Chapter 33

Monitoring the HCM

You monitor the High-Availability Chassis Manager (HCM) on the M10i router to ensure that it works with its companion Routing Engine to provide control and monitoring functions for router components. You also monitor the HCM to ensure that it displays alarm status and takes Physical Interface Cards (PICs) online and offline. (See Table 100.)

Table 100: Checklist for Monitoring the HCM

Monitor HCM Tasks	Command or Action
Understanding the HCM on page 433	
Monitoring the HCM Status on page 435	
1. Check HCM LEDs on page 435	Look at the LEDs on the HCM component faceplate.
2. Check HCM Environmental Status on page 435	show chassis environment hcm
3. Check the Companion Routing Engine Status on page 436	show chassis routing-engine
Displaying HCM Alarms on page 437	show chassis alarms
Performing A Swap Test on page 438	
1. Remove an HCM on page 439	Remove the HCM and replace it with one that you know works. Follow the procedure in the *M10i Internet Router Hardware Guide* to remove an HCM. 1. If two HCMs are installed, determine which HCM is master using the show chassis environment hcm CLI command. 2. Switch HCM mastership using the request chassis routing-engine master switch CLI command. 3. Shut down the router software using the request system halt CLI command. 4. Remove the Routing Engine. 5. Remove the failed HCM.
6. Install an HCM on page 441	1. Install the HCM that works. 2. Install the Routing Engine. 3. Ensure that the HCM is functioning properly using the show chassis environment hcm CLI command. If the HCM still doesn't work, return it. See "Return the Failed Component" on page 86 or follow the procedure described in the *M10i Internet Router Hardware Guide*.

Monitor HCM Tasks	Command or Action
Getting HCM Hardware Information on page 441	
1. Display the HCM Hardware Information on page 442	show chassis hardware
2. Locate the HCM Serial Number ID Label on page 442	Look near the front of the component on the right side.
Returning the HCM on page 442	See “Return the Failed Component” on page 86, or follow the procedure in the *M10i Internet Router Hardware Guide*.

Understanding the HCM

Purpose Inspect the HCM to ensure that it works with its companion Routing Engine to provide control and monitoring functions for routing components. Also, inspect the HCM to ensure that it displays alarm status and takes the PIC online and offline.

What Is an HCM The HCM on the M10i router performs the following functions:

Monitoring and control of router components—The HCM collects statistics from all sensors in the system. When it detects a failure or alarm condition, it sends a signal to the Routing Engine, which generates control messages or sets an alarm. The HCM also relays control messages from the Routing Engine to the router components.

Controlling component power-up and power-down—The HCM controls the power-up sequence of router components as they start and powers down components when their offline buttons are pressed.

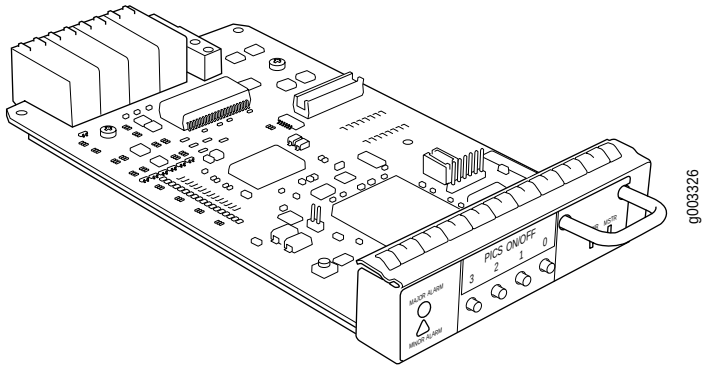
Signaling of mastership—In a router with more than one Routing Engine, the HCM signals to all router components which Routing Engine is the master and which is the standby.

Alarm display—The HCM provides status and troubleshooting information at a glance. It is located on the front of the chassis below the FPC card cage, as shown in Figure 174. The LEDs on the HCM include two alarm LEDs. The circular red alarm LED at the upper right of the craft interface indicates a critical condition that can result in a system shutdown. The triangular yellow alarm below it indicates a less severe condition that requires monitoring or maintenance. Both alarms can occur simultaneously.

PIC removal—If a PIC offline button is pressed, the HCM relays the request to the Compact Forwarding Engine Board (CFEB), which takes the PIC offline and informs the Routing Engine. Other PICs are unaffected, and system operation continues. For more information, see “PIC Offline Buttons” on page 21.

Figure 173 shows the M10i router HCM component.

Figure 173: M10i Router HCM Component



The HCM has the following components:

100-Mbps Fast Ethernet switch—Carries signals and monitoring data between router components.

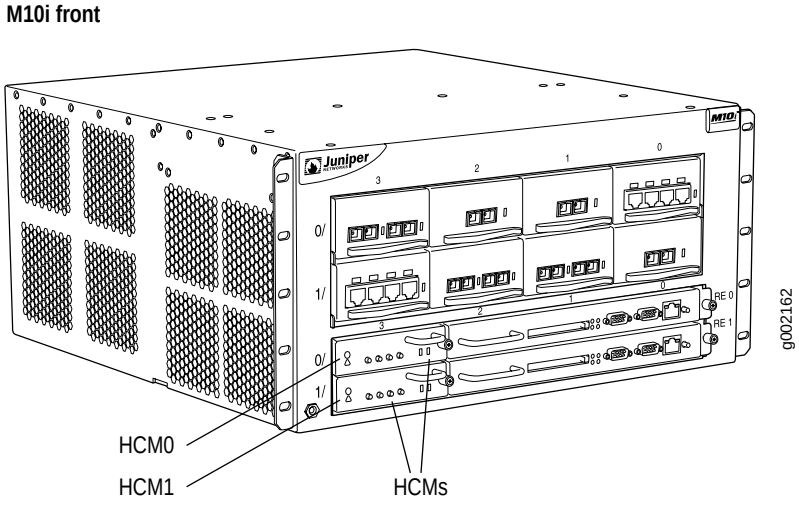
Two LEDs—Indicate HCM status. The green LED is labeled PWR and the blue LED labeled MSTR. See “HCM LEDs” on page 435 for a description of the LED states.

Alarm LEDs—Display alarm conditions, if any exist.

PIC offline buttons—Relay a request to the CFEB, which prepares a PIC for removal from the router, or brings the PIC online when it is replaced.

Two HCMs are installed into the midplane from the front of the chassis, as shown in Figure 174. The master HCM performs all functions and provides PIC removal buttons for the first FPC. The standby HCM provides PIC removal buttons for the second FPC. The HCM in the slot labeled HCM0 is paired with the Routing Engine in the slot labeled RE0. Likewise, the HCM in the slot labeled HCM1 is paired with the Routing Engine in the slot labeled RE1. By default, the HCM in the slot labeled HCM0 is the master.

Figure 174: M10i Router HCM Location



The HCM is hot-pluggable.

Monitoring the HCM Status

Steps To Take To monitor the HCM status, follow these steps:

1. Check HCM LEDs on page 435
2. Check HCM Environmental Status on page 435
3. Check the Companion Routing Engine Status on page 436

Step 1: Check HCM LEDs

Action To check the HCM LEDs, look at the component faceplate at the bottom left front of the M10i router chassis (see Figure 174 on page 434).

Two LEDs indicate HCM status—a green PWR LED and a blue MSTR LED. Table 101 describes the LED states.

Table 101: HCM LEDs

Label	Color	State	Description
PWR	Green	On steadily	HCM is functioning normally.
		Blinking	HCM is starting up.
MSTR	Blue	On steadily	HCM is master.

Step 2: Check HCM Environmental Status

Action To check the HCM environmental status, use the following CLI command:

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

Sample Output

```
user@host> show chassis environment hcm
HCM 0 status:
  State                  Online Master
  FPGA Revision          27
HCM 1 status:
  State                  Present Standby
  FPGA Revision          27
```

What It Means The command output shows that the HCM status, including slot number, operating state, and field programmable gate array (FPGA) revision.

