

## Chapter 35

# Monitoring the FEB

You monitor the Forwarding Engine Board (FEB) on an M5 and M10 router to ensure that forwarding processes occur, such as route lookups, incoming data packet allocation, outgoing data packet transfer, and exception and control packet transfer. (See Table 105.)

**Table 105: Checklist for Monitoring the FEB**

Monitor FEB Tasks	Command or Action
<b>Understanding the FEB on page 454</b>	
<b>Monitoring the FEB Status on page 455</b>	
1. Display the FEB Environmental Status on page 455	show chassis environment
2. Display the FEB Detailed Status on page 456	show chassis feb
<b>Verifying FEB Failure on page 456</b>	
1. Check the FEB Uptime on page 457	show chassis feb
2. Check the System Uptime on page 457	show system uptime
3. Check the FEB Connection on page 457	Check that the screws at the top of the FEB are securely tightened.
4. Perform a Swap Test on the FEB on page 458	1. Power down the router. 2. Remove the FEB. 3. Replace the FEB with one that you know works.
<b>Getting FEB Hardware Information on page 459</b>	
1. Display the FEB Hardware Information on page 459	show chassis hardware
2. Display the FEB Firmware Information on page 459	show chassis firmware
3. Locate the FEB Serial Number ID Label on page 460	Look near the back on the right side of the FEB.
<b>Returning the FEB on page 460</b>	See “Return the Failed Component” on page 86, or follow the procedure in the <i>M5 and M10 Internet Router Hardware Guide</i> .

## Understanding the FEB

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**Purpose** Inspect the FEB to ensure that communication occurs with the Routing Engine.

**What Is an FEB** The FEB is a control board for the M5 and M10 routers (see Figure 180). The FEB communicates with the Routing Engine using a dedicated 100-Mbps link that transfers routing table data from the Routing Engine to the forwarding table in the Internet Processor II application-specific integrated circuit (ASIC). The link is also used to transfer routing link-state updates and other packets destined for the router from the FEB to the Routing Engine. The FEB provides the following functions:

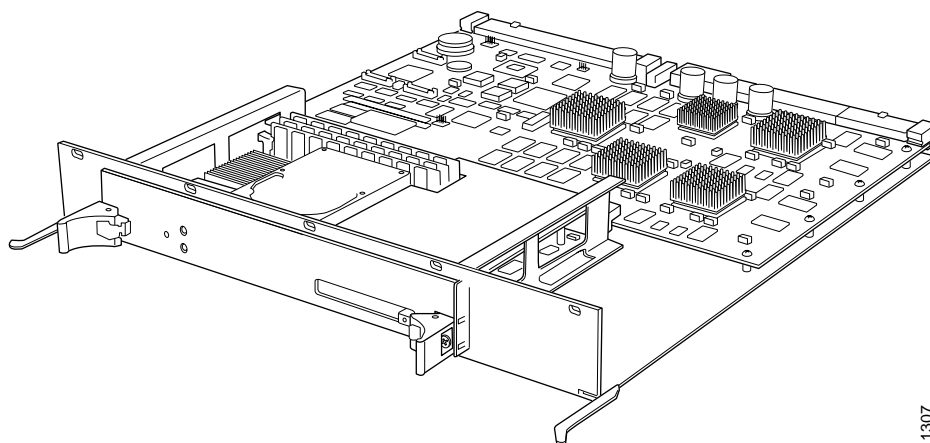
Route lookups—The Internet Processor II ASIC on the FEB performs route lookups using the forwarding table stored in synchronous SRAM (SSRAM).

Shared memory management—One Distributed Buffer Manager ASIC on the FEB uniformly allocates incoming data packets throughout the router's shared memory.

Outgoing data packet transfer—A second Distributed Buffer Manager ASIC on the FEB passes data packets to the destination Physical Interface Card (PIC) when the data is ready to be transmitted.

Exception and control packet transfer—The Internet Processor II ASIC passes exception packets to the microprocessor on the FEB, which processes almost all of them. The remaining packets are sent to the Routing Engine for further processing. Any errors originating in the Packet Forwarding Engine and detected by the FEB are sent to the Routing Engine using system log messages.

