



## CHAPTER 5

# Upgrading and Downgrading ROM Monitor Firmware on Cisco CRS Routers

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This chapter describes how to upgrade or downgrade the ROM Monitor firmware on a Cisco CRS router. It includes the following sections:

- [Information About ROM Monitor Firmware, page 5-58](#)
  - [About ROMMON A and ROMMON B, page 5-58](#)
  - [Upgrading or Downgrading a Single Node or All Nodes, page 5-58](#)
  - [Reloading Nodes After a ROMMON Firmware Change, page 5-59](#)
  - [ROM Monitor Compatibility with Cisco IOS XR Software, page 5-59](#)
- [Split-Boot Support, page 5-60](#)
- [Upgrading or Downgrading ROM Monitor Using the FPD PIE, page 5-61](#)
- [Configuration Examples for ROM Monitor Upgrades, page 5-67](#)
- [Additional References, page 5-74](#)



### Caution

The ROM Monitor firmware on all RPs must be compatible with the Cisco IOS XR software release currently running on the router before a Cisco CRS system is upgraded to Cisco IOS XR Software Release 3.9.0. For minimum ROM Monitor requirements, see [Software/Firmware Compatibility Matrix](#).

If the router is brought up with an incompatible version of the ROM Monitor software, then the standby RP may fail to boot. For instructions to overcome a boot block in the standby RP in a single-chassis system, see [Additional References, page 5-74](#). If a boot block occurs in a multishelf system, contact your Cisco Technical Support representative for assistance. See [Obtaining Documentation and Submitting a Service Request, page vii](#).

Cisco CRS multishelf systems should be upgraded to ROMMON release 1.54 before being upgraded to Cisco IOS XR Release 3.9.0, to ensure that RPs are assigned the correct rack numbers during system boot.



### Note

After upgrading to Cisco IOS XR Software Release 3.9.0, you should upgrade the ROM Monitor to the recommended version for Cisco IOS XR Software Release 3.9.0. For more information, see [ROM Monitor Compatibility with Cisco IOS XR Software, page 5-59](#).

# Information About ROM Monitor Firmware

The ROM Monitor, which is also known as *ROMMON*, is a bootstrap program that initializes the hardware and boots the Cisco IOS XR firmware when you power on or restart a Cisco CRS router. ROM Monitor upgrades can be required to resolve firmware defects or support new features. Typically, ROM Monitor upgrades are infrequent and not required for every Cisco IOS XR software upgrade.

Before upgrading or downgrading ROM Monitor firmware, you should understand the following concepts:

- [About ROMMON A and ROMMON B, page 5-58](#)
- [Upgrading or Downgrading a Single Node or All Nodes, page 5-58](#)
- [ROM Monitor Compatibility with Cisco IOS XR Software, page 5-59](#)



Tip

Information on operating the router in ROM Monitor mode is provided in the [ROM Monitor Overview, page 1-1](#).

## About ROMMON A and ROMMON B

Each node in a Cisco CRS router includes two copies of ROM Monitor: ROMMON A and ROMMON B. During power on, ROMMON A loads first. If ROMMON A detects the presence of ROMMON B, it checks the compatibility and integrity of the ROMMON B code. If ROMMON B passes these tests, ROMMON A passes control of the router to ROMMON B.

Normally, you only upgrade ROMMON B in most cases. ROMMON A is a backup from ROMMON B in case ROMMON B fails. Failures are most likely to occur during ROMMON upgrades or downgrades; they are very unlikely to fail during normal usage. A failure in ROMMON A results in an inactive card that must be returned to the authorized merchandiser.

By default, on an MSC/FP-140 and PRP ROMMON, there is a dedicated piece of hardware that chooses to boot ROMMON B. This resets the board and selects ROMMON A in the event of a boot timer expiry, which means that ROMMON A and ROMMON B are fully independent and identical images.



Note

- ROMMON 1.x and ROMMON 2.x are not compatible with each other.
- We recommend that you upgrade ROMMON A and ROMMON B to a minimum of ROMMON version 2.03 or a later version after the Cisco IOS XR software is upgraded to release 4.1.0 or a later release.

## Upgrading or Downgrading a Single Node or All Nodes

The upgrade and downgrade procedures for ROMMON firmware are the same. Install a higher version to upgrade the firmware, or a lower version to downgrade the firmware.

ROM Monitor operates on every node within the router. During an upgrade or downgrade, the ROMMON firmware is copied into hardware EEPROMs in the router. For more information on ROMMON firmware compatibility with Cisco IOS XR software and the Cisco CRS router, see [ROM Monitor Compatibility with Cisco IOS XR Software, page 5-59](#).

For most upgrades, we recommend upgrading or downgrading the ROMMON firmware on all nodes. You can also upgrade or downgrade a single node, which is useful when moving a card between two routers or adding a card that is not running the correct ROM Monitor version. When you upgrade a single node that uses ROM Monitor in both the CPU0 and SP modules, such as a line card node, we recommend that you upgrade both the modules to the same ROM Monitor version.

## Reloading Nodes After a ROMMON Firmware Change

The new ROMMON firmware is not active on a node until the card is reloaded. For example, if you upgrade a single node, you must reload that node only after the upgrade. If you upgrade or downgrade all nodes, you must also reload all nodes to activate the new ROMMON version.

To gracefully reload all nodes, reload the standby RP, perform a redundancy switchover, reload the second RP, and then reload all other nodes in the system.

If the router does not contain a redundant standby RP, or if you wish to perform a cold restart, you can also reload all nodes at the same time, including the primary RP (DSC). Remember that a cold restart results in router downtime while the cards reboot.

Instructions to reload the nodes are included in [Upgrading or Downgrading ROM Monitor Using the FPD PIE](#), page 5-61.

## ROM Monitor Compatibility with Cisco IOS XR Software

The ROM Monitor firmware on all RPs must be compatible with the Cisco IOS XR software release currently running on the router before a Cisco CRS system is upgraded to Cisco IOS XR Software Release 3.9.0. If the router is brought up with an incompatible version of the ROM Monitor software, the standby RP may fail to boot.

