

# Installing FRE-4-PPC Processor Modules in BN Platforms

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# Preface

The Bay Networks® FRE®-4-PPC processor module is a high-performance fast routing engine that includes a memory daughterboard and supports the following FRE-4-PPC link modules:

- 1000BASE-SX Ethernet
- 1000BASE-LX Ethernet
- 10/100BASE-TX Ethernet
- 100BASE-FX Ethernet

## Before You Begin

This guide is intended for qualified service personnel who need to install or replace a FRE-4-PPC processor module in these Backbone Node (BN®) platforms:

- Backbone Link Node (BLN®)
- Backbone Link Node-2 (BLN-2)
- Backbone Concentrator Node (BCN®)

A qualified service person should have appropriate technical training and experience and be aware of the hazards involved in installing and replacing processor modules.

## Text Conventions

This guide uses the following text conventions:

<b>bold text</b>	Indicates command names and options and text that you need to enter.
	Example: Enter the <b>diags</b> command.
<i>italic text</i>	Indicates new terms and book titles.

## Acronyms

This guide uses the following acronyms:

DMA	direct memory access
EMC	electromagnetic compatibility
GAME	Gate Access Management Entity
HDCM	Harpoon Diagnostic Console Monitor
ILI	Intelligent Link Interface
LED	light-emitting diode
SRM-F	System Resource Module-Front

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# Chapter 1

## Installing the Processor Module

This chapter describes how to install the FRE-4-PPC processor module.



**Note:** Use the FRE-4-PPC processor module with the following Ethernet link modules only: 1000BASE-SX, 1000BASE-LX, 10/100BASE-TX, and 100BASE-FX.

You can install and remove processor modules with the power on or off.



**Danger:** Although you can install and remove processor modules with the power on, a potential energy hazard exists during hot-swap service of processor modules. Do *not* remove more than two adjacent modules without turning the BN platform off.

Complete these tasks to install the processor module:

1. **Remove the front bezel.**
2. **Remove the EMC shield.**
3. **Choose a slot.**
4. **Remove the board retainer bracket (BLN and BLN-2 only).**
5. **Remove the airflow module or the processor module.**
6. **Insert the processor module.**

Depending on your BN platform, you need a Phillips or flat-tip screwdriver to complete the installation.



**Note:** The jumpers on the processor module are not user-configurable. Changing any jumper settings on this module can disrupt module functioning.

## Removing the Front Bezel

You must remove the front bezel (front cover) of BLN, BLN-2, and BCN platforms to access their interiors.



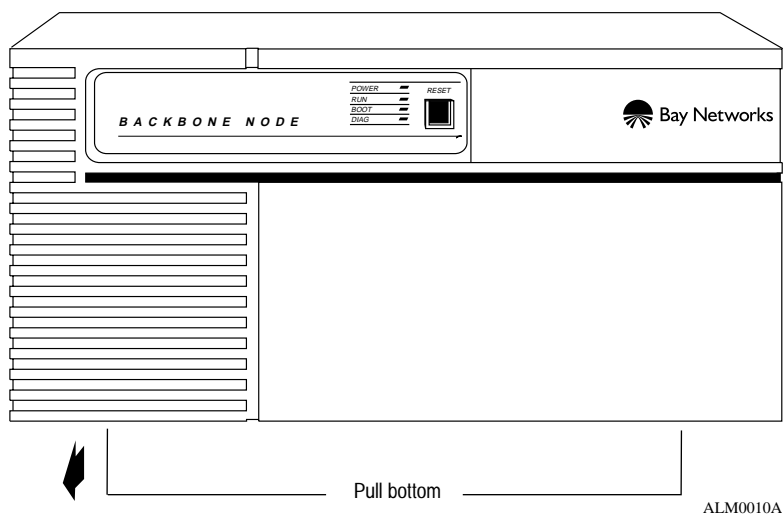
**Note:** Keep the front bezel on during normal operation to comply with airflow requirements.

