

## Chapter 32

# Monitoring the CFEBs

You monitor the Compact Forwarding Engine Board (CFEB), which provides route lookup, filtering, and switching on incoming data packets, then directs outbound packets to the appropriate interface for transmission to the network. (See Table 96.)

The M7i router CFEB can process 8 million packets per second (Mpps); the M10i router CFEB can process 16 Mpps.

The CFEB communicates with the Routing Engine using a dedicated 100-Mbps Fast Ethernet link that transfers routing table data from the Routing Engine to the forwarding table in the integrated ASIC. The link is also used to transfer from the CFEB to the Routing Engine routing link-state updates and other packets destined for the router that have been received through the router interfaces.

**Table 96: Checklist for Monitoring the CFEB**

Monitor CFEB Tasks	Command or Action
<b>Understanding the CFEB on page 419</b>	
M7i Router CFEB on page 419	
M7i Router CFEB with ASP-I on page 420	
M10i Router CFEB Component on page 421	
M7i and M10i Router CFEB Location on page 421	
<b>Monitoring the CFEB Status on page 421</b>	
1. Display the CFEB Environmental Status on page 422	show chassis environment
2. Display the CFEB Detailed Status on page 422	show chassis cfeb
3. Check CFEB LEDs on page 423	Look at the LEDs on the CFEB faceplate located on the rear of the router above the power supplies.
<b>Checking for CFEB Alarms on page 423</b>	
1. Display CFEB Alarms on page 423	show chassis alarms (M7i router) Look at the alarm LEDs on the right side of the Fixed Interface Card (FIC). (M10i router) Look at the alarm LEDs on the right side of the High-Availability Chassis Manager (HCM). For a listing of the conditions that trigger CFEB alarms, see “M7i or M10i Router Chassis Component Alarm Conditions” on page 63.
2. Check the CFEB LEDs on page 424	Look at the three LEDs located on the component faceplate. The CFEB is located on the rear of the router above the power supplies.

<b>Monitor CFEB Tasks</b>	<b>Command or Action</b>
3. Display CFEB Error Messages in the System Log File on page 424	show log messages   match cfeb
4. Display CFEB Error Messages in the Chassis Daemon Log File on page 425	show log chassisd   match cfeb
<b>Verifying CFEB Failure on page 426</b>	
1. Check the CFEB Uptime on page 426	show chassis cfeb
2. Check the System Uptime on page 427	show system uptime
3. Check the CFEB Connection on page 427	Check that the thumbscrews on each CFEB ejector lever are securely tightened.
4. Perform a Swap Test on the CFEB on page 427	<p>Before performing a swap test, always check for bent pins in the midplane and check the CFEB for stuck pins in the connector.</p> <p>Power down the CFEB before removing it by pressing and holding down the offline button on the faceplate until the amber LED labeled FAIL lights, or by using the request chassis cfeb offline CLI command.</p> <p>Power up the CFEB after installing it by pressing and holding down the offline button on the CFEB faceplate until the green LED labeled Output OK lights steadily, or by using the request chassis cfeb online CLI command.</p> <p>Follow the procedure in the appropriate router hardware guide for replacing and installing a CFEB.</p>
<b>Getting CFEB Hardware Information on page 429</b>	
1. Display the CFEB Hardware Information on page 429	show chassis hardware
2. Display the CFEB Firmware Information on page 430	show chassis firmware
3. Locate the CFEB Serial Number ID Label on page 430	Look on the right side of the CFEB top panel.
<b>Returning the CFEB on page 430</b>	See “Return the Failed Component” on page 86 or follow the procedure in the appropriate router hardware guide.

## Understanding the CFEB

**Purpose** Monitor the CFEB so that it can provide route lookup, filtering, and switching on incoming data packets and direct outbound packets to the appropriate interface for transmission to the network.

**What Is an CFEB** The CFEB processes 16 Mpps. The CFEB performs the following functions:

Route lookups—Performs route lookups using the forwarding table stored in synchronous SRAM (SSRAM).

Management of shared memory —Uniformly allocates incoming data packets throughout the router’s shared memory.