**Note**

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ROMMON version 2.01 (or 2.03) is the minimal version for Cisco IOS XR Software Release 4.0.x (or 4.1.x).

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For minimum ROM Monitor version requirements for Cisco IOS XR Software Release 3.2 and later releases, see *Software/Firmware Compatibility Matrix* at the following URL:

[http://www.cisco.com/web/Cisco\\_IOS\\_XR\\_Software/index.html](http://www.cisco.com/web/Cisco_IOS_XR_Software/index.html)

In addition, Cisco CRS multishelf systems should be upgraded to ROMMON release 1.54 before being upgraded to Cisco IOS XR Software Release 3.9.0, to ensure that RPs are assigned the correct rack numbers during system boot.

After you upgrade to Cisco IOS XR Software Release 3.9.0, you should upgrade the ROM Monitor firmware to the recommended version for this release. See *Software/Firmware Compatibility Matrix*.

**Note**

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If the ROM Monitor firmware is not compatible with the Cisco IOS XR software currently running on the router, refer to the documentation for your currently running software release for instructions on upgrading the ROM Monitor firmware to a compatible version. After you upgrade to Cisco IOS XR Software Release 3.9.0, use the instructions in this module to upgrade your ROM Monitor firmware to a version compatible with Cisco IOS XR Software Release 3.9.0.

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**Overriding a Boot Block in the Standby RP**

If a Cisco CRS system is upgraded to Cisco IOS XR Software Release 3.9.0 before the ROM Monitor firmware is upgraded to a compatible version, a boot block may occur in the standby RP.

- For instructions to override a boot block in a single-chassis system, see [Additional References, page 5-74](#).
- If a boot block occurs in a multishelf system, contact your Cisco Systems support representative for assistance. See [“Obtaining Documentation and Submitting a Service Request” section on page vii](#).

**Note**

If you are running Cisco IOS XR Software Release 3.2.6, or an earlier release, RP/B is not supported in Cisco CRS systems (single-shelf or multishelf). RP/B was introduced in Cisco IOS XR Software Release 3.3.0 with a minimum supported ROMMON version of 1.38.

## Split-Boot Support

In split-boot feature, the minimal boot image (MBI) resides within bootflash memory and the rest of the packages reside on the PCMCIA cards. Split-boot applies only to the RP node, DRP nodes of the LC chassis, and SC node of the fabric chassis. ROM Monitor boots the MBI from bootflash memory. MBI boots other packages (Manageability, Security, MPLS, and Multicast) from flash disk (disk0/disk1) on all RP, DRP, and SC nodes within the Cisco CRS router. When the MBI is installed, it contains all the necessary file system drivers, which can then access the packages and files from the PCMCIA cards.

**Note**

The flash disk drives, disk0 and disk1, are not accessible from ROM Monitor due to the FAT 32 file system. However, the flash disk drives are accessible from ROM Monitor in the FAT 16 file system. Both Cisco IOS XR software Release 3.9.0 and Cisco IOS XR software Release 3.8.0 support both FAT 16 and FAT 32 file systems. Earlier releases support only the FAT 16 filesystem.

## Prerequisites

The following are the prerequisites for implementing the split-boot feature on ROM Monitor:

- **New ROMMON with split-boot support:** The minimum ROMMON version of 1.53 is required to support Split-boot. When the Cisco CRS router uses Cisco IOS XR software Release 3.9.0 or a later release, you must upgrade the ROM Monitor based on the instructions mentioned in the next section. For more information, see [Upgrading or Downgrading ROM Monitor Using the FPD PIE, page 5-61](#).
- **Install code with split-boot support:** All RP, DRP, and SC nodes must have a working bootflash; otherwise, the router fails to boot.

## Safe Messages to Ignore

Safe messages do not indicate any error. They appear because the new ROM Monitor first searches for the MBI in bootflash memory in Release 3.7.0 and earlier releases of Cisco IOS XR software. However, these safe messages are not displayed if you are using Cisco IOS XR Software Release 3.9.0 and Cisco IOS XR software Release 3.8.0. releases.

When the flash disk is booting RP, DRP, and SC nodes that have the new ROM Monitor with a Cisco IOS XR software image earlier than Release 3.9.0, the safe messages are displayed under the following conditions:

- When the BOOT variable is set to `BOOT=disk0:<mbi_image_path>/<mbi.vm>`:  

```
Fail to open file name disk0/<mbi_image_path>/<mbi.vm>
```
- When disk mirroring is enabled and when the `BOOT_DEV_SEQ_OPER` variable is set to `BOOT_DEV_SEQ_OPER=disk0:,disk1:`:  

```
Fail to open file name disk0/<mbi_image_path>/<mbi.vm>
Fail to open file name disk1/<mbi_image_path>/<mbi.vm>
```

## Turboboot Errors

A process called *Turboboot* is performed on the Cisco CRS routers to install Cisco IOS XR software into a persistent storage device for the first time. This persistent storage device subsequently diskboots the Cisco CRS router. When diskbooted, the router can be warm booted with a newer version of software, which might require a reload of the node.

The Turboboot errors appear when any one of the following conditions occurs:

- If the bootflash is bad or missing on the active RP (at least in the Turboboot phase), the Turboboot operation fails with the following error messages:

```
<snip>
TURBOBOOT: Failed to obtain turboboot parameters: 'Turboboot' detected the 'fatal'
condition 'No devices that qualifies for boot device are found in the system'
TURBOBOOT: Resetting TURBOBOOT rommon variable to (TURBOBOOT=).
TURBOBOOT: Setting config-register to NOT autoboot the router and NOT disable send
break.
TURBOBOOT: Failed reading/validating turboboot settings: 'Turboboot' detected the
'fatal' condition 'No devices that qualifies for boot device are found in the system'
</snip>
```

- If the bootflash on the standby RP is bad or missing, the installation encounters a fatal error condition and sends a message that 'bootflash is either corrupt or missing'.