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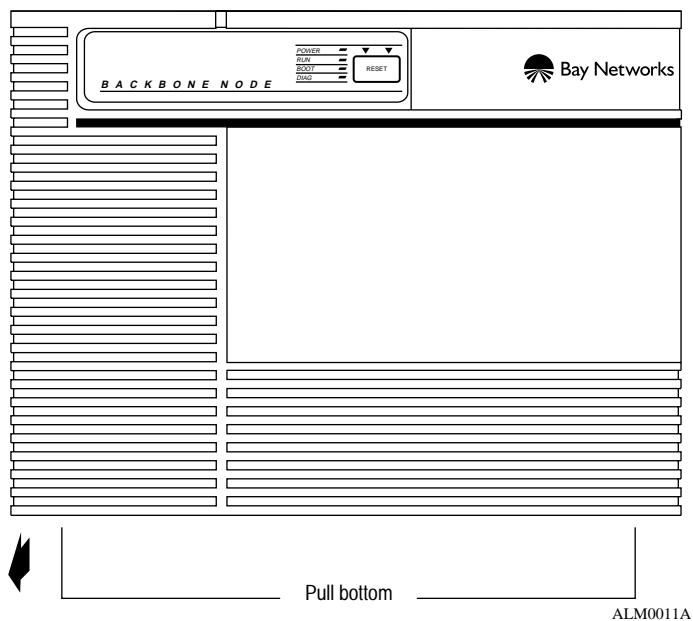
To remove the front bezel from the BLN and BLN-2:

1. **Using both hands, pull the bottom of the front bezel forward.**
2. **Remove the bezel from the chassis.**

Figure 1-1 shows how to remove the bezel from the BLN. Figure 1-2 shows how to remove the bezel from the BLN-2.



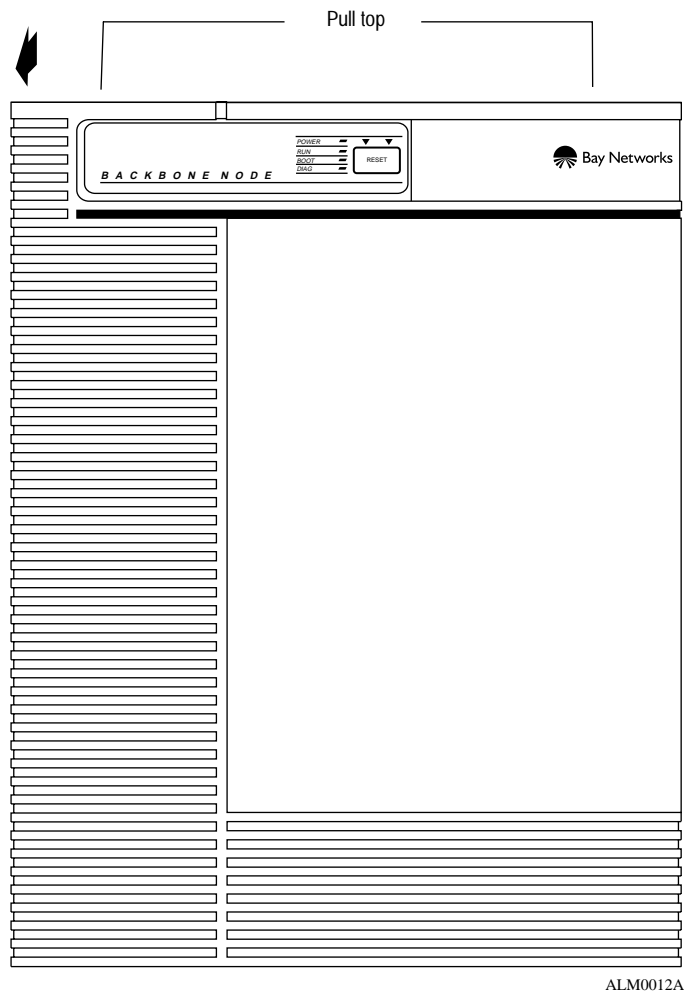
**Figure 1-1. Removing the BLN Front Bezel**



**Figure 1-2. Removing the BLN-2 Front Bezel**

To remove the front bezel from the BCN:

1. Using both hands, pull the top of the front bezel forward ([Figure 1-3](#)).
2. Remove the bezel from the chassis.



**Figure 1-3. Removing the BCN Front Bezel**

## Removing the EMC Shield

You must remove the EMC shield to access the slots for processor modules in BN platforms.



**Caution:** Do not operate a BN platform with the EMC shield removed for more than 5 minutes. Without the EMC shield, the BN platform may overheat. In addition, the BCN contains temperature sensors that may not detect an overheating condition without the shield in place.