Transfer of outgoing data packets—Passes data packets to the destination FIC or Physical Interface Card (PIC) when the data is ready to be transmitted.

Transfer of exception and control packets—Passes exception packets to the microprocessor on the CFEB, which processes almost all of them. The remainder are sent to the Routing Engine for further processing. Any errors originating in the Packet Forwarding Engine and detected by the CFEB are sent to the Routing Engine using system log messages.

(M7i router only) Built-in tunnel interface—Encapsulates arbitrary packets inside a transport protocol, providing a private, secure path through an otherwise public network.

The built-in tunnel interface on the CFEB is configured the same way as a PIC. For information about configuring the built-in tunnel interface, see the *JUNOS Services Interfaces Configuration Guide*.

(M7i router only) Optional Adaptive Services PIC–Integrated (ASP–I)—Provides one or more services on one PIC. See “Adaptive Services PIC–Integrated (ASP–I)” on page 11 for more information.

Figure 168 shows the M7i router CFEB component.

**Figure 168: M7i Router CFEB**

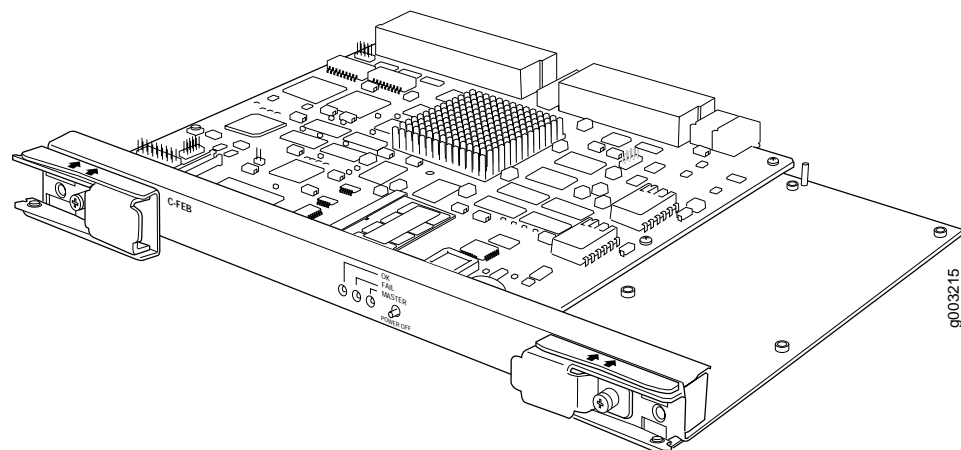
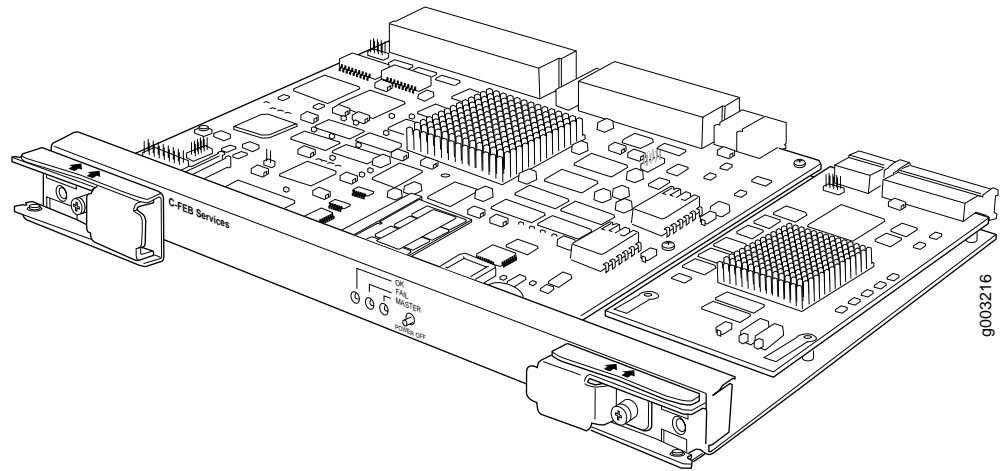


Figure 169 shows the M7i router CFEB with ASP-I.

**Figure 169: M7i Router CFEB with ASP-I**



The ASP-I is an optional component of the CFEB. The ASP-I is similar to the standalone Adaptive Services PIC, but operates at a reduced bandwidth. The ASP-I enables you to perform one or more services on the same PIC by configuring a set of services and applications.

The ASP-I provides the following services:

Stateful firewall—A type of firewall filter that considers state information derived from previous communications and other applications when evaluating traffic.

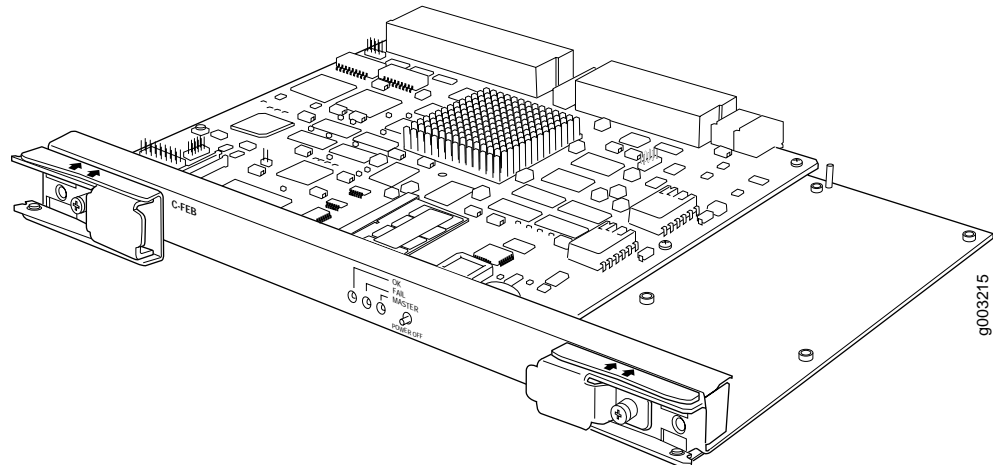
Network Address Translation (NAT)—A security procedure for concealing host addresses on a private network behind a pool of public addresses.

Intrusion detection services (IDS)—A set of tools for detecting, redirecting, and preventing certain kinds of network attack and intrusion.

The configuration for these three services comprises a series of rules that you can arrange in order of precedence as a rule set. Each rule follows the structure of a firewall filter, with a from statement containing input or match conditions and a then statement containing actions to be taken if the match conditions are met. For information about configuring interfaces on the ASP-I, see the *JUNOS Services Interfaces Configuration Guide*.

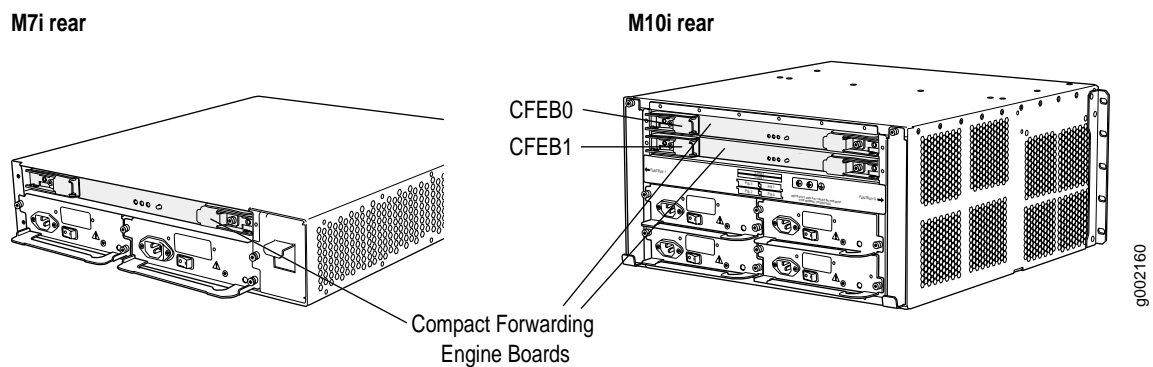
Figure 170 shows the M10i router CFEB component.

**Figure 170: M10i Router CFEB Component**



You can install one CFEB in the M7i router from the rear of the router above the power supplies. You can install one or two CFEBs from the rear of the M10i router chassis above the fan tray (see Figure 171).

**Figure 171: M7i and M10i Router CFEB Location**



## Monitoring the CFEB Status

**Steps To Take** To monitor the CFEB status, follow these steps:

1. Display the CFEB Environmental Status on page 422
2. Display the CFEB Detailed Status on page 422
3. Check CFEB LEDs on page 423

### Step 1: Display the CFEB Environmental Status

**Action** To display the CFEB environmental status, use the following command-line interface (CLI) command:

```
user@host> show chassis environment
```

**Sample Output**

```
user@m5-host> show chassis environment
Class Item           Status  Measurement
Power Power Supply 0  OK
  Power Supply 1     Absent
Temp Intake          OK     22 degrees C / 71 degrees F
  FPC 0              OK     23 degrees C / 73 degrees F
  Power Supplies     OK     23 degrees C / 73 degrees F
  CFEB Intake        OK     24 degrees C / 75 degrees F
  CFEB Exhaust       OK     30 degrees C / 86 degrees F
[...Output truncated...]
```

**What It Means** The command output displays the temperature and status of the CFEB intake and exhaust, which can be OK, Failed, or Absent.

### Step 2: Display the CFEB Detailed Status

**Action** To display more detailed CFEB status, use the following CLI command:

```
user@host> show chassis cfeb
```

**Sample Output**

```
user@host> show chassis cfeb
CFEB status:
Slot 0 information:
State                Master
Intake temperature   29 degrees C / 84 degrees F
Exhaust temperature  38 degrees C / 100 degrees F
CPU utilization      3 percent
Interrupt utilization 0 percent
Heap utilization     10 percent
Buffer utilization   22 percent
Total CPU DRAM      128 MB
Internet Processor II Version 1, Foundry IBM, Part number 164
Start time:          2004-09-28 03:07:54 PDT
Uptime:              9 days, 18 hours, 36 minutes, 15 seconds
Slot 1 information:
State                Backup
```

**What It Means** The command output displays the temperature of the air passing by the CFEB intake and exhaust, in degrees Centigrade. It displays the total percentage of CPU, interrupt, heap space, and buffer space being used by the CFEB processor, including the total DRAM available to the CFEB processor. The command output displays the time when the CFEB started running and how long the CFEB has been running. A short uptime can indicate that there is a CFEB problem.

### Step 3: Check CFEB LEDs

Three LEDs—a green LED labeled OK, a red LED labeled FAIL, and a blue LED labeled MASTER—indicate CFEB status.

**Action** Look at the LEDs on the CFEB faceplate. The CFEB is located on the rear of the router above the power supplies (see Figure 171 on page 421). Table 97 describes the CFEB LED states.

**Table 97: CFEB LEDs**

Label	Color	State	Description
OK	Green	On steadily	CFEB is running normally.
		Blinking	CFEB is starting up.
FAIL	Red	On steadily	CFEB is not operational or is in reset mode.
MASTER	Blue	On steadily	CFEB is functioning as master.

### Checking for CFEB Alarms

For a listing of the conditions that trigger CFEB alarms, see “M7i or M10i Router Chassis Component Alarm Conditions” on page 63.

**Steps To Take** To check for CFEB alarms, follow these steps:

1. Display CFEB Alarms on page 423
2. Check the CFEB LEDs on page 424
3. Display CFEB Error Messages in the System Log File on page 424
4. Display CFEB Error Messages in the Chassis Daemon Log File on page 425

### Step 1: Display CFEB Alarms

For conditions that trigger CFEB alarms, see “Display the Current Router Alarms” on page 61.

**Action** To display CFEB alarms, use the following CLI command:

```
user @host> show chassis alarms
```

**Sample Output**

```
user@host> show chassis alarms
1 alarms currently active
Alarm time      Class  Description
2004-10-08 00:29:02 PDT  Major  CFEB not online, the box is not forwarding
```

**What It Means** The command output displays the alarm date, time, severity level, and description.

**Alternative Action** The CFEB generates a red alarm. Table 98 displays the CFEB alarms, severity, and remedies.

**Table 98: CFEB Alarms, Remedies, and Severity**

Chassis Component	Alarm Condition	Remedy	Alarm Severity
CFEB	The router has an optional internal flash drive and boots from an alternate boot device. If you configure your router to boot from the hard disk, ignore this alarm condition.	Replace the failed or missing CFEB.	Red
	Both CFEBs have been removed or have failed.	Replace the failed or missing CFEB.	Red
	Too many hard errors in CFEB memory.	Replace the failed CFEB.	Red
	A CFEB microcode download has failed.	Replace the failed CFEB.	Red

(M7i router) Look at the alarm LEDs on the right side of the FIC.

(M10i router) Look at the alarm LEDs on the right side of the HCM.

**Step 2: Check the CFEB LEDs**

**Action** To check the CFEB LEDs, see Figure 99.

**Table 99: CFEB LEDs**

Label	Color	State	Description
OK	Green	On steadily	CFEB is running normally.
		Blinking	CFEB is starting up.
FAIL	Red	On steadily	CFEB is not operational or is in reset mode.
MASTER	Blue	On steadily	CFEB is functioning as master.

**Step 3: Display CFEB Error Messages in the System Log File**

Check for messages at least 5 minutes before and after a CFEB alarm occurs.

**Action** To check for CFEB error messages in the system log messages file, use the following CLI command:

```
user@host> show log messages | match cfeb
```

**Sample Output**

```
user@host> show log messages | match cfeb
Sep 14 11:00:01 clinton cfeb CM: ALARM SET: (Major) Slot 0: CFEB not online,
the box is not forwarding
Sep 14 11:00:11 clinton craftd[4896]: Major alarm cleared, CFEB not online, the box is not forwarding
Sep 14 11:00:11 clinton alarmd[4893]: Alarm cleared: CFEB color=RED, class=
CHASSIS, reason=CFEB not online, the box is not forwarding
Sep 14 11:00:12 clinton cfeb CM: ALARM CLEAR: Slot 0: CFEB not online, the box
is not forwarding
Oct 8 00:29:02 clinton craftd[4896]: Major alarm set, CFEB not online, the
box is not forwarding
```

```
Oct 8 00:29:02 clinton chassisd[4891]: CHASSISD_SHUTDOWN_NOTICE: Shutdown reason: CFEB connection lost
Oct 8 00:29:02 clinton alarmd[4893]: Alarm set: CFEB color=RED, class=CHASSIS, reason=CFEB not online, the
box is not forwarding
```

**What It Means** The messages system log file records the time the failure or event occurred, the severity level, a code, and a message description. You can also use the `show log messages | match cfeb` command to see error messages that are generated when a Control Board fails or is offline. Use this information to diagnose a Control Board problem and to let the Juniper Networks Technical Assistance Center (JTAC) know what error messages were generated and the router events that occurred before and after the problem. For more information about system log messages, see the *JUNOS System Log Messages Reference*.

#### Step 4: Display CFEB Error Messages in the Chassis Daemon Log File

**Action** To display CFEB error messages in the chassisd log file, use the following CLI command:

```
user@host> show log chassisd | match cfeb
```

**Sample Output**

```
user@host> show log chassisd | match cfeb
Apr 28 03:25:13 Resetting CFEB 0
Apr 28 03:25:26 send: red alarm set, device CFEB 0, reason CFEB Not Online
Apr 28 03:25:26 Resetting CFEB 0
Apr 28 03:25:27 CFEB 0 added
Apr 28 03:25:27 CHASSISD_SNMP_TRAP7: SNMP trap generated: FRU insertion (jnxFruC
ontentsIndex 6, jnxFruL1Index 1, jnxFruL2Index 0, jnxFruL3Index 0, jnxFruName
CFEB, jnxFruType 4, jnxFruSlot 1)
Apr 28 03:25:46 Resetting CFEB 0
Apr 28 03:28:42 send: red alarm set, device CFEB 0, reason CFEB Not Online
Apr 28 03:28:42 Resetting CFEB 0
Apr 28 03:28:43 CFEB 0 added
Apr 28 03:28:43 CHASSISD_SNMP_TRAP7: SNMP trap generated: FRU insertion (jnxFruC
ontentsIndex 6, jnxFruL1Index 1, jnxFruL2Index 0, jnxFruL3Index 0, jnxFruName
CFEB, jnxFruType 4, jnxFruSlot 1)
Apr 28 03:29:17 rcv reply: CFEB Restart
Apr 28 03:29:17 CHASSISD_SNMP_TRAP9: SNMP trap generated: FRU power on (jnxFruCo
ntentsIndex 6, jnxFruL1Index 1, jnxFruL2Index 0, jnxFruL3Index 0, jnxFruName
CFEB, jnxFruType 4, jnxFruSlot 1, jnxFruOfflineReason 2, jnxFruLastPowerOff 5526, jnxFruLastPowerOn 5526)
Apr 28 03:29:17 sending 1 queued messages to CFEB 0
Apr 28 03:29:17 missing ctm for CFEB 0 -- timerid 0x0, timerset 0
Apr 28 03:29:17 send: CFEB config cmd
Apr 28 03:29:17 send: set_boolean_cmd CFEB 0 setting debugmode off
Apr 28 03:29:17 send: set_boolean_cmd CFEB 0 setting coredump on
Apr 28 03:29:17 send: set_boolean_cmd CFEB 0 setting source-route on
Apr 28 03:29:17 send: set_boolean_cmd CFEB 0 setting mtu-check off
Apr 28 03:29:17 send: set_boolean_cmd CFEB 0 setting soft-restart on
Apr 28 03:29:17 send: set_boolean_cmd CFEB 0 setting pfeman-reconnect off
Apr 28 03:29:17 send: set_boolean_cmd CFEB 0 setting l2cache on
Apr 28 03:29:17 send: set_boolean_cmd CFEB 0 setting no-load-balancing-clone off
Apr 28 03:29:17 send: set_boolean_cmd CFEB 0 setting equal-weighted-mode off
Apr 28 03:29:17 send: set_boolean_cmd CFEB 0 setting ipv4-key-hash-L3 on
Apr 28 03:29:17 send: set_boolean_cmd CFEB 0 setting mpls-key-hash-2label off
Apr 28 03:29:27 send: red alarm clear, device CFEB 0, reason CFEB Not Online
```

**What It Means** The chassisd database provides the date, time, and a component status message. The chassisd database is dynamic. It is initialized at router startup and is updated when components are added or removed. You can search for multiple items in the chassisd log file by using the `show log chassisd | match cfeb` command to see error messages that are generated when a Control Board fails or is offline. Use this information to diagnose a Control Board problem and to let JTAC know what error messages were generated and the router events that occurred before and after the problem. For more information about system log messages, see the *JUNOS System Log Messages Reference*.

## Verifying CFEB Failure

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**Steps To Take** To verify CFEB failure, follow these steps:

1. Check the CFEB Uptime on page 426
2. Check the System Uptime on page 427
3. Check the CFEB Connection on page 427
4. Perform a Swap Test on the CFEB on page 427

### Step 1: Check the CFEB Uptime

**Action** To check the CFEB uptime, use the following CLI command:

```
user@host> show chassis cfeb
```

**Sample Output**

```
user@host> show chassis cfeb
CFEB status:
Slot 0 information:
  State                Master
  Intake temperature   29 degrees C / 84 degrees F
  Exhaust temperature  38 degrees C / 100 degrees F
  CPU utilization       3 percent
  Interrupt utilization 0 percent
  Heap utilization     10 percent
  Buffer utilization    22 percent
  Total CPU DRAM       128 MB
  Internet Processor II Version 1, Foundry IBM, Part number 164
  Start time:          2004-09-28 03:07:54 PDT
  Uptime:               9 days, 18 hours, 41 minutes, 32 seconds
Slot 1 information:
  State                Backup
```

**What It Means** The command output displays how long the CFEB has been operating. A short uptime can indicate a CFEB failure. Look for error messages that were generated at least 5 minutes prior to the failure event by using the following CLI command:

```
user@host> show log messages | match cfeb
```