### Note

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Ensure that all required bootflashes are present and working on all Cisco CRS routers before installing the new Cisco IOS XR software and the new ROM Monitor that supports split-boot.

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## Upgrading or Downgrading ROM Monitor Using the FPD PIE

The field-programmable devices (FPDs) are hardware devices implemented on router cards that support separate software upgrades. A field-programmable gate array (FPGA) is a type of programmable memory device that exists on most hardware components of a router. The term "FPD" describes any type of programmable hardware device on SIPs and shared port adapters (SPAs), including FPGAs. Cisco IOS XR software provides the Cisco FPD upgrade feature to manage the upgrade of FPD images on SIPs and SPAs.

Use the following procedure to upgrade or downgrade the ROM Monitor firmware using the ROM Monitor image contained in the field-programmable device (FPD) software PIE. This section also includes instructions to reload a node, gracefully reload all nodes in the system, or perform a cold restart for all nodes in the system.

**Note**

We recommend upgrading one card at a time. After each upgrade, you should see a message indicating that the upgrade was performed successfully. Reload the card only after the upgrade finishes successfully.

If you are not sure if a card requires a ROM Monitor upgrade, you can install the card and use the **show hw-module fpd** command to determine if the ROM Monitor image on the card is compatible with the currently running Cisco IOS XR software release.

## Prerequisites

Before upgrading or downgrading ROM Monitor firmware, verify that the following prerequisites have been met:

- ROMMON firmware is compatible with the Cisco IOS XR software version on your router. For more information, see [ROM Monitor Compatibility with Cisco IOS XR Software, page 5-59](#).
- FPD PIE is installed on your router. For more information on installing software PIEs, see the *Upgrading and Managing Cisco IOS XR Software* module of *Cisco IOS XR System Management Configuration Guide for the Cisco CRS Router*.

**Note**

If the Cisco IOS XR software was upgraded to Release 3.9.0 or a later release before the ROMMON firmware was upgraded to a compatible version, and the standby RP fails to boot, clear the boot block with the **hw-module boot override** command in administration configuration mode. For more information, see [Additional References, page 5-74](#).


## SUMMARY STEPS

1. **show hw-module fpd location all**
2. **admin**
3. **show fpd package**
4. **upgrade hw-module fpd rommon location [all | node-id]**  
**upgrade hw-module fpd rommonA location [all | node-id]**
5. **exit**
6. If you are upgrading a single node on a router, including a standby DSDRSC, go to Step 9.
7. If you are upgrading a router with redundant DSCs, and want to perform a graceful reload, go to Step 10.
8. If you are upgrading a router with a single RP, or want to perform a cold restart on all nodes, go to Step 11.
9. Reload a single node:
  - a. **hw-module location node-id reload**
  - b. Go to Step 12.
10. Gracefully reload all nodes on a system that includes redundant RPs:
  - a. **(Optional) cfs check**
  - b. **(Optional)** Repeat on each secure domain router (SDR) impacted by the reload operation.
  - c. **hw-module location node-id reload**

- d. **show redundancy**
  - e. **redundancy switchover**
  - f. **show redundancy**
  - g. **hw-module location *node-id* reload**
  - h. Repeat Step a. to Step g. for all DSDRSC pairs in the system.
  - i. **admin**
  - j. **show platform**
  - k. **hw-module location *node-id* reload**
  - l. Repeat Step k. to reload all upgraded nodes in the system.
  - m. **show platform**
  - n. Go to Step 12.
11. Reload all nodes in a system (cold restart):
    - a. **(Optional) cfs check**
    - b. **(Optional)** Repeat on each SDR impacted by the **reload** operation.
    - c. **admin**
    - d. **reload location all**
  12. **show platform**


## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>show hw-module fpd location all</b>  <b>Example:</b> RP/0/RP0/CPU0:Router# show hw-module fpd location all	Displays the current FPD image versions for all cards installed in the router. Use this command to determine if you must upgrade the ROM monitor image on your cards.
Step 2	<b>admin</b>  <b>Example:</b> RP/0/RP0/CPU0:Router# admin	Enters administration EXEC mode from EXEC mode.
Step 3	<b>show fpd package</b>  <b>Example:</b> RP/0/RP0/CPU0:Router(admin)# show fpd package	(Optional) Displays which cards are supported with your current Cisco IOS XR software release, which FPD or ROM monitor image you need for each card, and what the minimum hardware requirements are for the cards. If there are multiple FPD images for your card, use this command to determine which FPD image to use if you want to upgrade only a specific FPD type.

Command or Action	Purpose
<p><b>Step 4</b> <b>For ROMMON B:</b></p> <pre>upgrade hw-module fpd rommon location [all   node-id]</pre> <p><b>For ROMMON A:</b></p> <pre>upgrade hw-module fpd rommonA location [all   node-id]</pre> <p><b>Example:</b></p> <pre>RP/0/RP0/CPU0:Router(admin)# upgrade hw-module fpd rommon location 0/SM3/SP</pre>	<p>Upgrades the ROMMON B and ROMMON A images on the specified card (<i>node-id</i>) or all cards (<b>all</b>). You need to explicitly upgrade the ROMMON A using the hidden command, provided your ROMMON is earlier than Release 1.52.</p> <p><b>Note</b> Before you continue to reload the card, you should see a message indicating that the upgrade was completed successfully.</p> <p> <b>Warning</b> Do not stop the upgrade or reload any cards while the upgrade process is in progress. It may corrupt the firmware making the card unbootable.</p>
<p><b>Step 5</b> <code>exit</code></p> <p><b>Example:</b></p> <pre>RP/0/RP0/CPU0:Router(admin)# exit</pre>	<p>Exits administration EXEC mode and returns to EXEC mode.</p>
<p><b>Step 6</b> If you are upgrading a single node on a router, including a standby DSDRSC, go to <a href="#">Step 9</a>.</p>	<p>Continues to reload the node.</p>
<p><b>Step 7</b> If you are upgrading a router with redundant DSCs, and want to perform a graceful reload, go to <a href="#">Step 10</a>.</p>	<p>Continues to gracefully reload all nodes.</p>
<p><b>Step 8</b> If you are upgrading a router with a single RP, or want to perform a cold restart on all nodes, go to <a href="#">Step 11</a>.</p>	<p>Continues to perform a cold restart of all nodes</p>
<p><b>Step 9</b> Reload a single node:</p> <ol style="list-style-type: none"> <li>a. <code>hw-module location node-id reload</code></li> <li>b. Go to <a href="#">Step 12</a></li> </ol> <p><b>Example:</b></p> <pre>RP/0/RP0/CPU0:router# hw-module location 0/RP1/CPU0 reload</pre>	<ol style="list-style-type: none"> <li>a. Reloads a single node within a router, such as a standby RP. The new ROMMON firmware is not active on a node until the card is reloaded. <ul style="list-style-type: none"> <li>– Replace <i>node-id</i> with the node ID you specified when upgrading ROM Monitor.</li> <li>– When reloading cards that contain both a CPU and an SP (such as an MSC card), it is only necessary to reload the CPU node. When the CPU is reloaded, the SP will also reload.</li> </ul> </li> <li>b. Go to <a href="#">Step 12</a> to verify that the correct ROMMON firmware is active on each node.</li> </ol>



Command or Action	Purpose
<p><b>Step 10</b> Gracefully reload all nodes on a system that includes redundant RPs (DSCs):</p> <ol style="list-style-type: none"> <li>a. <b>cfs check</b></li> <li>b. Repeat on each secure domain router (SDR) impacted by the reload operation.</li> <li>c. <b>hw-module location <i>node-id</i> reload</b></li> <li>d. <b>show redundancy</b></li> <li>e. <b>redundancy switchover</b></li> <li>f. <b>show redundancy</b></li> <li>g. <b>hw-module location <i>node-id</i> reload</b></li> <li>h. Repeat Step a. to Step g. for all DSDRSC pairs in the system.</li> <li>i. <b>admin</b></li> <li>j. <b>show platform</b></li> <li>k. <b>hw-module location <i>node-id</i> reload</b></li> <li>l. Repeat Step k. to reload all upgraded nodes in the system.</li> <li>m. <b>show platform</b></li> <li>n. Go to <a href="#">Step 12</a>.</li> </ol>	<p>Gracefully reloads all nodes on a system that includes redundant RPs. The new ROMMON firmware is not active on a node until the card is reloaded.</p> <ol style="list-style-type: none"> <li>a. (Optional) Use <b>cfs check</b> command to ensure the sanity of the configuration file system for the owner SDR.</li> <li>b. (Optional) Repeat the <b>cfs check</b> command on the DSDRSC of each additional non-owner SDR in the system to verify the configuration file system for each non-owner SDR</li> <li>c. Reloads the standby RP to activate the new ROMMON firmware.</li> </ol> <p><b>Note</b> The standby RP is the standby DSC for the system. The primary and standby DSCs are also the DSDRSCs for the owner SDR.</p> <ol style="list-style-type: none"> <li>d. Use the <b>show redundancy</b> command to verify the redundancy status of the DSC nodes. Wait for the standby RP to return to “Ready” state.</li> <li>e. Use the <b>redundancy switchover</b> command to cause the primary (active) RP to fail over to the redundant standby RP.</li> </ol> <p><b>Note</b> The standby RP must be ready to take over.</p> <ol style="list-style-type: none"> <li>f. Use the <b>show redundancy</b> command to verify the status of the RP nodes. Wait for the standby RP to return to ready state.</li> <li>g. Reload the original primary RP to activate the new ROMMON firmware.</li> <li>h. (Optional) Repeat Step a. to Step g. on all DSDRSCs in the system to ensure a graceful restart for all SDRs.</li> <li>i. Use the <b>admin</b> command to enter administration EXEC mode.</li> <li>j. Use the <b>show platform</b> command to view all the nodes in the system. Enter this command in administration EXEC mode to display information for all nodes in the system, including admin plane resources such as fabric cards.</li> </ol>

Command or Action	Purpose
<p><b>Example:</b></p> <pre>RP/0/RP0/CPU0:router# cfs check RP/0/RP0/CPU0:router# hw-module location 0/RP1/CPU0 reload RP/0/RP0/CPU0:router# show redundancy RP/0/RP0/CPU0:router# redundancy switchover RP/0/RP0/CPU0:router# show redundancy RP/0/RP0/CPU0:router# hw-module location 0/RP0/CPU0 reload RP/0/RP0/CPU0:router# admin RP/0/RP0/CPU0:router(admin)# show platform RP/0/RP0/CPU0:router(admin)# hw-module location 0/1/CPU0 reload RP/0/RP0/CPU0:router(admin)# hw-module location 0/2/CPU0 reload RP/0/RP0/CPU0:router(admin)# hw-module location 0/SM0/SP reload RP/0/RP0/CPU0:router(admin)# hw-module location 0/SM1/SP reload RP/0/RP0/CPU0:router(admin)# hw-module location 0/SM2/SP reload RP/0/RP0/CPU0:router(admin)# hw-module location 0/SM3/SP reload RP/0/RP0/CPU0:router(admin)# show platform</pre>	<p><b>k.</b> Use the <b>hw-module location <i>node-id</i> reload</b> command to reload each additional card where the ROMMON firmware was changed. Each node must be reloaded to activate the new ROMMON firmware.</p> <p>Replace <i>node-id</i> with the node ID you specified when upgrading ROM Monitor.</p> <p>When reloading cards that contain both a CPU and an SP (such as an MSC card), it is only necessary to reload the CPU node. When the CPU is reloaded, the SP will also reload.</p> <p><b>l.</b> Repeat Step <b>k.</b> to reload all upgraded nodes in the system.</p> <p><b>m.</b> Use the <b>show platform</b> command to view all the nodes in the system. Verify that all the reloaded nodes are in the “IOS XR RUN” state.</p>
<p><b>Step 11</b> <b>Reload all nodes in the system (cold restart):</b></p> <ol style="list-style-type: none"> <li><b>cfs check</b></li> <li>Repeat on each SDR impacted by the reload operation.</li> <li><b>admin</b></li> <li><b>reload [location all]</b></li> </ol> <p><b>Example:</b></p> <pre>RP/0/RP0/CPU0:router# cfs check RP/0/RP0/CPU0:router# admin RP/0/RP0/CPU0:router(admin)# reload location all</pre>	<p>Reloads all nodes, including the DSC. Use these commands if you are upgrading a router with a single RP, or wish to perform a cold restart of all nodes. The new ROMMON firmware is not active on a node until the card is reloaded.</p> <p> <b>Caution</b> Reloading the primary RP (DSC) interrupts all service.</p> <ol style="list-style-type: none"> <li>(Optional) Ensures the sanity of the configuration file system for the owner SDR.</li> <li>(Optional) Ensures the sanity of the configuration file system for each non-owner SDR in the system.</li> <li>Enters administration EXEC mode.</li> <li>Reloads the DSDRSC with the upgraded ROM Monitor firmware. Use the <b>reload location all</b> command in administration EXEC mode to reload all nodes in the system.</li> </ol>
<p><b>Step 12</b> <b>show platform</b></p> <p><b>Example:</b></p> <pre>RP/0/RP0/CPU0:Router# show platform</pre>	<p>Verifies that the ROM monitor image on the card has been successfully upgraded by displaying the status of all cards in the system.</p>

