Preface

This book presents configuration information and examples for using the ROM Monitor mode of the Cisco IOS XR software. The preface for *Cisco IOS XR ROM Monitor Guide for the Cisco CRS Router* consists of the following sections:

- Changes to This Document, page vii
- Obtaining Documentation and Submitting a Service Request, page vii

Changes to This Document

Table 1 lists the technical changes made to this document since it was first printed.

Table 1 Changes to This Document

Revision	Date	Change Summary
OL-24663-01	April 2011	Initial release of the document.

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

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CHAPTER 1

ROM Monitor Overview and Basic Procedures

This chapter provides an overview of ROM Monitor concepts and operations. For instructions on how to perform various tasks in ROM Monitor mode (ROMMON), see the other chapters in this book.

This chapter includes the following main topics:

- ROM Monitor Overview, page 1-1
- Entering ROM Monitor Mode, page 1-3
- ROM Monitor Commands, page 1-7
- Displaying the Configuration Register Setting, page 1-10
- Environment Variable Settings, page 1-11
- Viewing Chassis Serial Numbers (Cisco CRS Routers), page 1-13
- Exiting ROM Monitor Mode, page 1-14
- Additional References, page 1-17

ROM Monitor Overview

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. A version of the ROM Monitor software exists on each card. If the Cisco IOS XR software cannot boot on a card, the card startup ends in ROM Monitor mode. When you connect a terminal to a card that is in ROM Monitor mode, the ROM Monitor CLI prompt is displayed.

Cisco CRS Prompt

```
rommon B1>
```

During normal operation, users do not see the ROM Monitor prompt or use ROM Monitor mode. ROM Monitor mode is used only in special circumstances, such as reinstalling the entire software set, resetting the router password, or specifying a configuration file to use at startup.

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 cards, 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.

A copy of the ROM Monitor software exists on each card. If a card fails to boot the Cisco IOS XR software, the ROM Monitor software takes control and places the card in ROM Monitor mode. Because a card in ROM Monitor mode is not running the Cisco IOS XR software, that card becomes unavailable for normal router operations.

Understanding the Role of the DSC

The active Route Processor (RP) for the owner Secure Domain Router (SDR) is called the Designated Shelf Controller (DSC). This card performs system-wide functions, including the creation of additional non-owner SDRs. If the active DSC is placed in ROM Monitor mode, it is no longer running the Cisco IOS XR software. If a standby DSC is available, the standby RP resumes router operations. If a standby DSC is not available or is also placed in the ROM Monitor mode, then router operations stop.

Designated Secure Domain Router Shelf Controller (DSDRSC)

In addition to the DSC, each SDR in the system contains at least one DSDRSC. The DSDRSCs provide configuration and administrative functions for a single SDR only. The DSC also serves as the DSDRSC for the owner SDR.

When the Designated Secure Domain Router Shelf Controller (DSDRSC) in an SDR is placed in ROM Monitor mode, the router operations are transferred to the standby DSDRSC (if available). If both the primary and standby DSDRSCs are in ROM Monitor mode, then the router operations cease because the Cisco IOS XR software is no longer running.

Accessing ROM Monitor Mode on the DSC

In most situations, you interact with the ROM Monitor mode only on the DSC (DSDRSC for the owner SDR). The DSC contains the administration configuration for the entire system and distributes the required software to all the other nodes in the router. All the tasks in this document describe ROM Monitor mode accessed through the DSC for the system.

Remember, the DSC is also the following:

- Active RP of rack 0
- DSDRSC for the owner SDR

Environmental Variables and the Configuration Register

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 describe how to load it. After ROM Monitor has initialized the card, it uses the environment variables to locate and load the Cisco IOS XR software.

The *configuration register* is a software setting that controls how a card starts up. One of the primary uses of the configuration register is to control whether the card starts in ROM Monitor mode or Administration EXEC mode. The configuration register is set in either ROM Monitor mode or Administration EXEC mode as needed. Typically, you set the configuration register using the Cisco IOS XR software prompt on the active RP when you need to use ROM Monitor mode. When the maintenance in ROM Monitor mode is complete, you change the configuration register so the card reboots with the Cisco IOS XR software.

Note Throughout this guide, the term *RP* is used to refer to the RP cards supported on Cisco CRS routers. If a feature or an issue applies to only one platform, the accompanying text specifies the platform.

Accessing ROM Monitor Mode with a Terminal Connection

When an RP is in ROM Monitor mode, you can access the ROM Monitor software only from a terminal connected directly to the console port of the card. Because the Cisco IOS XR software (EXEC mode) is not operating, the nonmanagement interfaces (such as POS interfaces) are not accessible. Basically, all Cisco IOS XR software resources are unavailable. The hardware is there, but no configuration exists to make use of the hardware.

Network Management Access and ROM Monitor Mode

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 can be confusing when using ROM Monitor and the Cisco IOS XR software is the 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.

To access other devices, such as a TFTP server, while in ROM Monitor mode on the Cisco CRS, you must configure the ROM Monitor variables with IP access information.

Entering ROM Monitor Mode

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

- Resetting the Configuration Register and Reloading a DSC to ROM Monitor Mode, page 1-3
- Manually Halting the Initialization Process During System Reload, page 1-7

Resetting the Configuration Register and Reloading a DSC to ROM Monitor Mode

In normal operating conditions, it should not be necessary to use ROM Monitor mode. If you do find it necessary to place a designated shelf controller (DSC) in ROM Monitor mode, 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 1-3.

Prerequisites

Before you place a DSC in ROM Monitor mode, verify that the system is in a steady state:

1. Prepare the RP card:
   a. Anticipate substantial downtime, including the loss of packet forwarding on the system.
   b. Verify the sanity of the configuration file system using the **cfs check** command in EXEC mode.
   c. Verify that all changes to the active router configuration are saved with the **commit** command in any configuration mode.
   d. Verify that all changes to the active software set are saved with the **install commit** command in Administration EXEC mode.

e. Verify that all install commit processes are complete with the **show install committed** command in Administration EXEC mode. This command displays the committed packages that become active during the next router boot. If any of the processes are not committed, use the **install commit** command in the Administration mode.

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.
2. Connect a terminal to the DSC console port and log in to the router.
3. **admin**
4. Place the DSC, or all RPs in ROM Monitor mode:

- Place only the DSC in the ROM Monitor mode:
  a. **config-register 0x0**
  b. **exit**
  c. **reload**

  or
- Place all RPs in the ROM Monitor mode:
  a. **config-register 0x0 location all**
  b. **reload location all**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Verify that the router is in a steady state.	Ensures that all configurations are saved and that no installation processes are running. • For more information, see the "Prerequisites" section on page 1-3.
Step 2	Connect a terminal to the DSC console port and log in to the router.	Connects a terminal or PC to the DSC console port and establishes a router management session. • For more information on connecting a terminal, see "Connecting and Communicating with the Router" in *Cisco IOS XR Getting Started Guide for the Cisco CRS Router.*

	Command or Action	Purpose
Step 3	**admin** **Example:** `RP/0/RP0/CPU0:router# admin`	Enters administration EXEC mode.

Step 4	**config-register 0x0**
	exit
	reload
	or
	config-register 0x0 location all
	reload location all
	
	Examples:
	`RP/0/RP0/CPU0:router(admin)# config-register 0x0`
	`RP/0/RP0/CPU0:router(admin)# exit`
	`RP/0/RP0/CPU0:router# reload`
	
	`Or,`
	
	`RP/0/RP0/CPU0:router(admin)# config-register 0x0 location all`
	`RP/0/RP0/CPU0:router(admin)# reload location all`
		Enter the following commands to place only the DSC in ROM Monitor mode:
		a. Enter the **config-register 0x0** command to set the configuration register for ROM Monitor mode during the next card reload.
		b. Enter the **exit** command to exit administration EXEC mode.
		c. Enter the **reload** command to reload the DSC and enter ROM Monitor mode.
		Note If there is a standby DSC, the configuration register on the standby DSC is also set to 0x0. When you place the active RP in ROM Monitor mode, the system fails over to the standby RP, which then becomes the active RP. If both RPs need to be in ROM Monitor mode, connect to the new active RP and enter the **reload** command.
		
		Enter the following commands to place all RPs and SCs in ROM Monitor mode:
		a. Enter the **config-register 0x0 location all** command to reset the configuration register for all RPs in the system.
		b. Enter the **reload location all** command in administration EXEC mode to reload all RPs in the system.
		Note Make sure you have access to the console ports of both RSP0 and RSP1 cards on the system. To enter the system to the ROM Monitor mode, press **Ctrl-C** a few times on both RSP0 and RSP1 consoles until you get to the ROM Monitor mode.
		
		Caution Resetting the configuration register may change the baud rate for the console.

Tip To verify the configuration register setting, enter the **show variables boot** command in the administration EXEC mode.

Examples

The following examples show how to place the DSC in ROM Monitor mode:

- Verifying the Router State: Example, page 1-6
- Placing the DSC in ROM Monitor Mode: Example, page 1-6

Verifying the Router State: Example

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

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

Sun Jun  6 04:12:24.171 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 21:51:57 2010: 2 weeks, 5 days, 6 hours, 20 minutes ago
Active node booted Mon May 17 21:51:57 2010: 2 weeks, 5 days, 6 hours, 20 minutes ago
Standby node boot Mon May 17 21:51:32 2010: 2 weeks, 5 days, 6 hours, 20 minutes ago
Standby node last went not ready Mon May 17 22:03:03 2010: 2 weeks, 5 days, 6 hours, 9
minutes ago
Standby node last went ready Mon May 17 22:03:03 2010: 2 weeks, 5 days, 6 hours, 9 minutes
ago
Standby node last went not NSR-ready Fri Jun  4 17:59:52 2010: 1 day, 10 hours, 12 minutes
ago
Standby node last went NSR-ready Fri Jun  4 18:00:28 2010: 1 day, 10 hours, 11 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# show platform

Sun Jun  6 04:14:44.888 DST
Node            Type                 PLIM             State           Config State
------------------------------------------------------------------------------------------
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
```

Placing the DSC in ROM Monitor Mode: Example

The following example shows how to place the RP0 in the ROM Monitor mode:

```
RP/0/RP0/CPU0:router# admin
RP/0/RP0/CPU0:router(admin)# config-register 0x0

Successfully set config-register to 0x0 on node 0/RP0/CPU0
Successfully set config-register to 0x0 on node 0/RP1/CPU0
RP/0/RP0/CPU0:router(admin)# reload


Configuring MPPs ...
```

```
Configuring PCMCIA slots ...

System Bootstrap, Version 1.53(20090311:225342) [CRS ROMMON],
Copyright (c) 1994-2009 by Cisco Systems, Inc.

Acquiring backplane mastership .... successful
Preparing for fan initialization..... ready
Setting fan speed to 4000 RPMs  successful
Reading backplane EEPROM ...
Released backplane mastership ...

Board type is 0x100002 (1048578)

Switch 0 initialized
Backplane FE port Up... Enabling
Enabling watchdog
G4(7457-NonSMP-MV64360 Rev 3) platform with 4096 MB of main memory

rommon B1 >
```

Manually Halting the Initialization Process During System Reload

To force the DSC 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. Press the **Ctrl-C** key combination immediately. 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 ROM Monitor mode. This ends your Telnet session to the console or auxiliary port.

This operation can be performed only from a terminal directly connected to the DSC console port. For more information, see the "Connecting and Communicating with the Router" section in *Cisco IOS XR Getting Started Guide for the Cisco CRS Router.*

Note When the DSC is placed in ROMMON, it switches over to the standby DSC, which can then also be placed in ROMMON. Repeat this process for both RP cards.

ROM Monitor Commands

The commands in the ROM Monitor mode are different from those available in the Cisco IOS XR software. You can run ROM Monitor commands only while in ROM Monitor mode, and you cannot run Cisco IOS XR software commands. This section includes the following topics:

- Commonly Used ROM Monitor Commands, page 1-8
- Displaying the Available ROM Monitor Commands, page 1-8
- Changing the ROM Monitor Prompt, page 1-10

Commonly Used ROM Monitor Commands

Table 1-1 summarizes the commands commonly used in ROM Monitor. For specific instructions on using these commands, refer to the relevant procedure in this document.

Table 1-1 Commonly Used ROM Monitor Commands

ROMMON Command	Description
boot *image*	Manually boots a vm Cisco IOS XR software image.
boot *image* –**o** *config-file-path*	Manually boots the Cisco IOS XR software with a temporary alternative administration configuration file.
boot *image* –**a** *config-file-path*	Manually boots the Cisco IOS XR software with an alternative SDR configuration file.
cookie	Displays the system cookie.
confreg	Changes the config-register setting. **Note** When the value of confreg is 0, it means autoboot is disabled and you need to manually boot the Cisco IOS XR software image from the ROM Monitor mode. However, if the value of confreg is non-zero value of 0x2, it means autoboot is enabled and the ROM Monitor mode automatically boots the Cisco IOS XR software image given in the BOOT= environment variable.
dev	Displays the available local storage devices (for example, disk0: and disk1:).
dir	Displays the files on a storage device.
dumpplaneeeprom	Displays the chassis serial number in a Cisco CRS router.
reset	Resets the node.
set	Displays the currently set ROM Monitor environmental settings.
sync	Saves the new ROM Monitor environmental settings.
unset	Removes an environmental variable setting.
version	Displays the ROM Monitor version.

Displaying the Available ROM Monitor Commands

Table 1-2 describes the available **help** commands for ROM Monitor mode.

Table 1-2 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 on a Cisco CRS:

```
rommon B5> ?
addrloop             walk 1 thru range of addresses
alias                set and display aliases command
alter                alter locations in memory
bcm_init             Initialise Broadcom switch for ROMMON
getPciReg            Get BCM 5600 PCI memory mapped Reg.
setPciReg            Set BCM 5600 PCI Memory mapped Reg.
getSocReg            Get BCM 5600 On-chip reg value
setSocReg            Set BCM 5600 On-chip reg value
getMiiReg            Get BCM 5600 FE PHY Regs.
setMiiReg            Set BCM 5600 FE PHY Regs.
bcm_links_update     Update links status of BCm 5600
show_bcm_regs        Show all Broadcom switch registers
show_bcm_raw         Show Broadcom Switches port info
berrscan             scan range of addresses for bus errors
boot                 boot up an external process
break                set/show/clear the breakpoint
call                 call a subroutine at address with converted hex args
cat                  concatenate files
checksum             checksum a block of memory
clrerr               clear the error log
compare              compare two blocks of memory
dcompare             compare two blocks of memory accessed as 8 bytes
confreg              configuration register utility
cont                 continue executing a downloaded image
context              display the context of a loaded image
cpu                  cpu / system information and control
dev                  list the device table
dir                  list files in file system
dis                  disassemble instruction stream
dnld                 serial download a program module
dump                 display a block of memory
ddump                display a block of memory as double words
echo                 monitor echo command
errlog               display the error log
fdump                file dump utility
fill                 fill a block of memory
dfill                fill a block of memory with double words
dpar                 test the CPU bus data parity
flash                flash services command
frame                print out a selected stack frame
getPci0ConfigReg     print out PCI0 config space reg
getPci1ConfigReg     print out PCI1 config space reg
setPci0ConfigReg     set PCI0 config space reg
setPci1ConfigReg     set PCI1 config space reg
help                 monitor builtin command help
history              monitor command history
hang_i2c_bus         cause a hang on the I2C bus
test_unhang_i2c_bus  cause unhang sequence to be generated on the I2C bus
ifill                fill a block of memory w/incrementing pattern
initfs               re-initialize the file system access structures
jump                 call a subroutine at address with argc/argv
launch               launch a downloaded image
memdebug             write/read/verify scope loop
```

```
meminfo             main memory information
memloop             write or read scope loop
memtest             simple memory test
move                move a block of memory
pingdsc             validate MBI and rack number w/ the dSC
prt6729             print CLPD6729 internal registers
dmove               move a block of memory accessed as 8 bytes
dumpspd             Dump the Serial Presents Detect info from the SDRAM DIMMs
dumpplaneeeprom     Dump the contents of the back plane
dumpphys            Dumps registers of all ethernet phys
readi2c             read an I2c device
repeat              repeat a monitor command
reset               system reset
resetd              dump core and reset a card
resetsp             reset an sp card
scanpci0            scan for devices on PCI bus 0
scanpci1            scan for devices on PCI bus 1
set                 display the monitor variables
setprocmask         Change the mask of CPUs passed to the OS in EMT_GET_SMP_MASK
setromA             Set rommon to force it to rommon A upon next reset
showerr             show crash error message
smptest             Test the other CPU on an SMP board
speed               timed performance loop
stack               produce a stack trace
sync                write monitor environment to NVRAM
tcal                timer calibration test
tftpdnld            tftpdnld no longer available, use boot
tscope              timer scope loop
unalias             unset an alias
unset               unset a monitor variable
version             display rommon software, board, version
watchdog            test watchdog rebooting of the box
writei2c            Write to an I2C device
```

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

```
rommon B5> dir -?
bad device name
usage: dir <device>
```

Changing the ROM Monitor Prompt

You can change the prompt in ROM Monitor mode by using the **PS1=** command as shown in the following example:

```
rommon B5> PS1= "CRS_rp1_rommon ! >"
```

Changing the prompt is useful if you are working with multiple routers in ROM Monitor at the same time. This example specifies that the prompt is CRS_rp1_rommon followed by the line number.

Displaying the Configuration Register Setting

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

```
rommon B5> 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 the **no** command to avoid changing the configuration register setting. For more information about exiting the ROM Monitor mode or changing the configuration setting, see the "Exiting ROM Monitor Mode" section on page 1-14.

Environment Variable Settings

The ROM Monitor environment variables define the attributes of the ROM Monitor, such as the IP address for an RP control Ethernet port or the location of the Cisco IOS XR software and describe how to load it. Environmental variables are entered like commands and are always followed by the equal sign (=). Environment variable settings are entered in capital letters, followed by a definition. For example:

```
TURBOBOOT=on,disk0,format
```

Under normal operating conditions, you do not need to modify these variables. They are cleared or set only when you need to make changes to the way ROM Monitor operates.

This section includes the following topics:

- Frequently Used Environmental Variables, page 1-11
- Displaying Environment Variable Settings, page 1-12
- Entering Environment Variable Settings, page 1-13
- Saving Environment Variable Settings, page 1-13
- Clearing Environment Variable Settings, page 1-13

Frequently Used Environmental Variables

Table 1-3 shows the main ROM Monitor environmental variables. For instructions on how to use these variables, see the relevant instructions in this document.

Table 1-3 Frequently Used ROM Monitor Environmental Variables

Environmental variable	Description
IP_ADDRESS=*ip_address*	Sets the IP address for the Management Ethernet interface on the DSC. (On the Cisco CRS RP only.)
IP_SUBNET_MASK=*ip_address*	Sets the subnet mask for the Management Ethernet interface on the DSC. (On the Cisco CRS RP only)

Table 1-3 Frequently Used ROM Monitor Environmental Variables (continued)

Environmental variable	Description
DEFAULT_GATEWAY=*ip_address*	Sets the default gateway that serves the DSC. (On the Cisco CRS RP only) **Note** You must always add the DEFAULT_GATEWAY variable, even if CRS is directly connected in the same IP network.
TFTP_SERVER=*ip_address*	Sets the IP address of the TFTP server where a bootable software image is located.
TFTP_FILE=*drive* **:** *path* **/** *file*	Sets the directory and filename of a a bootable software image.
TURBOBOOT=*on, boot-device, options*	Completely replaces the existing software when the router is reloaded.
BOOT=*drive* **:** *path* **/** *file*	Identifies the boot software for a node. This variable is usually set automatically when the router boots.
AUX_AUTHEN_LEVEL=*number*	Bypasses ksh authentication. A reboot is required only on the card that has to bypass authentication.
IOX_ADMIN_CONFIG_FILE= *drive* **:** *path* **/** *file*	Permanently changes the location of the default administration configuration file.
IOX_CONFIG_FILE=*drive* **:** *path* **/** *file*	Permanently changes the location of the SDR configuration file.
IOX_CONFIG_MEDIUM=*drive* **:** *path*	Permanently changes the default location where configuration files are saved.

Displaying Environment Variable Settings

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

```
rommon B1> set


PS1=rommon ! >
TFTP_SERVER=172.23.16.81
IP_ADDRESS=172.29.52.71
IP_SUBNET_MASK=255.255.255.0
DEFAULT_GATEWAY=172.29.52.1
IOX_ADMIN_CONFIG_FILE=
TURBOBOOT=
BOOT_DEV_SEQ_CONF=disk0:;disk1:
MIRROR_ENABLE=Y
?=0
ReloadReason=68
BSI=0
BOOT_DEV_SEQ_OPER=disk0:;disk1:
EASYBAKE=0x0
BOOT=disk0:hfr-os-mbi-3.9.0.08I/mbihfr-rp.vm,1;
```

Entering Environment Variable Settings

Environment variable settings are entered in capital letters, followed by a definition. The following example shows the environmental variables used to configure the control Ethernet port on a Cisco CRS:

```
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
```

Saving Environment Variable Settings

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

```
rommon B1> sync
```

Clearing Environment Variable Settings

To clear the environment variable settings, enter the **unset** command:

```
rommon B1> unset
```

To make the change permanent, use the **sync** command.

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

Viewing Chassis Serial Numbers (Cisco CRS Routers)

The chassis serial number is required for multishelf routers and can be read from an SC or RP that is running in ROM Monitor mode. RP may be necessary if the physical label is missing or damaged.

Note You can view the chassis serial numbers using the Cisco IOS XR software. For more information, see "Displaying the Chassis Serial Numbers (Cisco CRS Routers)" in *Cisco IOS XR System Management Configuration Guide for the Cisco CRS Router.*

Step 1 Attach a console to the console port of an SC or RP in the chassis. (Only the SC or RP needs to run to perform this procedure. Other cards need not be inserted.)

Step 2 Apply power to the chassis.

Step 3 Enter ROM Monitor mode, as described in the "Entering ROM Monitor Mode" section on page 1-3.

Step 4 Enter the **dumpplaneeeprom** command in privilege mode of the ROM Monitor prompt to display the chassis serial number. In the following example, the serial number is TBC0636606900000:

```
rommon B3 > priv
rommon B4 > dumpplaneeeprom
EEPORM data backplane
000000  00 00 01 e2 00 00 00 00 00 00 00 00 00 00 00 00 ................
000010  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000020  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000030  00 00 00 00 00 00 08 00 45 3b 61 01 04 00 00 00 ........E;a.....
```

```
000040  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000050  54 42 43 30 36 33 36 36 30 36 39 30 30 30 30 30 TBC0636606900000
000060  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000070  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000080  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000090  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
0000a0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
0000b0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
0000c0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
0000d0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
0000e0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
0000f0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................

rommon B3 > priv
rommon B4 > dumpplaneeeprom
EEPORM data backplane
000000  00 00 01 e2 00 00 00 00 00 00 00 00 00 00 00 00 ................
000010  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000020  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000030  00 00 00 00 00 00 08 00 45 3b 61 01 04 00 00 00 ........E;a.....
000040  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000050  54 42 43 30 36 33 36 36 30 36 39 30 30 30 30 30 TBC0636606900000
000060  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000070  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000080  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
000090  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
0000a0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
0000b0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
0000c0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
0000d0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
0000e0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
0000f0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ................
```

Note The chassis serial number is displayed in the output to the right (row "00050"). A similar number is present for every chassis.

Step 5 Return the router to EXEC mode, as described in the "Exiting ROM Monitor Mode" section on page 1-14.

Exiting ROM Monitor Mode

To exit ROM Monitor mode, you must change the configuration register to 0x102 and reset the RP. This process can be done by either entering CLI commands or responding to prompts.

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

The following sections describe ways to exit the ROM Monitor mode:

- Resetting to EXEC Mode with CLI Commands, page 1-15

- Resetting the Configuration Register Using Prompts, page 1-15

Resetting to EXEC Mode with CLI Commands

Perform this task to reset the configuration register in ROM Monitor mode and start the RP in EXEC mode.

SUMMARY STEPS

1. **confreg 0x102**
2. **reset**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**confreg 0x102** **Example:** `rommon B1> confreg 0x102`	Resets the configuration register to enter EXEC mode after the system is reset.
Step 2	**reset** **Example:** `rommon B1> reset`	Resets and initializes the router.

Resetting the Configuration Register Using Prompts

In ROM Monitor mode, you can change the configuration register value using the configuration register prompts, as shown in this procedure.

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`	Starts the configuration register configuration prompts.
Step 2	Respond to each prompt as instructed.	See the example that follows this procedure for more information.
Step 3	**reset** **Example:** `rommon B2> reset`	Resets and initializes the router.

Examples

The following example shows the commands required and the prompts that appear when you reset the RP 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: 0x102)
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 RP to boot the startup Cisco IOS XR software and configuration.

Additional References

The following sections provide references related to the ROM Monitor.

Related Documents

Related Topic	Document Title
Display chassis serial numbers (Cisco CRS Routers)	"Displaying the Chassis Serial Numbers (Cisco CRS Routers)" in *Cisco IOS XR System Management Configuration Guide for the Cisco CRS Router*
Connecting a terminal to a router	"Connecting and Communicating with the Router" in *Cisco IOS XR Getting Started Guide for the Cisco CRS Router*
Configuring a router with Cisco IOS XR software	Cisco IOS XR Software Documentation: http://www.cisco.com/en/US/products/ps5845/tsd_products_support_series_home.html

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. 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. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/support

CHAPTER 2

Router Recovery with ROM Monitor

This chapter describes the router recovery methods in ROM Monitor mode (ROMMON) of the router.

This chapter contains the following sections:

- Overview, page 2-19
- About ROMMON Installation Files, page 2-20
- About the TURBOBOOT Variable, page 2-24
- About the Boot Device (Destination Disk), page 2-24
- Reinstalling Cisco IOS XR Software on Cisco CRS Routers, page 2-25
- Additional References, page 2-37

Overview

The standard way to install new software on the Designated Shelf Controller (DSC) is by using the **install** command in administration EXEC mode. However, if the DSC 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 DSC is in ROM Monitor mode. When you install the Cisco IOS XR software from ROM Monitor mode, you must use a special software installation file with a vm file extension. These files are called *vm files*. You cannot install software in package installation envelope (PIE) files from ROM Monitor mode.

Note Installation using a vm file in ROM Monitor mode should be performed only from the DSC of the system.

Caution Reinstalling the Cisco IOS XR software from ROM Monitor mode replaces the currently installed router software and causes substantial router downtime. We recommend installing or upgrading software packages from administration EXEC mode using PIE files, as described in the "Upgrading and Managing Cisco IOS XR Software" module of *Cisco IOS XR System Management Configuration Guide for the Cisco CRS Router.*

About ROMMON Installation Files

This section includes the following topics:

- Locating Installable Files, page 2-20
- tar Filenames and Version Numbers, page 2-21
- vm Filenames and Version Numbers, page 2-23

Locating Installable Files

To obtain Cisco IOS XR software and version information, use the Cisco Software Delivery System (SDS), available at the following URL:

http://tools.cisco.com/support/downloads/go/Tree.x?mdfid=279017029&mdfLevel=null&treeName=Routers&modelName=Cisco%20IOS%20XR%20Software&treeMdfId=268437899

To locate Cisco IOS XR software images:

- Select **Cisco IOS XR software**, or any entry under **Cisco Carrier Routing System**.
- Select Cisco IOS XR software to see the image tar files, or choose any of the other categories to see the other files.

Table 2-1 lists the software packages that you can install from ROMMON.

Table 2-1 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 PIE[1] file format and can be installed while Cisco IOS XR is running, as described in the "Upgrading and Managing Cisco IOS XR Software" module of *Cisco IOS XR System Management Configuration Guide for the Cisco CRS Router*. The other copy is in a vm file that can be installed from ROM Monitor. This package also includes 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 in addition to Cisco IOS XR Security package (in a PIE file).

1. PIE stands for Package Installation Envelope

Table 2-1 lists packages that 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 the "Upgrading and Managing Cisco IOS XR Software" module of *Cisco IOS XR*

System Management Configuration Guide for the Cisco CRS Router. 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.

tar Filenames and Version Numbers

The format for a *tar* filename is:

platform-bundle_name-major.minor.maintenance.tar

Table 2-2 describes the tar filename components.

Table 2-2 tar Filename Components

Component	Description
platform	Identifies the platform for which the software package is designed. For packages designed for the Cisco CRS router, the platform designation is "CRS."
bundle_name	Identifies a specific bundle. • *IOS XR* 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 the *Upgrading and Managing Cisco IOS XR Software* module of *Cisco IOS XR System Management Configuration Guide for the Cisco CRS Router.* • *IOS XR-k9* bundle name indicates a file that includes all packages in the *iosxr* bundle file plus the security package.
major	Identifies the major release of this package. • Major releases occur 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. • Major release is the least frequent release and may require a router reboot.

Table 2-2 tar Filename Components (continued)

Component	Description
minor	Identifies the minor release of this package. • Minor releases contain one or more of the following: – New features – Bug fixes • Minor release versions do 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. • Minor releases may require a router reboot.
maintenance	Identifies the maintenance release of this package. • Maintenance releases contain a collection of bug fixes for a package. • Maintenance release versions do 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. • Maintenance releases usually do not require a router reboot.

vm Filenames and Version Numbers

The format for a composite *vm* filename for Cisco CRS routers is:

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

The “comp” prefix indicates that the file is a composite of multiple packages. Table 2-3 describes the other filename components.

Table 2-3 vm Filename Components

Component	Description
platform	Identifies the platform for which the software package is designed. For packages designed for Cisco CRSs, the platform designation is “hfr.”
package_name	Identifies a specific package. • Mini package names indicate a composite package that includes all packages in the Cisco IOS XR Unicast Routing Core Bundle, which is described in the “Upgrading and Managing Cisco IOS XR Software” module of *Cisco IOS XR System Management Configuration Guide for the Cisco CRS Router.* •
major	Identifies the major release of this package. • 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.
minor	Identifies the minor release of this package. • A minor release contains one or more of the following: – 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.
maintenance	Identifies the maintenance release of this package. • 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.

The following example shows a composite of multiple mini packages:

comp-hfr-mini.vm-3.9.0

About the TURBOBOOT Variable

The TURBOBOOT environmental variable automates the software installation process in the ROM Monitor mode and determines the installation settings, such as the boot device (destination disk) for software installation. The following is the syntax for the TURBOBOOT environmental variable:

TURBOBOOT=on,{*boot-device*}**,[format | clean]**,[**nodisablebreak**]

In the preceding example, the TURBOBOOT variable is set to **on**, the boot device (destination disk) is the flash disk in **disk0:**, the installation process formats the disk, and the installation process can be terminated prematurely.

```
TURBOBOOT=on,disk0,format,nodisablebreak
```

There are four main arguments and keywords for the TURBOBOOT variable:

- **on**—Installs and activates the Cisco IOS XR software packages when the RP is booted with the *vm* image.
- *boot-device*—Selects the destination disk for software installation. For more information, see the "About the Boot Device (Destination Disk)" section on page 2-24.

Note The default boot device disk is disk0:.

- [**format | clean**]: When the **clean** option is selected, the Cisco IOS XR software is completely replaced, but all other files on the disk are preserved, including configuration files for each secure domain router (SDR). When the **format** option is selected, the Cisco IOS XR software is completely replaced, and only the administration configuration is preserved. All other files on the disk, including all configuration files for the SDRs and all user files, are deleted. The administration configuration contains the configuration that determines SDR name and inventory. The SDR configurations include router configurations such as Border Gateway Protocol (BGP) and interface configurations.
- [**nodisablebreak**]: When the **nodisablebreak** flag is added, the installation process using the TURBOBOOT variable can be prematurely terminated by sending a break from the terminal. The default is to ignore breaks from the terminal.

Note Each argument is separated by a comma.

For more information, see the "Environment Variable Settings" section on page 1-11.

About the Boot Device (Destination Disk)

The boot device determines the location where the Cisco IOS XR software is installed on all RPs. The system uses the boot-device to install the software to the other RP card in the system. Any additional software or software upgrades are automatically saved to the same boot device.

When you install Cisco IOS XR software using the Turboboot method in ROM Monitor mode, you must specify a boot-device for the router. The boot device is the local disk on the RP card where the Cisco IOS XR software is installed.

- On the Cisco CRS, the supported boot devices are disk0: and disk1:. If a boot-device is not specified, disk0: is used by default. If disk0: is not installed, then disk1: is used. All packages are installed on the flash disk and the MBI resides within the bootflash memory to support split-boot. For more information on Split-Boot feature, see the "Split-Boot Support" section on page 5-60.
- MBI is always installed on the bootflash: device.
- For more information on TURBOBOOT variable usage and syntax, see the "About the TURBOBOOT Variable" section on page 2-24.

The boot-device determines the slot where all software is installed on all RPs and distributed route processors (DRPs) that act as the designated secure domain router shelf controllers (DSDRSCs). In other words, when you turboboot the Cisco IOS XR software to the DSC, all the other RPs in the system must include a disk in that same slot. The system uses these disks to distribute the software to each RP in the system. Any additional software or software upgrades are automatically saved to the same boot device.

After the Cisco IOS XR software is installed to the boot device using the TURBOBOOT method, all additional software and software upgrades are automatically installed and synchronized to that same boot device and cannot be changed. For example:

- If the Cisco IOS XR software is installed in the RP card using the TURBOBOOT variable, with disk0 (TURBOBOOT=on,disk0), all packages are installed to *disk0*: and the boot device is *disk0:*.
- If the Cisco IOS XR software is installed in the RP card using the TURBOBOOT variable, with disk1 (TURBOBOOT=on,disk1), all packages are installed to disk1: and the boot device is "disk1:".
- After you boot the Cisco IOS XR software, you are not allowed to add packages to anywhere other than the boot-device. For example, you cannot boot the DSC to disk1: and decide to add your packages to disk0: or vice versa.

Note We recommend using disk0: as the boot device. Disk0: is preinstalled in most RPs, which ensures that the correct disk is used to store the software packages on the entire system.

Reinstalling Cisco IOS XR Software on Cisco CRS Routers

Caution Reinstalling Cisco IOS XR software from ROM Monitor mode replaces the currently installed router software and causes substantial router downtime. We recommend that you install or upgrade software packages from the Administration EXEC mode using package installation envelope (PIE) files, as described in the "Upgrading and Managing Cisco IOS XR Software" module of *Cisco IOS XR System Management Configuration Guide for the Cisco CRS Router.*

This section includes the following topics:

- Cisco CRS Router Installation Overview, page 2-25
- Reinstalling to a Cisco CRS Router from a TFTP Server Image, page 2-27
- Reinstalling to a Cisco CRS Router from an Image on a Local Storage Device, page 2-32
- What to Do Next, page 2-36

Cisco CRS Router Installation Overview

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

- Load the Cisco IOS XR software from a vm file on a TFTP server to the DSC.
- Transfer the *vm* file to a local storage device and then load the Cisco IOS XR software from that storage device to the DSC.

The following sections provide an overview of these procedures:

- Installation from a TFTP Server, page 2-26
- Installation from a Local Storage Device, page 2-26

Installation from a TFTP Server

When you install Cisco IOS XR software from a TFTP server to the DSC, you must perform the following tasks:

1. Back up the router configuration while still in EXEC mode.
2. Verify the sanity of the configuration file system on each SDR using the **cfs check** command.
3. Place all RPs and DRPs in ROM Monitor mode.
4. From ROM Monitor mode, clear the ROM Monitor environmental variables on all RPs, including the DSC.
5. On the DSC, configure the IP parameters for the Management Ethernet interface. These variables are set in ROM Monitor, and are required to access the TFTP server.
6. On the DSC, configure the TURBOBOOT environment variable to either clean or format the boot disk during the installation. The recommended boot device is disk0:.
7. On the DSC, boot the Cisco IOS XR software from a *vm* file on the TFTP server.
8. Reset all other RPs to boot the Cisco IOS XR software.

Note After you boot the Cisco IOS XR software, the TURBOBOOT process either cleans or formats the boot device, based on the TURBOBOOT environment variable setting.

Caution If the TURBOBOOT variable is set to format the boot device, all SDR configurations are deleted and only the admin configuration is preserved. For more information, see About the TURBOBOOT Variable, page 2-24 and About the Boot Device (Destination Disk), page 2-24.

Installation from a Local Storage Device

When you install Cisco IOS XR software from a local storage device, you must perform the following tasks:

1. Back up the router configuration while still in EXEC mode.
2. Verify the sanity of the configuration file system on each SDR using the command **cfs check**.
3. Copy the required vm file to the DSC flash disk that will hold the installable file. We recommend using disk1. You can also replace the flash disk with a flash disk that already has the correct image.

4. Place all RPs and DRPs in ROM Monitor mode.
5. From ROM Monitor mode, clear the ROM Monitor environmental variables on all RPs, including the DSC.
6. On the DSC, configure the TURBOBOOT environment variable to either clean or format the boot disk during the installation. The recommended boot device is disk0:.
7. Turboboot the DSC with the vm image located on the local storage device.
8. Reset all other RPs to boot the Cisco IOS XR software.

Caution If the TURBOBOOT variable is set to format the boot device, all existing SDR configurations are deleted. Only the admin configuration is preserved. For more information, see About the TURBOBOOT Variable, page 2-24 and About the Boot Device (Destination Disk), page 2-24.

For the procedure to install Cisco IOS XR software from a local storage device, see the "Reinstalling to a Cisco CRS Router from an Image on a Local Storage Device" section on page 2-32.

Reinstalling to a Cisco CRS Router from a TFTP Server Image

Cisco IOS XR software can be reinstalled directly from a *vm* file 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 to a Cisco CRS Router from an Image on a Local Storage Device" section on page 2-32.

Prerequisites

Before reinstalling Cisco IOS XR software from a TFTP server image, verify that the following prerequisites have been met:

- ROM Monitor firmware on the Cisco CRS router is compatible with the Cisco IOS XR software image that you are installing. For more information, see Upgrading or Downgrading ROM Monitor Using the FPD PIE, page 5-61.
- The following information is available:
  - IP address of the Management Ethernet interface on the DSC
  - Subnet mask of the Management Ethernet interface on the DSC
  - 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

– Boot device for your system. For more information, see the About the Boot Device (Destination Disk), page 2-24.

SUMMARY STEPS

1. Back up the router configuration while still in EXEC mode.
2. Verify the sanity of the configuration file system:
   a. **cfs check**
   b. Repeat on each SDR in the system.
3. Place all RPs in ROM Monitor mode:
   a. **admin**
   b. **config-register 0x0 location all**
   c. **reload location all**
4. Clear the ROM Monitor environmental variables on all RPs, including the DSC:
   a. **unset BOOT**
   b. **unset TFTP_FILE**
   c. **sync**
   d. Repeat for each RP in the system (LCC and fabric chassis).
5. On the DSC, 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=***mask*
   c. **DEFAULT_GATEWAY=***ip_address*
6. On the DSC, set the TFTP environment variables:
   a. **TFTP_VERBOSE**=print_setting
   b. **TFTP_RETRY_COUNT**=retry_count
   c. **TFTP_TIMEOUT**=timeout
   d. **TFTP_CHECKSUM**=1
   e. **TFTP_BLKSIZE**=transfer_size
7. Set the Turboboot variables on the DSC:
   a. **TURBOBOOT=on, disk0,** *options*
   b. **sync**
8. On the DSC, boot the vm image located on the TFTP server:
   boot tftp://*server/directory/filename*
9. Reset all other RSPsRPs to boot the Cisco IOS XR software:
   a. **confreg 0x2**
   b. **reset**

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. For more information, see the "Upgrading and Managing Cisco IOS XR Software" module of *Cisco IOS XR System Management Configuration Guide for the Cisco CRS Router.*
Step 2	Verify the sanity of the configuration file system. Repeat on each SDR in the system. **cfs check** **Example:** `RP/0/RP0/CPU0:router# cfs check`	(Optional) Verifies the sanity of the router configuration, and resolves any internal inconsistencies. Repeat the **cfs check** command on each SDR in the system. **Note** This step is necessary only if you wish to preserve the router configurations (if TURBOBOOT is set to **clean**). If TURBOBOOT is set to **format**, then the disk is erased and the existing configurations are deleted. The default option is **clean**.