## Step 2: Check the System Uptime

**Action** To check the system uptime, use the following CLI command:

```
user@host> show system uptime
```

**Sample Output**

```
user@host> show system uptime
Current time: 2002-07-17 16:43:45 PDT
System booted: 2002-07-12 17:29:12 PDT (4d 23:14 ago)
Protocols started: 2002-07-12 17:29:56 PDT (4d 23:13 ago)
Last configured: 2002-07-10 23:10:27 PDT (6d 17:33 ago) by regress
4:43PM up 4 days, 23:15, 2 users, load averages: 0.07, 0.02, 0.00
```

**What It Means** The command output displays the time when the system was last booted, in days and hours. If the boot time is short, it can indicate a Routing Engine or a CFEB failure. Look for error messages that were generated at least 5 minutes prior to the failure event by using the following CLI command:

```
user@host> show log messages | match cfeb
```

## Step 3: Check the CFEB Connection

**Action** Make sure the CFEB is properly seated in the midplane. Check that the thumbscrews on each CFEB ejector lever are securely tightened. Use a Phillips screwdriver to ensure that the screws are securely tightened.

## Step 4: Perform a Swap Test on the CFEB



**CAUTION:** Before performing a swap test, always check for bent pins in the midplane and check the CFEB for stuck pins in the connector. Pins stuck in the component connector can damage other good slots during a swap test.

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You must power down the CFEB before removing it by pressing and holding down the offline button on the faceplate until the amber LED labeled FAIL lights, or by using the request chassis cfeb offline CLI command.

You must power up the CFEB upon installation by pressing and holding down the offline button on the CFEB faceplate until the green LED labeled Output OK lights steadily, or by using the request chassis cfeb online CLI command.

**Action** To perform a swap test on a CFEB, follow the procedure in the appropriate routing hardware guide for replacing and installing a CFEB.

## Step 5: Perform a Swap Test on the CFEB

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**CAUTION:** Before performing a swap test, always check for bent pins in the midplane and check the CFEB for stuck pins in the connector. Pins stuck in the component connector can damage other good slots during a swap test.

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To perform a swap test on an CFEB, follow the procedure in the *M10i Internet Router Hardware Guide* for replacing and installing a CFEB.

One or two CFEBs can install into the uppermost slots in the rear of the chassis. Only one CFEB is active at a time, with the optional second CFEB in reset mode. CFEBs are hot-pluggable. Removing the standby CFEB has no effect on router function.

If the active CFEB fails or is removed from the chassis, the effect depends on whether two CFEBs are installed:

If there is only one CFEB, forwarding halts until the CFEB is replaced and functioning again.

If there are two CFEBs, forwarding halts until the standby CFEB boots and becomes active.

In both cases, all components in the Packet Forwarding Engine reset, and it takes approximately one minute for the new CFEB to become active; synchronizing router configuration information can take additional time, depending on the complexity of the configuration.

**Action** To perform a swap test on a CFEB, follow these steps:

1. Place an electrostatic bag or antistatic mat on a flat, stable surface.
2. Attach an electrostatic discharge (ESD) grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.
3. If you are removing the active CFEB, press and hold the offline button on the faceplate until the amber LED labeled FAIL lights, which takes about 5 seconds. (The effect of removing the active CFEB depends on whether a second CFEB is installed.)
4. Loosen the thumbscrew on each ejector lever using a Phillips screwdriver if necessary.
5. Pull the end of each ejector lever outward until it is nearly perpendicular to the CFEB faceplate.
6. Grasp the ejector levers and pull firmly to slide the CFEB about halfway out of the chassis.

7. Place one hand under the CFEB to support it, slide it completely out of the chassis, and place it on the antistatic mat or in the electrostatic bag.



**CAUTION:** When a CFEB is out of the chassis, do not hold it by the ejector levers. They cannot support the weight of the CFEB.

Do not stack CFEBs on top of or under other components. Place each one individually in an electrostatic bag or on its own antistatic mat on a flat, stable surface.

