

# FAILURE MODE EFFECTS ANALYSIS/CRITICAL ITEMS LIST

FMEA NUMBER: EC-PORT2-2 ORIGINATOR: JSC PROJECT: EDFT-03

PART NAME: LOCK PIN RET ASY	LRU/ORU PART NUMBER: SED39126454-301	QUANTITY: 1
PART NUMBER: SED39126460-301	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: N/A
4. DETECTION GROUND CREW: N/A
- C/5. LOSS OF REDUNDANCY FROM SINGLE CAUSE: Pass

FUNCTION: The lock pin retainer prevents the receiver lock pin from working itself free from the RU receiver.

FAILURE MODE CODE: N/A for NSTS.

FAILURE MODE: Inadvertently opens.

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

REMAINING PATHS: 1  
Lock pin tether.

EFFECT/ MISSION PHASE:  
Launch/Landing

CORRECTIVE ACTION: None required.

### -FAILURE EFFECTS-

END ITEM/LRU/ORU/ASSEMBLY: Receiver lock pin is free to disengage from RU receiver.

SUBSYSTEM/NEXT ASSEMBLY/INTERFACE: N/A

SYSTEM/END ITEM/MISSION: Possible damage to PRUM.

CREW/VEHICLE : None, unless lock pin tether fails. Possible vehicle damage due to loose equipment in PLB.

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### HAZARD INFORMATION:

HAZARD: N/A

HAZARD ORGANIZATION CODE: N/A

HAZARD NUMBER: N/A

TIME TO EFFECT: Seconds  
 TIME TO DETECT: N/A  
 TIME TO CORRECT: Immediately  
 FAILURE DETECTION/FLIGHT: None

### REMARKS:

### -RATIONALE FOR ACCEPTABILITY-

A) DESIGN: Lock Pin retainer is designed to be single fault tolerant in not allowing the pin to be released in the PLB. Restraint tether is designed to restrain a loose pin.

(B) TEST:

Acceptance: Functional (performed at predelivery acceptance, preinstallation acceptance, pre/post environmental test, and demonstrated during the Human Thermal Vacuum test).

- 1) Force required to operate the lock pin retainer is between 1 and 5 lb.
- 2) Force required to operate the lock pin is between 1 and 8 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 : Lock pin retainer operation demonstrated at a temperature of -100°F at a pressure of  $1 \times 10^{-5}$  torr.

(C) INSPECTION:

Fabrication - All PRUM components are verified to generally clean individually. The PRUM assembly is verified to be visually clean at predelivery acceptance.

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

(D) FAILURE HISTORY: None.

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**(E) OPERATIONAL USE:**

- 1) Operational Effect -None. Release of the pin is possible if tether fails. Loose equipment could impact the vehicle. Lock pin may be damaged and not be usable during the EVA.
- 2) Crew Action - Inspect pin if failure occurs prior to use during EVA.
- 3) Crew Training - Crew trained in proper operation of PRUM.
- 4) Mission constraint - None.
- 5) In Flight Checkout - Proper stowage verified during EVA operations.

**(F) MAINTAINABILITY: N/A**


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PREPARED BY: G. Wright

REVISION:

DATE: 8/10/95

WAIVER NUMBER:

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