Step 3	Place all RPs in ROM Monitor mode:
	admin
	config-register 0x0 location all
	reload location all
	Example:
	`RP/0/RP0/CPU0:router# admin`
	`RP/0/RP0/CPU0:router(admin)# config-register 0x0 location all`
	`RP/0/RP0/CPU0:router(admin)# reload location all`
		For more information, see Resetting the Configuration Register and Reloading a DSC to ROM Monitor Mode, page 1-3.

Step 4	Clear the ROM Monitor environmental variables on all RPs, including the DSC.
	unset BOOT
	unset TFTP_FILE
	sync
	Example:
	`rommon B1> unset BOOT`
	`rommon B2> unset TFTP_FILE`
	`rommon B3> sync`
		Ensures that all the RPs in the system are prepared for TURBOBOOT. Repeat for each RP in the system (LCC and fabric chassis).
		Enter the settings exactly as shown. You must attach a terminal to each card for this procedure.
		All variable names are case sensitive.
		• Clears the BOOT variable.
		• Clears the TFTP_FILE variable.
		• Saves the changes.
		Note If the **unset** command displays an error message, it is most likely because the variable you are trying to change is not set. If this is the case, ignore the message and continue.

	Command or Action	Purpose

Step 5	On the DSC, set the environment variables that configure the Management Ethernet interface for use in ROM Monitor mode:
	`IP_ADDRESS=`*`ip_address`*
	`IP_SUBNET_MASK=`*`mask`*
	`DEFAULT_GATEWAY=`*`ip_address`*
	Example:
	`rommon B4> IP_ADDRESS=1.1.1.1`
	`rommon B5> IP_SUBNET_MASK=255.255.254.0`
	`rommon B6> DEFAULT_GATEWAY=1.1.0.1`
		Enter these settings exactly as shown. All variable names are case sensitive.
		• Sets the IP address for the Management Ethernet interface on the DSC.
		• Sets the subnet mask for the Management Ethernet interface on the DSC.
		• Identifies the default gateway that serves the DSC.

Step 6	On the DSC, set the TFTP environment variables:
	`TFTP_VERBOSE=`*`print_setting`*
	`TFTP_RETRY_COUNT=`*`retry_count`*
	`TFTP_TIMEOUT=`*`timeout`*
	`TFTP_CHECKSUM=1`
	`TFTP_BLKSIZE=`*`transfer_size`*
	Example:
	`rommon B4> TFTP_VERBOSE=0`
	`rommon B5> TFTP_RETRY_COUNT=4`
	`rommon B6> TFTP_TIMEOUT=6000`
	`rommon B7> TFTP_CHECKSUM=1`
	`rommon B8> TFTP_BLKSIZE=1468`
		(Optional) Enter these settings exactly as shown. All variable names are case sensitive.
		• **TFTP_VERBOSE** sets the printer setting: 0=quiet, 1=progress (default), 2=verbose
		• **TFTP_RETRY_COUNT** sets the retry count for ARP and TFTP (default=7)
		• **TFTP_TIMEOUT** sets the overall timeout of the operation in seconds (default=7200)
		• **TFTP_CHECKSUM** specifies whether or not to perform a checksum test on the image: 1=no, 2=yes
		• **TFTP_BLKSIZE** sets the transfer size per package in bytes (default=1468)

Step 7	On the DSC, set the TURBOBOOT variables:
	`TURBOBOOT=on,` *`boot-device`*`,` *`options`*
	`sync`
	Example:
	`rommon B9> TURBOBOOT=on,disk0,format`
	`rommon B10> sync`
		Sets the TURBOBOOT parameters and saves the configuration. Separate each parameter with a comma (,).
		• To enable the Turboboot process, specify on.
		• Specify a boot device where all software will be installed on the DSC and all DSDRSCs. We recommend disk0.
		• To replace the existing software without formatting the boot device, replace options with clean.
		• To replace the existing software and format the boot device, replace options with format.
		• The default option is clean.
		• Any existing configuration is preserved.

	Command or Action	Purpose

Step 8	On the DSC, boot the vm image located on the tftp server:
	`boot tftp://server/directory/filename`
	Example:
	`rommon B11> boot tftp://223.255.254.254/softdir/comp-hfr-mini.vm`
		Retrieves the file from the TFTP server and installs it on the boot disk.
		• Run this command on the DSC 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 DSC.
		• Allow the system to fully boot. The Turboboot process takes some time. Do not enter any commands until you are prompted to enter a username or until the CLI prompt appears.
		• The "Press RETURN to get started" message appears twice. The first occurrence appears when the software is loaded into memory. The second occurrence happens after the software has been installed on the disk.
		• The DSC is fully booted when the following message appears:
		`SYSTEM CONFIGURATION COMPLETED`

Step 9	Reset all other RPs to boot the Cisco IOS XR software:
	`confreg 0x2`
	`reset`
	Example:
	`rommon B4> confreg 0x2`
	`rommon B5> reset`
		• Sets the configuration register to automatically start the boot process instead of staying in ROM Monitor mode.
		• Resets the RP and starts the boot process.
		The RPs synchronize the new Cisco IOS XR software from the DSC.

Examples

Verify the sanity of the configuration file system on each SDR in the system:

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

Place all RPs in ROM Monitor mode:

```
RP/0/RP0/CPU0:router# admin
RP/0/RP0/CPU0:router(admin)# config-register 0x0 location all
RP/0/RP0/CPU0:router(admin)# reload location all
```

Clear the ROM Monitor environmental variables on all RPs, including the DSC:

```
rommon B1> unset BOOT
rommon B2> unset TFTP_FILE
rommon B3> sync
```

Set the IP environment variables to configure the ROM Monitor Management Ethernet interface on the DSC:

```
rommon B4> IP_ADDRESS=10.1.1.1
rommon B5> IP_SUBNET_MASK=255.255.254.0
rommon B6> DEFAULT_GATEWAY=10.1.0.1
```

Enable installation process using the TURBOBOOT variable on the DSC. The following example shows how to boot the router using the specified vm file on the specified TFTP server:

```
rommon B7> TURBOBOOT=on,disk0,format
rommon B8> sync
rommon B9> boot tftp://10.10.10.10/software/comp-hfr-mini.vm-3.9.0
```

Reset all other RPs to boot the Cisco IOS XR software:

```
rommon B8> confreg 0x2
rommon B9> reset
```

Reinstalling to a Cisco CRS Router from an Image on a Local Storage Device

This section describes the tasks required to install Cisco IOS XR software on the boot device using a vm image stored on a local storage device. The local storage device can be either of the removable flash disks in disk0 or disk1. We recommend using disk1 as the storage device for the vm image, and disk0 as the boot device (destination disk).

Complete the procedures exactly as described in this section.

Note Before booting begins on the DSC, a delay of 10 minutes or more may occur while the vm image is read to memory from the removable local storage device.

Prerequisites

- The ROM Monitor firmware on the Cisco CRS router is compatible with the Cisco IOS XR software image that you are installing. For more information, see Upgrading or Downgrading ROM Monitor Using the FPD PIE, page 5-61.
- A valid vm image, as described in the "Locating Installable Files" section on page 2-20, must be located on a flash disk installed the RP. Cisco recommends using disk1.

  If this file is not present on a local disk 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 disk0 or disk1. This process is described in the "Upgrading and Managing Cisco IOS XR Software" module of *Cisco IOS XR System Management Configuration Guide for the Cisco CRS Router*. For more information, see specifically the section "Obtaining and Placing Cisco IOS XR Software".
  - 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. For more information, see Related Documents, page 37.

Note The removable flash disk used to store the installation file should be used to store archives only of vm and PIE files. This disk cannot be used as a destination for installed software or configurations. Only the boot device can be used to store active software and configurations. See the "Upgrading and Managing Cisco IOS XR Software" module of *Cisco IOS XR System Management Configuration Guide for the Cisco CRS Router*.

SUMMARY STEPS

1. Back up the router configuration while still in EXEC mode.
2. Verify the sanity of the configuration file system:
   a. **cfs check**
   b. Repeat on each SDR in the system.
3. Copy the required vm file to the DSC flash disk that will hold the installable file. We recommend using disk1. You can also replace the flash disk with a flash disk that already has the correct image.
4. Place all RPs in ROM Monitor mode:
   a. **admin**
   b. **config-register 0x0 location all**
   c. **reload location all**
5. Clear the ROM Monitor environmental variables on all RPs, including the DSC:
   a. **unset BOOT**
   b. **unset TFTP_FILE**
   c. **sync**
   d. Repeat for each RP in the system (line card chassis and fabric chassis).
6. Set the TURBOBOOT variables on the DSC:
   a. **TURBOBOOT=on**, **disk0**, *options*
   b. **sync**
7. On the DSC, boot the vm image located on the local storage device:
   boot *device***:/***filename*
8. Reset all other RPs to boot the Cisco IOS XR software:
   c. **confreg 0x2**
   d. **reset**

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. For more information, see the "Upgrading and Managing Cisco IOS XR Software" module of *Cisco IOS XR System Management Configuration Guide for the Cisco CRS Router.*
Step 2	Verify the sanity of the configuration file system. Repeat on each SDR in the system. **cfs check** **Example:** `RP/0/RP0/CPU0:router# cfs check`	(Optional) Verifies the sanity of the router configuration, and resolves any internal inconsistencies. Repeat the **cfs check** command on each SDR in the system. **Note** This step is necessary only to preserve the router configurations (if TURBOBOOT is set to **clean**). If TURBOBOOT is set to **format**, then the disk is erased and the existing configurations are deleted. The default option is **clean**.
Step 3	Copy the required vm file to the DSC flash disk, or replace the flash disk with a flash disk that has the correct image.	Places the software on the router in preparation for installation. • We recommend using flash disk1: to hold the installable file. • For more information, see Prerequisites, page 2-32 for this procedure.

Step 4	Place all RPs in ROM Monitor mode:
	admin
	config-register 0x0 location all
	reload location all
	Example:
	`RP/0/RP0/CPU0:router# admin`
	`RP/0/RP0/CPU0:router(admin)#`
	`config-register 0x0 location all`
	`RP/0/RP0/CPU0:router(admin)# reload`
	`location all`
		For more information, see Resetting the Configuration Register and Reloading a DSC to ROM Monitor Mode, page 1-3.

