CRI ITEMS LIST

REFERENCE DESIGNATOR: TBA-2
NAME / QUANTITY: BACK-UP PANEL ASSY. (2)
DRAWING REFERENCE 10101-2007/2008

PROJECT: HST
LRU NAME / QUANTITY BACK-UP PANEL ASSY. (2)
LRU PART NUMBER 10101-2007-01/2008-01

SUBSYSTEM TOOL BOX
EFFECTIVITY ALL ORBITERS

FAILURE MODE NUMBER	CRITICALITY
HST-TBA-3-1	1R/2

FUNCTION

The back-up panels are used to stow the back-up tools within the tool box.

FAILURE MODE AND CAUSE

MODE

Either back-up panel is stuck in the deployed position.

CAUSE(S)

1.) Latches are jammed closed.
2.) Contamination.

REDUNDANCY SCREENS	REMAINING PATHS
A - Pass B - N/A C - Pass	1) Release 5/16" hex-head bolts at hinge.

MISSION PHASE	CORRECTIVE ACTION TIMES	
	TIME TO EFFECT	TIME TO CORRECT
EVA	Hours	Minutes

FAILURE EFFECT

END ITEM

Cannot restow the back-up panels which prevents the lap panel from being closed and the doors from being shut

MISSION

Mission objectives are complete.

CREW / VEHICLE

Possible damage to the orbiter if the doors or any content in the box become loose in the payload bay.

INTERFACE

None

RETENTION RATIONALE

DESIGN

I. **Design Feature to Minimize the Chance of the Failure Mode**

A. Design
All tool box components were designed to a structural safety factor of 2.0

B. Tolerances
Sufficient tolerances will be used in the latch design to prevent jamming by expansion and contraction of material due to temperature extremes or on-orbit use.

C. Materials - Major Components

1. Latch Assembly: 6061-T651, CRES 304 Cond. A, 15-5PH 1025
2. Back-Up Panel Slide: CRES 304 Cond. A, Acetal, 6061-T651
3. Box Bottom and Top Panels: 7075-T73551

II. **Testing and Analysis**

A. Acceptance Testing

1. PDA

A full pre delivery acceptance (PDA) test will be performed on the tool box assembly before it is delivered to JSC for the beginning of the certification process. The PDA will verify that the latches are operating correctly and that the assembly is clean.

2. Vibration

The flight tool box will be exposed to acceptance vibration loads while it is in flight configuration. The test will verify that the latches will withstand the vibration loads.

PREPARED BY: J. F. PARK REVISION BASIC SUPERSEDING DATE: NONE DATE: 8/18/93

CRIT ITEMS LIST

REFERENCE DESIGNATOR: TBA-2
NAME / QUANTITY: BACK-UP PANEL ASSY. (2)
DRAWING REFERENCE 10981-20007/20008

PROJECT: HST
LRU NAME / QUANTITY: BACK-UP PANEL ASSY. (2)
LRU PART NUMBER: 10181-20287-01/20288-01

SUBSYSTEM: TOOL BOX
EFFECTIVITY ALL ORBITERS

FAILURE MODE NUMBER	CRITICALITY
HST-TBA-3-1	1R/2

FUNCTION

The back-up panels are used to stow the back-up tools within the tool box.

FAILURE MODE AND CAUSE

MODE

Either back-up panel is stuck in the deployed position.

CAUSE(S)

1.) Latches are jammed closed.
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REDUNDACY SCREENS	REMAINING PATHS
A - Pass B - N/A C - Pass	1) Release 5/16" hex-head bolts at hinge.

MISSION PHASE	CORRECTIVE ACTION TIMES	
	TIME TO EFFECT	TIME TO CORRECT
EVA	Hours	Minutes

FAILURE EFFECT

END ITEM
Cannot restow the back-up panels which prevents the lap panel from being closed and the doors from being shut.

MISSION
Mission objectives are complete.

CREW / VEHICLE
Possible damage to the orbiter if the doors or any content in the box become loose in the payload bay.