To remove the EMC shield:

- 1. Attach an antistatic wrist strap.**

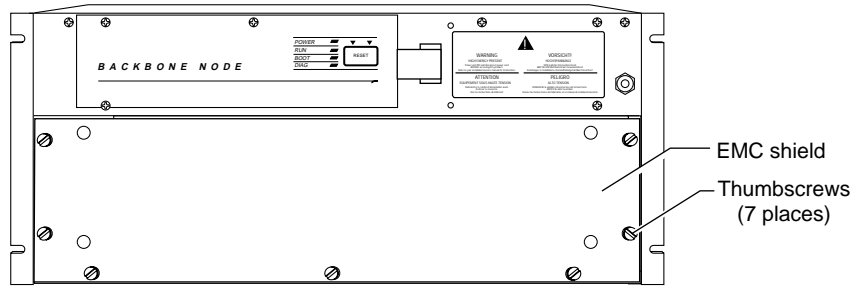
BN platforms and link and processor modules ship with an antistatic wrist strap. You must wear one of these straps whenever you access components in the platform.

The antistatic wrist strap directs the discharge of static electricity from your body to the chassis, thereby avoiding discharge and possible damage to sensitive electronic components.

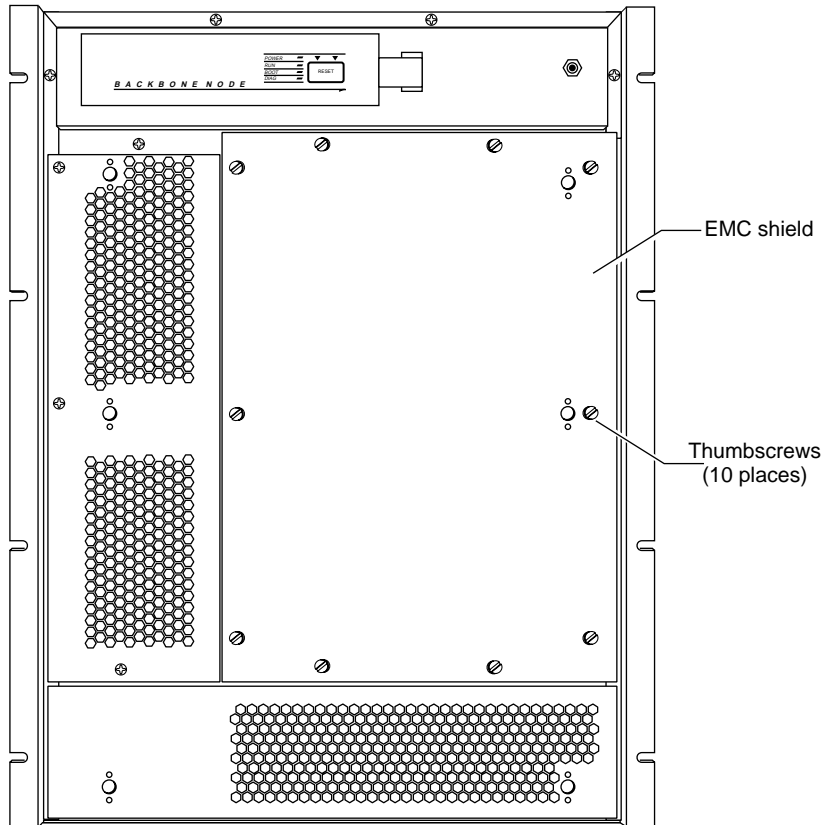


**Caution:** Electrostatic discharge can damage hardware. Always use the antistatic wrist strap when handling any component in your BN platform.

- 2. Loosen the captive thumbscrews that fasten the EMC shield to the chassis ([Figure 1-4](#)).**
- 3. Remove the EMC shield from the chassis.**



