



Router Recovery and Management with ROM Monitor

The ROM Monitor is a bootstrap program that initializes the hardware and boots the Cisco IOS XR software when you power on or reload a router. If the Cisco IOS XR software cannot boot, the router startup ends in ROM Monitor mode and displays the ROM Monitor command-line interface (CLI) prompt:

```
rommon B1>
```

During normal operation, users do not see the ROM Monitor prompt or use ROM Monitor mode. If the ROM Monitor prompt appears, you might need to reinstall the router software. If you lose the router password or want to specify a configuration file to use at startup, you can perform these tasks in ROM Monitor mode. This chapter describes the procedures that you might want to perform in ROM Monitor mode.

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This appendix contains the following sections:

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- [Reinstalling the Cisco IOS XR Software from ROMMON, page A-2](#)
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- [Specifying an Alternative Configuration, page A-24](#)
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ROM Monitor Overview

The ROM Monitor software is known by many names. It is sometimes called ROMMON because of the CLI prompt in ROM Monitor mode. The ROM Monitor software is also called the boot software, boot image, or boot helper.

Although it is distributed with routers that use the Cisco IOS XR software, ROM Monitor is a separate program from the Cisco IOS XR software. During normal startup, the ROM Monitor initializes the router, and then control passes to the Cisco IOS XR software. After the Cisco IOS XR software takes over, ROM Monitor is no longer in use.

Two primary connections exist between ROM Monitor and the Cisco IOS XR software: the ROM Monitor environment variables and the configuration register. The ROM Monitor environment variables define the location of the Cisco IOS XR software and how to load it. After ROM Monitor has initialized the router, it uses the environment variables to locate and load the Cisco IOS XR software.

The configuration register is a software setting that controls router startup. One of the primary uses of the configuration register is to control whether the router starts in ROM Monitor mode or EXEC mode. The configuration register is set in either ROM Monitor mode or EXEC mode as needed. Typically, you set the configuration register for ROM Monitor mode in the Cisco IOS XR software when you need to use ROM Monitor mode. When your maintenance in ROM Monitor mode is complete, you change the configuration register to start the Cisco IOS XR software.

When the router is in ROM Monitor mode, you can access the ROM Monitor software only from a terminal connected directly to the Console port of the primary or standby route processor (RP). Because the Cisco IOS XR software (EXEC mode) is not operating, the non management interfaces (such as PoS interfaces) are not accessible. Basically, all of the Cisco IOS XR software resources are unavailable. The hardware is there, but no configuration exists to make use of the hardware.

Some people get confused when they start to use ROM Monitor mode. It is important to remember that ROM Monitor mode is a router mode, not a mode within the Cisco IOS XR software. It is best to remember that ROM Monitor software and the Cisco IOS XR software are two separate programs that run on the same router. At any given time, the router is running one of these programs, but it never runs both at the same time.

One area that confuses people when using ROM Monitor and the Cisco IOS XR software is that area that defines the IP configuration for the Management Ethernet interface. Most router users get comfortable with configuring the Management Ethernet interface in the Cisco IOS XR software. When the router is in ROM Monitor mode, however, the router is not running the Cisco IOS XR software, so that Management Ethernet interface configuration is not available. Therefore, because it is a separate program, you must configure ROM Monitor to use the Management Ethernet interface if you want to access other devices, such as a TFTP server, while in ROM Monitor mode.

Reinstalling the Cisco IOS XR Software from ROMMON



Caution

Reinstalling the Cisco IOS XR software from ROMMON replaces the currently installed router software and causes substantial router downtime. We recommend installing or upgrading software packages from the EXEC mode using package installation envelope (PIE) files, as described in [Chapter 5, “Managing Cisco IOS XR Software Packages.”](#)

The standard way to install new software on a router is by using the **install** command in admin EXEC mode. However, if the router is unable to boot the Cisco IOS XR software or you want to completely replace the existing software, you can reinstall the software while the router is in ROM Monitor mode. When you install the Cisco IOS XR software from ROM Monitor, you must use a special software installation file with a .vm file extension. You cannot install software in PIE files from ROM Monitor mode.

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Cisco IOS XR Software Installation Overview

When you reinstall the software from ROM Monitor mode, you can do either of the following:

- Load the Cisco IOS XR software from a .vm file on a TFTP server.
- Transfer the .vm file to disk1: and load the Cisco IOS XR software from disk1:.

The following sections provide an overview of the processes:

- [Installation from a TFTP Server, page A-3](#)
- [Installation from disk1:, page A-4](#)

Installation from a TFTP Server

When you install the Cisco IOS XR software from a TFTP server, you must do the following:

1. Place the router in ROM Monitor mode.
2. Clear any environment variables that might interfere with the installation.
3. Configure ROM Monitor with the IP parameters required to access the TFTP server.
4. Configure the TURBOBOOT environment variable to either clean or format disk0: during the install.
5. Boot the Cisco IOS XR software from a .vm file on the TFTP server.

After you boot the Cisco IOS XR software, the software loads into memory so that it can clean or format disk0: based on the TURBOBOOT environment variable setting. When this variable is set to clean the disk, the software replaces all previously installed software with the Cisco IOS XR software from the TFTP server. All router configuration files are retained so that after the installation, the new software operates with the previous configuration.

When the TURBOBOOT environment variable is set to format disk0:, the Cisco IOS XR software from the TFTP server replaces the software on disk0: and the previous configuration is deleted. When the router starts after a disk format, it operates as would a new router with no configuration.

For the procedure to install the Cisco IOS XR software from a TFTP server, see the [“Reinstalling the Software from an Image Located on a TFTP Server”](#) section on page A-10.

Installation from disk1:

When you install the Cisco IOS XR software from disk1:, you must do the following:

1. Copy the new Cisco IOS XR software to disk1:.
2. Place the router in ROM Monitor mode.
3. Clear any environment variables that might interfere with the installation.
4. Configure the TURBOBOOT environment variable to either clean or format disk0: during the install.
5. Boot the Cisco IOS XR software from the new Cisco IOS XR software on disk1:.

After you boot the Cisco IOS XR software, the software loads into memory so that it can clean or format disk0: based on the TURBOBOOT environment variable setting. When this variable is set to clean the disk, the software replaces all previously installed software with the Cisco IOS XR software from disk1:. All router configuration files are retained so that after the installation, the new software operates with the previous configuration.

When the TURBOBOOT environment variable is set to format disk0:, the Cisco IOS XR software from disk1: replaces the software on disk0: and the previous configuration is deleted. When the router starts after a disk format, it operates as would a new router with no configuration.

For the procedure to install the Cisco IOS XR software from disk1:, see the [“Reinstalling the Software from a .vm File Located on Flash disk1:”](#) section on page A-16.

Locating Installable Files

To obtain Cisco IOS XR software and version information, use the Cisco IOS XR Software Selector tool at the following website:

<http://www.cisco.com/cgi-bin/Software/IOXPlanner/planner-tool/ioxplanner.cgi?>

The Cisco IOS XR Software Selector tool allows you to browse for your software upgrade from a single interface. You can display and select software by package name, release, or platform. The tool also includes posting images and Extensible Markup Language (XML) schemas. Choosing a platform, release, or software feature automatically limits the choices based on your selection, until you arrive at your preferred software.

The software packages that you can install from ROMMON are listed in [Table A-1](#).

Table A-1 Downloadable Software for Installation from ROM Monitor

Software Package Name	Description
Cisco IOS XR IP/MPLS Core Software	This package contains two copies of the Cisco IOS XR Unicast Routing Core Bundle. One copy is in the package installation envelope (PIE) file format and can be installed while IOS XR is running, as described in Chapter 5, “Managing Cisco IOS XR Software Packages.” The other copy is in a .vm file that can be installed from ROM Monitor. This package also includes the Cisco IOS XR MPLS, Manageability, and Multicast packages (in PIE files).
Cisco IOS XR IP/MPLS Core Software 3DES	This package contains everything in the Cisco IOS XR IP/MPLS Core Software package, and it contains the Cisco IOS XR Security package (in a PIE file).

The packages listed in [Table A-1](#) are distributed in files with .tar filename extensions (.tar files are assembled with the UNIX tar utility). When you download a tar file, you must unpack the tar file with a software program before you can install any of the files in the package.

The files that you can install from ROM Monitor have a .vm filename extension. These files contain the software included in the Cisco IOS XR Unicast Routing Core Bundle. The other files in the packages are PIE files.

**Note**

The tar files contain both PIE files and .vm files. If the router is operating properly, you can install the software using the appropriate PIE file with little or no interruption to router traffic, as described in [Chapter 5, “Managing Cisco IOS XR Software Packages.”](#) If the router cannot boot the Cisco IOS XR software, install the core software using the .vm file first, then install any additional packages using the PIE files after the router enters EXEC mode.

Packages for the Cisco XR 12000 Series Router contain additional files which are described in [Table A-1](#).

Table A-2 Additional Files for the Cisco XR 12000 Series Router

Filename	Description
mbiprp-rp.vm-3.2.0	This is the software for all RPs except the RP that serves as the designated shelf controller (DSC). This software is automatically downloaded from the DSC to the other RPs when the RPs are started.
bfprp_romupgrade-1.14.0.91	This is the ROM Monitor upgrade software for the PRP cards, and later versions may display a different version number at the end of the filename. For instructions on installing this software, see Appendix C, “Upgrading and Downgrading Boothelper and ROM Monitor on Cisco XR 12000 Series Routers.”
c12kprp-boot-mz.120-30.S	This is the boothelper software for the PRP cards, and later versions may display a different version number at the end of the filename. For instructions on installing this software, see Appendix C, “Upgrading and Downgrading Boothelper and ROM Monitor on Cisco XR 12000 Series Routers.”

tar Filenames and Version Numbers

The format for a tar filename is:

platform-bundle_name-major.minor.maintenance.tar

The tar filename components are described in [Table A-3](#).

Table A-3 *tar* Filename Components

Component	Description
<i>platform</i>	<p>Identifies the platform for which the software package is designed.</p> <ul style="list-style-type: none"> For packages designed for the Cisco CRS-1 router, the platform designation is “CRS-1.” For packages designed for the Cisco XR 12000 Series Router, the platform designation is “c12000.”
<i>bundle_name</i>	<p>Identifies a specific bundle.</p> <ul style="list-style-type: none"> The “iosxr” bundle name indicates a file that includes all packages in the Cisco IOS XR Unicast Routing Core Bundle and the Management, MPLS, and Multicast packages. These packages are described in Chapter 5, “Managing Cisco IOS XR Software Packages.” The “iosxr-k9” bundle name indicates a file that includes all packages in the “iosxr” bundle file plus the Security package.
<i>major</i>	<p>Identifies the major release of this package.</p> <ul style="list-style-type: none"> A major release occurs when there is a major architectural change to the product (for example, a major new capability is introduced). All packages operating on the router must be at the same major release level. A major release is the least frequent release and may require a router reboot.

Table A-3 tar Filename Components (continued)

Component	Description
<i>minor</i>	<p data-bbox="915 317 1403 348">Identifies the minor release of this package.</p> <ul style="list-style-type: none"> <li data-bbox="927 365 1455 512">• A minor release contains one or more of the following: <ul style="list-style-type: none"> <li data-bbox="976 438 1159 470">– New features <li data-bbox="976 485 1117 516">– Bug fixes <li data-bbox="927 531 1463 678">• The minor release version does not have to be identical for all software packages operating on the router, but the operating packages must be certified by Cisco as compatible with each other. <li data-bbox="927 701 1459 732">• A minor release may require a router reboot.
<i>maintenance</i>	<p data-bbox="915 747 1468 779">Identifies the maintenance release of this package.</p> <ul style="list-style-type: none"> <li data-bbox="927 793 1455 856">• A maintenance release contains a collection of bug fixes for a package. <li data-bbox="927 871 1463 1060">• The maintenance release version does not have to be identical for all software packages operating on the router, but the major and minor versions of the maintenance release must match the those of the package being updated. <li data-bbox="927 1075 1403 1138">• A maintenance release usually does not require a router reboot.

.vm Filenames and Version Numbers

The format for a composite .vm filename for Cisco CRS-1s is:

comp-platform-package_name.vm-major.minor.maintenance

The format for a .vm filename for Cisco XR 12000 Series Routers is:

platform-package_name.vm-major.minor.maintenance

The “comp” prefix indicates that the file is a composite of multiple packages. The other filename components are described in [Table A-4](#).

Table A-4 .vm Filename Components

Component	Description
<i>platform</i>	Identifies the platform for which the software package is designed. <ul style="list-style-type: none"> For packages designed for Cisco CRS-1s, the platform designation is “hfr.” For packages designed for Cisco XR 12000 Series Routers, the platform designation is “c12k.” The mbiprp platform name specifies a special file for the Cisco XR 12000 Series Router. This file is described in Table A-2.
<i>package_name</i>	Identifies a specific package. <ul style="list-style-type: none"> The “mini” package name indicates a composite package that includes all packages in the Cisco IOS XR Unicast Routing Core Bundle, which is described in Chapter 5, “Managing Cisco IOS XR Software Packages.” The rp package name specifies a special file for the Cisco XR 12000 Series Router. This file is described in Table A-2.
<i>major</i>	Identifies the major release of this package. <ul style="list-style-type: none"> A major release occurs when there is a major architectural change to the product (for example, a major new capability is introduced). All packages operating on the router must be at the same major release level. A major release is the least frequent release and may require a router reboot.

Table A-4 .vm Filename Components (continued)

Component	Description
<i>minor</i>	<p>Identifies the minor release of this package.</p> <ul style="list-style-type: none"> • A minor release contains one or more of the following: <ul style="list-style-type: none"> – New features – Bug fixes • The minor release version does not have to be identical for all software packages operating on the router, but the operating packages must be certified by Cisco as compatible with each other. • A minor release may require a router reboot.
<i>maintenance</i>	<p>Identifies the maintenance release of this package.</p> <ul style="list-style-type: none"> • A maintenance release contains a collection of bug fixes for a package. • The maintenance release version does not have to be identical for all software packages operating on the router, but the major and minor versions of the maintenance release must match the those of the package being updated. • A maintenance release usually does not require a router reboot.

Reinstalling the Software from an Image Located on a TFTP Server

The Cisco IOS XR software can be reinstalled directly from a .vm image located on a TFTP server. Complete the instructions in this section exactly as described.

Restrictions for TFTP Services

TFTP services by some vendors (such as Sun Solaris) may not support files larger than 32 MB. Because most Cisco IOS XR .vm images are larger than 32 MB, you may need to use one of the following options:

- Use a third-party or freeware TFTP server that supports file sizes larger than 32 MB.
- Download a patch from Sun Microsystems to correct this limitation (<http://www.sun.com>).
- Install the Cisco IOS XR software from a .vm image located on the local flash disk. See the “[Reinstalling the Software from a .vm File Located on Flash disk1:](#)” section on page A-16.

Prerequisites

Before you begin, collect the following information.

- IP address of the Management Ethernet interface for your router
- Subnet mask of the Management Ethernet interface for your router
- IP address of the default gateway that serves your router
- IP address of the TFTP server from which the software will be downloaded
- The filename and directory of the .vm installation file that will be installed on the router

**Note**


This procedure installs the Cisco IOS XR software on a router that previously ran the Cisco IOS software. If you are upgrading a Cisco XR 12000 Series Router that is currently running Cisco IOS software, you need to first upgrade the router to Cisco IOS XR software, as described in the document titled *Upgrading from Cisco IOS to Cisco IOS XR Software on the Cisco XR 12000 Series Router, Release 3.2*.

SUMMARY STEPS

1. Back up the router configuration while still in EXEC mode.
2. Place both the standby RP and primary RP in ROM Monitor mode.
3. Prepare the standby RP:
 - a. **unset BOOT**
 - b. **unset TFTP_FILE**
 - c. **sync**
 - d. **confreg 0x2**
 - e. **reset**
4. On the primary RP, set the environment variables that configure the Management Ethernet interface for use in ROM Monitor mode:
 - a. **IP_ADDRESS=ip_address**
 - b. **IP_SUBNET_MASK=ip_address**
 - c. **DEFAULT_GATEWAY=ip_address**
5. On the primary RP, clear the BOOT and TFTP filename variables and set the TURBOBOOT environment variable:
 - a. **unset BOOT**
 - b. **unset TFTP_FILE**
 - c. **TURBOBOOT=on, destination, options**
 - d. **sync**
6. **boot tftp://server/directory/filename**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Back up the router configuration while still in EXEC mode.	(Optional) To preserve the current router configuration, copy it to another disk while still in EXEC mode. <ul style="list-style-type: none"> See the “Managing Configuration History and Rollback” section on page 3-3 for more information.
Step 2	Place both the standby RP and primary RP in ROM Monitor mode.	See the “Entering ROM Monitor Mode” section on page A-25 for more information. <ul style="list-style-type: none"> You must attach a terminal to each card for this procedure.
Step 3	Prepare the standby RP: <ol style="list-style-type: none"> unset BOOT unset TFTP_FILE sync confreg 0x2 reset Example: <pre>rommon B1> unset BOOT rommon B2> unset TFTP_FILE rommon B4> sync rommon B5> confreg 0x2 rommon B6> reset</pre>	Enter these settings exactly as shown. All variable names are case sensitive. <ol style="list-style-type: none"> Clears the BOOT variable. Clears the TFTP_FILE variable. Saves the changes. Sets the configuration register to automatically start the router in EXEC mode when the card is reset. Resets the standby RP and starts the boot process.
Step 4	On the primary RP, set the environment variables that configure the Management Ethernet interface for use in ROM Monitor mode: <ol style="list-style-type: none"> IP_ADDRESS=ip_address IP_SUBNET_MASK=ip_address DEFAULT_GATEWAY=ip_address Example: <pre>rommon B1> IP_ADDRESS=1.1.1.1 rommon B2> IP_SUBNET_MASK=255.255.254.0 rommon B3> DEFAULT_GATEWAY=1.1.0.1</pre>	Enter these settings exactly as shown. <ul style="list-style-type: none"> All variable names are case sensitive. <ol style="list-style-type: none"> Sets the IP address for the Management Ethernet interface on the router. Sets the subnet mask for the Management Ethernet interface on the router. Identifies the default gateway that serves the router.

Command or Action	Purpose
<p>Step 5 On the primary RP, clear the BOOT and TFTP filename variables and set the TURBOBOOT environment variable:</p> <ol style="list-style-type: none"> a. unset BOOT b. unset TFTP_FILE c. TURBOBOOT=on, destination, options d. sync <p>Example:</p> <pre>rommon B1> TURBOBOOT=on,disk0,format rommon B2> sync</pre>	<ol style="list-style-type: none"> a. Clears the BOOT variable. b. Clears the TFTP_FILE variable. c. Sets the TURBOBOOT parameters. TURBOBOOT parameters are: <ul style="list-style-type: none"> – on: Enables TURBOBOOT and cleans the destination if the format option is not specified. – <i>destination</i>: Specifies the disk from which the Cisco IOS XR software boots. Available destinations are disk0 and disk1. – <i>options</i>: Specifies the TURBOBOOT options. If no option is specified or the clean option is entered, the destination is cleaned. To format the destination, enter the format option. – When the clean option is selected, the current software is deleted and replaced with new packages. Other files, such as user configurations, are preserved. – When the format option is entered, the entire flash disk is formatted before the new software packages are installed. All existing software and configurations are deleted. d. Saves the new ROM Monitor variable settings. <p> Caution The option to format disk0: deletes all router configurations. To preserve the current router configuration, copy it to another disk while still in EXEC mode. See the “Managing Configuration History and Rollback” section on page 3-3.</p>

Command or Action	Purpose
<p>Step 6 <code>boot tftp://server/directory/filename</code></p> <p>Example: rommon B1> boot tftp://223.255.254.254/softdir/comp-hfr-mini.vm</p>	<p>Retrieves the file from the TFTP server and installs it on disk0:.</p> <ul style="list-style-type: none"> • Execute this command on the primary RP and specify the .vm installation file from the TFTP server. • This process removes any existing software packages, resets the configuration register to 0x2, and boots the system. • After the primary RP boots, the standby RP downloads (synchronizes) the packages from the primary RP and boots automatically. • Allow the system to fully boot. • If you choose the option to format disk0:, the router configuration is cleared and the router prompts you to enter a root-system username and password. • If you choose the option to clean disk0:, the system is fully booted when the CLI prompt is shown and the interfaces are created. • The TURBOBOOT process takes some time. Please do not enter any commands until you are prompted to enter a username or until the CLI prompt appears.

Examples

The following examples are provided:

- [Preparing the Standby RP, page A-14](#)
- [Setting the IP Environment Variables, page A-15](#)
- [Setting the TURBOBOOT Variable, page A-15](#)
- [Booting the .vm Installation File, page A-15](#)

Preparing the Standby RP

The following example shows how to clear the boot and TFTP filename environment variables, set the TURBOBOOT variable to clean the hard disk, set the configuration register to start the router in EXEC mode, and reset the standby RP:

```
rommon B1> unset BOOT
rommon B2> unset TFTP_FILE
rommon B4> sync
rommon B5> confreg 0x2
rommon B6> reset
```

Setting the IP Environment Variables

The following example shows how to configure the ROM Monitor Management Ethernet interface on the primary RP:

```
rommon B1> IP_ADDRESS=10.1.1.1
rommon B2> IP_SUBNET_MASK=255.255.254.0
rommon B3> DEFAULT_GATEWAY=10.1.0.1
```

Setting the TURBOBOOT Variable

The following example shows how to set the TURBOBOOT variable on the primary RP and save the change:

```
rommon B1> TURBOBOOT=on,disk0,format
rommon B2> sync
```

Booting the .vm Installation File

The following example shows how to boot the router using the specified .vm file on the specified TFTP server. Because the TURBOBOOT option was set to format disk0:, the previous configuration is erased, and the Cisco IOS XR software prompts the user to enter a root-system username and password:

```
rommon B2> boot tftp://10.10.10.10/software/comp-hfr-mini.vm-05.02.08
```

```
.
.
.
```

```
bios con0/RP1/CPU0 is now available
```

```
Press RETURN to get started.
```

```
.
.
.
```

```
--- Administration User Dialog ---
```

```
Enter root-system username: crs-1
```

```
Enter secret: crs-1
```

The following configuration command script was created:

```
username crs-1
  secret 5 $1$NCmY$VBS6zCKg3baU0IrJ.IvLm/
  group cisco-support
!
end
```

```
[0] Return back to the setup without saving this config.
[1] Save this configuration and exit.
Enter your selection [1]: 1
RP/0/RP1/CPU0:Feb 17 21:54:19.709 : exec[65667]: %MGBL-LIBTARCFG-6-SYSTEM_ADMIN_
COMMIT : Administration configuration committed by system.
Use the 'configure' command to modify this configuration.
User Access Verification
```

```
Username: crs-1
Password:
RP/0/RP1/CPU0:ios#
```

Reinstalling the Software from a .vm File Located on Flash disk1:

This section describes the tasks required to install the Cisco IOS XR software on the flash disk0: using a .vm image stored on flash disk1:. Complete the procedures exactly as described in this section.



Note

Before booting begins, a delay of 10 minutes or more may occur while the .vm image is read to memory from the removable flash disk1: (DDTS CSCed22546).

Copying a .vm Image to disk1:

Flash disk1: can contain an archive of bootable .vm files. If these files are not present on disk1: or a different version is required, use one of the following options:

- While the router is still in EXEC mode, copy the necessary .vm image from a TFTP, an FTP, or an rcp server to disk1:. This process is described in the [“Upgrading, Downgrading, and Installing Packages”](#) section on page 5-26.
- Consult your system administrator for a flash disk containing the bootable .vm file.
- Consult your Cisco representative for a flash disk containing the bootable .vm file. See the [“Obtaining Technical Assistance”](#) section on page xviii for more information.



Note

The removable disk1: is used to store archives of .vm and PIE files only. This disk cannot be used as a destination for installed software or configurations. Only disk0: can be used to store active software and configurations. See the [“Overview of Package Management”](#) section on page 5-18 for more information.

Prerequisites


A valid .vm image, as described in the [“Locating Installable Files”](#) section on page A-4, must be located on flash disk (disk1:).

SUMMARY STEPS

1. Back up the router configuration while still in EXEC mode.
2. Place both the standby RP and primary RP in ROM Monitor mode.
3. Prepare the standby RP:
 - a. **unset BOOT**
 - b. **unset TFTP_FILE**
 - c. **sync**
 - d. **confreg 0x2**
 - e. **reset**
4. On the primary RP, clear the BOOT and TFTP filename variables and set the TURBOBOOT variable:
 - a. **unset BOOT**
 - b. **unset TFTP_FILE**
 - c. **TURBOBOOT=on, destination, options**
 - d. **sync**
5. **boot disk1:/filename**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Back up the router configuration while still in EXEC mode.	(Optional) To preserve the current router configuration, copy it to another disk while still in EXEC mode. <ul style="list-style-type: none"> See the “Managing Configuration History and Rollback” section on page 3-3 for more information.
Step 2	Place both the standby RP and primary RP in ROM Monitor mode.	See the “Entering ROM Monitor Mode” section on page A-25 for more information. <ul style="list-style-type: none"> You must attach a terminal to each card for this procedure.
Step 3	Prepare the standby RP: <ol style="list-style-type: none"> unset BOOT unset TFTP_FILE sync confreg 0x2 reset <p>Example:</p> <pre>rommon B1> unset BOOT rommon B2> unset TFTP_FILE rommon B4> sync rommon B5> confreg 0x2 rommon B6> reset</pre>	Enter the settings exactly as shown. <ul style="list-style-type: none"> All variable names are case sensitive. <ol style="list-style-type: none"> Clears the BOOT variable. Clears the TFTP_FILE variable. Saves the changes. Sets the configuration register to automatically start the boot process instead of staying in ROM Monitor mode. Resets the standby RP and starts the boot process.

Command or Action	Purpose
<p>Step 4 On the primary RP, clear the BOOT and TFTP filename variables and set the TURBOBOOT environment variable:</p> <ol style="list-style-type: none"> a. unset BOOT b. unset TFTP_FILE c. TURBOBOOT=on, destination, options d. sync <p>Example:</p> <pre>rommon B1> TURBOBOOT=on,disk0,format rommon B2> sync</pre>	<ol style="list-style-type: none"> a. Clears the BOOT variable. b. Clears the TFTP_FILE variable. c. Sets the TURBOBOOT parameters. TURBOBOOT parameters are: <ul style="list-style-type: none"> – on: Enables TURBOBOOT and cleans the destination if the format option is not specified. – <i>destination</i>: Specifies the disk from which the Cisco IOS XR software boots. Available destinations are disk0 and disk1. – <i>options</i>: Specifies the TURBOBOOT options. If no option is specified or the clean option is entered, the destination is cleaned. To format the destination, enter the format option. – When the clean option is selected, the current software is deleted and replaced with new packages. Other files, such as user configurations, are preserved. – When the format option is entered, the entire flash disk is formatted before the new software packages are installed. All existing software and configurations are deleted. d. Saves the configuration. <p> Caution The option to format disk0: deletes all router configurations. To preserve the current router configuration, copy it to another disk while still in EXEC mode. See the “Managing Configuration History and Rollback” section on page 3-3</p>

Command or Action	Purpose
<p>Step 5 boot disk1:/filename</p> <p>Example: rommon B1> boot disk1:/comp-hfr-mini.vm-05.02.08</p>	<p>Boots the file located on disk1: and installs it to the default disk0:.</p> <ul style="list-style-type: none"> • This process removes any existing software packages, resets the configuration register to 0x2, and boots the system. • After the primary RP boots, the standby RP downloads (synchronizes) the packages from the primary RP and boots automatically. • Allow the system to fully boot. • If you choose the option to format disk0:, the router configuration is cleared and you must enter a new root-system username and password when the router boot process completes. • If you choose the option to clean disk0:, the system is fully booted when the CLI prompt is shown and the interfaces are created. • The TURBOBOOT process takes some time. Please do not enter any commands until you are prompted to enter a username or until the CLI prompt appears. <p>Note A delay of 10 minutes or more occurs while the software is read from the flash disk (DDTS CSCed22546).</p>

Examples

The following examples are provided:

- [Preparing the Standby RP, page A-20](#)
- [Setting the TURBOBOOT Variable, page A-21](#)
- [Booting the .vm Installation File, page A-21](#)

Preparing the Standby RP

The following example shows how to clear the boot and TFTP filename environment variables, set the configuration register to start the router in EXEC mode, and reset the standby RP:

```
rommon B1> unset BOOT
rommon B2> unset TFTP_FILE
rommon B4> sync
rommon B5> confreg 0x2
rommon B6> reset
```

Setting the TURBOBOOT Variable

The following example shows how to set the TURBOBOOT variable on the primary RP and save the change:

```
rommon B1> TURBOBOOT=on, disk0, format
rommon B2> sync
```

Booting the .vm Installation File

The following example shows how to boot the router using the specified .vm file on flash disk1:

```
rommon B1> boot disk1:/comp-hfr-mini.vm
```

**Note**

A delay of 10 minutes or more occurs while the software is read from the flash disk (DDTS CSCed22546).

What to Do Next

After the system is up, it is in normal EXEC mode, and you can execute the full range of CLI commands.