**Figure 180: FEB Component**

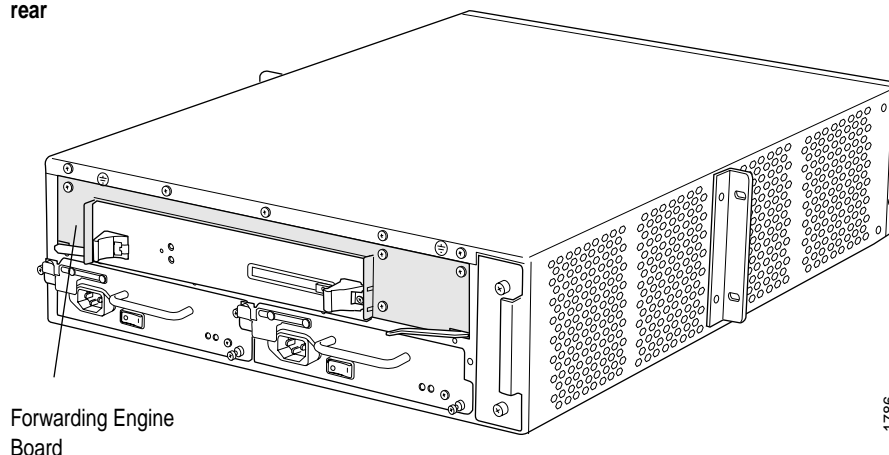


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The FEB is located on the rear of the router above the power supplies (see Figure 181).

**Figure 181: M5 and M10 Router FEB Location**

**M5 and M10 router  
rear**



The FEB is field-replaceable, but is not hot-removable or hot-pluggable. You must power down the router before removing or replacing the FEB.

## Monitoring the FEB Status

If the FEB fails, no information about chassis components is available through the JUNOS software command-line interface (CLI).

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

1. Display the FEB Environmental Status on page 455
2. Display the FEB Detailed Status on page 456

### Step 1: Display the FEB Environmental Status

**Action** To display the FEB environmental status, use the following CLI command:

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

**Sample Output**

```
user@m5-host> show chassis environment
Class Item      Status  Measurement

Power Power Supply A    OK
Power Supply B    OK

Temp FPC Slot 0    OK      32 degrees C / 89 degrees F
FEB             OK      31 degrees C / 87 degrees F
PS Intake       OK      26 degrees C / 78 degrees F
PS Exhaust      OK      31 degrees C / 87 degrees F
[...Output truncated...]
```

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

## Step 2: Display the FEB Detailed Status

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

```
user@host> show chassis feb
```

**Sample Output**

```
user@host> show chassis feb
FEB status:
  Temperature      37 Centigrade
  CPU utilization   0 percent
  Interrupt utilization 0 percent
  Heap utilization  16 percent
  Buffer utilization 43 percent
  DRAM              64 Mbytes
  Internet Processor II Version 1, Foundry IBM, Part number 9
  Start time        1999-01-24 16:24:42 UTC
  Uptime            2 hours, 21 minutes, 28 seconds
```

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

## Verifying FEB Failure

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The FEB will either restart, keep crashing, or fail completely. If the FEB fails, you will lose the router interface connections.

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

1. Check the FEB Uptime on page 457
2. Check the System Uptime on page 457
3. Check the FEB Connection on page 457
4. Perform a Swap Test on the FEB on page 458

### Step 1: Check the FEB Uptime

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

```
user@host> show chassis feb
```

**Sample Output**

```
user@host> show chassis feb
FEB status:
  Temperature      24 degrees C / 75 degrees F
  CPU utilization   1 percent
  Interrupt utilization 0 percent
  Heap utilization  17 percent
  Buffer utilization 44 percent
  Total CPU DRAM    64 MB
  Internet Processor II Version 1, Foundry IBM, Part number 9
  Start time:       2002-07-12 17:30:43 PDT
  Uptime:           0 days, 0 hours, 1 minutes, 0 seconds
```

**What It Means** The command output displays how long the FEB has been operating. A short uptime can indicate an FEB 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
```

### 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 an FEB 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
```

### Step 3: Check the FEB Connection

**Action** Make sure the FEB is properly seated in the midplane. Use a Phillips screwdriver to ensure that the screws at the top of the FEB are securely tightened.

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



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

You must power down the router to remove and replace the FEB.

