ORU PART NAME: PRUM ASSY	SYSTEM: GFE
LSC CONTROL NO: N/A	DRAWING/REF DESIGNATOR: SEE P/N	SUBSYSTEM: EVA
ZONE/LOCATION: PORT 2	EFFECTIVITY/AFFECT STAGE: STS-72	

**HAZARD INFORMATION:**

HAZARD: N/A

HAZARD ORGANIZATION CODE: N/A

HAZARD NUMBER: N/A

TIME TO EFFECT: Hours  
 TIME TO DETECT: Seconds  
 TIME TO CORRECT: Minutes  
 FAILURE DETECTION/FLIGHT : Visual

**REMARKS:**

**-RATIONALE FOR ACCEPTABILITY-**

(A) DESIGN: The PRUM Latch, latch pin, and Probe latch hook are simple mechanical devices designed to the requirements specified in JSC-38192 "Certification and Acceptance Requirements Document for the Flight Support Equipment for DTO 0671". The latch captures the probe latch hook in a groove and is held in place due to the latches inherent material stiffness. The latch pin deactivates the latch by driving the latch off the probe latch hook. The PRUM also incorporates EVA releasable bolts that could be released in the event that the RU can not be removed from the PRUM.

(B) TEST: (Applicable Requirements per JSC-38192)

Acceptance: Functional (performed at redelivery acceptance, preinstallation acceptance, pre/post environmental test, and demonstrated during the Human Thermal/Vacuum test).  
 1) Force required to depress the latch pin which opens the latch is between 2 and 10 lb.

Qualification:

Protoflight Vibration : A vibration test was performed to the following levels for a duration of 1 minute in each axis:

X AXIS	Y AXIS	Z AXIS
20 - 30 Hz      +3 db/oct	20 - 45 Hz      +10 db/oct	20 - 45Hz      .009g <sup>2</sup> /Hz
80 - 350 Hz      .040g <sup>2</sup> /Hz	45 - 600 Hz      .060g <sup>2</sup> /Hz	45 - 70 Hz      +12 db/oct
350 - 2000 Hz      -3db/oct	600 - 2000      -10db/oct	70 - 600 Hz      .050 g <sup>2</sup> /Hz
		600 - 2000Hz -6 db/oct
6.1 grms	7.7 grms	7.0 grms

Thermal/Vacuum : Strut operation demonstrated at a temperature of -100°F at a pressure of 1 x 10<sup>-5</sup> torr.

(C) INSPECTION:

Fabrication - All latch components are verified to generally clean individually. The PRUM is verified to be visually clean at pre-delivery acceptance.

---

## FAILURE MODE EFFECTS ANALYSIS/CRITICAL ITEMS LIST

---

FMEA NUMBER: EC-PORT2-3

ORIGINATOR: JSC

PROJECT: EDFT-03

PART NAME: RU LATCH

LRU/ORU PART NUMBER: SED391264S4-301

QUANTITY: 1

PART NUMBER: SDD39126436-301

LRU/ORU PART NAME: PRUM ASSY

SYSTEM: GFE

LSC CONTROL NO: N/A

DRAWING/REF DESIGNATOR: SEE P/N

SUBSYSTEM: EVA

ZONE/LOCATION: PORT 2

EFFECTIVITY/AFFECT STAGE: STS-72

Test - Quality Assurance surveillance is required at all test and inspections. Discrepancy reports are written on all noncompliances.

(D) FAILURE HISTORY: None

(E) OPERATIONAL USE:

- 1) Operational Effect - Unable to remove RU from PRUM. Release of the RU is possible during deorbit/landing. Loose equipment could impact the vehicle.
- 2) Crew Action - If a latch jams, release EVA bolts securing PRUM and jettison PRUM and RU.
- 3) Crew Training - Crew trained in proper operation of PRUM during WETF training.
- 4) Mission constraint - None.
- 5) In Flight Checkout - Proper stowage of RU verified during EVA operations.

(F) MAINTAINABILITY: N/A

PREPARED BY: G. Wright

REVISION:

DATE: 8/1/95

WAIVER NUMBER: