CRITCAL ITEMS LIST

REFERENCE DESIGNATOR: TBA-1
NAME / QUANTITY: BACK-UP PANEL ASSY. (3)
DRAWING REFERENCE [illegible]

PROJECT: HST
LRU NAME / QUANTITY: BACK-UP PANEL ASSY. (3)
LRU PART NUMBER: [illegible]

SUBSYSTEM: TOOL BOX
EFFECTIVITY: ALL ORBITERS

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

FUNCTION

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

FAILURE MODE AND CAUSE

MODE

Back-up panels cannot be deployed because they are stuck in their stowed position.

CAUSE(S)

1.) Latch jams in locked position.
2.) Contamination.

REDUNDACY SCREENS	REMAINING PATHS
A - N/A B - N/A C - N/A	None

MISSION PHASE	CORRECTIVE ACTION TIMES	
	TIME TO EFFECT	TIME TO CORRECT
EVA	Seconds	N/A

FAILURE EFFECT

END ITEM
Cannot access the back-up tools.

MISSION
Unable to complete some mission objectives if primary tools are unusable and the back-up panel is stuck.

CREW / VEHICLE
None

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 Side: 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. PARR | REVISION: DRAFT | SUPERSEDING DATE: NONE | DATE [illegible]

CRITCAL ITEMS LIST

REFERENCE DESIGNATOR: TBA-2
NAME / QUANTITY: BACK-UP PANEL ASSY. (2)
DRAWING REFERENCE: [illegible]

PROJECT: HST
LRU NAME / QUANTITY: BACK-UP PANEL ASSY. (2)
LRU PART NUMBER: [illegible]

SUBSYSTEM: TOOL BOX
EFFECTIVITY: ALL ORBITERS

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

FUNCTION

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

FAILURE MODE AND CAUSE

MODE

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CAUSE(S)

1.) Latch jams in locked position.
2.) Contamination.

REDUNDACY SCREENS	REMAINING PATHS
A - N/A B - N/A C - N/A	None

MISSION PHASE	CORRECTIVE ACTION TIMES	
	TIME TO EFFECT	TIME TO CORRECT
EVA	Seconds	N/A

FAILURE EFFECT

END ITEM
Cannot access the back-up tools.

MISSION
Unable to complete some mission objectives if primary tools are unusable and the back-up panel is stuck.

CREW / VEHICLE
None

INTERFACE
None

RETENTION RATIONALE

DESIGN

A. Acceptance Testing (continued)

The following vibration levels are per SMD memo ES42-92-434:

Frequency (Hz)	Slope (dB/oct.)	Constant Level G^2/Hz	Overal Grms
20-80	+3.0	.04	8.1
80-350			
350-2000	-3.0		
20-45	+10.0	.08	7.7
45-600			
600-2000	-6.0		
20-70	+4.0	.05	7.0
70-600			
600-2000	-6.0		

B. Certification Testing

1. Thermal Vacuum

The Tool Box will be exposed to the following thermal vacuum environment. Latch operations 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: 11/30/93

CRITCAL ITEMS LIST

REFERENCE DESIGNATOR: TBA-2
NAME / QUANTITY: BACK-UP PANEL ASSY. (2)
DRAWING REFERENCE: [illegible]

PROJECT: HST
LRU NAME / QUANTITY: BACK-UP PANEL ASSY. (2)
LRU PART NUMBER: [illegible]

SUBSYSTEM: TOOL BOX
EFFECTIVITY: ALL ORBITERS

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

FUNCTION

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

FAILURE MODE AND CAUSE

MODE

Back-up panels cannot be deployed because they are stuck in their stowed position.

CAUSE(S)

1.) Latch jams in locked position.
2.) Contamination.

REDUNDACY SCREENS	REMARKS PATH
A - N/A B - N/A C - N/A	None

MISSION PHASE	CORRECTIVE ACTION TIMES	
	TIME TO EFFECT	TIME TO CORRECT
EVA	Seconds	N/A

FAILURE EFFECT

END ITEM
Cannot access the back-up tools.

MISSION
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CREW / VEHICLE
None

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 degrade the hardware performance.

C. Certification Analysis
The door panel latches 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 (FS. 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 (10181-10081A)

PREPARED BY: J. F. PARK | REVISION: BASIC | SUPERSEDING DATE: NONE | DATE: 3/5/90

CRITCAL ITEMS LIST

REFERENCE DESIGNATOR: TBA-3
NAME / QUANTITY: BACK-UP PANEL ASSY. (2)
DRAWING REFERENCE: 10181-3607/3608

PROJECT: HST
LRU NAME / QUANTITY: BACK-UP PANEL ASSY. (2)
LRU PART NUMBER: 10181-3607-01/3608-01

SUBSYSTEM: TOOL BOX
EFFECTIVITY: ALL ORBITERS

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

FUNCTION

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

FAILURE MODE AND CAUSE

MODE

Back-up panels cannot be deployed because they are stuck in their stowed position.

CAUSE(S)

1.) Latch jams in locked position.
2.) Contamination.

REDUNDANCY SCREENS	REMAINING PATHS
A - N/A B - N/A C - N/A	None

MISSION PHASE	CORRECTIVE ACTION TIMES	
	TIME TO EFFECT	TIME TO CORRECT
EVA	Seconds	N/A

FAILURE EFFECT

END ITEM
Cannot access the back-up tools.

MISSION
Unable to complete some mission objectives if primary tools are unusable and the back-up panel is stuck.

CREW / VEHICLE
None

INTERFACE
None

RETENTION RATIONALE

DESIGN

III. Inspection

A. Manufacturing

1. The latch 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 3.5.3.5 of the HST S/AD (10181-1008/A). 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. PARR
REVISION: BASIC
SUPERSEDING DATE: NONE
DATE: 12/21/93

HST-TBA-1-28

CRITCAL ITEMS LIST

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NAME / QUANTITY: BACK-UP PANEL ASSY. (2)
DRAWING REFERENCE [illegible]

PROJECT: HST
LRU NAME / QUANTITY: BACK-UP PANEL ASSY. (2)
LRU PART NUMBER: [illegible]

SUBSYSTEM TOOL BOX
EFFECTIVITY ALL ORBITERS

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

FUNCTION

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

FAILURE MODE AND CAUSE

MODE

Back-up panels cannot be deployed because they are stuck in their stowed position.

CAUSE(S)

1.) Latch jams in locked position.
2.) Contamination.

REDUNDANCY SCREENS

A - N/A
B - N/A
C - N/A

REMAINING PATHS

None

MISSION PHASE	CORRECTIVE ACTION TIMES	
	TIME TO EFFECT	TIME TO CORRECT
EVA	Seconds	N/A

FAILURE EFFECT

END ITEM

Cannot access the back-up tools.

MISSION

Unable to complete some mission objectives if primary tools are unusable and the back-up panel is stuck.

CREW / VEHICLE

None

INTERFACE

None

RETENTION RATIONALE

DESIGN

IV. Failure History

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

V. Operations

A. Effects of Failure
Cannot access the back-up tools.

B. Crew Actions
None

C. Training
None

D. Mission Constraints
All contents stowed on the back-up panels will not be accessible. Some mission operations could be effected if the need exists for the back-up tools and they are not accessible.

E. Inflight Check-Outs
None.

PREPARED BY J.F.FARN REVISION: BASIC SUPERSEDING DATE: NONE DATE: [illegible]