INTERFACE
None

RETENTION RATIONALE

DESIGN

A. Acceptance Testing (continued)

The following vibration levels are per SMD memo ES42-92-134:

Frequency (Hz)	Slope (dB/oct.)	Constant Level G^2/Hz	Overal Grms
20-80	+3.0		6.1
80-350		.04	
350-2000	-3.0		
20 45	+10.0		7.7
45-600		.06	
600-2000	-6.0		
20-70	+4.0		7.0
70-600		.05	
600-2000	-6.0		

B. Certification Testing

1. Thermal Vacuum

The Tool Box will be exposed to the following thermal vacuum environment. Latch operation and contingency bolts operation will be a part of the test plan.

a. Temperature
- Cold Side Only (amb. to -90°F)

b. Pressure
- ATM to 1x10-5 torrs

PREPARED BY: J.F. PARK

REVISION: BASIC

SUPERSEDING DATE: NONE

DATE: 6/18/93

CRI[illegible]. ITEMS LIST

REFERENCE DESIGNATOR: TBA-2
NAME / QUANTITY: BACK-UP PANEL ASSY. (2)
DRAWING REFERENCE 10161-20207/20208

PROJECT: HST
LRU NAME / QUANTITY: BACK-UP PANEL ASSY. (2)
LRU PART NUMBER 10161-20207-01/20208-01

SUBSYSTEM: TOOL BOX
EFFECTIVITY: ALL ORBITERS

FAILURE MODE NUMBER	CRITICALITY
HST-TBA-3-1	1R/2

FUNCTION

The back-up panels are used to stow the back-up tools within the tool box.

FAILURE MODE AND CAUSE

MODE

Either back-up panel is stuck in the deployed position.

CAUSE(S)

1.) Latches are jammed closed.
2.) Contamination.

REDUNDACY SCREENS	REMAINING PATHS
A - Pass B - N/A C - Pass	1) Release 5/16" hex-head bolts at hinge.

MISSION PHASE	CORRECTIVE ACTION TIMES	
	TIME TO EFFECT	TIME TO CORRECT
EVA	Hours	Minutes

FAILURE EFFECT

END ITEM
Cannot restow the back-up panels which prevents the lap panel from being closed and the doors from being shut.

MISSION
Mission objectives are complete.

CREW / VEHICLE
Possible damage to the orbiter if the doors or any content in the box become loose in the payload bay.

INTERFACE
None

RETENTION RATIONALE

DESIGN

B. Certification Testing (continued)

2. Functionals

The tool box components like the door panel latches will be functionally operated prior to and immediately after all certification test to verify that the test environment does not degrate the hardware performance.

C. Certification Analysis
The door panel latches and hinges will be analyzed to the following induced environments to verify that the assembly can withstand the environment levels:

1. Requirements	Source
a. Shock	
- Functional	NSTS-07700 VOL. XIV
b. Vibration (Flt. Levels)	
- Acoustics	NSTS-07700 VOL. XIV
- Modal	JSC-14046
c. Structures	
- Ult. (fs = 2.0)	NSTS-07700 VOL. XIV
- Fracture	NSTS-07700 VOL. XIV
d. Acceleration	
- Flight	MF0004-014D
- Crash	MIL-STD-810, Method 516, Procedure I
e. Temperature	
- Hot (+250°F)	HST S/AD (10161-10061A)

PREPARED BY: J. F. PARK | REVISION: BASIC | SUPERSEDING DATE: NONE | DATE: 9/16/93

C AL ITEMS LIST

REFERENCE DESIGNATOR: TBA-2
NAME / QUANTITY: BACK-UP PANEL ASSY. [2]
DRAWING REFERENCE: 10181-20207/20208

PROJECT: HST
LRU NAME / QUANTITY: BACK-UP PANEL ASST. (2)
LRU PART NUMBER: 10181-20207-01/20208-01

SUBSYSTEM: TOOL BOX
EFFECTIVITY: ALL ORBITERS

FAILURE MODE NUMBER	CRITICALITY
HST-TBA-3-1	1R/2

FUNCTION

The back-up panels are used to stow the back-up tools within the tool box.

