

# Avoiding Connector and Backplane Damage During CRU/FRU Replacement

The connectors on NonStop S-series backplanes have high pin densities and small pin diameters. When a plugable unit (a CRU/FRU) is installed, a damaged plastic shell on the unit's connector can bend a pin on the backplane connector. The initial damage can be hard to see and might go undetected until more damage is done. This procedure describes how to identify damaged connectors so that affected CRUs/FRUs and backplanes can be replaced before they cause further damage. This procedure should be performed as part of every CRU/FRU replacement.



**Caution:** Connector damage can be propagated to multiple CRUs/FRUs and backplanes. Do not install a damaged CRU/FRU in a good slot or a good CRU/FRU in a damaged slot.

If a system is stable, a CRU/FRU should not be removed to inspect the connectors unless either the CRU/FRU is being replaced, symptoms have been encountered, or there is reason to believe connector damage might have been propagated. For more information, see [The Cycle \(How Damage Propagates\)](#), [Symptoms of a Damaged Pin](#), [Damage Due to Handling](#), and [Examples of Damage in the Middle of a Connector](#).

## 1 Inspect Backplane Connectors

Using a flashlight, examine the connector for bent pins. A bent pin can be crushed and molded against the inside wall of the connector housing. See [Examples of Damaged Pins on Backplanes](#).

Pay particular attention to the pins around the perimeter of the connector and to the top row of pins. In slots 50 and 55, the 3 left pins on the top row are the most susceptible to damage. See [PMF CRU and IOMF CRU Slots](#). When a PMF CRU or IOMF CRU is installed, these 3 pins are engaged by a section of the CRU connector that is more likely to propagate damage.

If a bent pin is found, replace the backplane (or enclosure). Do not try to straighten the pins; they are easily deformed. Locate all CRUs/FRUs that have been installed in this slot and inspect their connectors as described in Step 2. To replace a backplane, you must be a trained service provider. See the backplane-replacement section of the NonStop S-Series Service Provider Supplement in the Hardware Service and Maintenance library.

## 2 **Inspect CRU/FRU Connectors**

Using a flashlight, examine the connector shell and the sockets.

Examine the perimeter of the shell for small notches, scrapes, and indentations. On PMF CRUs and IOMF CRUs, pay particular attention to the shell immediately above the 3 right sockets on the top row (facing the connector). This section of the shell is more susceptible to damage because the margins (distance) between the top of the shell and the socket windows are thinner here. See [Top Row Margins](#) and [Examples of CRU/FRU Connector Damage](#).

Check the sockets for damage. On PMF CRUs and IOMF CRUs, pay particular attention to the 3 right sockets on the top row, where damage most commonly occurs. Check the windows for punctures, deformations, and obstructions. See [Examples of CRU/FRU Connector Damage](#).

If any damage is found, replace the CRU/FRU. Locate all slots where the unit has been installed and inspect those backplane connectors as described in Step 1. Describe the damage and its location in Genesis and on the Part Return Tag (PRT).

This procedure should be performed as part of every CRU/FRU replacement. There is no need to inspect a working system for connector damage.

# Examples of Damaged Pins on Backplanes

Initially, a bent pin might look like those shown in Figure 1 and Figure 3. After successive CRUs/FRUs have been installed in those slots, the bent pins can be crushed and look like those shown in Figure 2 and Figure 4.