## Troubleshooting Tips

- If any node cannot be upgraded successfully, if you do not receive a message indicating a successful upgrade, or if you see error messages similar to the following message, try reformatting the bootflash (**format bootflash: [location all | node-id]**) and then repeat this upgrade procedure:

```
LC/0/3/CPU0:rommon_burner[65635]: %ROMMON_BURNER-3-FILE_OP_ERR : Opening ROMMON flash
partition failed: No such file or directory in function main at line 952
```

- If you are upgrading ROMMON B and the version does not change to the expected version after the upgrade, the upgrade might have failed. When the router cannot load ROMMON B, it loads ROMMON A.
- If both ROMMON B and ROMMON A are damaged due to an unexpected node reset or a power interruption during the upgrade, the affected route processors must be returned to Cisco for repair.

## Configuration Examples for ROM Monitor Upgrades

This section provides the following configuration examples:

- [ROM Monitor Upgrade: Example, page 5-67](#)
- [Graceful Reload of a Cisco CRS Router: Example, page 5-70](#)

### ROM Monitor Upgrade: Example

The following example illustrates how to display ROM monitor image information for all cards in the router. ROMMON B is referred to as rommon in the display.

```
RP/0/RP0/CPU0:Router(admin)# show hw-module fpd location all
```

```
Sun Jun 6 04:24:16.510 DST
```

```
===== Existing Field Programmable Devices =====
=====
Location      Card Type      HW      Current SW Upg/
Version Type Subtype Inst  Version  Dng?
=====
0/1/SP        40G-MSC        0.2    lc    rommonA  0      2.03    No
              lc    rommon   0      2.03    No
-----
0/1/CPU0      CRS1-SIP-800   0.96   lc    fpga1    0      6.00    No
              lc    rommonA  0      2.03    No
              lc    rommon   0      2.03    No
-----
0/1/0         SPA-4XOC3-POS  1.0    spa   fpga1    0      3.04    No
-----
0/1/1         SPA-4XT3/E3    1.1    spa   fpga1    1      1.00    No
              spa   rommon   1      2.12    No
              spa   fpga2    1      1.04    No
              spa   fpga3    1      1.04    No
-----
0/1/4         SPA-4XOC48POS/RPR  1.0    spa   fpga1    4      1.00    No
-----
0/1/5         SPA-8X1GE      2.2    spa   fpga1    5      1.08    No
-----
0/4/SP        DRP            0.3    lc    rommonA  0      2.03    No
```

			lc	rommon	0	2.03	No
0/4/CPU0	DRP	0.3	lc	rommonA	0	2.03	No
			lc	rommon	0	2.03	No
0/4/CPU1	DRP	0.3	lc	rommonA	0	2.03	No
			lc	rommon	0	2.03	No
0/6/SP	40G-MSC	0.3	lc	rommonA	0	2.03	No
			lc	rommon	0	2.03	No
0/6/CPU0	CRS1-SIP-800	0.96	lc	fpga1	0	6.00	No
			lc	rommonA	0	2.03	No
			lc	rommon	0	2.03	No
0/6/0	SPA-4XOC3-POS	1.0	spa	fpga1	0	3.04	No
0/6/1	SPA-1X10GE-WL-V2	1.0	spa	fpga1	1	1.11	No
0/6/4	SPA-8XOC12-POS	1.1	spa	fpga1	4	1.00	No
0/6/5	SPA-8X1GE	2.2	spa	fpga1	5	1.08	No
0/RP0/CPU0	RP	0.1	lc	rommonA	0	2.03	No
			lc	rommon	0	2.03	No
0/RP1/CPU0	RP	0.1	lc	rommonA	0	2.03	No
			lc	rommon	0	2.03	No
0/SM0/SP	Fabric HS123	0.1	lc	rommonA	0	2.03	No
			lc	rommon	0	2.03	No
0/SM1/SP	Fabric HS123	0.1	lc	rommonA	0	2.03	No
			lc	rommon	0	2.03	No
0/SM2/SP	Fabric HS123	0.1	lc	rommonA	0	2.03	No
			lc	rommon	0	2.03	No
0/SM3/SP	Fabric HS123	0.1	lc	rommonA	0	2.03	No
			lc	rommon	0	2.03	No

The following example shows how to determine what FPD images are available for each card in the router:

```
RP/0/RP0/CPU0:Router(admin)# show fpd package
```

```
Sun Jun 6 04:25:46.199 DST
```

```
=====
                          Field Programmable Device Package
=====
```