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

1. Attach an electrostatic discharge (ESD) wrist strap to your bare wrist, and connect the wrist strap to one of the two ESD points on the chassis.
2. Turn off power to the router. For information on powering down the router, see the *M5 and M10 Internet Router Hardware Guide*.
3. Unscrew the five screws holding the rear chassis component cover in place, and remove the cover. Be sure to save the screws for when you reinstall the cover.
4. Flip the ends of the two ejector levers towards the outside edges of the router.
5. Grasp both sides of the FEB and slide it about three-quarters of the way out of the router.
6. Move one hand underneath the FEB to support it and slide it completely out of the chassis.
7. Remove the Routing Engine from the FEB.

Unscrew the screws on the outside edges of the extractor clips to unseat the Routing Engine from the FEB. Press in on the red tabs on the extractor clips, then flip the ends of the extractor clips toward the outside edges of the router to release the Routing Engine. Grasp both sides of the Routing Engine and slide it evenly out of the FEB.

8. Replace the Routing Engine in the FEB.

Align the rear of the unit with the guides inside the chassis. Slide the Routing Engine all the way in until it contacts the connectors on the FEB. Flip the ends of the extractor clips toward the center of the router to seat the Routing Engine onto the FEB. Using a screwdriver, tighten the screws on the outside edges of the extractor clips. Slide the Routing Engine into the slot evenly.

9. Use both hands to grasp the front of the replacement FEB that works and align the rear of the FEB with the guides on the chassis.
10. To ensure proper seating of the ejector levers, move them to an outward position slightly less than perpendicular to the faceplate before seating the FEB in the slot.
11. Slide the FEB all the way into the chassis until it contacts the midplane.
12. Grasp the ejector levers and carefully push the FEB to seat it onto the midplane.
13. Flip the ejector levers toward each other to lodge the FEB in place.

## Getting FEB Hardware Information

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**Steps To Take** To obtain FEB hardware information, follow these steps:

1. Display the FEB Hardware Information on page 459
2. Display the FEB Firmware Information on page 459
3. Locate the FEB Serial Number ID Label on page 460

### **Step 1: Display the FEB Hardware Information**

**Action** To display the FEB 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                    50974         M10
Midplane   REV 03   710-001950   HA9949
Power Supply A Rev 03   740-002498   LK33316      DC
Display    REV 04   710-001995   HB2079
Routing Engine              a000000792cd0a01 RE-2.0
FEB        REV 11   710-001948   HE6497       Internet Processor II
[...Output truncated...]
```

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

### **Step 2: Display the FEB Firmware Information**

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

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

**Sample Output**

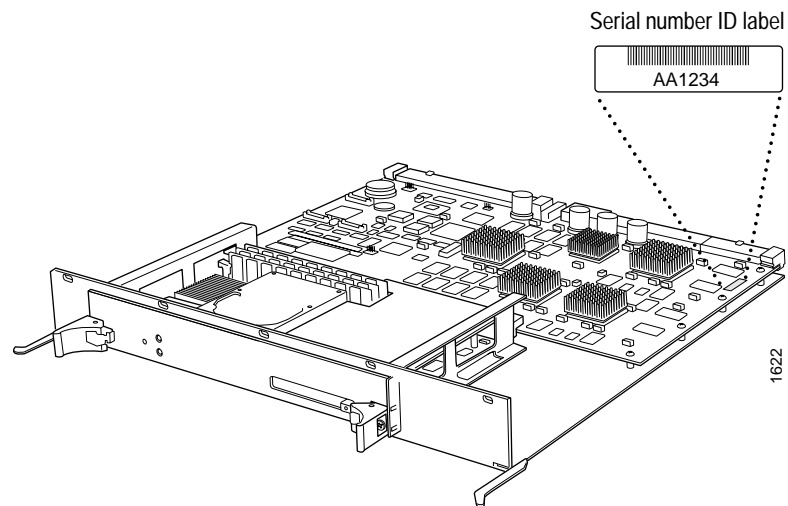
```
user@host> show chassis firmware
Part      Type      Version
Forwarding engine board ROM      Juniper ROM Monitor Version 4.1b2
O/S       Version 4.1I1 by tlim on 2000-04-24 11:27
```

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

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

**Action** To locate the FEB serial number ID label, look near the back on the right side of the FEB (see Figure 182).

**Figure 182: FEB Serial Number ID Label**



### Returning the FEB

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**Action** To replace the FEB, see "Return the Failed Component" on page 86 or the *M5 and M10 Internet Router Hardware Guide*.