



ROM Monitor Configuration Guide for Cisco ASR 9000 Series Routers, IOS XR Release 6.4.x

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Americas Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

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Preface

From Release 6.1.2 onwards, Cisco introduces support for the 64-bit Linux-based IOS XR operating system. Extensive feature parity is maintained between the 32-bit and 64-bit environments. Unless explicitly marked otherwise, the contents of this document are applicable for both the environments. For more details on Cisco IOS XR 64 bit, refer to the [Release Notes](#) for Cisco ASR 9000 Series Routers, Release 6.1.2 document.

The *ROM Monitor Configuration Guide for Cisco ASR 9000 Routers* preface contains these sections:

- [Changes to This Document, on page vii](#)
- [Communications, Services, and Additional Information, on page vii](#)

Changes to This Document

This product has reached end-of-life status. For more information, see the [End-of-Life and End-of-Sale Notices](#).

This table lists the technical changes made to this document since it was first released.

Table 1: Changes to This Document

Date	Summary
March 2018	Initial release of this document.

Communications, Services, and Additional Information

- To receive timely, relevant information from Cisco, sign up at [Cisco Profile Manager](#).
- To get the business impact you're looking for with the technologies that matter, visit [Cisco Services](#).
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CHAPTER 1

New and Changed ROMMON Features

This table summarizes the new and changed feature information for the *ROM Monitor Configuration Guide for Cisco ASR 9000 Routers*, and tells you where they are documented.

- [New and Changed ROMMON Feature Information, on page 1](#)

New and Changed ROMMON Feature Information

Feature	Description	Changed in Release	Where Documented
No new features in this release	NA	Release 6.4.1	NA



CHAPTER 2

ROM Monitor Overview

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

This chapter includes these main topics:

- [Information About ROM Monitor, on page 3](#)
- [Entering ROM Monitor Mode, on page 5](#)
- [How to Set Console Baud in Cisco IOS XR 64 Bit OS, on page 9](#)
- [ROM Monitor Commands, on page 10](#)
- [Displaying the Configuration Register Setting, on page 12](#)
- [Environment Variables, on page 13](#)
- [Viewing Chassis Serial Numbers, on page 15](#)
- [Exiting ROM Monitor Mode, on page 16](#)
- [Attaching to Primary RSP from Standby RSP, on page 18](#)
- [Additional References, on page 19](#)

Information About ROM Monitor

The ROM Monitor is a bootstrap program that initializes the ASR 9000 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 and is factory supplied. The ROM Monitor program provides an initial power-on environment for each card. If the Cisco IOS XR software is rebooted or unable to run, the corresponding card returns to the ROM Monitor mode.

When you connect a terminal to a card that is in the ROM Monitor mode, the ROM Monitor CLI prompt is displayed.

Cisco ASR 9000 Series Router Prompt

```
rommon B1>
```

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.

Understanding the Role of the Route Switch Processor (RSP) Card

The Cisco ASR 9000 Series Router contains series of chassis slots, each of which can hold one of several types of line cards (LCs). Two slots in the chassis are reserved for route switch processors (RSP) cards that provide the central point for chassis provisioning and management.

The active RSP for the owner SDR is called the Designated Shelf Controller (DSC). This card performs system-wide functions. If the active RSP card is placed in ROM Monitor mode, it is no longer running the Cisco IOS XR software. If a standby RSP card is available, then the standby RSP card resumes router operations. If both the RSP cards are not available or if the active RSP (previously standby) is also placed in the ROM Monitor mode, router operations will stop.

Designated Secure Domain Router Shelf Controller (DSDRSC)

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 RSP Card

In most situations, you interact with the ROM Monitor mode only on the RSP cards. The active RSP card 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 RSP card for the system.

The line cards have its own ROM Monitor software which can be upgraded using the RSP FPD upgrade operation, if required.

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 common environment variables are BOOT, IP_ADDRESS, DEFAULT_GATEWAY, TFTP_FILE, TURBOBOOT and SUBNET_MASK.

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 RSP 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 RSP is used to refer to the RSP cards supported on Cisco ASR 9000 Series 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 RSP 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 GigabitEthernet 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 ASR 9000 Series Router, 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:

Prerequisites

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

1. Prepare the RSP card:
 - Anticipate substantial downtime, including the loss of packet forwarding on the system.
 - Verify the sanity of the configuration file system using the **cfs check** command in EXEC mode.
 - Verify that all changes to the active router configuration are saved with the **commit** command in any configuration mode.
 - Verify that all changes to the active software set are saved with the **install commit** command in Administration EXEC mode.
 - 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:
 - If a standby RSP is installed, verify that it is in the ready state with the **show redundancy** command in EXEC mode.

- Verify that all available nodes in the system are in IOS XR RUN state with the **show platform** command in EXEC mode.

3. This process is applicable to Cisco IOS XR 32 bit OS only.

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:

Resetting the Configuration Register and Reloading a RSP Card 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 RSP card 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.

SUMMARY STEPS

1. Verify the router is in a steady state.
2. Connect a terminal to the RSP card console port and log in to the router.
3. **admin**
4. `config-register boot-mode rom-monitor location <node-id>` command, **exit** command and **reload** command or `config-register boot-mode rom-monitor location all` command and **reload location all** command.

DETAILED STEPS

	Command or Action	Purpose
Step 1	Verify the router is in a steady state.	Ensures that all configurations are saved and that no installation processes are running.
Step 2	Connect a terminal to the RSP card console port and log in to the router.	Connects a terminal or PC to the RSP card console port and establishes a router management session. For more information on connecting a terminal, see <i>Connecting and Communicating with the Router</i> in Cisco ASR 9000 Series Aggregation Services Router Getting Started Guide.
Step 3	admin Example: RP/0/RSP0/CPU0:router# admin	Enters administration EXEC mode.
Step 4	<code>config-register boot-mode rom-monitor location <node-id></code> command, exit command and reload command or <code>config-register boot-mode rom-monitor location all</code> command and reload location all command. Example: RP/0/RSP0/CPU0:router(admin)# <code>config-register boot-mode rom-monitor location 0/RSP0/CPU0</code>	<ul style="list-style-type: none"> • Enter the following commands to place only one RSP card (active or standby) in ROM Monitor mode: • Enter the boot-mode rom-monitor location <code><node-id></code> command, where <code><node-id></code> is the ID of the card, to set the configuration register for ROM Monitor mode during the next card reload. • Enter the exit command to exit administration EXEC mode.

Command or Action	Purpose
<pre>RP/0/RSP0/CPU0:router(admin)# exit RP/0/RSP0/CPU0:router# reload Or, RP/0/RSP0/CPU0:router(admin)# config-register boot-mode rom-monitor location all RP/0/RSP0/CPU0:router(admin)# reload location all</pre>	<ul style="list-style-type: none"> • Enter the reload command to reload the card and enter ROM Monitor mode. <p>Note</p> <ul style="list-style-type: none"> • If you specify the config-register boot-mode rom-monitor command without the location keyword, then all the RSPs are placed in ROM Monitor mode. <ul style="list-style-type: none"> • Enter the following commands to place all RSPs in ROM Monitor mode: • Enter the config-register boot-mode rom-monitor location all command to reset the configuration register for all RSPs in the system. • Enter the reload location all command in administration EXEC mode to reload all RSPs in the system. <p>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.</p> <p>Caution Resetting the configuration register may change the baud rate for the console. The default baud rate is 9600.</p> <p>Tip To verify the configuration register setting, enter the show variables boot command in the administration EXEC mode.</p>

Verifying the Router State: Example

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

```
RP/0/RSP0/CPU0:router#show redundancy

Wed Jun 30 21:35:23.656 UTC
Redundancy information for node 0/RSP0/CPU0:
=====
Node 0/RSP0/CPU0 is in ACTIVE role
Partner node (0/RSP1/CPU0) is in STANDBY role
Standby node in 0/RSP1/CPU0 is ready
Standby node in 0/RSP1/CPU0 is NSR-ready

Reload and boot info
```

Placing the RSP Cards in ROM Monitor Mode: Example

```

-----
A9K-RSP-8G reloaded Tue Jun 29 18:56:15 2010: 1 day, 2 hours, 39 minutes ago
Active node booted Tue Jun 29 18:56:15 2010: 1 day, 2 hours, 39 minutes ago
Standby node boot Tue Jun 29 18:55:54 2010: 1 day, 2 hours, 39 minutes ago
Standby node last went not ready Tue Jun 29 18:58:52 2010: 1 day, 2 hours, 36
minutes ago
Standby node last went ready Tue Jun 29 18:59:52 2010: 1 day, 2 hours, 35 minutes
ago
There have been 0 switch-overs since reload

Active node reload "Cause: Node reload is required by install operation"
Standby node reload "Cause: pID node reload is required by install operation"

RP/0/RSP0/CPU0:router#show redundancy summary
Wed Jun 30 21:35:32.259 UTC
  Active Node      Standby Node
  -----
  0/RSP0/CPU0      0/RSP1/CPU0 (Ready, NSR: Ready)

RP/0/RSP0/CPU0:router#show platform

Wed Jun 30 21:35:35.944 UTC
Node                Type                                State          Config State
-----
0/RSP0/CPU0         A9K-RSP-8G (Active)                IOS XR RUN     PWR, NSHUT, MON
0/RSP1/CPU0         A9K-RSP-8G (Standby)              IOS XR RUN     PWR, NSHUT, MON
0/1/CPU0            A9K-8T-E                           IOS XR RUN     PWR, NSHUT, MON
0/5/CPU0            A9K-40GE-B                         IOS XR RUN     PWR, NSHUT, MON
0/6/CPU0            A9K-2T20GE-E                      IOS XR RUN     PWR, NSHUT, MON

```

Placing the RSP Cards in ROM Monitor Mode: Example

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

```

RP/0/RSP0/CPU0:router# admin
RP/0/RSP0/CPU0:router(admin)# config-register boot-mode rom-monitor location
all

Set to rom-monitor mode for all mgmt nodes:
RP/0/RSP0/CPU0:router(admin)#config-register boot-mode rom-monitor location all
Successfully set config-register to RP/0/RSP0/CPU0:router
Successfully set config-register to RP/0/RSP0/CPU0:router

```

Manually Halting the Initialization Process During System Reload

To force the RSP card 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
TYPE 'Send Break'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 RSP card console port. For more information, see the “Connecting and Communicating with the Router” section in Cisco ASR 9000 Series Aggregation Services Router Getting Started Guide.



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

How to Set Console Baud in Cisco IOS XR 64 Bit OS

Rommon is not supported in Cisco IOS XR 64 bit OS. Therefore, to set the console baud rate, do the following:

1. Roll back to Cisco IOS XR 32 bit OS.
2. Set the console baud rate in rommon.
3. Roll back to Cisco IOS XR 64 bit OS.

To enter into rommon mode, select the **IOS-XR (32 bit Classic XR)** in boot option, as follows:

```
Please select the operating system and the boot device:
 1) IOS-XR (32 bit Classic XR)
 2) IOS-XR 64 bit Boot previously installed image
 3) IOS-XR 64 bit Mgmt Network boot using DHCP server
 4) IOS-XR 64 bit Mgmt Network boot using local settings (iPXE)
(Press 'p' for more option)
Selection [1/2/3/4]: 1
Selected IOS-XR (32 bit Classic XR), Continue ? Y/N: y
```

Now in rommon, type **confreg**, and you will be prompted to change the boot settings, as follows:

```
rommon 2 > confreg

Configuration Summary
(Virtual Configuration Register: 0x2142)
enabled are:
console baud: 9600

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]: y
enter rate: 0 = 9600, 1 = 4800, 2 = 1200, 3 = 2400 4 = 19200, 5 = 38400, 6 = 57600, 7 =
115200 [0]: 7
change the boot characteristics? y/n [n]: n

Configuration Summary
(Virtual Configuration Register: 0x3962)
enabled are:
console baud: 115200
boot: MBI Boot
```

Type **y** to change the console baud rate. Select the baud rate option **7** to change the baud rate settings to 115200. The Configuration Summary in the above output shows that the console baud rate updated to 115200.

You must reset or power cycle for the new confreg value to take effect, as follows:

```
rommon 3 > reset -h
```

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

The table below summarizes the commands commonly used in ROM Monitor. For specific instructions on using these commands, refer to the relevant procedure in this document.

Table 2: Commonly Used ROM Monitor Commands

ROMMON Command	Description
<code>boot image</code>	Manually boots a vm Cisco IOS XR software image.
<code>boot image -o config-file-path</code>	Manually boots the Cisco IOS XR software with a temporary alternative administration configuration file.
<code>boot tftp://config-file-path/image</code>	Manually boots the Cisco IOS XR software with a temporary default SDR configuration file. The system can also be booted from external compactflash using Cisco ASR 9000 Series Router Image Refresh method.
<code>cookie</code>	Displays the system cookie.
<code>confreg</code>	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.
<code>dev</code>	Displays the available local storage devices (for example, disk0: and disk1:).
<code>dir</code>	Displays the files on a storage device.

ROMMON Command	Description
bpcookie	Displays the chassis serial number, MAC address, MAC range, PID, Controller type, version, and so on, in a Cisco ASR 9000 Series 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

The table below describes the available **help** commands for ROM Monitor mode.

Table 3: Help Commands in ROMMON

	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**.

Displaying the Available ROM Monitor Commands: Examples

The following example shows what appears when you enter the **?** command on a Cisco ASR 9000 Series Router:

```
rommon B1> ?
alias                set and display aliases command
boot                boot up an external process
bpcookie            display the backplane cookie
cbcinfo            Display information from CBC
cbcmsg             Send a message to the CBC
cbcping            Send "PING" to CBC LED Matrix
clocks             get CPU clock information
confreg            configuration register utility
cookie            display the system cookie
dev                list the device table
dir                list files in file system
dimminfo           Display info for DDR DIMMs
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
dumpsdpd            display DDR2 SPD information
fpgainfo            display information about FPGA images
ftcookie            display the fan tray cookie
help                monitor builtin command help
history             monitor command history
meminfo            main memory information
portstatus         Show 6 port switch port status
repeat             repeat a monitor command
reset              system reset
showrobfl          show run logs
rominfo            display the ROMMON header information
scanpci1           scan for devices on PCI bus 1
scanpci2           scan for devices on PCI bus 2
set                display the monitor variables
sync              write monitor environment to NVRAM
unalias            unset an alias
unset              unset a monitor variable
version            display rommon software, board, version

```

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

```

rommon B1> dir -?
bad device name
usage: dir <device>

```

The following example shows what appears when you enter the **version** command at the Cisco ASR 9000 Series Router ROM Monitor mode prompt:

```

rommon B1 > version

System Bootstrap, Version 1.0(20081208:173612) [ASR9K ROMMON],
Copyright (c) 1994-2008 by Cisco Systems, Inc.
Compiled Mon 08-Dec-08 09:36 by abc

LNC2:  1.17  [00000001/00000011]
TMPO:  1.13  [00000001/0000000d]
LB_3:  1.14  [00000001/0000000e]
PUNT:  1.4   [00000001/00000004]
CBC:   1.1
BID: 0x0004

```

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 B1> PS1= "ASR9K_ROMMON B1!>"

```

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 ASR9K_ROMMON B 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 B1> confreg
```

```
Configuration Summary
(Virtual Configuration Register: 0x1920)
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.

Environment Variables

The ROM Monitor environment variables define the attributes of the ROM Monitor, such as the IP address for an RSP 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.

Frequently Used Environmental Variables

The table below shows the main ROM Monitor environmental variables. For instructions on how to use these variables, see the relevant instructions in this document.

Environmental variable	Description
TFTP_MGMT_INTF = <i>{0 1}</i>	Description
IP_ADDRESS = <i>ip_address</i>	Description
IP_SUBNET_MASK = <i>ip_address</i>	Sets the subnet mask for the Management Ethernet interface on the RSP card.
DEFAULT_GATEWAY = <i>ip_address</i>	Description
TFTP_SERVER = <i>ip_address</i>	Description
TFTP_FILE = <i>drive:path/file</i>	Description
TURBOBOOT = <i>on, boot-device, options</i>	Sets the subnet mask for the Management Ethernet interface on the RSP card.
BOOT = <i>drive:path/file</i>	Sets the default gateway that serves the RSP card.

Environmental variable	Description
BOOT_DEV_SEQ_OPER = <i>drive</i> :	Specifies the sequence of local storage devices in which the disk-boot operation occurs. (For example, the disk0;;disk1: sequence indicates to boot from disk0: device initially and if failure occurs, boot from the disk1: device.
BOOT_DEV_SEQ_CONF = <i>drive</i> :	Indicates the configured primary and secondary devices (disk0: and disk1:) for disk mirroring. This variable is usually set by Cisco IOS XR software.
AUX_AUTHEN_LEVEL = <i>number</i>	Bypasses ksh authentication. A reboot is required only on the card that has to bypass authentication.
IOX_ADMIN_CONFIG_FILE = <i>drive:path/file</i>	Permanently changes the location of the default administration configuration file.
IOX_CONFIG_FILE = <i>drive:path/file</i>	Permanently changes the location of the router configuration file.
IOX_CONFIG_MEDIUM = <i>drive:path</i>	Permanently changes the default location where configuration files are saved.
MIRROR_ENABLE = <i>value</i>	Sets to Y in Cisco IOS XR software to indicate disk mirroring is enabled. When it is set to N, it indicates disk mirroring is disabled.

Displaying Environment Variable Settings

To display the current environment variable settings, enter the **set** command at the ROM Monitor mode prompt:

```
rommon B1> set

PS1=RO RSP P4D-17 ! >
IP_ADDRESS=172.29.52.137
DEFAULT_GATEWAY=172.29.52.1
IP_SUBNET_MASK=255.255.255.0
TFTP_SERVER=172.23.16.81
IOX_ADMIN_CONFIG_FILE=
TFTP_MGMT_INTF=0
BOOT_DEV_SEQ_CONF=disk0;;disk1:
MIRROR_ENABLE=Y
?=0
TFTP_FILE=/auto/tftpboot-users/lpatton/
TURBOBOOT=
BSI=0
BOOT_DEV_SEQ_OPER=disk0;;disk1:
BOOT=disk0:/mbiasr9k-rp.vm,1;
ReloadReason=1asr9k-os-mbi-5.3.0
```

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 ASR 9000 Series Router:

```
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
```



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

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

The chassis serial number can be read from an RSP that is running in ROM Monitor mode. Viewing the chassis number from the RSP may be necessary if the physical label is missing or damaged.

1. Attach a console to the console port of an RSP SC or RP in the chassis. (Only the RSP card SC or RP needs to run to perform this procedure. Other cards need not be inserted.)
2. Apply power to the chassis.
3. Enter ROM Monitor mode.
4. Enter the `bpcookie` command in privilege mode of the ROM Monitor prompt to display the chassis serial number.

- Return the router to EXEC mode.

Exiting ROM Monitor Mode

To exit ROM Monitor mode, you must change the configuration register and reset the RSP.

Resetting the Configuration Register Using Prompts

To change the configuration register settings in the ROM Monitor mode, enter the **confreg** command at the ROM Monitor mode. Entering this command displays the configuration summary and the prompts used to change the configuration.

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

SUMMARY STEPS

- confreg**
- Respond to each prompt as instructed.
- reset**

DETAILED STEPS

	Command or Action	Purpose
Step 1	confreg Example: <code>rommon B1> confreg</code>	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: <code>rommon B2> reset</code>	Resets and initializes the router.

Resetting to EXEC Mode or MBI Validation Mode

To exit the ROM Monitor mode and reset to EXEC mode, enter the **confreg** command at the ROM Monitor mode prompt. Respond to prompts as instructed.

Exiting ROM Monitor Mode: Examples

The following example shows how to enable ROM Monitor mode at the next system boot:

```
rommon B5 > confreg
```



```

Configuration Summary
(Virtual Configuration Register: 0x1920)
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 boot type:
  0 = ROM Monitor
  2 = MBI Validation Boot Mode
[0]: 0

```

```

Configuration Summary
(Virtual Configuration Register: 0x1920)
enabled are:
console baud: 9600
boot: the ROM Monitor

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

You must reset or power cycle for new config to take effect
rommon B6 > reset

```

The following example shows how to enter the minimum boot image (MBI) validation mode or the EXEC mode of Cisco IOS XR software at the next system boot:

```

rommon B7 > confreg

Configuration Summary
(Virtual Configuration Register: 0x1920)
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 boot type:
  0 = ROM Monitor
  2 = MBI Validation Boot Mode
[0]: 2

Configuration Summary
(Virtual Configuration Register: 0x1922)
enabled are:
console baud: 9600
boot: MBI Boot

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

```

You must reset or power cycle for new config to take effect

```
rommon B8 > reset
```

To reset to the MBI validation mode or EXEC mode, select 2 as the boot type. Enter the **reset** command to boot the RSP in the EXEC mode.



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

Attaching to Primary RSP from Standby RSP

You must follow these steps in order to attach to the primary RSP from standby RSP:

- From the console port of the standby RSP, press the ESC key.
- Type **ksh** and press ENTER key.
- Login with a local username and password.
- Attach to the peer RSP using **attach node** command.
- Launch the console using **/pkg/bin/exec -a** command.

```
-- --
-- --
This (D)RP Node is not ready or active for login /configuration
Username: root
Password:

# uname -a
QNX node0_RSP0_CPU0 6.4.0 2014/01/07-14:26:36PST asr9k-rsp x86
# attach 0/RSP1/CPU0

attach: Starting session 1 to node 0/RSP1/CPU0

# /pkg/bin/exec -a

RP/0/RSP1/CPU0#show platform
Mon Apr 21 16:00:37.573 UTC
Node                Type                               State                Config State
-----
0/RSP0/CPU0         A9K-RSP880-SE(Standby)             IOS XR RUN           PWR, NSHUT, MON
0/RSP1/CPU0         A9K-RSP880-SE(Active)              IOS XR RUN           PWR, NSHUT, MON
0/1/CPU0            A9K-24x10GE-SE                     IOS XR RUN           PWR, NSHUT, MON
0/2/CPU0            A9K-SIP-700                        IOS XR RUN           PWR, NSHUT, MON
0/2/1               SPA-8XOC3-POS                      OK                   PWR, NSHUT, MON
RP/0/RSP1/CPU0#exit
Terminating attach to node 0/RSP1/CPU0..
```

Additional References

The following sections provide references related to the ROM Monitor.

Related Documents

Related Topic	Document Title
Connecting a terminal to a router	<i>Connecting and Communicating with the Router in Cisco ASR 9000 Series Aggregation Services Router Getting Started Guide</i>
Configuring a router with Cisco IOS XR software	Cisco IOS XR Software Documentation: http://www.cisco.com/en/US/products/84561/products_support_sais_home.html

Technical Assistance

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



CHAPTER 3

Router Recovery with ROM Monitor

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

Table 4: Feature History for Router Recovery with the ROM Monitor

Release	Modification
Release 4.2.0	A new board, RSP3 was introduced.

- [Information About Router Recovery, on page 21](#)
- [About ROMMON Installation Files, on page 22](#)
- [About the TURBOBOOT Variable, on page 26](#)
- [About the Boot Device \(Destination Disk\), on page 26](#)
- [Reinstalling Cisco IOS XR Software on Cisco ASR 9000 Series Router, on page 27](#)
- [Additional References, on page 36](#)

Information About Router Recovery

The standard way to install new software on the RSP card of a Cisco ASR 9000 Series Aggregation Services Router is by using the **install** command in administration EXEC mode. However, if the RSP card 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 RSP card 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 RSP card 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 the *System Management Configuration Guide for Cisco ASR 9000 Series Routers*.

About ROMMON Installation Files

This section includes the following topics:

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://www.cisco.com/cisco/software/navigator.html?mdfid=279844343&flowid=2130>

To locate Cisco IOS XR software images:

- Select any entry under Cisco ASR 9000 Series Aggregation Services Routers.
- Select IOS XR software to see the image tar files, or choose any of the other categories to see the other files.

The table below lists the software packages that you can install from ROMMON.

Table 5: Downloadable Software for Installation from ROM Monitor

Software Package Name	Description
Cisco IOS XR IP/MPLS Core Software	This package contains two copies of the Cisco IOS XR Unicast Routing Core Bundle. One copy is in the Package Installation Envelope (PIE) file format and can be installed while Cisco IOS XR is running, as described in the <i>Upgrading and Managing Cisco IOS XR Software</i> module of the <i>System Management Configuration Guide for Cisco ASR 9000 Series Routers</i> . 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).

The table above 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 the *System Management Configuration Guide for Cisco ASR 9000 Series Routers*. If the router is not booted with the Cisco IOS XR software, install the core software using the vm file first, and 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 6: tar Filename Components

Component	Description
platform	<p>Identifies the platform for which the software package is designed.</p> <p>For packages designed for the Cisco ASR 9000 Series Aggregation Services Routers, the platform designation is "ASR9k."</p>
bundle_name	<p>Identifies a specific bundle.</p> <ul style="list-style-type: none"> • <i>IOS XR</i> 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 <i>Upgrading and Managing Cisco IOS XR Software</i> module of <i>System Management Configuration Guide for Cisco ASR 9000 Series Routers</i>. • IOS XR-k9 bundle name indicates a file that includes all packages in the iosxr bundle file plus the security package.
major	<p>Identifies the major release of this package.</p> <ul style="list-style-type: none"> • 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.

Component	Description
minor	<p>Identifies the minor release of this package.</p> <ul style="list-style-type: none"> • Minor releases contain one or more of the following: <ul style="list-style-type: none"> • 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	<p>Identifies the maintenance release of this package.</p> <ul style="list-style-type: none"> • 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 vm filename for Cisco ASR 9000 Series Aggregation Services Routers is:

platform-package_name.vm-major.minor.maintenance

The table below describes the other filename components.

Table 7: vm Filename Components

Component	Description
platform	<p>Identifies the platform for which the software package is designed.</p> <p>For packages designed for Cisco ASR 9000 Series Aggregation Services Routers, the platform designation is “asr9k”.</p>

Component	Description
package_name	<p>Identifies a specific package.</p> <ul style="list-style-type: none"> • 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 <i>Upgrading and Managing Cisco IOS XR Software</i> module of <i>System Management Configuration Guide for Cisco ASR 9000 Series Routers</i>.
major	<p>Identifies the major release of this package.</p> <ul style="list-style-type: none"> • A major release occurs when there is a major architectural change to the product (for example, a major new capability is introduced). • All packages operating on the router must be at the same major release level. • A major release is the least frequent release and may require a router reboot.
minor	<p>Identifies the minor release of this package.</p> <ul style="list-style-type: none"> • A minor release contains one or more of the following: <ul style="list-style-type: none"> • New features • Bug fixes • The minor release version does not have to be identical for all software packages operating on the router, but the operating packages must be certified by Cisco as compatible with each other. • A minor release may require a router reboot.