FAILURE MODE AND CAUSE

MODE

Either back-up panel is stuck in the deployed position.

CAUSE(S)

1.) Latches are jammed closed.
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REDUNDANCY SCREENS	REMAINING PATHS
A - Pass B - N/A C - Pass	1) Release 5/16" hex-head bolts at hinge.

MISSION PHASE	CORRECTIVE ACTION TIMES	
	TIME TO EFFECT	TIME TO CORRECT
EVA	Hours	Minutes

FAILURE EFFECT

END ITEM

Cannot restow the back-up panels which prevents the lap panel from being closed and the doors from being shut.

MISSION

Mission objectives are complete.

CREW / VEHICLE

Possible damage to the orbiter if the doors or any content in the box become loose in the payload bay.

INTERFACE

None

RETENTION RATIONALE

DESIGN

III. Inspection

A. Manufacturing

1. The latches and door panel hinge components will be inspected prior to build-up for conformance to their applicable drawings.
2. All fracture critical piece parts will be inspected as described on their applicable drawings.

B. Assembly

1. Interior assemblies will be cleaned and inspected to the levels described in section 3.53.5 of the HST S/AD (10181-10081-01). Once cleaned, the tool box will be completely bagged to prevent any contamination from entering the box.

C. Testing

1. The assembly will be fully inspected and functionally operated during PDAs and PIAs.
2. The hardware will be fully inspected for any signs of galling as a part of the pre/post functional tests performed prior to and immediately after all major certification and acceptance testing.

PREPARED BY: J.F. PARK

REVISION: BASIC

SUPERSEDING DATE: NONE

DATE: 6/18/90

CRIT ITEMS LIST

REFERENCE DESIGNATOR: TBA-2
NAME / QUANTITY: BACK-UP PANEL ASSY. (2)
DRAWING REFERENCE: 19181-20207/20208

PROJECT: HST
LRU NAME / QUANTITY: BACK-UP PANEL ASSY. (2)
LRU PART NUMBER: 80181-20207-01/20208-01

SUBSYSTEM: TOOL BOX
EFFECTIVITY: ALL ORBITERS

FAILURE MODE NUMBER	CRITICALITY
HST-TBA-3-1	1R/2

FUNCTION

The back-up panels are used to store the back-up tools within the tool box.

FAILURE MODE AND CAUSE

MODE

Either back-up panel is stuck in the deployed position.

CAUSE(S)

1.) Latches are jammed closed.
2.) Contamination.

REDUNDACY SCREENS	REMAINING PATHS
A - Pass B - N/A C - Pass	1) Release 5/16" hex-head bolts at hinge.

MISSION PHASE	CORRECTIVE ACTION TIMES	
	TIME TO EFFECT	TIME TO CORRECT
EVA	Hours	Minutes

FAILURE EFFECT

END ITEM
Cannot restow the back-up panels which prevents the lap panel from being closed and the doors from being shut.

MISSION
Mission objectives are complete.

CREW / VEHICLE
Possible damage to the orbiter if the doors or any content in the box become loose in the payload bay.

INTERFACE
None

RETENTION RATIONALE

DESIGN

IV. Failure History

A. There have been no failures associated with the door panel latches or the door panel hinges.

V. Operations

A. Effects of Failure
Cannot restow the back-up panel which prevents the lap panel from being closed and the doors from being shut.

B. Crew Actions
To activate the redundant path, the EVA crew will attach the EVA power tool or wrench to disengage the 7/16" hex-head bolts at the door hinges and the check bar attachment location and remove the lap panel.

C. Training
As part of the certification testing , crews will actuate the redundant systems during the thermal vacuum tests. Additional training will occur in the WETF

D. Mission Constraints
All contents in the box will have to be removed prior to landing in addition to the process listed in the crew actions section.

E. Inflight Check-Outs
None.

PREPARED BY: J. F. PARK | REVISION: BASIC | SUPERSEDING DATE: NONE | DATE: 8/18/93