Figure 1

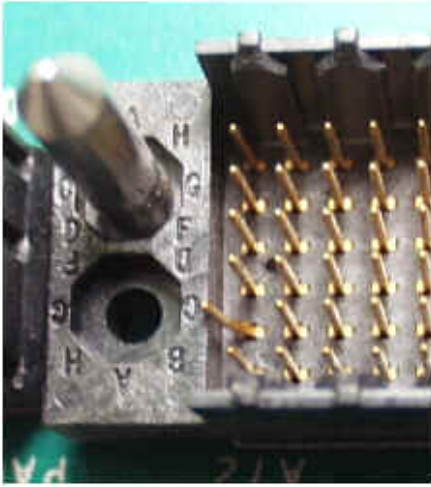


Figure 2

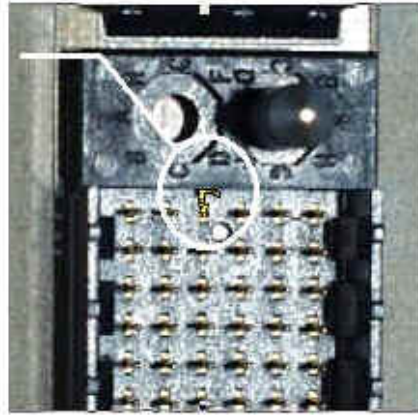


Figure 3

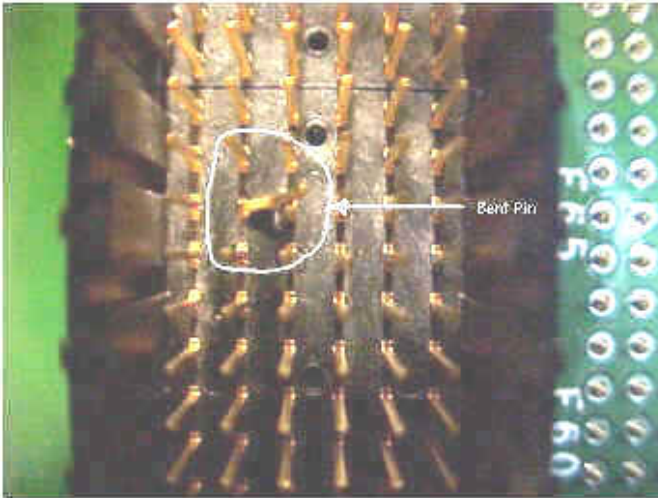
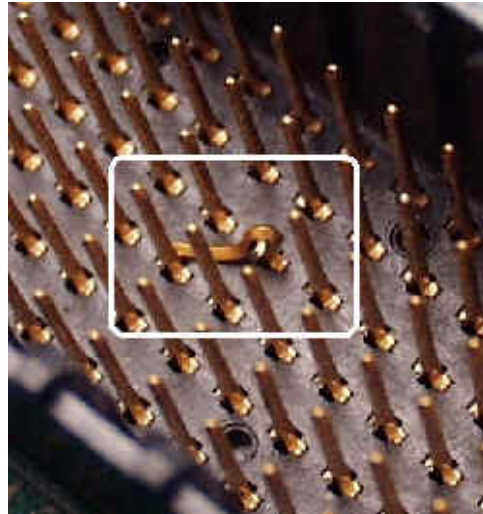