Alternative Action To display the environmental status of a particular HCM, use the following CLI command:

```
m10i@host> show chassis environment hcm slot
```

Step 3: Check the Companion Routing Engine Status

The HCM in the slot labeled HCM0 is paired with the Routing Engine in the slot labeled RE0. Likewise, the HCM in the slot labeled HCM1 is paired with the Routing Engine in the slot labeled RE1. By default, the HCM in the slot labeled HCM0 is the master.

When HCM mastership changes because of failure, Routing Engine mastership changes as well.

Action To check Routing Engine status, use the following CLI command:

```
user@host> show chassis routing-engine
```

Sample Output

```
user@host> show chassis routing-engine
Routing Engine status:
  Slot 0:
    Current state                Master
    Election priority            Master (default)
    Temperature                  36 degrees C / 96 degrees F
    CPU temperature              35 degrees C / 95 degrees F
    DRAM                         256 MB
    Memory utilization           37 percent
    CPU utilization:
      User                       0 percent
      Background                 0 percent
      Kernel                     6 percent
      Interrupt                  0 percent
      Idle                       93 percent
    Model                        RE-5.0
    Serial ID                    1000488824
    Start time                   2004-09-28 03:06:10 PDT
    Uptime                       13 days, 10 hours, 36 minutes, 22 seconds
    Load averages:               1 minute   5 minute  15 minute
                                 0.22       0.06      0.02
Routing Engine status:
  Slot 1:
    Current state                Backup
    Election priority            Backup (default)
    Temperature                  35 degrees C / 95 degrees F
    CPU temperature              32 degrees C / 89 degrees F
    DRAM                         256 MB
    Memory utilization           28 percent
    CPU utilization:
      User                       0 percent
      Background                 0 percent
      Kernel                     1 percent
      Interrupt                  0 percent
      Idle                       99 percent
    Model                        RE-5.0
    Serial ID                    1000485860
    Start time                   2004-09-11 01:01:02 PDT
    Uptime                       30 days, 12 hours, 41 minutes, 15 seconds
```

What It Means The command output displays the operating state of both Routing Engines installed in the router chassis, including slot number, current state, and default election priority—master or backup. The command output also displays the Routing Engine temperature, amount of memory, and the percentage of memory and CPU utilization. The command output displays the Routing Engine model number, serial number ID, start time, and total operating time.

Alternative Action Look at the Routing Engine LEDs by using the show chassis routing-engine CLI command or by looking at the component faceplate at the front of the router. The Routing Engine has four LEDs that tell operating status: agreen LED labeled HDD, a blue LED labeled MASTER, a red LED labeled FAIL, and a green LED labeled ONLINE. Table 102 describes the Routing Engine LED states.

Table 102: Routing Engine LEDs

Label	Color	State	Description
HDD	Green	Blinking	There is read/write activity on the PC card.
MASTER	Blue	On steadily	Routing Engine is functioning as master.
FAIL	Red	On steadily	Routing Engine is not operational..
ONLINE	Green	On steadily	Routing Engine is running normally.

Displaying HCM Alarms

If a router with a single HCM fails, no alarm can be sent. If a master HCM fails on a router with dual HCMs and the backup HCM takes over mastership, an alarm is reported on the backup Routing Engine.

When HCM mastership changes because of failure, Routing Engine mastership changes as well.

Action To view HCM alarms, use the following CLI command:

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

Sample Output

```
user@host> show chassis alarms
4 alarms currently active
Alarm time               Class  Description
2005-02-16 22:10:27 UTC  Minor  Backup RE Active
```

What It Means The command output displays a minor alarm indicating that the backup Routing Engine is active or is master. Since the HCM is a companion component of the Routing Engine, the backup HCM is also active. The command output displays the date and time of the alarm.