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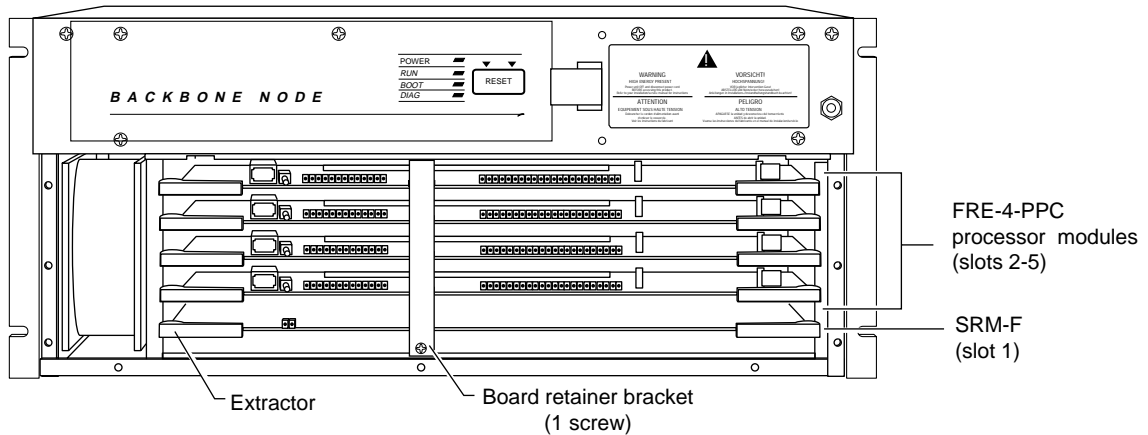
ALM0013A

**Figure 1-4. BLN and BCN EMC Shields**

## Choosing a Slot

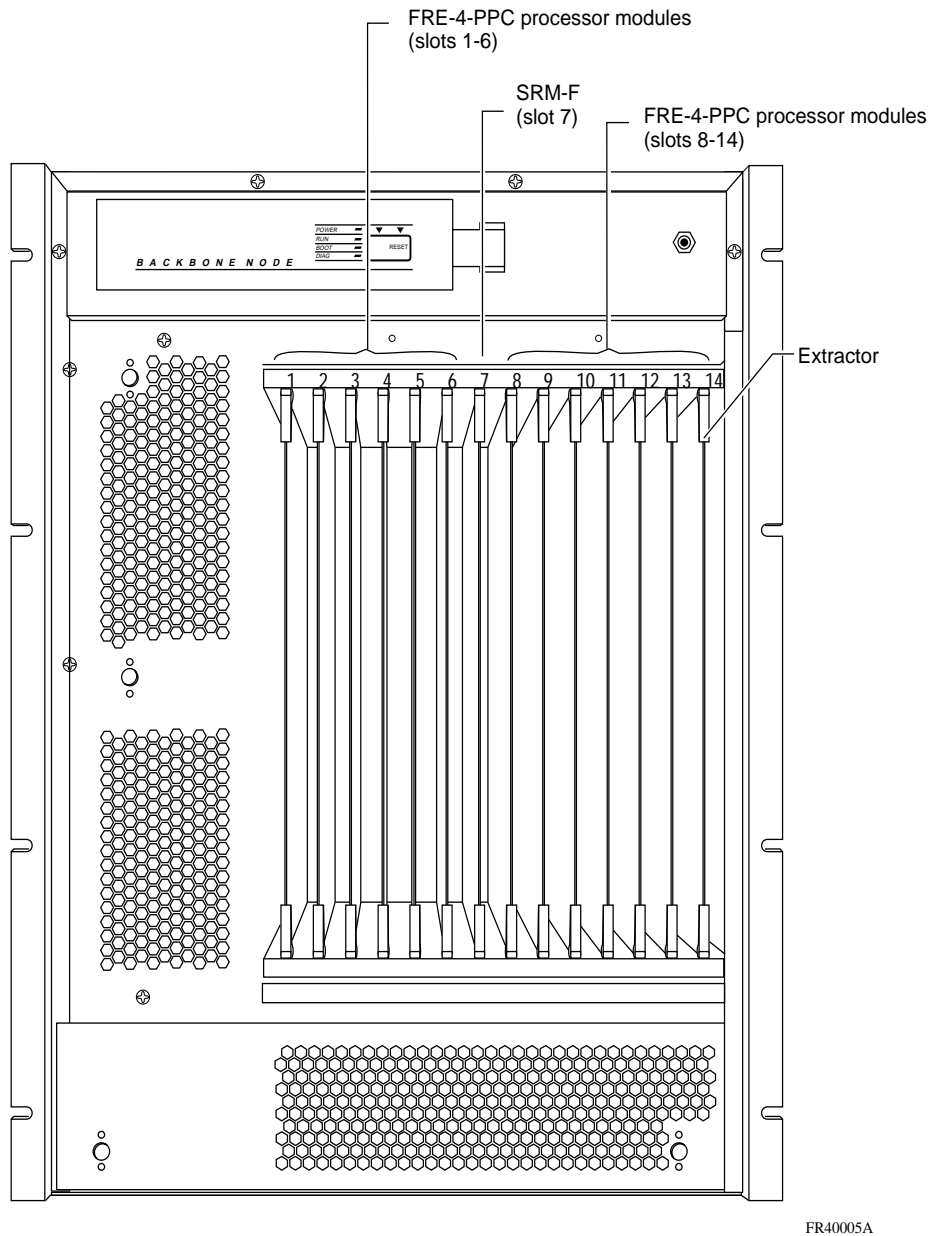
You can install a FRE-4-PPC processor module in the following slots:

- Slots 2 through 5 in the BLN and BLN-2 platforms ([Figure 1-5](#))
- Slots 1 through 6 and slots 8 through 14 in the BCN platform ([Figure 1-6](#))



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**Figure 1-5. Location of Processor Modules and the SRM-F in a BLN or BLN-2**



**Figure 1-6. Location of Processor Modules and the SRM-F in a BCN**

## Removing the Board Retainer Bracket (BLN and BLN-2 Only)

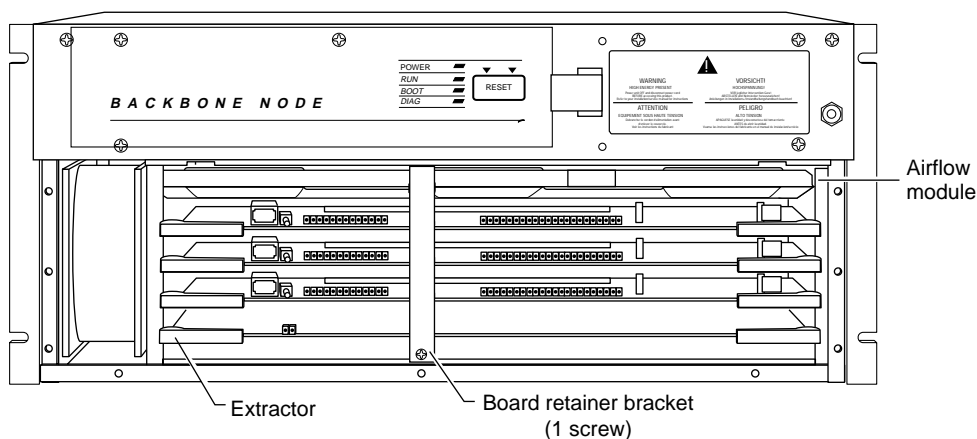
If you have a BLN or BLN-2 platform, remove the board retainer bracket shown in [Figure 1-5](#) on page [page 1-7](#):

1. Use a screwdriver to remove the screw connecting the board retainer bracket to the chassis.
2. Gently pull the bottom of the board retainer bracket to remove it.

## Removing an Airflow Module

Bay Networks ships an airflow module in each empty processor module slot in all BN platforms. Each airflow module directs cool air to the adjacent processor module.

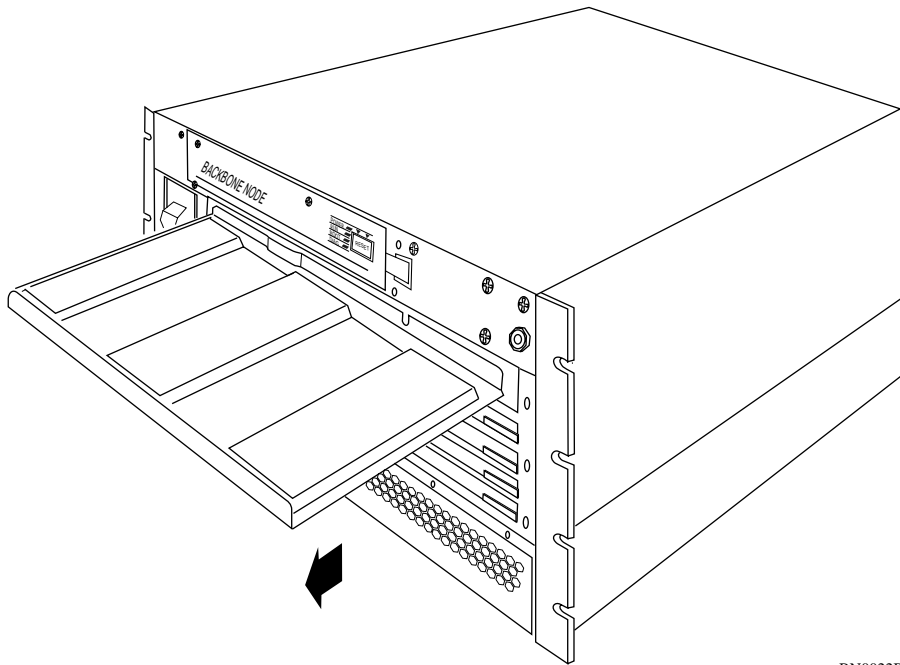
Figure 1-7 shows the location of an airflow module in slot 5 of a BLN platform. If the slot in which you want to install the processor module contains an airflow module, you must first remove it from that slot. If the slot that you want to use already contains a processor module, see “Removing a Processor Module” on page [page 1-10](#).