Card Type	FPD Description	Type	Subtype	SW Version	Min Req SW Ver	Min Req HW Vers
140G-MSC	FPGA Linecard 32.0	lc	fpga2	32.00	0.0	0.0
	FPGA CPU 6.0	lc	fpga1	6.00	0.0	0.0
	ROMMONA swv2.03 kensho	lc	rommonA	2.03	0.0	0.0
	ROMMONB swv2.03 kensho	lc	rommon	2.03	0.0	0.0
10C768-ITU/C	OPTICS FIRMWARE 110B10	lc	fpga2	110.10	0.0	0.0

```

-----
----
10C768-DWDM-L      OPTICS FIRMWARE 110B10    lc  fpga2    110.10    0.0    0.0
-----
----
10C768-DPSK/C      OPTICS FIRMWARE 110B14    lc  fpga2    110.14    0.0    0.0
-----
----
10C768-DPSK/C-O    OPTICS FIRMWARE 110B14    lc  fpga2    110.14    0.0    0.0
-----
----
10C768-DPSK/C-E    OPTICS FIRMWARE 110B14    lc  fpga2    110.14    0.0    0.0
-----
----
CRS-CGSE-PLIM      FPGA mCPU0 0.559          lc  fpga2    0.559    0.0    0.0
                   FPGA sCPU0 0.559          lc  fpga3    0.559    0.0    0.0
                   FPGA mCPU1 0.559          lc  fpga4    0.559    0.0    0.0
                   FPGA sCPU1 0.559          lc  fpga5    0.559    0.0    0.0
                   FPGA PLIM_SVC 0.41014      lc  fpga1    0.41014  0.0    0.0
-----
----
20-10GBE           FPGA 42.0                 lc  fpga3    42.00    0.0    0.0
-----
----
12-10GBE           FPGA 42.0                 lc  fpga3    42.00    0.0    0.0
-----
----
1-100GBE           FPGA 14.0                 lc  fpga3    14.00    0.0    0.0
                   FPGA 26.0                 lc  fpga4    26.00    0.0    0.0
                   FPGA 20.0                 lc  fpga5    20.00    0.0    0.0
-----
----
14-10GBE           FPGA 42.0                 lc  fpga3    42.00    0.0    0.0
-----
----
CRS1-SIP-800       JACKET FPGA swv6.0        lc  fpga1    6.00     5.0    0.0
0.80               FPGA swv6.0 hwv80         lc  fpga1    6.00     5.0
-----
----
8-10GBE           FPGA swvA.0               lc  fpga1    10.00    0.0    0.0
-----
----
OC48-POS-16-ED     FPGA PLIM_OC48 9.0        lc  fpga1    9.00     0.0    0.0
-----
----
4-10GBE           FPGA sw_4p_v15.0          lc  fpga1    15.00    0.0    0.0
--More--

```

The following example shows how to upgrade ROMMON B:

```
RP/0/RP0/CPU0:Router(admin)# upgrade hw-module fpd rommon force location 0/SM3/SP
```

```
% RELOAD REMINDER:
```

- The upgrade operation of the target module will not interrupt its normal operation. However, for the changes to take effect, the target module will need to be manually reloaded after the upgrade operation. This can be accomplished with the use of "hw-module <target> reload" command.
- If automatic reload operation is desired after the upgrade, please use the "reload" option at the end of the upgrade command.
- The output of "show hw-module fpd location" command will not display correct version information after the upgrade if the target module is not reloaded.

```
Continue? [confirm]
```

Starting the upgrade/download of following FPD:

```

=====
Location      Type Subtype Upg/Dng   Current   Upg/Dng
              Version   Version
-----
0/SM3/SP     lc  rommon  upg      1.43      1.43
-----
SP/0/SM3/SP:Feb 20 15:58:25.656 : lc_fpd_upgrade[112]: %PLATFORM-UPGRADE_FPD-6-START :
Starting to upgrade rommon subtype image from 1.43 to 1.43 for for this card on location
0/SM3/SP SP/0/SM3/SP:Feb 20 15:58:25.692 : upgrade_daemon[128]: Start Upgrade...
SP/0/SM3/SP:Feb 20 15:58:25.696 : upgrade_daemon[128]: programming...with file
/net/node0_RP0_CPU0/dev/shmem/hfr-fpd-3.5.0.I/fpd/ucode/rommon-hfr-ppc8255-sp-B.bin
SP/0/SM3/SP:Feb 20 15:58:25.719 : upgrade_daemon[128]: Verifying
/net/node0_RP0_CPU0/dev/shmem/hfr-fpd-3.5.0.I/fpd/ucode/rommon-hfr-ppc8255-sp-B.bin:
SP/0/SM3/SP:Feb 20 15:58:25.920 : upgrade_daemon[128]: Passed.
SP/0/SM3/SP:Feb 20 15:58:31.257 : upgrade_daemon[128]: Verifying ROMMON B:
SP/0/SM3/SP:Feb 20 15:58:31.297 : upgrade_daemon[128]: Passed.
SP/0/SM3/SP:Feb 20 15:58:31.301 : upgrade_daemon[128]: OK, ROMMON B is programmed
successfully.
SP/0/SM3/SP:Feb 20 15:58:31.310 : lc_fpd_upgrade[112]: %PLATFORM-UPGRADE_FPD-6-PASSED :
Successfully upgrade rommon subtype image for for this card on location 0/SM3/SP

% Successfully upgraded 1 FPD for Fabric HS123 on location 0/SM3/SP