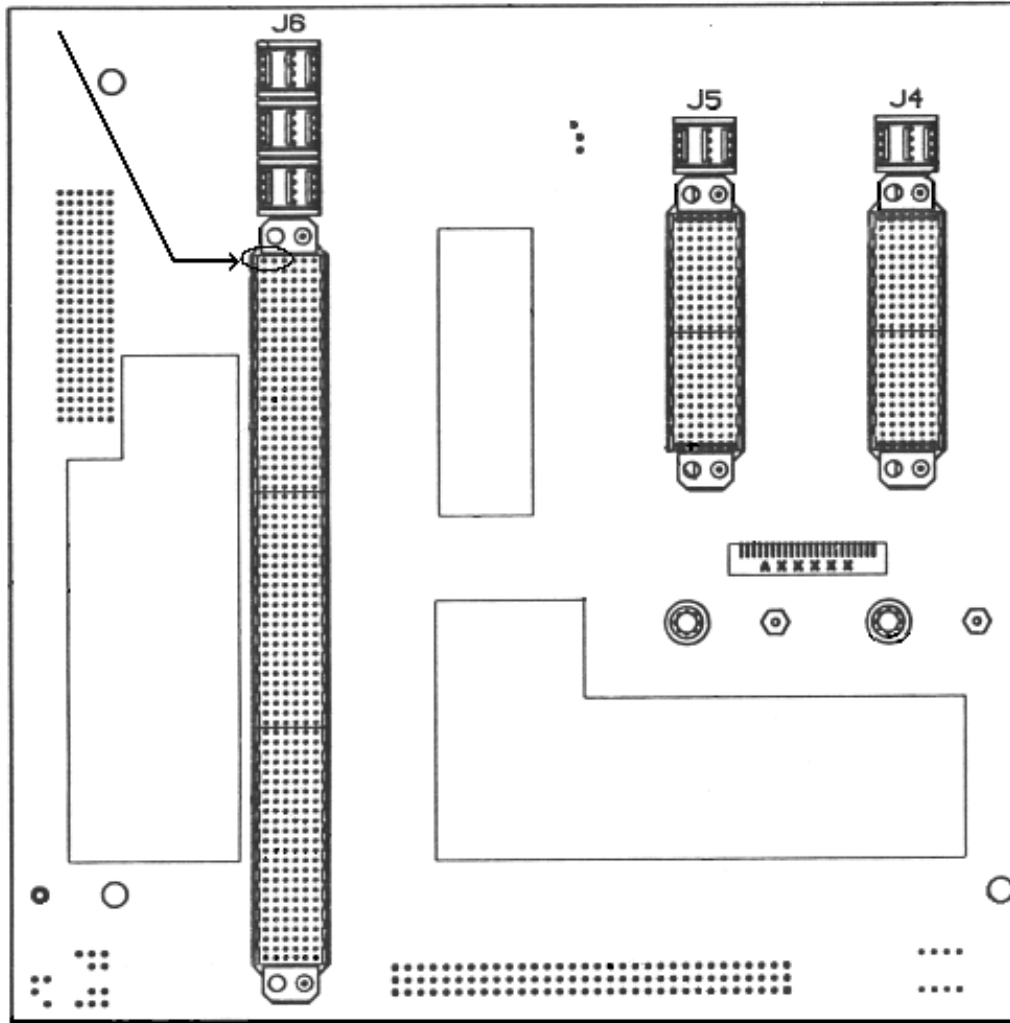
Figure 4



# Figure: PMF CRU and IOMF CRU Slots

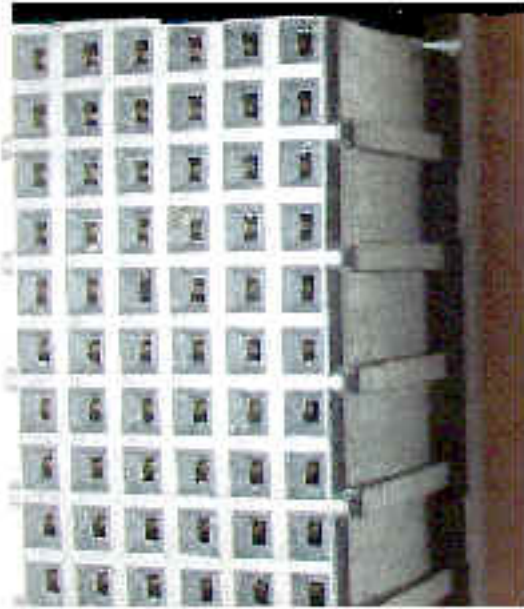
Three left pins on top row (slots 50 and 55)

Partial view of backplane



# Figure: Top Row Margins

On CRU/FRU connectors, the plastic shell above the top row of sockets is thinner on the right half of the connector than on the left.



# Examples of CRU/FRU Connector Damage

Figure 1



Figure 2

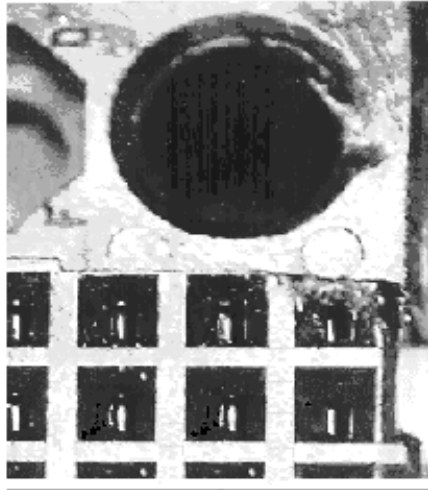
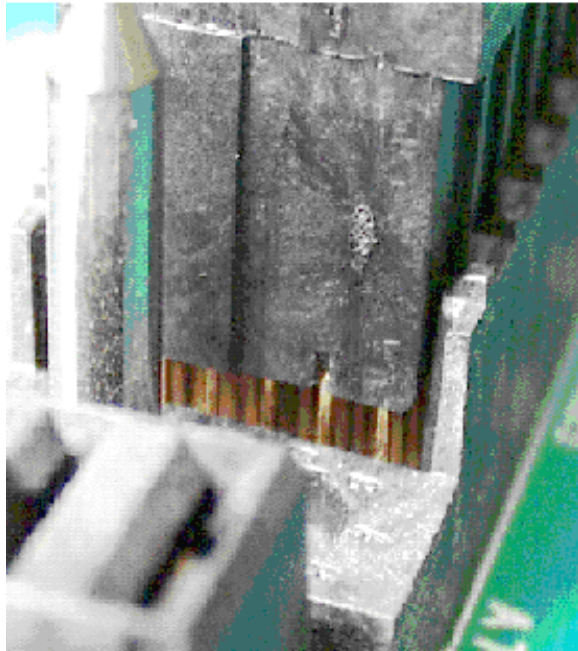


Figure 3



Figure 4

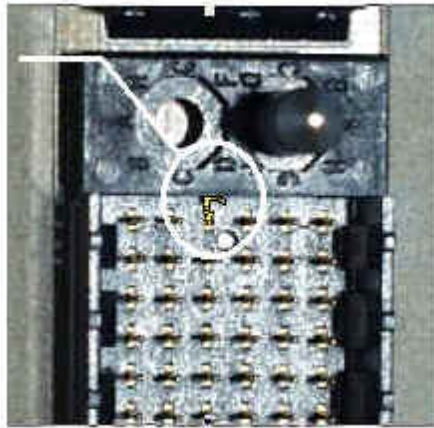


# The Cycle (How Damage Propagates)

Figure 1 shows a pin crushed against the wall of a backplane connector. When a good CRU/FRU is installed in this slot, the damaged pin will cut a notch in the edge of the CRU/FRU connector (Figure 2). If that CRU/FRU is then plugged in to a good slot, the notched connector will bend a pin in that slot (Figure 3). Figure 4 shows the bent pin. When a good CRU/FRU is then installed in this slot, the bent pin can be crushed to look like Figure 1 and the cycle of damage continues.

**Figure 1**

Crushed backplane pin, ready to damage connector shell of next CRU/FRU plugged into slot.



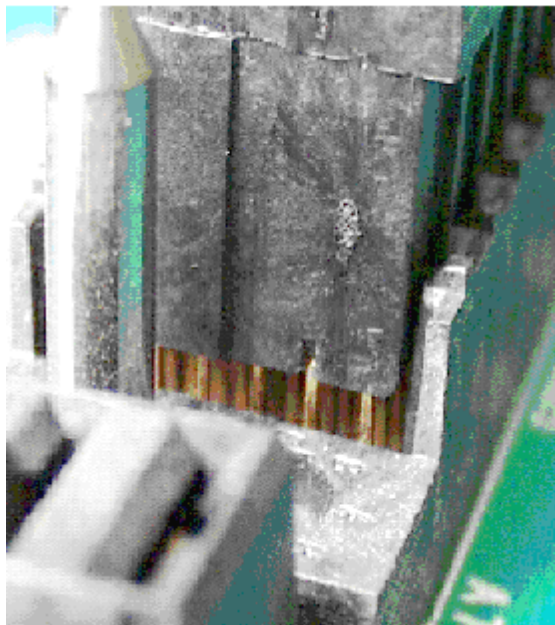
**Figure 2**

Notched CRU/FRU connector after unit is plugged in to a slot with bent pin. (Note: pin aperture is blocked; window ramp is deformed.)



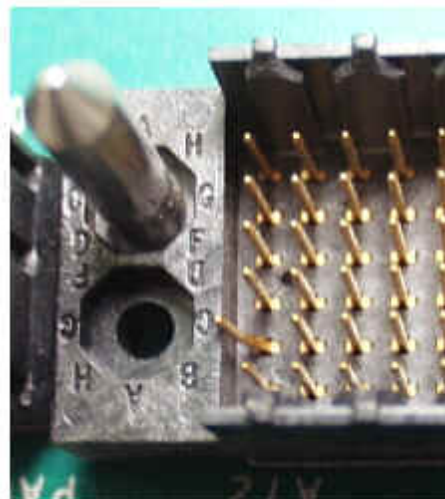
**Figure 3**

Pin in good slot being bent by seating a CRU/FRU with a damaged connector.



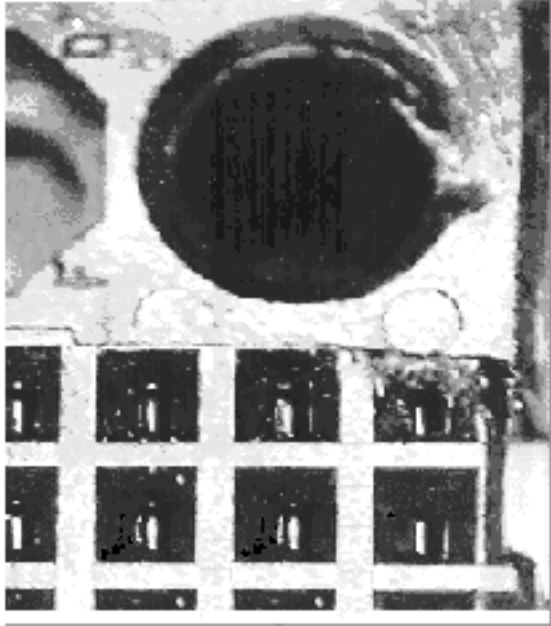
**Figure 4**

Bent pin in slot, ready to damage connector shell of next CRU/FRU plugged in to slot.



# Figure: Damage Due to Handling

Bumping a CRU/FRU's connector against a surface can cause aperture damage to the connector. This type of damage will bend pins on the backplane and thus propagate damage.



