PRINT DATE: 01/29/01

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL HARDWARE
NUMBER: 02-5E-L08 -X

SUBSYSTEM NAME: PAYLOAD RETEN & DEPLOY - LATCHES
REVISION: 4 01/17/01

PART DATA

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU	: LIGHTWEIGHT LONGERON LATCH	V073-544100
LRU	: MIDDLEWEIGHT LONGERON LATCH	V073-544230
LRU	: SUPER MIDDLE WT LONGERON LATCH	V073-544530
SRU	: SWITCH, LIMIT	MC452-0123-0003

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
TWO "LATCH OPEN" LIMIT SWITCHES, S1 AND S3, ARE INSTALLED IN SWITCH MODULE AND ARE ACTUATED BY SAME LEVER.

QUANTITY OF LIKE ITEMS:
20 MAX

FUNCTION:
LIGHTWEIGHT, MIDDLEWEIGHT OR SUPER MIDDLEWEIGHT LONGERON LATCH REACTS FLIGHT LOADS ON PAYLOAD HORIZONTAL TRUNNION HELD BETWEEN TWO SPHERICAL HALF BEARINGS. WHEN LATCH IS OPEN, LATCH OPEN LIMIT SWITCH ASSEMBLY VERIFIES LATCH IS OPENED SUFFICIENTLY TO ALLOW PAYLOADS TO BE BERTHED OR DEPLOYED. LIMIT SWITCH SIGNAL REMOVES POWER FROM THE MOTORS AND GIVES THE CREW AN INDICATION THAT THE LATCH IS OPEN.

PRINT DATE: 01/29/01

FAILURE MODES EFFECTS ANALYSIS FMEA -- NON-CIL FAILURE MODE
NUMBER: 02-5E-L08- 01

REVISION#: 4 01/17/01

SUBSYSTEM NAME: PAYLOAD RETEN & DEPLOY - LATCHES
LRU: LIGHT, MIDDLE, SUPER MIDDLE WT LONGERON LATCH **CRITICALITY OF THIS**
ITEM NAME: SWITCH, LIMIT **FAILURE MODE:** 2R3

FUNCTIONAL CRITICALITY/
REQUIRED FAULT TOLERANCE/ACHIEVED FAULT TOLERANCE:2R/0/1

FAILURE MODE:
TRANSFERS PREMATURELY/INADVERTENTLY (LATCH OPEN)

MISSION PHASE: OO ON-ORBIT

VEHICLE/PAYLOAD/KIT EFFECTIVITY:

102	COLUMBIA
103	DISCOVERY
104	ATLANTIS
105	ENDEAVOUR

CAUSE:
ACCELERATION, CONTAMINATION/FOREIGN OBJECT/DEBRIS, DEFECTIVE PART/ MATERIAL OR MANUFACTURING DEFECT, TEMPERATURE, VIBRATION

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN

A) PASS
B) PASS
C) PASS

PASS/FAIL RATIONALE:
A)

B)

C)

CORRECTING ACTION: MANUAL

CORRECTING ACTION DESCRIPTION:
CREW CAN PERFORM EXTRAVEHICULAR ACTIVITY (EVA) PROCEDURES FOR MANUAL LATCH OPEN/CLOSE.

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL **FAILURE MODE NUMBER: 02-5E-L08- 01**

- FAILURE EFFECTS -

(A) SUBSYSTEM:
FAILURE WILL RESULT IN SWITCH OUTPUT INDICATING LATCH OPEN REGARDLESS OF ACTUAL LINKAGE POSITION. FAILURE WILL PREVENT LATCH FROM DRIVING IN THE OPEN DIRECTION.

(B) INTERFACING SUBSYSTEM(S):
FAILURE WILL RESULT IN INABILITY TO RELEASE PAYLOAD.

(C) MISSION:
FAILURE WITH LATCH CLOSED WILL RESULT IN LOSS OF MISSION DUE TO INABILITY TO RELEASE PAYLOAD.

(D) CREW, VEHICLE, AND ELEMENT(S):
NO EFFECT. LATCH CAN BE COMMANDED CLOSED TO SECURE THE RETURNED PAYLOAD FOR ENTRY.

(E) FUNCTIONAL CRITICALITY EFFECTS:
LOSS OF MISSION OBJECTIVE IF THE LATCH CANNOT BE OPENED.

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

(F) RATIONALE FOR CRITICALITY DOWNGRADE:
CRITICALITY IS DOWNGRADED FROM THE DESIGN CRITICALITY, 2/2, TO 2R/3 DUE TO CONSIDERATION OF THE OPERATIONAL WORKAROUND CAPABILITY. THE CREW CAN OPEN OR CLOSE LATCHES MANUALLY BY PERFORMING EVA.

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: DAYS

- APPROVALS -

S&R ENGINEER :T. T. Al : 2/26/01

PRINT DATE: 01/29/01

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL **FAILURE MODE**
NUMBER: 02-5E-L08- 01

DESIGN ENGINEER :D. E.HAEHLKE : Don Haehlke 1/26/01