```

## Graceful Reload of a Cisco CRS Router: Example

The following example shows how a Cisco CRS router is gracefully reloaded following a ROMMON upgrade or downgrade:

```
RP/0/RP0/CPU0:router# cfs check
```

```
Sun Jun  6 04:27:09.007 DST
```

```
Creating any missing directories in Configuration File system...OK
Initializing Configuration Version Manager...OK
Syncing commit database with running configuration...OK
```

```
RP/0/RP0/CPU0:router# hw-module location 0/RP1/CPU0 reload
```

```
WARNING: This will take the requested node out of service.
Do you wish to continue?[confirm(y/n)]y
```

```
RP/0/RP0/CPU0:router# show redundancy
```

```
Sun Jun  6 04:28:20.813 DST
Redundancy information for node 0/RP0/CPU0:
=====
Node 0/RP0/CPU0 is in ACTIVE role
Partner node (0/RP1/CPU0) is in STANDBY role
Standby node in 0/RP1/CPU0 is ready
Standby node in 0/RP1/CPU0 is NSR-ready
```

```
Reload and boot info
-----
```

```
RP reloaded Mon May 17 21:51:56 2010: 2 weeks, 5 days, 6 hours, 36 minutes ago
Active node booted Mon May 17 21:51:56 2010: 2 weeks, 5 days, 6 hours, 36 minutes ago
Standby node boot Mon May 17 21:51:31 2010: 2 weeks, 5 days, 6 hours, 36 minutes ago
Standby node last went not ready Mon May 17 22:03:02 2010: 2 weeks, 5 days, 6 hours, 25
minutes ago
```

```

Standby node last went ready Mon May 17 22:03:02 2010: 2 weeks, 5 days, 6 hours, 25
minutes ago
Standby node last went not NSR-ready Fri Jun  4 17:59:52 2010: 1 day, 10 hours, 28 minutes
ago
Standby node last went NSR-ready Fri Jun  4 18:00:28 2010: 1 day, 10 hours, 27 minutes ago
There have been 0 switch-overs since reload

Active node reload "Cause: Lost DSC"
Standby node reload "Cause: User reload request"

RP/0/RP0/CPU0:router# redundancy switchover

Updating Commit Database.  Please wait...[OK]
Proceed with switchover 0/RP0/CPU0 -> 0/RP1/CPU0? [confirm]
Initiating switch-over.
RP/0/RP0/CPU0:Router#

<Your 'TELNET' connection has terminated>

User Access Verification

Username: username
Password: <secret>
Last switch-over Tue Jun 13 12:07:34 2006: 1 minute ago

RP/0/RP1/CPU0:router# show redundancy

Redundancy information for node 0/RP1/CPU0:
=====
Node 0/RP1/CPU0 is in ACTIVE role
Partner node (0/RP0/CPU0) is in STANDBY role
Standby node in 0/RP0/CPU0 is ready

Reload and boot info
-----
RP reloaded Sun Jun 11 19:47:43 2006: 1 day, 16 hours, 24 minutes ago
Active node booted Sun Jun 11 19:48:25 2006: 1 day, 16 hours, 24 minutes ago
Last switch-over Tue Jun 13 12:07:34 2006: 5 minutes ago
Standby node boot Tue Jun 13 12:08:50 2006: 3 minutes ago
Standby node last went not ready Tue Jun 13 12:09:21 2006: 3 minutes ago
Standby node last went ready Tue Jun 13 12:11:21 2006: 1 minute ago
There has been 1 switch-over since reload

RP/0/RP1/CPU0:router# hw-module location 0/rp0/cpu0 reload

WARNING: This will take the requested node out of service.
Do you wish to continue?[confirm(y/n)]y

RP/0/RP1/CPU0:router# show redundancy

Redundancy information for node 0/RP1/CPU0:
=====
Node 0/RP1/CPU0 is in ACTIVE role
Partner node (0/RP0/CPU0) is in STANDBY role
Standby node in 0/RP0/CPU0 is ready

Reload and boot info
-----
RP reloaded Sun Jun 11 19:47:43 2006: 1 day, 16 hours, 30 minutes ago
Active node booted Sun Jun 11 19:48:25 2006: 1 day, 16 hours, 30 minutes ago
Last switch-over Tue Jun 13 12:07:34 2006: 11 minutes ago
Standby node boot Tue Jun 13 12:15:24 2006: 3 minutes ago
Standby node last went not ready Tue Jun 13 12:18:26 2006: 11 seconds ago
Standby node last went ready Tue Jun 13 12:18:26 2006: 11 seconds ago

```

There has been 1 switch-over since reload

RP/0/RP1/CPU0:router# **admin**

RP/0/RP1/CPU0:router(admin)# **show platform**

Sun Jun 6 04:30:19.934 DST

Node	Type	PLIM	State	Config State
0/1/SP	MSC (SP)	N/A	IOS XR RUN	PWR, NSHUT, MON
0/1/CPU0	MSC	Jacket Card	IOS XR RUN	PWR, NSHUT, MON
0/1/0	MSC (SPA)	4XOC3-POS	OK	PWR, NSHUT, MON
0/1/1	MSC (SPA)	4T3E3	OK	PWR, NSHUT, MON
0/1/4	MSC (SPA)	4XOC48-POS	OK	PWR, NSHUT, MON
0/1/5	MSC (SPA)	8X1GE	OK	PWR, NSHUT, MON
0/4/SP	DRP (SP)	N/A	IOS XR RUN	PWR, NSHUT, MON
0/4/CPU0	DRP (Active)	DRP-ACC	IOS XR RUN	PWR, NSHUT, MON
0/4/CPU1	DRP (Active)	DRP-ACC	IOS XR RUN	PWR, NSHUT, MON
0/6/SP	MSC (SP)	N/A	IOS XR RUN	PWR, NSHUT, MON
0/6/CPU0	MSC	Jacket Card	IOS XR RUN	PWR, NSHUT, MON
0/6/0	MSC (SPA)	4XOC3-POS	OK	PWR, NSHUT, MON
0/6/1	MSC (SPA)	1x10GE	OK	PWR, NSHUT, MON
0/6/4	MSC (SPA)	8XOC3/OC12-POS	OK	PWR, NSHUT, MON
0/6/5	MSC (SPA)	8X1GE	OK	PWR, NSHUT, MON
0/RP0/CPU0	RP (Active)	N/A	IOS XR RUN	PWR, NSHUT, MON
0/RP1/CPU0	RP (Standby)	N/A	IOS XR RUN	PWR, NSHUT, MON
0/SM0/SP	FC-40G/S (SP)	N/A	IOS XR RUN	PWR, NSHUT, MON
0/SM1/SP	FC-40G/S (SP)	N/A	IOS XR RUN	PWR, NSHUT, MON
0/SM2/SP	FC-40G/S (SP)	N/A	IOS XR RUN	PWR, NSHUT, MON
0/SM3/SP	FC-40G/S (SP)	N/A	IOS XR RUN	PWR, NSHUT, MON

RP/0/RP1/CPU0:router(admin)# **hw-module location 0/1/cpu0 reload warm**

WARNING: This will warm reload the requested node.