Step 5	Clear the ROM Monitor environmental variables on all RPs, including the DSC.
	unset BOOT
	unset TFTP_FILE
	sync
	Example:
	`rommon B1> unset BOOT`
	`rommon B2> unset TFTP_FILE`
	`rommon B3> sync`
		Ensures that all RPs in the system are prepared for Turboboot. Repeat for each RP in the system (line card chassis and fabric chassis).
		Enter the settings exactly as shown. You must attach a terminal to each card for this procedure.
		All variable names are case sensitive.
		a. Clears the BOOT variable.
		b. Clears the TFTP_FILE variable.
		c. Saves the changes.
		Note If the **unset** command displays an error message, it is most likely because the variable you are trying to change is not set. If this is the case, ignore the message and continue.

	Command or Action	Purpose

Step 6	On the DSC, set the TURBOBOOT variables:
	`TURBOBOOT=on, boot-device, options`
	`sync`
	Example:
	`rommon B7> TURBOBOOT=on,disk0,format`
	`rommon B8> sync`
		Sets the TURBOBOOT parameters and saves the configuration. Separate each parameter with a comma (,).
		• To enable the Turboboot process, specify on.
		• Specify a boot device where all software will be installed on the DSC and all DSDRSCs. We recommend disk0.
		• To replace the existing software without formatting the boot device, replace options with clean.
		• To replace the existing software and format the boot device, replace options with format.
		• The default option is clean.
		• Any existing configuration is preserved.

Step 7	On the DSC, boot the vm image located the local storage device:
	`boot devixe:/filename`
	Example:
	`rommon B7> boot`
	`disk1:/comp-hfr-mini.vm-3.8.0`
		Boots the file located on the local storage device and installs it to the boot disk.
		• This process removes any existing software packages, resets the configuration register to 0x2, and boots the system.
		• Allow the RP to fully boot. The "Press RETURN to get started" message appears twice. The first occurrence appears when the software is loaded into memory. The second occurrence happens after the software has been installed on the disk.
		• The system is fully booted when the following message appears:
		`SYSTEM CONFIGURATION COMPLETED`
		Note A delay of 10 minutes or more occurs while the software is read from the flash disk.

Step 8	Reset all other RPs to boot the Cisco IOS XR software:
	`confreg 0x2`
	`reset`
	Example:
	`rommon B4> confreg 0x2`
	`rommon B5> reset`
		• Sets the configuration register to automatically start the boot process instead of staying in ROM Monitor mode.
		• Resets the RP and starts the boot process.
		The RPs synchronize the new Cisco IOS XR software from the DSC.

Examples

Verify the sanity of the configuration file system on each SDR in the system:

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

Place all RPs in ROM Monitor mode:

```
RP/0/RP0/CPU0:router# admin
RP/0/RP0/CPU0:router(admin)# config-register 0x0 location all
RP/0/RP0/CPU0:router(admin)# reload location all
```

Clear the ROM Monitor environmental variables on all RPs, including the DSC:

```
rommon B1> unset BOOT
rommon B2> unset TFTP_FILE
```

```
rommon B4> sync
```

Turboboot the DSC:

```
rommon B5> TURBOBOOT=on,disk0,format
rommon B6> sync
rommon B7> boot disk1:/comp-hfr-mini.vm-3.8.0
```

Note A delay of 10 minutes or more occurs while the software is read from the flash disk.

Reset all other RPs to boot the Cisco IOS XR software:

```
rommon B8> confreg 0x2
rommon B9> reset
```

What to Do Next

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

Note If there was no previous router configuration, you must enter a root-system username and password when the boot process is complete.

After reinstalling the software, you might want to verify interfaces, install additional packages or perform other configuration tasks:

- For instructions on how to verify that the interfaces are up and properly configured, see "Verifying the System Interfaces" in the "Troubleshooting the Cisco IOS XR Software" module of *Cisco IOS XR Getting Started Guide for the Cisco CRS Router.*
- Install additional software from the PIE files, as necessary. For more information, see the "Upgrading and Managing Cisco IOS XR Software" module of *Cisco IOS XR System Management Configuration Guide for the Cisco CRS Router.*
- See Related Documents for a list of the additional documentation required to fully configure the router.

Additional References

The following sections provide references related to the ROM Monitor.

Related Documents

Related Topic	Document Title
Contact a Cisco representative	"Obtaining Additional Publications and Information" in *What's New* in Cisco Product Documentation located at: http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html
Removable flash disk used to store archives of vm and PIE files Save current router configuration Verify that interfaces are up and properly configured Install or upgrade software packages from PIE files	*Upgrading and Managing Cisco IOS XR Software* module of *Cisco IOS XR System Management Configuration Guide for the Cisco CRS Router*
Redundancy slot pairs	*Managing the Router Hardware* module of *Cisco IOS XR System Management Configuration Guide for the Cisco CRS Router*
Upgrade a Cisco XR 12000 Series Router that is running Cisco IOS software.	*Migrating from Cisco IOS to Cisco IOS XR Software on the Cisco XR 12000 Series Router*

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. 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. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/support

CHAPTER 3

Managing Configuration Files in ROM Monitor

This chapter provides information about managing configuration files in the router.

This chapter contains the following sections:

- Information about Configuration Files, page 3-39
- Specifying an Alternative Administration Configuration, page 3-40
- Specifying an Alternative SDR Configuration, page 3-43
- Specifying an Alternate Storage Location for Configuration Files, page 3-48
- Additional References, page 3-51

Information about Configuration Files

Cisco IOS XR software creates two types of configuration files—the administration configuration file and the default secure domain router (SDR) configuration files. These configuration files are stored in the following locations:

- There is only one administration configuration file, which is stored on the designated shelf controller (DSC) and contains system-wide configurations for items such as SDR name and node inventory.
- In addition, each SDR has its own SDR configuration to specify the parameters for routing, interfaces, SDR usernames, and other SDR-specific configurations. By default, the configuration file for each SDR is stored on the designated secure domain router shelf controller (DSDRSC) for the SDR.

For more information on SDRs, DSDRSCs and admin plane configuration, see the "*Configuring Secure Domain Routers on Cisco IOS XR* Software" module of *Cisco IOS XR System Management Configuration Guide for the Cisco CRS Router.*

The following sections describe ways to manage the use of configuration files from ROM Monitor:

Caution The default configuration should be sufficient for most situations. The options described in the following sections are for rare cases in which an alternative configuration is required. Use of these options can result in system errors or downtime. Consult Cisco technical support before using these options.

Specifying an Alternative Administration Configuration

The administration configuration stores system-wide configurations such as the SDR name and node inventory for the entire system. This is separate from the default-SDR configuration that stores routing and interface configurations.

To specify an alternative administration configuration file from ROM Monitor mode, use the methods described in the following sections:

- Specifying a Temporary Alternative Administrative Configuration with the -o Boot Option, page 3-40
- Specifying a Permanent Alternative Administrative Configuration File with the IOX_ADMIN_CONFIG_FILE= Variable, page 3-42

Caution The default committed administration configuration should be sufficient for most situations. The option described in this section is for rare cases when an alternative admin configuration is required. Use of this method can result in system errors or downtime.

Specifying a Temporary Alternative Administrative Configuration with the -o Boot Option

This mode of administrative configuration with the **-o boot** option is temporary in nature. After this boot option is set, this mode allows the router to boot from this alternative configuration, and the configuration specified in this configuration file becomes part of the running and persistent configuration.

Note When the router boots with the external configuration specified by the **-o** option, the system loses the default configuration. The default configuration is completely replaced with this alternative configuration.

To specify a temporary administration configuration file with the **-o boot** option, use the following procedure. With this method, the specified configuration file is used for a single router boot. If the DSC is reset again, the permanent configuration file is used.

SUMMARY STEPS

1. Place the DSC and the standby DSC in ROM Monitor mode.
2. **confreg 0x0**
3. **confreg 0x102**
4. **set**
5. **boot** *image* **–o** *config-file-path*
6. **confreg 0x102**
7. **reset**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Place the DSC and the standby DSC in ROM Monitor mode.	For more information, see Entering ROM Monitor Mode, page 1-3.
Step 2	**confreg 0x0** **Example:** `rommon 1> confreg 0x0`	Sets the configuration register of the standby DSC to 0x0 so that the standby DSC does not take control. **Note** The configuration register is not an environment variable like TURBOBOOT. Do not enter an equal sign when entering the **confreg** command. For more information about ROMMON commands and environmental variables, see Chapter 1, "ROM Monitor Overview and Basic Procedures".
Step 3	**confreg 0x102** **Example:** `rommon 1 > confreg 0x102`	Sets the active RP configuration register to 0x102.
Step 4	**set** **Example:** `rommon 2 > set`	Displays the current environment variable settings. **Note** The filename is set in the BOOT variable.
Step 5	**boot** *image* **-o** *config-file-path* **Example:** `rommon 3> boot tftp://223.255.254.254/images/comp-hfr-mini.vm -o /disk1:/cfgarchives/admingold.conf`	Boots the router. Replace *image* with the filename listed in the boot variable, and replace *config-file-path* with the path and filename for the configuration file. **Note** The pathname should be a valid UNIX pathname (a slash [/] must be included after the device: "disk1:/").
Step 6	**confreg 0x102** **Example:** `rommon 1> confreg 0x102`	Sets the configuration register of the standby DSC to 0x102.
Step 7	**reset** **Example:** `rommon 2 > reset`	Resets the standby DSC so that the new setting takes effect and the standby DSC becomes operational.

Specifying a Permanent Alternative Administrative Configuration File with the IOX_ADMIN_CONFIG_FILE= Variable

This mode of alternative administrative configuration with the IOX_ADMIN_CONFIG_FILE= variable is permanent in nature. After this variable is set, this mode allows the router to always boot from this alternative configuration, and the system does not revert to the default commited configuration on the next system reload.

Note When the router boots with the external configuration specified by the IOX_ADMIN_CONFIG_FILE= variable, the system loses the default configuration. The default configuration is completely replaced with this alternative configuration.

To permanently change the location of the default administration configuration file, specify the filename and directory path in the IOX_ADMIN_CONFIG_FILE= environment variable while in ROM Monitor mode. Specifying the environment variable forces the use of the specified file for all boots while this variable is set.