To verify that the backup HCM has taken over mastership, use the show chassis routing-engine CLI command.

```
user@host> show chassis routing-engine
```

Sample Output

```
user@host> show chassis routing-engine
Routing Engine status:
  Slot 0:
    Current state                  Backup
    Election priority              Master (default)
    Temperature                 33 degrees C / 91 degrees F
    DRAM                      2048 MB
    Memory utilization           13 percent
    CPU utilization:
      User                      0 percent
      Background                0 percent
```

```
    Kernel                 0 percent
    Interrupt              0 percent
    Idle                 100 percent
  Model                    RE-3.0
  Serial ID                P10865703096
  Start time               2005-02-16 22:13:19 UTC
  Uptime                   2 hours, 13 minutes, 57 seconds
Routing Engine status:
 Slot 1:
  Current state            Master
  Election priority        Backup (default)
  Temperature              33 degrees C / 91 degrees F
  CPU temperature          29 degrees C / 84 degrees F
  DRAM                   2048 MB
  Memory utilization       12 percent
  CPU utilization:
    User                   0 percent
    Background             0 percent
    Kernel                 3 percent
    Interrupt              0 percent
    Idle                  97 percent
  Model                    RE-3.0
  Serial ID                P10865701255
  Start time               2005-02-03 03:13:39 UTC
  Uptime                   13 days, 21 hours, 12 minutes, 35 seconds
  Load averages:             1 minute   5 minute  15 minute
                          0.00       0.03       0.01
```

What It Means The HCM in the slot labeled HCM0 is paired with the Routing Engine in the slot labeled RE0. Likewise, the HCM in the slot labeled HCM1 is paired with the Routing Engine in the slot labeled RE1. By default, the HCM in the slot labeled HCM0 is the master. However, in this instance, the Routing Engine in slot RE1 has taken over mastership, indicating that the HCM in slot HCM1 is also master.

Performing A Swap Test

NOTE: although steps to remove and install an HCM are provided here, ensure that you refer to the appropriate hardware guide for the latest information.

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

The HCM is hot-pluggable. You can perform a swap test on an HCM to pinpoint the problem.

Steps To Take To perform a swap test and verify HCM failure, follow these steps:

1. Remove an HCM on page 439
2. Install an HCM on page 441

Step 1: Remove an HCM

The HCM is hot-pluggable. You can perform a swap test on an HCM to try to pinpoint the problem.

Action To remove an HCM, follow these steps:

1. Place an electrostatic bag or antistatic mat on a flat, stable surface.
2. If a Routing Engine is installed in the same row as the HCM you are removing, remove the Routing Engine first. If two Routing Engines are installed, use one of the following two methods to determine which HCM is functioning as master:

   Note which of the blue MASTER LEDs is lit on the Routing Engine faceplates.

   Use the following CLI command:

   user@host> **show chassis environment hcm**

   ```
   HCM 0 status:
       State                  Online Master
       FPGA Revision           27
   HCM 1 status:
       State                  Online Standby
       FPGA Revision           27
   ```

   The master HCM is designated Master in the State field.

3. If you are removing the master Routing Engine and a second Routing Engine is installed, issue the following CLI command to switch mastership to the standby host module:

   user@host> **request chassis routing-engine master switch**

   ```
   warning: Traffic will be interrupted while the PFE is re-initialized
   Toggle mastership between routing engines ? [yes,no] (no) yes

   Resolving mastership...
   ```

If the Routing Engines are running JUNOS Release 6.0 or later and are configured for graceful switchover, the standby Routing Engine immediately assumes Routing Engine functions and there is no interruption to packet forwarding. Otherwise, packet forwarding halts while the standby Routing Engine becomes the master and the Packet Forwarding Engine components reset and connect to the new master Routing Engine. For information about configuring graceful switchover, see the section about Routing Engine redundancy in the *JUNOS System Basics Configuration Guide*.

NOTE: Router performance might change if the standby Routing Engine's configuration differs from the former master's configuration. For the most predictable performance, configure the two Routing Engines identically, except for parameters unique to a Routing Engine, such as the hostname defined at the [edit system] hierarchy level and the management interface (fxp0 or equivalent) defined at the [edit interfaces] hierarchy level.

To configure Routing Engine-specific parameters and still use the same configuration on both Routing Engines, include the appropriate configuration statements under the re0 and re1 statements at the [edit groups] hierarchy level and use the apply-groups statement. For instructions, see the *JUNOS System Basics Configuration Guide*.

4. On the console or other management device connected to the Routing Engine, enter CLI operational mode and use the following command to shut down the router software cleanly and preserve Routing Engine state information:

   user@host> **request system halt**

   Wait until a message appears on the console confirming that the operating system has halted.