**Note**

If you chose the option to format disk0:, the router configuration is cleared and you must enter a root-system username and password when the boot process is complete.

After reinstalling the software, you might want to do one or more of the following:

1. See the [“Verifying the System Interfaces” section on page 7-22](#) for instructions to verify that the interfaces are up and properly configured.
2. Install additional software from the PIE files, as necessary. See [Chapter 5, “Managing Cisco IOS XR Software Packages,”](#) for more information.
3. See the [“Related Documents” section on page xv](#) for a list of the additional documentation required to fully configure the router.

Recovering the Root Password

If the root password is forgotten, it can be recovered only at the designated shelf controller (DSC). To recover the password at the DSC, set the configuration register to 0x42 on the primary RP and reboot the router. When the router boots, a password recovery dialog appears. This dialog prompts you to reset the root-system username and password. After you save the new password, the configuration register automatically resets to the prior value (such as 0x2).

Password recovery procedures are described in the following sections:

- [Recovering the Root Password on Single-RP Routers, page A-22](#)
- [Recovering the Root Password on Redundant-RP Routers, page A-23](#)

Recovering the Root Password on Single-RP Routers

Use the following procedure to recover the router password from a router with a single RP.

Step 1 Place the router in ROM Monitor mode, as described in the [“Entering ROM Monitor Mode”](#) section on page A-25.

Step 2 Set the RP configuration register to 0x42 at the ROMMON prompt:

```
rommon 1 > confreg 0x42
```



Note

The configuration register is not an environment variable like TURBOBOOT (which is described earlier in this chapter). Do not enter an equal sign when entering the **confreg** command.

Step 3 Reset or power cycle the router so that the new setting can take effect:

```
rommon 2 > reset
```

Step 4 Press **Return** at the prompt to enter the password recovery dialog. Then enter the new root-system username and password and save the configuration.

```
router con0/0/CPU0 is now available
```

```
Press RETURN to get started.
```

```
--- Administration User Dialog ---
```

```
Enter root-system username: c12000
```

```
Enter secret: c12000
```

The following configuration command script was created:

```
username c12000
 secret 5 $1$5b3a$YCat5x.hUoAhZYWRrE0fI0
 group cisco-support
!
end
```

```
[0] Return back to the setup without saving this config.
[1] Save this configuration and exit.
Enter your selection [1]: 1
config register will be reset to 0x102
Use the 'configure' command to modify this configuration.
User Access Verification
```

```
Username: c12000
Password:
```

```
RP/0/0/CPU0:router#
```

Recovering the Root Password on Redundant-RP Routers

Use the following procedure to recover the router password from a router with redundant RPs.

- Step 1** Place both RPs in ROM Monitor mode, as described in the [“Entering ROM Monitor Mode”](#) section on page A-25.
- Step 2** Set the configuration register of the secondary RP to 0x0 so that the secondary RP does not take control during the password recovery:

```
rommon 1> confreg 0x0
```



Note The configuration register is not an environment variable like TURBOBOOT (which is described earlier in this chapter). Do not enter an equal sign when entering the **confreg** command.

- Step 3** Set the primary RP configuration register to 0x42:
- Step 4** Reset or power cycle the router so that the new setting can take effect:
- Step 5** Press **Return** at the prompt to enter the password recovery dialog. Then enter the new root-system username and password and save the configuration, as shown in the following example:

```
router con0/0/CPU0 is now available
```

```
Press RETURN to get started.
```

```
--- Administration User Dialog ---
```

```
Enter root-system username: c12000
```

```
Enter secret: c12000
```

The following configuration command script was created:

```
username c12000
  secret 5 $1$5b3a$YCat5x.hUoAhZYWRrE0fI0
  group cisco-support
!
end

[0] Return back to the setup without saving this config.
[1] Save this configuration and exit.
Enter your selection [1]: 1
config register will be reset to 0x102
Use the 'configure' command to modify this configuration.
User Access Verification

Username: c12000
Password:

RP/0/0/CPU0:router#
```

Step 6 Set the configuration register of the secondary RP to 0x102:

```
rommon 1> confreg 0x102
```

Step 7 Reset the secondary RP so that the new setting can take effect and the secondary RP becomes operational:

```
rommon 2 > reset
```

Specifying an Alternative Configuration



Caution

The default committed configuration (disk0:/config/startup) should be sufficient for most situations. The option described in this section is for rare cases when an alternative configuration is required. Use of this method can result in system errors or downtime.

To specify a temporary configuration file with the -a boot option, use the following procedure:

Step 1 Place both RPs in ROM Monitor mode, as described in the [“Entering ROM Monitor Mode”](#) section on page A-25.

Step 2 Set the configuration register of the secondary RP to 0x0 so that the secondary RP does not take control:

```
rommon 1> confreg 0x0
```



Note

The configuration register is not an environment variable like TURBOBOOT (which is described earlier in this chapter). Do not enter an equal sign when entering the **confreg** command.

Step 3 Set the primary RP configuration register to 0x2:

```
rommon 1 > confreg 0x2
```

Step 4 Enter the set command to display the current environment variable settings:

```
rommon 2 > set
```

Note the filename set in the BOOT variable.

Step 5 Enter the **boot** command using the following command syntax:

```
boot image -a config-file-path
```

Replace *image* with the filename listed in the boot variable, and replace *config-file-path* with the path and filename for the configuration file. Example:

```
rommon 3> boot tftp://223.255.254.254/images/comp-hfr-mini.vm -a  
/disk1:/cfgarchives/gold.conf
```



Note

The pathname should be a valid UNIX pathname (a slash [/] must be included after the device: "disk1:/").

Although this command causes the router to boot from an alternative configuration, the system reverts to the default committed configuration on the next system reload.