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**Figure 1-7. Airflow Module in a BN Platform**

Pull the front of the airflow module forward to remove it (Figure 1-8).



BN0022B

**Figure 1-8. Removing an Airflow Module**

## Removing a Processor Module

When you remove a processor module, connections to that slot and the services that slot provides are disrupted. The other processor modules resynchronize their routing tables after the slot fails to receive packets.

To remove a processor module:

**1. Attach an antistatic wrist strap.**

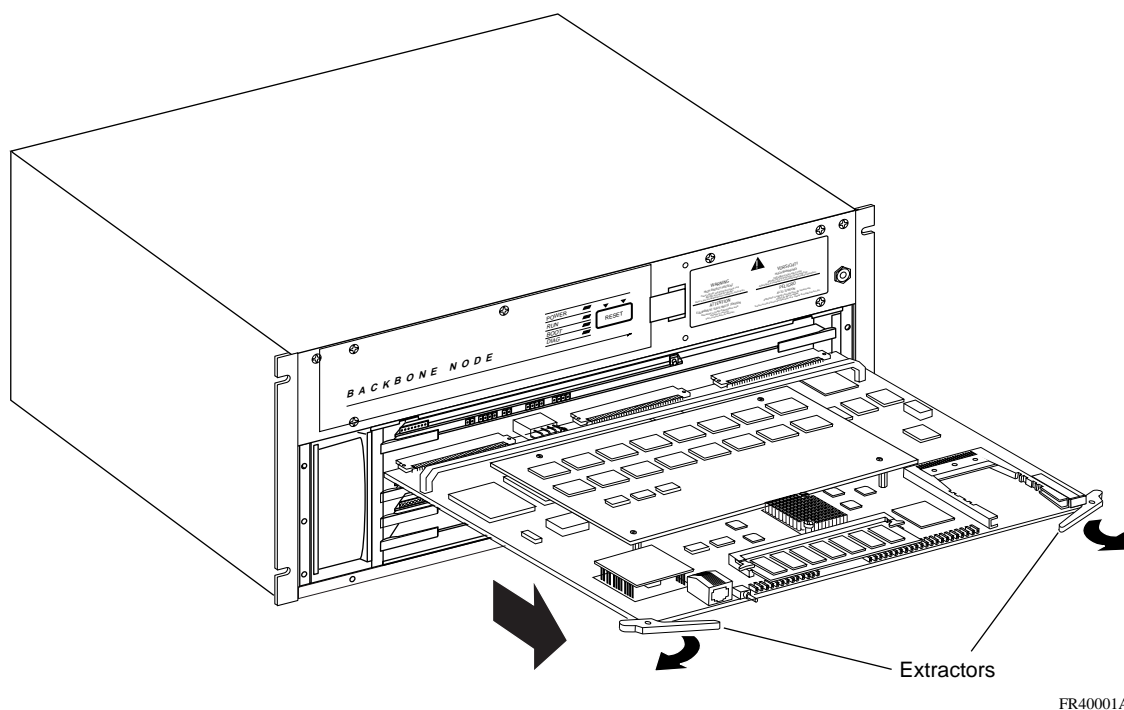
BN platforms and processor modules ship with an antistatic wrist strap. You must wear one of these straps whenever you access components in the platform.