Do you wish to continue?[confirm(y/n)]**y**

RP/0/RP1/CPU0:router(admin)# **hw-module location 0/6/cpu0 reload warm**

WARNING: This will warm reload the requested node.

Do you wish to continue?[confirm(y/n)]**y**

RP/0/RP1/CPU0:router(admin)# **hw-module location 0/sm0/sp reload**

WARNING: This will take the requested node out of service.

Do you wish to continue?[confirm(y/n)]**y**

RP/0/RP1/CPU0:router(admin)# **hw-module location 0/sm1/SP reload**

WARNING: This will take the requested node out of service.

Do you wish to continue?[confirm(y/n)]**y**

RP/0/RP1/CPU0:router(admin)# **hw-module location 0/sm2/SP reload**

WARNING: This will take the requested node out of service.

Do you wish to continue?[confirm(y/n)]**y**

RP/0/RP1/CPU0:router(admin)# **hw-module location 0/sm3/SP reload**

WARNING: This will take the requested node out of service.

Do you wish to continue?[confirm(y/n)]**y**

RP/0/RP1/CPU0:router(admin)# **show platform**

Sun Jun 6 04:30:19.934 DST

Node	Type	PLIM	State	Config State
------	------	------	-------	--------------



```

-----
0/1/SP          MSC (SP)          N/A              IOS XR RUN       PWR, NSHUT, MON
0/1/CPU0       MSC              Jacket Card     IOS XR RUN       PWR, NSHUT, MON
0/1/0          MSC (SPA)        4XOC3-POS      OK               PWR, NSHUT, MON
0/1/1          MSC (SPA)        4T3E3          OK               PWR, NSHUT, MON
0/1/4          MSC (SPA)        4XOC48-POS     OK               PWR, NSHUT, MON
0/1/5          MSC (SPA)        8X1GE          OK               PWR, NSHUT, MON
0/4/SP         DRP (SP)         N/A            IOS XR RUN       PWR, NSHUT, MON
0/4/CPU0       DRP (Active)     DRP-ACC        IOS XR RUN       PWR, NSHUT, MON
0/4/CPU1       DRP (Active)     DRP-ACC        IOS XR RUN       PWR, NSHUT, MON
0/6/SP         MSC (SP)         N/A            IOS XR RUN       PWR, NSHUT, MON
0/6/CPU0       MSC              Jacket Card     IOS XR RUN       PWR, NSHUT, MON
0/6/0          MSC (SPA)        4XOC3-POS      OK               PWR, NSHUT, MON
0/6/1          MSC (SPA)        1x10GE         OK               PWR, NSHUT, MON
0/6/4          MSC (SPA)        8XOC3/OC12-POS OK               PWR, NSHUT, MON
0/6/5          MSC (SPA)        8X1GE          OK               PWR, NSHUT, MON
0/RP0/CPU0     RP (Active)      N/A            IOS XR RUN       PWR, NSHUT, MON
0/RP1/CPU0     RP (Standby)     N/A            IOS XR RUN       PWR, NSHUT, MON
0/SM0/SP       FC-40G/S (SP)   N/A            IOS XR RUN       PWR, NSHUT, MON
0/SM1/SP       FC-40G/S (SP)   N/A            IOS XR RUN       PWR, NSHUT, MON
0/SM2/SP       FC-40G/S (SP)   N/A            IOS XR RUN       PWR, NSHUT, MON
0/SM3/SP       FC-40G/S (SP)   N/A            IOS XR RUN       PWR, NSHUT, MON

```

```
RP/0/RP1/CPU0:router(admin)# show diag | inc ROM|NODE|PLIM
```

```

NODE 0/1/SP : MSC (SP)
  ROMMON: Version 1.40 (20060207:032848) [CRS ROMMON]
PLIM 0/1/CPU0 : JACKET CARD
  ROMMON: Version 1.40 (20060207:032757) [CRS ROMMON]
NODE 0/1/0 : 4xOC3 POS SPA
NODE 0/1/5 : 8xGE SPA
NODE 0/6/SP : MSC (SP)
  ROMMON: Version 1.40 (20060207:032848) [CRS ROMMON]
PLIM 0/6/CPU0 : JACKET CARD
  ROMMON: Version 1.40 (20060207:032743) [CRS ROMMON]
NODE 0/6/0 : 4xOC3 POS SPA
NODE 0/6/4 : 8xOC3/OC12 POS SPA
NODE 0/6/5 : 8xGE SPA
NODE 0/RP0/CPU0 : RP
  ROMMON: Version 1.40 (20060207:032757) [CRS ROMMON]
NODE 0/RP1/CPU0 : RP
  ROMMON: Version 1.40 (20060207:032757) [CRS ROMMON]
NODE 0/SM0/SP : FC/S
  ROMMON: Version 1.40 (20060207:032848) [CRS ROMMON]
NODE 0/SM1/SP : FC/S
  ROMMON: Version 1.40 (20060207:032848) [CRS ROMMON]
NODE 0/SM2/SP : FC/S
  ROMMON: Version 1.40 (20060207:032848) [CRS ROMMON]
NODE 0/SM3/SP : FC/S
  ROMMON: Version 1.40 (20060207:032848) [CRS ROMMON]

```

## What to Do Next

Complete the instructions in [Upgrading or Downgrading ROM Monitor Using the FPD PIE, page 5-61](#).

# Additional References

## Related Documents

Related Topic	Document Title
Hardware component commands	<i>Cisco IOS XR Interface and Hardware Component Command Reference</i>
System management commands	<i>Cisco IOS XR System Management Command Reference</i>

## Technical Assistance

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<a href="http://www.cisco.com/support">http://www.cisco.com/support</a>