Step 6 Set the configuration register of the secondary RP to 0x102:

```
rommon 1> confreg 0x102
```

Step 7 Reset the secondary RP so that the new setting can take effect and the secondary RP becomes operational:

```
rommon 2 > reset
```

ROM Monitor Procedures

This section describes the following ROM Monitor tasks:

- [Entering ROM Monitor Mode, page A-25](#)
- [Displaying the Available ROM Monitor Commands and Options, page A-29](#)
- [Displaying the Configuration Register Setting, page A-30](#)
- [Displaying Environment Variable Settings, page A-30](#)
- [Saving Environment Variable Settings, page A-31](#)
- [Exiting ROM Monitor Mode, page A-31](#)

Entering ROM Monitor Mode

The following sections describe two ways to enter ROM Monitor mode:

- [Resetting the Configuration Register and Reloading the Router, page A-26](#)
- [Manually Halting the Initialization Process During System Reload, page A-28](#)

Resetting the Configuration Register and Reloading the Router

In normal operating conditions, it should not be necessary to enter ROM Monitor mode. If you do find it necessary to place the system in ROMMON, make sure that the system is in a steady state and that you are prepared for the consequences of a system reload. In particular, verify the items described in the [“Prerequisites” section on page A-26](#).

**Note**

If a standby RP is installed in the router, you must complete the steps for the standby after the primary RP has entered ROM Monitor mode.

Prerequisites

Before you place the router in ROM Monitor mode, verify that the system is in a steady state by doing the following:


1. Prepare the primary RP:
 - a. Anticipate substantial downtime, including the loss of packet forwarding on the system.
 - b. Verify that all changes to the active router configuration are saved with the **commit** command in configuration mode.
 - c. Verify that all changes to the active software set are saved with the **install commit** command in admin EXEC mode.
 - d. Verify that all install commit processes are complete with the **show install committed** command in admin EXEC mode. This command displays the committed packages that become active during the next router boot.
2. Verify that the other nodes in the system are in a steady state:
 - a. If a standby RP is installed, verify that it is in the “ready” state with the **show redundancy** command in EXEC mode.
 - b. Verify that all available nodes in the system are in IOS-XR RUN state with the **show platform** command in EXEC mode.

After you have verified that the system is in a stable state, you can enter ROM Monitor mode by setting the configuration register setting and entering the **reload** command, as described in the following steps.

SUMMARY STEPS

1. Verify that the router is in a steady state, as described in the [“Prerequisites” section on page A-26](#).
2. Connect a terminal to the primary RP console port and log into the router.
3. **admin**
4. **config-register 0x0**
5. **exit**
6. **reload**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Verify that the router is in a steady state, as described in the “Prerequisites” section on page A-26 .	Ensures that all configurations are saved and that no install processes are running.
Step 2	Connect a terminal to the primary RP console port and log into the router.	Connects a terminal or PC to the primary RP console port and establishes a router management session. <ul style="list-style-type: none"> See the “Connecting and Communicating with the Router” section on page 2-2 for more information on connecting a terminal.
Step 3	admin Example: RP/0/RP0/CPU0:router# admin	Enters admin EXEC mode.
Step 4	config-register 0x0 Example: RP/0/RP0/CPU0:router(admin)# config-register 0x0	Resets the configuration register to 0x0 so that the router enters ROM Monitor mode during the next reload.  Caution Resetting the configuration register may change the baud rate for the console.
Step 5	exit Example: RP/0/RP0/CPU0:router(admin)# exit	Exits admin EXEC mode.
Step 6	reload Example: RP/0/RP0/CPU0:router# reload	Reloads the system to enter ROM Monitor mode.

**Note**

When you place the primary RP in ROM Monitor mode, the system fails over to the standby RP, which then becomes the primary RP. If the router contains two RPs, repeat these steps for the second RP. Both RPs must be in ROM Monitor mode.

**Tip**

To verify the configuration register setting, enter the **show version | include 0x** command in EXEC mode or admin EXEC mode.

Examples

The following examples are provided:

- [Verifying the Router State: Example, page A-28](#)
- [Placing the System in ROM Monitor Mode: Example, page A-28](#)

Verifying the Router State: Example

The following example shows the redundancy roles of both RPs and that both are operating in IOS-XR RUN state:

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

```
This 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
```

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

Node	Type	PLIM	State	Config State
0/2/SP	L3LC (SP)	N/A	IOS-XR RUN	PWR, NSHUT, MON
0/2/CPU0	L3LC	16 port OC48	IOS-XR RUN	PWR, NSHUT, MON
0/3/SP	L3LC (SP)	N/A	IOS-XR RUN	PWR, NSHUT, MON
0/3/CPU0	L3LC	8 port 10GE	IOS-XR RUN	PWR, NSHUT, MON
0/RP0/CPU0	RP (Standby)	N/A	IOS-XR RUN	PWR, NSHUT, MON
0/RP1/CPU0	RP (Active)	N/A	IOS-XR RUN	PWR, NSHUT, MON
0/SM0/SP	S123 (SP)	N/A	IOS-XR RUN	PWR, NSHUT, MON

Placing the System in ROM Monitor Mode: Example

The following example shows how to place the primary RP in ROM Monitor mode:

```
P/0/0/CPU0:router# admin
```

```
RP/0/0/CPU0:router(admin)# config-register 0x0
```

```
Successfully set config-register to 0x0 on node 0/0/CPU0
```

```
RP/0/0/CPU0:router(admin)# exit
```

```
RP/0/0/CPU0:router# reload
```

```
Proceed with reload? [confirm]
```

```
System Bootstrap, Version 12.0(20040624:164256) [assafb-misc1 1.14dev(0.91)] DEV
ELOPMENT SOFTWARE
Copyright (c) 1994-2004 by cisco Systems, Inc.
```

```
DRAM DIMM Slot 1: 512M found, Slot 2: Empty
MPC7450 platform with 524288 Kbytes of main memory
```

```
rommon 1 >
```

Manually Halting the Initialization Process During System Reload

To force the router to stop loading and enter ROM Monitor mode, press Ctrl-C when you see the following message:

```
MBI validation sending request.
HIT CTRL-C to abort
```

This message usually appears during the first 20 seconds of system startup. It may be necessary to press the Ctrl-C keys repeatedly during this time to ensure that the initialization process stops and the system enters ROMMON.