The antistatic wrist strap directs the discharge of static electricity from your body to the chassis, thereby avoiding discharge and possible damage to sensitive electronic components.

**2. Gently pull the inside of the board extractors at each end of the module toward you ([Figure 1-9](#)).**

The extractors swing open, pulling the module out of the backplane connectors.

**3. Place the module in an antistatic protective bag.**



**Figure 1-9. Using the Extractors to Remove a Processor Module**

## Inserting a Processor Module

To insert a processor module:

1. **Locate the antistatic wrist strap shipped with the BN platform.**
2. **Verify that the cable is attached to the wrist strap.**
3. **Place the strap around your wrist.**
4. **Adjust the strap to ensure that the metal buckle inside the strap touches your skin.**
5. **Attach the alligator clip to the BN faceplate.**
6. **Holding the board extractors open, slide the module into the card guides of the slot.**

When inserting a module into a BLN or BLN-2, lift the middle of the board slightly and push it gently to ensure that the connector in the middle of the board engages.

7. **Push the extractors in to lock the board in place.**



**Note:** If the extractors do not lock into place easily, remove the module and repeat steps [6](#) and [7](#).

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When you insert the processor module into a slot, and the module determines that slot power is stable, the module automatically does the following:

- Executes the startup diagnostics
  - Completes the boot process
8. **Observe the module and front-panel LEDs to determine whether the FRE-4-PPC module is functioning properly.**

Following is a brief description of the LED activation sequence after you insert a new FRE-4-PPC module. For a complete description of LEDs, see Chapter 2, “FRE-4-PPC Module Switch and LEDs.”

- When you insert a FRE-4-PPC processor module, the DIAG LED turns on during diagnostics and then turns off if diagnostics determine that the module is functional. If the DIAG LED does not turn off, contact the Bay Networks Technical Solutions Center.

- If diagnostics determine that the FRE-4-PPC module is not functional, the DIAG LED on the front panel and LED 21 on the FRE-4-PPC module remain on. If this occurs, make sure that the module seats properly in the BN platform and issue the **diags** command.
- If diagnostics determine that the FRE-4-PPC module is functional and that a link module connects to it, the BN platform also performs diagnostics on the link module.

Regardless of the results of the link module diagnostics, the BOOT LED turns on, indicating that the FRE-4-PPC is booting. If the link module or any of its ports do not function, the link module Fail LED turns on.

9. **If you installed the processor module in a BLN or BLN-2, replace the board retainer bracket as follows:**
  - a. Slide the top of the board retainer bracket into its designated ridge and align the bottom of the bracket with the screw hole at the bottom of the chassis (Figure 1-5 on page [page 1-7](#)).
  - b. Use a screwdriver to secure the bracket to the chassis.
10. **Replace the EMC shield as follows:**
  - a. Position the EMC shield in front of the chassis.
  - b. Tighten the captive thumbscrews that fasten the EMC shield to the chassis.

Refer to [Figure 1-4](#) on page [page 1-6](#).

11. **Remove the antistatic wrist strap.**
12. **Replace the front bezel as follows:**
  - a. Align the mounting retainers on the inside of the bezel with the holes on the front of the EMC shield.
  - b. Push the sides of the bezel into place.

Refer to [Figure 1-1](#) (BLN) on page [page 1-2](#), [Figure 1-2](#) (BLN-2) on page [page 1-3](#), or [Figure 1-3](#) (BCN) on page [page 1-4](#).