SUMMARY STEPS

1. Place the DSC and the standby DSC in ROM Monitor mode.
2. **confreg 0x0**
3. **confreg 0x102**
4. **set**
5. **IOX_ADMIN_CONFIG_FILE=***drive:path/file*
6. **sync**
7. **boot**
8. **confreg 0x102**
9. **reset**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Place the DSC and the standby DSC in ROM Monitor mode.	For more information, see Entering ROM Monitor Mode, page 1-3.

Step 2	`confreg 0x0`
	
	Example:
	`rommon 1> confreg 0x0`
		Sets the configuration register of the standby DSC to 0x0 so that the standby DSC does not take control.
		
		Note The configuration register is not an environment variable like TURBOBOOT. Do not enter an equal sign when entering the **confreg** command.

	Command or Action	Purpose
Step 3	**confreg 0x102** **Example:** `rommon 1 > confreg 0x102`	Sets the DSC configuration register to 0x102.
Step 4	**set** **Example:** `rommon 2 > set`	Displays the current environment variable settings. **Note** The filename is set in the IOX_ADMIN_CONFIG_FILE variable.
Step 5	**IOX_ADMIN_CONFIG_FILE=***drive:path/file* **Example:** `rommon B1> IOX_ADMIN_CONFIG_FILE=/disk2:/cfgarchives/admingold.conf`	Sets the IOX_ADMIN_CONFIG_FILE variable to specify the absolute path of a different administration configuration file. **Note** The IOX_ADMIN_CONFIG_FILE variable is overridden by the **boot** command when it is entered with the **-o** option.
Step 6	**sync** **Example:** `rommon B1> sync`	Saves the changes.
Step 7	**boot** **Example:** `rommon B1> boot`	Boots the router.
Step 8	**confreg 0x102** **Example:** `rommon 1> confreg 0x102`	Sets the configuration register of the standby DSC to 0x102.
Step 9	**reset** **Example:** `rommon 2 > reset`	Resets the standby DSC so that the new setting takes effect and the standby DSC becomes operational.

Specifying an Alternative SDR Configuration

You can specify an alternative configuration for an SDR from ROM Monitor mode, using the methods described in the following sections. These procedures are run from the DSDRSC for the SDR. The DSC is also the DSDRSC of the owner SDR. For all other non-owner SDRs, the DSDRSC is the RP or DRP assigned as the DSDRSC.

Note For more information on SDRs and DSDRSCs, see the "Configuring Secure Domain Routers on Cisco IOS XR Software" module of *Cisco IOS XR System Management Configuration Guide for the Cisco CRS Router.*

This section includes the following procedures:

- Specifying a Temporary SDR Configuration File with the -a Boot Option, page 3-44

- Specifying a Permanent SDR Configuration File with the IOX_CONFIG_FILE= Variable, page 3-45

Caution The default committed SDR configuration should be sufficient for most situations. The option described in this section is for rare cases when an alternative SDR configuration is required. Use of this method can result in system errors or downtime.

Specifying a Temporary SDR Configuration File with the -a Boot Option

This mode of SDR configuration with the **-a** boot option is temporary in nature. Once this boot option is set, this mode allows the router to boot from this alternative configuration and the configuration specified in this configuration file becomes part of the running and persistent configuration.

Note When the router boots with the external configuration specified by the **-a** option, the system loses the default configuration. The default configuration is completely replaced with this alternative configuration.

To specify a temporary SDR configuration file with the **-a** boot option, use the following procedure. With this method, the specified configuration file is used for a single router boot. If the DSC is reset again, the permanent configuration file is used.

SUMMARY STEPS

1. Place the DSDRSC and the standby DSDRSC in ROM Monitor mode.
2. **confreg 0x0**
3. **confreg 0x102**
4. **set**
5. **boot** *image* **–a** *config-file-path*
6. **confreg 0x102**
7. **reset**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Place the DSDRSC and the standby DSDRSC in ROM Monitor mode.	For more information, see Entering ROM Monitor Mode, page 1-3.

Step 2	`confreg 0x0`
	
	Example:
	`rommon 1> confreg 0x0`
		Sets the configuration register of the standby DSDRSC to 0x0 so that the standby DSDRSC does not take control.
		
		Note The configuration register is not an environment variable like TURBOBOOT. Do not enter an equal sign when entering the confreg command.

	Command or Action	Purpose
Step 3	**confreg 0x102** **Example:** `rommon 1 > confreg 0x102`	Sets the DSDRSC configuration register to 0x102.
Step 4	**set** **Example:** `rommon 2 > set`	Displays the current environment variable settings. **Note** The filename is set in the BOOT variable.
Step 5	**boot** *image* **-a** *config-file-path* **Example:** `rommon 3> boot tftp://223.255.254.254/images/comp-hfr-mini.vm -a /disk1:/cfgarchives/SDRgold.conf`	Enter the boot command. Replace *image* with the filename listed in the boot variable, and replace *config-file-path* with the path and filename for the configuration file. **Note** The pathname should be a valid UNIX pathname (a slash [/] must be included after the device: "disk1:/").
Step 6	**confreg 0x102** **Example:** `rommon 1> confreg 0x102`	Sets the configuration register of the standby DSDRSC to 0x102.
Step 7	**reset** **Example:** `rommon 2 > reset`	Resets the standby DSDRSC so that the new setting takes effect and the standby DSDRSC becomes operational.

Specifying a Permanent SDR Configuration File with the IOX_CONFIG_FILE= Variable

This mode of alternative SDR configuration with the IOX_CONFIG_FILE= variable is permanent in nature. Once this variable is set, this mode allows the router to always boot from this alternative configuration. The system does not revert to the default commited configuration on the next system reload.

Note When the router boots with the external configuration specified by the IOX_CONFIG_FILE= variable, the system loses the default configuration. The default configuration is completely replaced with this alternative configuration.

To permanently change the location of the default configuration file for an SDR, specify the filename and directory path in the IOX_CONFIG_FILE= environment variable while in ROM Monitor mode. Specifying the environment variable forces the use of the specified file for all boots while this variable is set.

SUMMARY STEPS

1. Place the DSDRSC and the standby DSDRSC in ROM Monitor mode.

2. **confreg 0x0**
3. **confreg 0x102**
4. **set**
5. **IOX_CONFIG_FILE=***drive:path/file*
6. **sync**
7. **boot**
8. **confreg 0x102**
9. **reset**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Place the DSDRSC and the standby DSDRSC in ROM Monitor mode.	For more information, see Entering ROM Monitor Mode, page 1-3.
Step 2	**confreg 0x0** **Example:** `rommon 1> confreg 0x0`	Sets the configuration register of the standby DSDRSC to 0x0 so that the standby DSDRSC does not take control. **Note** The configuration register is not an environment variable like TURBOBOOT. Do not enter an equal sign when entering the **confreg** command.
Step 3	**confreg 0x102** **Example:** `rommon 1 > confreg 0x102`	Sets the DSDRSC configuration register to 0x102.
Step 4	**set** **Example:** `rommon 2 > set`	Displays the current environment variable settings. **Note** The filename is set in the IOX_CONFIG_FILE variable.
Step 5	**IOX_CONFIG_FILE**=*drive:path/file* **Example:** `rommon B1> IOX_CONFIG_FILE=/disk2:/cfgarchives/admingold.conf`	Sets the IOX_CONFIG_FILE variable to specify the absolute path of a different SDR configuration file. **Note** The IOX_CONFIG_FILE= variable is overridden by the **boot** command when it is entered with the **-a** option.
Step 6	**sync** **Example:** `rommon B1> sync`	Saves the changes.
Step 7	**boot** **Example:** `rommon B1> boot`	Boots the router.
Step 8	**confreg 0x102** **Example:** `rommon 1> confreg 0x102`	Sets the configuration register of the standby DSDRSC to 0x102.
Step 9	**reset** **Example:** `rommon 2 > reset`	Resets the standby DSDRSC so that the new setting takes effect and the standby DSDRSC becomes operational.

Specifying an Alternate Storage Location for Configuration Files

To change the default location where the configuration files for an SDR are saved (committed), specify the location and directory path in the IOX_CONFIG_MEDIUM= environment variable while in ROM Monitor mode. Specifying the environment variable forces the use of the specified location while this variable is set.

SUMMARY STEPS

1. Place the DSDRSC and the standby DSDRSC in ROM Monitor mode.
2. **confreg 0x0**
3. **confreg 0x102**
4. **set**
5. **IOX_CONFIG_MEDIUM=***/location:/path/*
6. **sync**
7. **boot**
8. **confreg 0x102**
9. **reset**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Place the DSDRSC and the standby DSDRSC in ROM Monitor mode.	For more information, see Entering ROM Monitor Mode, page 1-3.
Step 2	**confreg 0x0** **Example:** `rommon 1> confreg 0x0`	Sets the configuration register of the standby DSDRSC to 0x0 so that the standby DSDRSC does not take control. **Note** The configuration register is not an environment variable like TURBOBOOT. Do not enter an equal sign when entering the **confreg** command.
Step 3	**confreg 0x102** **Example:** `rommon 1 > confreg 0x102`	Sets the DSDRSC configuration register to 0x102.
Step 4	**set** **Example:** `rommon 2 > set`	Displays the current environment variable settings. **Note** The filename is set in the IOX_CONFIG_MEDIUM variable.
Step 5	**IOX_CONFIG_MEDIUM=***/location:/path/* **Example:** `rommon B1> IOX_CONFIG_MEDIUM=/disk1:/cfgarchives/admingold.conf`	Sets the IOX_CONFIG_MEDIUM variable to specify a different location. • For the Cisco CRS router, replace location with disk0 or disk1. Replace the *path* argument with the path to the directory in which you want to store the configuration files. • For the Cisco XR 12000 Series Router, replace location with disk0, disk1, or compactflash. Replace path with the path to the directory in which you want to store the configuration files. **Note** By default, the directory /disk0:/usr is available for storing alternative configurations and other user files. We recommend that you do not use a directory path starting with /disk0:/config because that path is used to store system files.
Step 6	**sync** **Example:** `rommon B1> sync`	Saves the changes.
Step 7	**boot** **Example:** `rommon B1> boot`	Boots the router.

	Command or Action	Purpose
Step 8	**confreg 0x102** **Example:** `rommon 1> confreg 0x102`	Sets the configuration register of the standby DSDRSC to 0x102.
Step 9	**reset** **Example:** `rommon 2 > reset`	Resets the standby DSDRSC so that the new setting takes effect and the standby DSDRSC becomes operational.