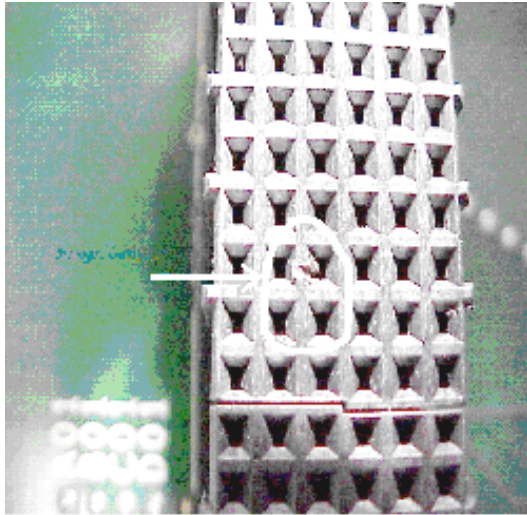
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# Examples of Damage in the Middle of a Connector

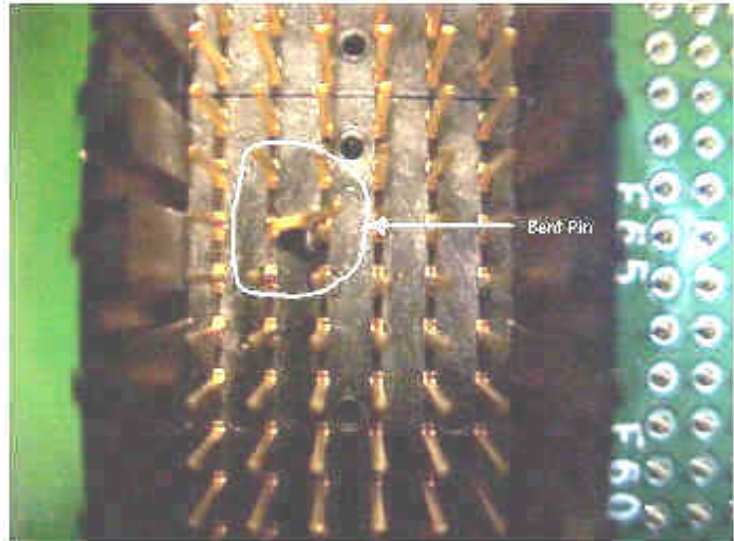
Figure 1 and Figure 2 show damage that will be propagated. Figure 3 shows the crushed pin that caused the imprint on the CRU/FRU connector shown in Figure 4. This imprint is not likely to damage other backplane connectors, because the mating pin's path is not affected. This backplane and CRU/FRU should still be replaced. (For an enlargement of the crushed pin shown in Figure 3, see Figure 4 in [Examples of Damaged Pins on Backplanes](#).)

Damage that will be propagated.

**Figure 1**



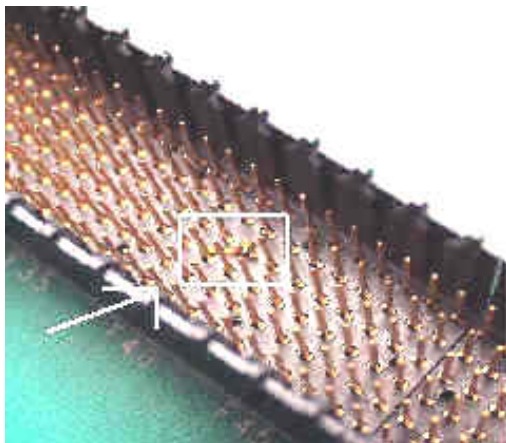
**Figure 2**



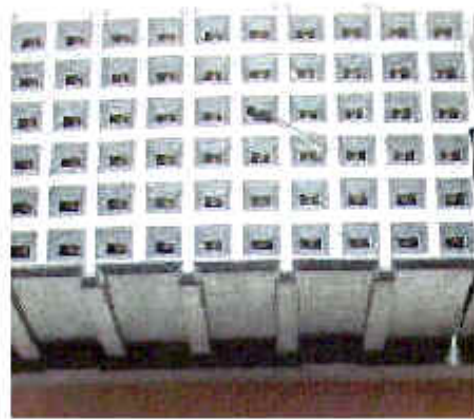
Crushed pin that caused imprint in Figure 4.

Imprint that might not propagate damage.

**Figure 3**



**Figure 4**



# Symptoms of a Damaged Pin

Depending on which pin is damaged, the symptoms can include a down link to a ServerNet/DA, a down disk-drive path (disk enable signal), or a down processor. If a system is stable, a CRU/FRU should not be removed to inspect the connectors unless either the CRU/FRU is being replaced, symptoms have been encountered, or there is reason to believe connector damage might have been propagated.