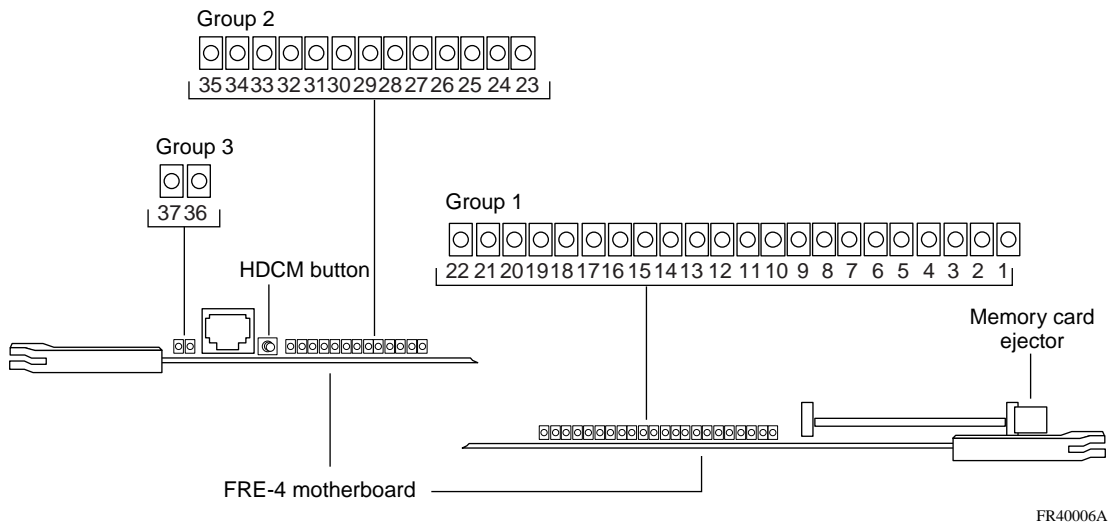


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## Chapter 2

# FRE-4-PPC Module Switch and LEDs

The front edge of each FRE-4-PPC processor module has several status LEDs, a Harpoon Diagnostic Console Monitor (HDCM) button, and a flash memory card ejector ([Figure 2-1](#)). Use the LEDs to verify that the module is operating after installation.



**Figure 2-1. FRE-4-PPC Module**

[Table 2-1](#) describes the LEDs on the FRE-4-PPC processor module.

**Table 2-1. FRE-4-PPC Processor Module LEDs**

LED	Meaning
<b>Group 1</b>	
1 through 4	Not used
5 (Green)	Address bus busy
6 (Green)	Address retry
7 (Green)	Data bus busy
8 (Green)	The Technician Interface is running on this slot.
9	Not used
10	Not used
11 through 18 (Green)	When diagnostics are running, LED 11 is on, and LEDs 12 through 18 indicate the current test in hexadecimal notation. When on, LEDs indicate 1s; when off, LEDs indicate 0s.  When the GAME operating system is executing, GAME uses these LEDs to count time.
19 (Green)	The FRE-4-PPC processor module is resetting.
20 (Amber)	The FRE-4-PPC processor module is booting.
21 (Red)	The FRE-4-PPC processor module failed.
22 (Green)	The FRE-4-PPC processor module is operating normally.
<b>Group 2</b>	
23 (Green)	Link module reset
24 (Green)	I2C memory controller reset
25 (Green)	The Parallel Packet Express (PPX®) is held in reset due to a hardware or software error. This LED also flashes briefly when the FRE-4-PPC is reinitialized or reset.
26 (Green)	DMA reset
27 (Green)	The PPX direct memory access (DMA) logic is accessing the buffer memory.
28 (Green)	The FRE-4-PPC processor module is flow-controlling on PPX D.
29 (Green)	The FRE-4-PPC processor module is flow-controlling on PPX C.
30 (Green)	The FRE-4-PPC processor module is flow-controlling on PPX B.

*(continued)*

**Table 2-1. FRE-4-PPC Processor Module LEDs** *(continued)*

LED	Meaning
31 (Green)	The FRE-4-PPC processor module is flow-controlling on PPX A.
32 (Green)	The FRE-4-PPC processor module is transmitting on PPX D.
33 (Green)	The FRE-4-PPC processor module is transmitting on PPX C.
34 (Green)	The FRE-4-PPC processor module is transmitting on PPX B.
35 (Green)	The FRE-4-PPC processor module is transmitting on PPX A.
<b>Group 3</b>	
36 (Green)	The FRE-4-PPC processor module is receiving power (2.6 V).
37 (Green)	The FRE-4-PPC processor module is receiving power (3.3 V).

The HDCM button has three functions:

- Establishes an HDCM session (when pressed for less than 1 second and released). The HDCM session is for Bay Networks Customer Service personnel only.
- Warm-starts the FRE-4-PPC module (during an HDCM session when pressed for less than 1 second and released).
- Cold-starts the FRE-4-PPC module (when pressed for more than 1 second and released, regardless of whether an HDCM session is running).



**Note:** Use the Technician Interface or Site Manager to reset the FRE-4-PPC module. Do not use the HDCM button unless Bay Networks Customer Service personnel instruct you to do so.