This operation can be performed only from a terminal directly connected to the router console port. See the [“Connecting and Communicating with the Router”](#) section on page 2-2 for more information.

**Note**

If a standby RP is installed in the system, repeat this process for both RPs. When the primary RP is placed in ROMMON, it fails over to the standby RP, which can then also be placed in ROMMON.

Displaying the Available ROM Monitor Commands and Options

Table A-5 describes the available help commands for ROM Monitor mode.

Table A-5 Help Commands in ROMMON

Command	Description
help or ?	Displays a summary of all available ROM Monitor commands.
-?	Displays information about command syntax.

**Note**

Commands are case sensitive. You can halt any command by pressing Ctrl-C.

Examples

The following example shows what appears when you enter the **?** command:

```
rommon B5 > ?
alias                set and display aliases command
show_bcm_links      Show Links status on Broadcom Switches
show_bcm            Show Broadcom Switches Information
boot                boot up an external process
confreg            configuration register utility
cont               continue executing a downloaded image
context            display the context of a loaded image
dev                list the device table
dir                list files in file system
dis                disassemble instruction stream
dnld               serial download a program module
help               monitor builtin command help
history            monitor command history
meminfo            main memory information
dumpspd            Dump the Serial Presents Detect info from the SDRAM DIMMs
dumpplaneeprom     Dump the contents of the back plane
repeat             repeat a monitor command
reset              system reset
scanpci0           scan for devices on PCI bus 0
scanpci1           scan for devices on PCI bus 1
set                display the monitor variables
smptest           Test the other CPU on an SMP board
sync              write monitor environment to NVRAM
tftpdnld           tftpdnld no longer available, use boot
unalias            unset an alias
unset              unset a monitor variable
version            display rommon software, board, version
writei2c           Write to an I2C device
rommon B2 >
```

The following example shows the parameters for the **dir** (directory) command:

```
rommon 7 > dir -?
bad device name
usage: dir <device>
```

Displaying the Configuration Register Setting

To display the current configuration register setting, enter the **confreg** command without parameters as follows:

```
rommon B1 > confreg
```

```

          Configuration Summary
(Virtual Configuration Register: 0x0)
enabled are:
console baud: 9600
boot: the ROM Monitor

do you wish to change the configuration? y/n [n]:
```

The configuration register setting is labeled *Virtual Configuration Register*. Enter **no** to avoid changing the configuration register setting. To change the configuration setting with this command, see the [“Resetting to EXEC Mode Using Prompts” section on page A-32](#).

Displaying Environment Variable Settings

To display the current environment variable settings, enter the **set** command as follows:

```
rommon B1 > set

PS1=rommon ! >
MARGIN_1_5V_HIGH=1
TFTP_VERBOSE=2
IP_ADDRESS=1.1.1.1
IP_SUBNET_MASK=255.255.0.0
TFTP_SERVER=
DEFAULT_GATEWAY=12.25.0.1
TFTP_FILE=
CONFIG_FILE=
?=0
ReloadReason=65
BOOT=disk0:hfr-os-mbi-1.0.0/mbihfr-rp.vm,1;
rommon B2 >
```

Saving Environment Variable Settings

To save the current environment variable settings, enter the **sync** command as follows:

```
rommon B1 > sync
```



Note

Environmental values that are not saved with the **sync** command are discarded whenever the system is reset or booted.

Exiting ROM Monitor Mode

To exit ROM Monitor mode, you must change the configuration register to 0x2 and reset the router. This process can be done by either entering CLI commands or responding to prompts.



Tip

The first RP to enter EXEC mode becomes the primary RP. You can determine which RP is the primary RP by resetting that card to EXEC mode first and then waiting 1 to 2 minutes to allow it to boot fully. You can also fail over to the standby RP at any time with the **redundancy switchover** command in EXEC mode.

The following sections describe ways to exit ROM Monitor mode:

- [Resetting to EXEC Mode with CLI Commands, page A-31](#)
- [Resetting to EXEC Mode Using Prompts, page A-32](#)

Resetting to EXEC Mode with CLI Commands

Perform this task to reset the configuration register in ROMMON and start the router in EXEC mode.

SUMMARY STEPS

1. **confreg 0x2**
2. **reset**

DETAILED STEPS

	Command or Action	Purpose
Step 1	confreg 0x2 Example: rommon B1> confreg 0x2	Resets the configuration register to enter EXEC mode when the system is reset.
Step 2	reset Example: rommon B1> reset	Resets and initializes the router.

Resetting to EXEC Mode Using Prompts

In ROM Monitor mode, you can also change the configuration register value using the configuration register prompts.

Enter the **confreg** command, as shown in the following example, and respond to each question when prompted.

SUMMARY STEPS

1. **confreg**
2. Respond to each prompt as instructed.
3. **reset**

DETAILED STEPS

	Command or Action	Purpose
Step 1	confreg Example: rommon B1> confreg 0x2	Initiates the configuration register configuration prompts.
Step 1	Respond to each prompt as instructed.	For more information, see the example that follows this procedure.
Step 2	reset Example: rommon B1> reset	Resets and initializes the router.

Examples

The following example shows the commands required and the prompts that appear when you reset the router to EXEC mode using the configuration register prompts:

```
rommon B1> confreg

          Configuration Summary
(Virtual Configuration Register: 0x0)
enabled are:
console baud: 9600
boot: the ROM Monitor

do you wish to change the configuration? y/n [n]: y
enable "diagnostic mode"? y/n [n]: n
change console baud rate? y/n [n]: n
change the boot characteristics? y/n [n]: y
enter to boot:
 0 = ROM Monitor
 1 = MBI Validation Boot Mode
[0]: 1

          Configuration Summary
(Virtual Configuration Register: 0x2)
enabled are:
console baud: 9600
boot: image specified by the boot system commands

do you wish to change the configuration? y/n [n]: n

You must reset or power cycle for new config to take effect
rommon B2> reset
```

**Note**

MBI validation mode causes the router to boot the startup Cisco IOS XR software and configuration.