8. Verify that the ends of the ejector levers are pulled outward to a position nearly perpendicular to the faceplate of the CFEB.
9. Place one hand under the CFEB to support it and grasp one of the ejector levers at the front with the other hand.
10. Align the rear of the CFEB with the guides inside the chassis and slide it in completely.
11. Press the ejector lever at each end of the CFEB inward.

## Getting CFEB Hardware Information

**Steps To Take** To display CFEB hardware information, follow these steps:

1. Display the CFEB Hardware Information on page 429
2. Display the CFEB Firmware Information on page 430
3. Locate the CFEB Serial Number ID Label on page 430

### Step 1: Display the CFEB Hardware Information

**Action** To display the CFEB hardware information, use the following CLI command:

```
user@host> show chassis hardware
```

**Sample Output**

```
user@host> show chassis hardware
Hardware inventory:
Item      Version Part number Serial number  Description
Chassis              30512      M7i
Midplane    REV 04  710-008761  CB9213      M7i Midplane
Power Supply 0  Rev 02  740-008985  QB12884     DC Power Supply
Routing Engine REV 09  740-009459  1000482742  RE-5.0
CFEB        REV 04  750-010112  CB8664      Internet Processor II
FPC 0              E-FPC
FPC 1              E-FPC
PIC 2             BUILTIN   BUILTIN     1x Tunnel
PIC 3            REV 04  750-009099  CB9103      1x G/E, 1000 BASE
```

**What It Means** The command output displays the CFEB version level, part number, serial number, and description.

### Step 2: Display the CFEB Firmware Information

**Action** To display the firmware running on the CFEB, use the following CLI command:

```
user@host> show chassis firmware
```

**Sample Output**

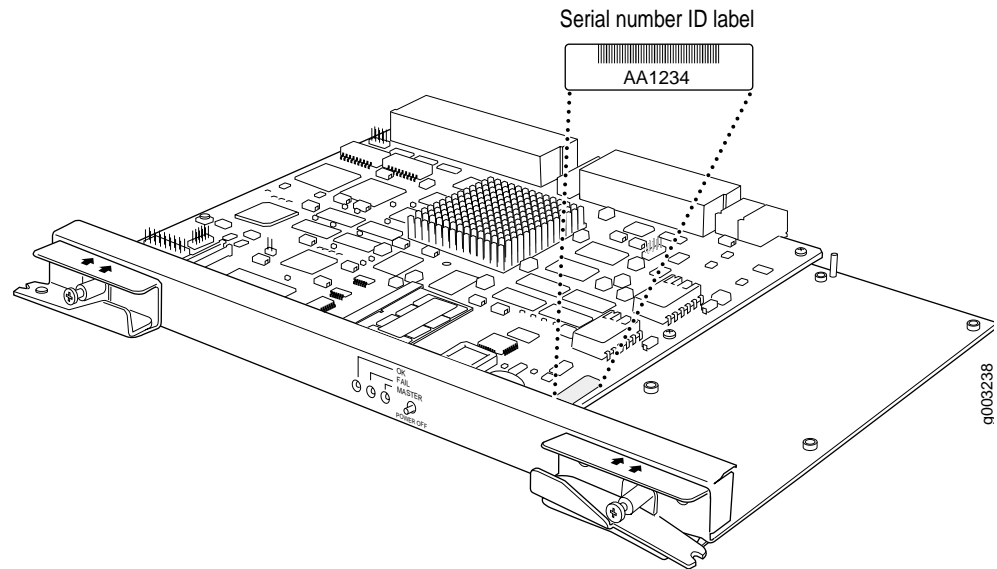
```
user@host> show chassis firmware
Part          Type   Version
[...Output truncated...]
CFEB          ROM    Juniper ROM Monitor Version 6.0b12
              O/S    Version 7.0I14 by bharani on 2004-09-14 17:
```

**What It Means** The command output displays the type and version level of the firmware running on the CFEB.

### Step 3: Locate the CFEB Serial Number ID Label

**Action** To locate the CFEB serial number ID label, look on the right side of the top panel (see Figure 172).

**Figure 172: CFEB Serial Number ID Label**



### Returning the CFEB

**Action** To return the CFEB, see “Return the Failed Component” on page 86 or follow the procedure in the appropriate router hardware guide.