Additional References

The following sections provide references related to the ROM Monitor.

Related Documents

Related Topic	Document Title
SDRs, DSDRSCs, and admin plane configuration	*Configuring Secure Domain Routers on Cisco IOS XR Software* module of *Cisco IOS XR System Management Configuration Guide for the Cisco CRS Router*

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. 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. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/support

CHAPTER 4

Password Recovery in ROM Monitor Mode

This chapter describes how to recover a password on the router. It also includes instructions to bypass ksh authentication on a node.

This chapter contains the following sections:

- Recovering the Root Password on Single-RP Routers, page 4-53
- Recovering the Root Password on Redundant-RP Routers, page 4-54
- Bypassing ksh Authentication, page 4-55
- Additional References, page 4-56

If the root password is forgotten, it can be recovered only at the RP card. To recover the password at the Designated Shelf Controller (DSC), set the configuration register to 0x142 on the active 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 0x102).

Note The AAA authentication configuration can still prevent access, even after the root password is recovered. In this case, you must bypass the ksh authentication via the auxiliary port.

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 (ROMMON), as described in the "Entering ROM Monitor Mode" section on page 1-3.

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

```
rommon B1> confreg 0x42
```

Note The configuration register is not an environment variable like TURBOBOOT. Do not enter an equal sign when entering the **confreg** command.

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

```
rommon B2> reset
```

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

```
router con0/0RP0/CPU0 is now available

Press RETURN to get started.


--- Administrative User Dialog ---


  Enter root-system username: user
  Enter secret:
  Enter secret again:
RP/0/0/CPU0:Jan 10 12:50:53.105 : exec[65652]: %MGBL-CONFIG-6-DB_COMMIT :
'Administration configuration committed by system'. Use 'show configuration commit changes
2000000009' to view the changes.
Use the 'admin' mode 'configure' command to modify this configuration.



User Access Verification

Username: user
Password:
RP/0/RP0/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 1-3.

Step 2 Set the configuration register of the standby RP to 0x0 so that the standby RP does not take control during the password recovery.

```
rommon B1> confreg 0x0
```

Note The configuration register is not an environment variable like TURBOBOOT. Do not enter an equal sign "(=)" when entering the **confreg** command. See the "ROM Monitor Overview" section on page 1-1 for more information on ROM Monitor mode commands and environmental variables.

Step 3 Set the active RP configuration register to 0x42:

```
rommon B1> confreg 0x42
```

Step 4 Reset or power cycle the router so that the new setting takes effect.

```
rommon B2> reset
```

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 con0/0RP0/CPU0 is now available

Press RETURN to get started.
```

```
--- Administrative User Dialog ---


  Enter root-system username: user
  Enter secret:
  Enter secret again:
RP/0/RP0/CPU0:Jan 10 12:50:53.105 : exec[65652]: %MGBL-CONFIG-6-DB_COMMIT :
'Administration configuration committed by system'. Use 'show configuration commit changes
2000000009' to view the changes.
Use the 'admin' mode 'configure' command to modify this configuration.



User Access Verification

Username: user
Password:
RP/0/0/CPU0:router#
```

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

```
rommon B3> confreg 0x102
```

Step 7 Reset the standby RP so that the new setting takes effect and the standby RP becomes operational.

```
rommon B4> reset
```

Bypassing ksh Authentication

You can bypass the ksh authentication for the auxiliary port of the route processor (RP), standby RP, and distributed RP cards and for console and auxiliary ports of line cards (LCs) and service processors (SPs). The situations in which ksh authentication may need to be bypassed include the following:

- DSC (active RP) disk0 corruption
- Loss of Qnet connectivity
- Inability to determine the node ID of the DSC (Active RP)

For information and instructions to bypass ksh authentication, see the “Configuring AAA Services on Cisco IOS XR Software” chapter of *Cisco IOS XR System Security Configuration Guide for the Cisco CRS Router.*

Additional References

The following sections provide references related to the ROM Monitor.

Related Documents

Related Topic	Document Title
How to bypass ksh authentication	*Configuring AAA Services on Cisco IOS XR Software* module of *Cisco IOS XR System Security Configuration Guide for the Cisco CRS Router*

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. 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. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/support

CHAPTER 5

Upgrading and Downgrading ROM Monitor Firmware on Cisco CRS Routers

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

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

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 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.

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 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.

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	**show hw-module fpd location all** **Example:** `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	**admin** **Example:** `RP/0/RP0/CPU0:Router# admin`	Enters administration EXEC mode from EXEC mode.
Step 3	**show fpd package** **Example:** `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
Step 4	**For ROMMON B:** **upgrade hw-module fpd rommon location** [**all** | *node-id*] **For ROMMON A:** **upgrade hw-module fpd rommonA location [all |** *node-id*] **Example:** `RP/0/RP0/CPU0:Router(admin)# upgrade hw-module fpd rommon location 0/SM3/SP`	Upgrades the ROMMON B and ROMMON A images on the specified card (*node-id*) or all cards (**all**). You need to explicitly upgrade the ROMMON A using the hidden command, provided your ROMMON is earlier than Release 1.52. **Note** Before you continue to reload the card, you should see a message indicating that the upgrade was completed successfully. **Warning** **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.**
Step 5	**exit** **Example:** `RP/0/RP0/CPU0:Router(admin)# exit`	Exits administration EXEC mode and returns to EXEC mode.
Step 6	If you are upgrading a single node on a router, including a standby DSDRSC, go to Step 9.	Continues to reload the node.
Step 7	If you are upgrading a router with redundant DSCs, and want to perform a graceful reload, go to Step 10.	Continues to gracefully reload all nodes.
Step 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.	Continues to perform a cold restart of all nodes
Step 9	Reload a single node: **a.** **hw-module location** *node-id* **reload** **b.** Go to Step 12 **Example:** `RP/0/RP0/CPU0:router# hw-module location 0/RP1/CPU0 reload`	**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. – Replace *node-id* with the node ID you specified when upgrading ROM Monitor. – 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. **b.** Go to Step 12 to verify that the correct ROMMON firmware is active on each node.

	Command or Action	Purpose
Step 10	Gracefully reload all nodes on a system that includes redundant RPs (DSCs): **a. cfs check** **b.** 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.	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. **a.** (Optional) Use **cfs check** command to ensure the sanity of the configuration file system for the owner SDR. **b.** (Optional) Repeat the **cfs check** command on the DSDRSC of each additional non-owner SDR in the system to verify the configuration file system for each non-owner SDR **c.** Reloads the standby RP to activate the new ROMMON firmware. **Note** The standby RP is the standby DSC for the system. The primary and standby DSCs are also the DSDRSCs for the owner SDR. **d.** Use the **show redundancy** command to verify the redundancy status of the DSC nodes. Wait for the standby RP to return to “Ready” state. **e.** Use the **redundancy switchover** command to cause the primary (active) RP to fail over to the redundant standby RP. **Note** The standby RP must be ready to take over. **f.** Use the **show redundancy** command to verify the status of the RP nodes. Wait for the standby RP to return to ready state. **g.** Reload the original primary RP to activate the new ROMMON firmware. **h.** (Optional) Repeat Step a. to Step g. on all DSDRSCs in the system to ensure a graceful restart for all SDRs. **i.** Use the **admin** command to enter administration EXEC mode. **j.** Use the **show platform** 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.

Command or Action	Purpose

Example:
`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`
	k. Use the **hw-module location** *node-id* **reload** command to reload each additional card where the ROMMON firmware was changed. Each node must be reloaded to activate the new ROMMON firmware.
	Replace *node-id* with the node ID you specified when upgrading ROM Monitor.
	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.
	l. Repeat Step k. to reload all upgraded nodes in the system.
	m. Use the **show platform** command to view all the nodes in the system. Verify that all the reloaded nodes are in the "IOS XR RUN" state.

Step 11 **Reload all nodes in the system** (cold restart)**:**
a. cfs check
b. Repeat on each SDR impacted by the reload operation.
c. admin
d. reload [**location all**]
Example:
`RP/0/RP0/CPU0:router# cfs check`
`RP/0/RP0/CPU0:router# admin`
`RP/0/RP0/CPU0:router(admin)# reload location all`
	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.
	Caution Reloading the primary RP (DSC) interrupts all service.
	a. (Optional) Ensures the sanity of the configuration file system for the owner SDR.
	b. (Optional) Ensures the sanity of the configuration file system for each non-owner SDR in the system.
	c. Enters administration EXEC mode.
	d. Reloads the DSDRSC with the upgraded ROM Monitor firmware. Use the **reload location all** command in administration EXEC mode to reload all nodes in the system.

Step 12 **show platform** **Example:** `RP/0/RP0/CPU0:Router# show platform`	Verifies that the ROM monitor image on the card has been successfully upgraded by displaying the status of all cards in the system.

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
                                     ========================================
                                       HW                        Current SW Upg/
Location     Card Type               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
                                  ==============================================
                                                                    SW      Min Req   Min Req
Card Type            FPD Description            Type Subtype   Version   SW Ver    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
-------------------------------------------------------------------------------------------
1OC768-ITU/C         OPTICS FIRMWARE 110B10     lc   fpga2     110.10        0.0       0.0
```

```
--------------------------------------------------------------------------------
----
1OC768-DWDM-L        OPTICS FIRMWARE 110B10     lc   fpga2     110.10        0.0       0.0
--------------------------------------------------------------------------------
----
1OC768-DPSK/C        OPTICS FIRMWARE 110B14     lc   fpga2     110.14        0.0       0.0
--------------------------------------------------------------------------------
----
1OC768-DPSK/C-O      OPTICS FIRMWARE 110B14     lc   fpga2     110.14        0.0       0.0
--------------------------------------------------------------------------------
----
1OC768-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
                      FPGA swv6.0 hwv80          lc   fpga1       6.00        5.0
0.80
--------------------------------------------------------------------------------
----
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:

=========== ==== ======= ======= =========== =========
                                   Current    Upg/Dng
Location    Type Subtype 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-3.5.0.0I/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-3.5.0.0I/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	*Cisco IOS XR Interface and Hardware Component Command Reference*
System management commands	*Cisco IOS XR System Management Command Reference*

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. 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. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/support

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