   For more information about the command, see the *JUNOS Protocols, Class of Service, and System Basics Command Reference*.

NOTE: The router might continue forwarding traffic for a few minutes after the request system halt command has been issued.

5. Attach an electrostatic discharge (ESD) grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.

6. Loosen the thumbscrews located at each end of the Routing Engine faceplate, using a Phillips screwdriver if necessary.

7. Grasp the handle and slide the unit about halfway out of the chassis.

CAUTION: Slide the Routing Engine straight out of the chassis. Damage can result if it gets lodged because of uneven movement.

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

9. Grasp the handle of the HCM and slide the unit about halfway out of the chassis.

CAUTION: Slide the HCM straight out of the chassis. Damage can result if it gets lodged because of uneven movement.

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

Step 2: Install an HCM

Action To install an HCM, follow these steps:

1. Attach an ESD grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.

2. Place one hand under the HCM to support it and grasp the handle on the faceplate with the other hand.

3. Align the rear of the HCM with the guide rails inside the chassis and slide it in completely.

CAUTION: Align the HCM carefully with the guide rails and push it in evenly. Damage can result if it gets lodged in the rails because of uneven movement.

4. Place one hand under the Routing Engine to support it and grasp the handle on the faceplate with the other hand.

5. Align the rear of the Routing Engine with the guide rails inside the chassis and slide it in completely.

CAUTION: Align the Routing Engine carefully with the guide rails and push it in evenly. Damage can result if it gets lodged in the rails because of uneven movement.

6. Tighten the thumbscrews on the Routing Engine faceplate to secure the Routing Engine.

7. Use the show chassis environment hcm CLI command to verify that the HCM is functioning correctly.

Getting HCM Hardware Information

Steps To Take To obtain HCM hardware information, follow these steps:

1. Display the HCM Hardware Information on page 442

2. Locate the HCM Serial Number ID Label on page 442

Step 1: Display the HCM Hardware Information

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

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

Sample Output

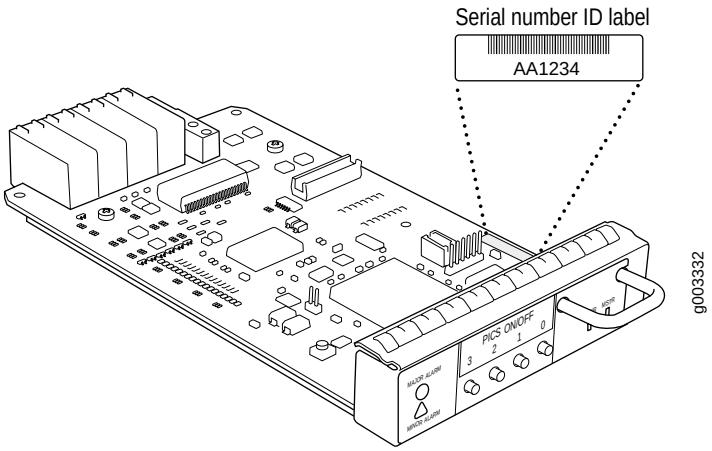
```
user@host> show chassis hardware
Hardware inventory:
Item          Version  Part number  Serial number     Description
Chassis                               30700           M10i
Midplane      REV 04   710-008920   CB8867          M10i Midplane
Power Supply 0  Rev 05   740-008537   QB12637         AC Power Supply
Power Supply 1  Rev 05   740-008537   QB12537         AC Power Supply
HCM slot 0      REV 05   710-008661   CC1145          M10i HCM
HCM slot 1      REV 05   710-008661   CC1138          M10i HCM
[...Output truncated...]
```

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

Step 2: Locate the HCM Serial Number ID Label

Action To locate the HCM serial number ID label, look near the front of the component on the right side (see Figure 175).

Figure 175: M10i Router HCM Serial Number ID Label



Returning the HCM

Action To return the HCM, see “Return the Failed Component” on page 86 or follow the instructions in the *M10i Internet Router Hardware Guide*.