maintenance	<p>Identifies the maintenance release of this package.</p> <ul style="list-style-type: none"> • A maintenance release contains a collection of bug fixes for a package. • The maintenance release version does not have to be identical for all software packages operating on the router, but the major and minor versions of the maintenance release must match the those of the package being updated. • A maintenance release usually does not require a router reboot.

The following example shows a composite of multiple mini packages:

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 RSP is booted with the *vm* image.
- *boot-device*—Selects the destination disk for software installation.
- [**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. 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 and all user files, are deleted. The administration configuration contains the configuration that determines default- SDR name and inventory.
- [**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.
- The default boot device disk is disk0:.

About the Boot Device (Destination Disk)

The boot device determines the location where the Cisco IOS XR software is installed on all RSPs. The system uses the boot-device to install the software to the other RSP 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 RSP card where the Cisco IOS XR software is installed.

The Cisco IOS XR package is installed on the boot device (disk0: or disk1:) and the minimal boot image (MBI) is installed on the bootflash: device. The MBI contains the low level Cisco IOS XR drivers and subsequently makes the full Cisco IOS XR software environment available on the router. The ROM Monitor software loads the MBI from the bootflash: device.

- MBI is always installed on the boot device.
- On the Cisco ASR 9000 Series Router, the supported boot devices are disk0: and disk1:.



Note On the RSP3 card, the Cisco IOS XR software is installed directly on either disk0 or disk1.

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 RSP 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 RSP 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 pre-installed in most RSPs, which ensures that the correct disk is used to store the software packages on the entire system.

Reinstalling Cisco IOS XR Software on Cisco ASR 9000 Series Router



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 *System Management Configuration Guide for Cisco ASR 9000 Series Routers*.

This section includes the following topics:

Cisco ASR 9000 Series Router 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 RSP.
- Transfer the *vm* file to a local storage device and then load the Cisco IOS XR software from that storage device to the RSP.

Installation from a TFTP Server

When you install Cisco IOS XR software from a TFTP server to the RSP, 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 using the **cfs check** command.
3. Place all RSPs in ROM Monitor mode.
4. From the ROM Monitor mode, clear BOOT and TFTP_FILE ROM Monitor environmental variables on all RSP cards. If disk mirroring is enabled, disable disk mirroring by clearing BOOT_DEV_SEQ_OPER and MIRROR_ENABLE ROM Monitor environment variables.



Note Restore disk mirroring after the Cisco IOS XR installation is complete using the TURBOBOOT variable. To restore disk mirroring, use the **mirror** command in the global configuration mode. For more information on the **mirror** command, see the “Boot Commands on Cisco IOS XR Software” module in Cisco ASR 9000 Series Aggregation Services Router System Management Command Reference.

5. Use the **confreg** command in the ROM Monitor mode to set all the RSP cards to MBI Validation Boot Mode or the EXEC mode.
6. On the active RSP, configure the IP parameters (**IP_ADDRESS**, **DEFAULT_GATEWAY**, **IP_SUBNET_MASK**) for the Management Ethernet interface. These variables are set in ROM Monitor, and are required to access the TFTP server.
7. On the active RSP, configure the TURBOBOOT environment variable to either clean or format the boot disk during the installation. The recommended boot device is disk0:.
8. On the active RSP, boot the Cisco IOS XR software from a *vm* file on the TFTP server.
9. Reset all other RSPs 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.

10. Restore disk mirroring if it was disabled in "Step 4". To restore disk mirroring, use the **mirror** command in the global configuration mode. For more information on the **mirror** command, see the *Boot Commands on Cisco IOS XR Software* module in *Cisco ASR 9000 Series Aggregation Services Router System Management Command Reference*.

**Caution**

If the TURBOBOOT variable is set to format the boot device, the default-SDR configuration is deleted and only the admin configuration is preserved.

Reinstalling to a CiscoASR 9000 SeriesRouter 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.

Reinstalling to a Cisco ASR 9000 Series Router from a TFTP Server Image

Before you begin

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 ASR 9000 Series Router is compatible with the Cisco IOS XR software image that you are installing.
- The following information is available:
 - IP address of the Management Ethernet interface on the RSP
 - Subnet mask of the Management Ethernet interface on the RSP
 - 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.

**Note**

On the RSP3 card, the ROMMON variable **TFTP_MGMT_INTF=port_no** is not required for a TFTP boot.

SUMMARY STEPS

1. Back up the router configuration while still in EXEC mode.
2. Verify the sanity of the configuration file system. Use **cfs check**
3. **admin**
4. Place all RSP cards in ROM Monitor mode. Use **config-register boot-mode rom-monitor location all** and **reload location all** commands.
5. Clear the ROM Monitor environmental variables on all RSP cards. Use **unset BOOT** command, **unset TFTP_FILE** command and **sync** command.
6. Clear the ROM Monitor environment variables **BOOT_DEV_SEQ_OPER** and **MIRROR_ENABLE**, if disk mirroring is enabled. Use **unset BOOT_DEV_SEQ_OPER** command, **unset MIRROR_ENABLE** command and **sync** command.

7. On the RSP card, set the environment variables that configure the Management Ethernet interface for use in ROM Monitor mode. Use **IP_ADDRESS=ip_address** command, **IP_SUBNET_MASK=mask** command and **DEFAULT_GATEWAY=ip_address** command.
8. On the RSP card, set the TFTP environment variables. Use **TFTP_VERBOSE=print_setting** command, **TFTP_RETRY_COUNT=retry_count** command, **TFTP_TIMEOUT=timeout** command, **TFTP_CHECKSUM=0** command, **TFTP_SERVER=server_ip_addr** command, **TFTP_MGMT_INTF=port_no** command
9. On the RSP card, set the TURBOBOOT variables. Use **TURBOBOOT=on,boot-device,options** command and **sync** command.
10. On the RSP card, boot the vm image located on the tftp server. Use **boot tftp://server/directory/filename**
11. Reset all other RSP cards to boot the Cisco IOS XR software. Use **confreg** and **reset** commands.
12. Restore disk mirroring, if it was disabled in “Step 5”.

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.
Step 2	<p>Verify the sanity of the configuration file system. Use cfs check</p> <p>Example:</p> <pre>RP/0/RSP0/CPU0:router# cfs check</pre>	<p>(Optional) Verifies the sanity of the router configuration, and resolves any internal inconsistencies.</p> <p>Note</p> <ul style="list-style-type: none"> This step is necessary only to preserve the router configurations (if TURBOBOOT variable is set to clean). If TURBOBOOT variable is set to format, then the disk is erased and the existing configurations are deleted. The default option is clean.
Step 3	<p>admin</p> <p>Example:</p> <pre>RP/0/RSP0/CPU0:router# admin</pre>	Enters the admin EXEC mode.
Step 4	<p>Place all RSP cards in ROM Monitor mode. Use config-register boot-mode rom-monitor location all and reload location all commands.</p> <p>Example:</p> <pre>RP/0/RSP0/CPU0:router(admin)# config-register boot-mode rom-monitor location all RP/0/RSP0/CPU0:router(admin)# reload location all</pre>	
Step 5	<p>Clear the ROM Monitor environmental variables on all RSP cards. Use unset BOOT command, unset TFTP_FILE command and sync command.</p> <p>Example:</p> <pre>rommon B1> unset BOOT</pre>	<p>Ensures that all RSP cards in the system are prepared for installation using the TURBOBOOT variable. Repeat for each RSP card in the system (LCC).</p> <p>Enter the settings exactly as shown. You must attach a terminal to each card for this procedure.</p>

	Command or Action	Purpose
	<pre>rommon B2> unset TFTP_FILE rommon B3> sync</pre>	<p>All variable names are case sensitive.</p> <ul style="list-style-type: none"> • Clears the BOOT variable. • Clears the TFTP_FILE variable. • Saves the changes. <p>Note</p> <ul style="list-style-type: none"> • 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.
Step 6	<p>Clear the ROM Monitor environment variables BOOT_DEV_SEQ_OPER and MIRROR_ENABLE, if disk mirroring is enabled. Use unset BOOT_DEV_SEQ_OPER command, unset MIRROR_ENABLE command and sync command.</p> <p>Example:</p> <p>Example</p> <pre>rommon B1> unset BOOT_DEV_SEQ_OPER rommon B2> unset MIRROR_ENABLE rommon B3> sync</pre>	<p>If disk mirroring is enabled, clear the BOOT_DEV_SEQ_OPER and MIRROR_ENABLE ROM Monitor environment variables to disable disk mirroring.</p> <p>All variable names are case sensitive.</p> <ul style="list-style-type: none"> • Clears the BOOT_DEV_SEQ_OPER variable. • Clears the MIRROR_ENABLE variable. • Saves the changes. <p>Note</p> <ul style="list-style-type: none"> • Restore the disk mirroring settings once the installation is complete using the TURBOBOOT variable. Disk mirroring is restored in the global configuration mode using the mirror command.
Step 7	<p>On the RSP card , set the environment variables that configure the Management Ethernet interface for use in ROM Monitor mode. Use IP_ADDRESS=ip_address command, IP_SUBNET_MASK=mask command and DEFAULT_GATEWAY=ip_address command.</p> <p>Example:</p> <pre>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</pre>	<p>Enter these settings exactly as shown. All variable names are case sensitive.</p> <ul style="list-style-type: none"> • Sets the IP address for the Management Ethernet interface on the RSP card . • Sets the subnet mask for the Management Ethernet interface on the RSP card . • Identifies the default gateway that serves the RSP card .
Step 8	<p>On the RSP card , set the TFTP environment variables. Use TFTP_VERBOSE=print_setting command, TFTP_RETRY_COUNT=retry_count command, TFTP_TIMEOUT=timeout command, TFTP_CHECKSUM=0 command,</p>	<p>(Optional) Enter these settings exactly as shown. All variable names are case sensitive.</p> <ul style="list-style-type: none"> • TFTP_VERBOSE sets the printer setting: 0=quiet, 1=progress (default), 2=verbose.

	Command or Action	Purpose
	<p>TFTP_SERVER=server_ip_addr command, TFTP_MGMT_INTF=port_no command</p> <p>Example:</p> <p>Example</p> <pre>rommon B4> TFTP_VERBOSE=0 rommon B5> TFTP_RETRY_COUNT=4 rommon B6> TFTP_TIMEOUT=6000 rommon B7> TFTP_CHECKSUM=0 rommon B8> TFTP_SERVER=223.255.255.254 rommon B9> TFTP_MGMT_INTF=0</pre>	<ul style="list-style-type: none"> • TFTP_RETRY_COUNT sets the retry count for ARP and TFTP (default=18). • 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: 0=no, 1=yes. • TFTP_SERVER sets the IP address of the TFTP server where a bootable software image is located. • TFTP_MGMT_INTF determines the RSP card Management LAN port to use for TFTP. The default value is port 0.
Step 9	<p>On the RSP card , set the TURBOBOOT variables. Use TURBOBOOT=on,boot-device,options command and sync command.</p> <p>Example:</p> <pre>rommon B9> TURBOBOOT=on,disk0,format rommon B10> sync</pre>	<p>Sets the TURBOBOOT parameters and saves the configuration. Separate each parameter with a comma (.). These parameters are:</p> <ul style="list-style-type: none"> • To enable the installation process using the TURBOBOOT variable, specify on. • Specify a boot device where all software is installed on the RSP cards. 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. • Default option is clean. • Any existing configuration is preserved.
Step 10	<p>On the RSP card , boot the vm image located on the tftp server. Use boot tftp://server/directory/filename</p> <p>Example:</p> <pre>rommon B11> boot tftp://223.255.254.254/softdir/comp-asr9k-mini.vm</pre>	<p>Retrieves the file from the TFTP server and installs it on the boot disk.</p> <ul style="list-style-type: none"> • Run this command on the RSP card 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 RSP card . • Allow the system to fully boot. The installation process using the TURBOBOOT variable takes some time. Do not enter any commands until you are prompted to enter a username or until the CLI prompt appears. • “Press RETURN to get started” appears twice. The first occurrence appears when the software is loaded

	Command or Action	Purpose
		<p>into memory. The second occurrence happens after the software has been installed on the disk.</p> <ul style="list-style-type: none"> RSP card is fully booted when the following message appears: SYSTEM CONFIGURATION COMPLETED
Step 11	<p>Reset all other RSP cards to boot the Cisco IOS XR software. Use confreg and reset commands.</p> <p>Example:</p> <pre>rommon B4> confreg rommon B5> reset</pre>	<ul style="list-style-type: none"> The confreg command displays a series of prompts to change the configuration register. To reset to EXEC mode, select the boot type as 2 when prompted. Sets the configuration register to automatically start the boot process instead of staying in ROM Monitor mode. Resets the RSP card and starts the boot process.
Step 12	<p>Restore disk mirroring, if it was disabled in “Step 5”.</p> <p>Example:</p> <pre>rommon B6 mirror</pre>	<p>To restore disk mirroring, use the mirror command in the global configuration mode.</p>

Reinstalling to a Cisco ASR 9000 Series Router from a TFTP Server Image: Example

The following example shows how to install the Cisco IOS XR software from the TFTP server:

Place all RSPs in ROM Monitor mode:

```
RP/0/RSP0/CPU0:router# admin
RP/0/RSP0/CPU0:router(admin)# config-register boot-mode rom-monitor
RP/0/RSP0/CPU0:router(admin)# location all
RP/0/RSP0/CPU0:router(admin)# reload location all
```

Clear the ROM Monitor environmental variables on all RSPs:

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

Clear the ROM Monitor environment variables for disk mirroring:

```
rommon B1 > unset BOOT_DEV_SEQ_OPER
rommon B2 > unset MIRROR_ENABLE
rommon B3 > sync
```



Note Restore disk mirroring settings after the installation is complete using the TURBOBOOT variable. Disk mirroring is restored using the **mirror** command in the global configuration mode. For more information on the **mirror** command, see the “Boot Commands on Cisco IOS XR Software” module in Cisco ASR 9000 Series Aggregation Services Router System Management Command Reference.

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

```
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 RSP. 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-asr9k-mini.vm
```

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

Respond to the prompts as instructed. Set the boot type as **2** to boot the RSP card in EXEC mode:

```
rommon B11 > reset
```

Installing Cisco IOS XR Software on Cisco ASR 9000 Series Router from a USB Drive

Before you begin

Verify that the following prerequisites are met:

- Cisco IOS XR file is available in the USB drive.
- RSP 440 is installed.
- Console access to active RSP 440 is available.

SUMMARY STEPS

1. Verify that the router is in a steady state.
2. Connect a terminal to the RSP card console port and log in to the router.
3. Place all the PSP cards in ROM Monitor mode. Use the **config-register boot-mode rom-monitor location all** command.
4. Insert the USB into the slot on the RSP. Use the **reload location all** command.
5. Use **dir usb**
6. Clear the ROM Monitor environmental variables on all RSP cards. Use **unset BOOT** and **sync** commands.
7. Set the TURBOBOOT variables on the RSP card. Use **TURBOBOOT=on ,disk 0,format** and **sync** commands.
8. Install Cisco IOS XR from the USB. Use **mediaboot usb:\ filename**

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.

	Command or Action	Purpose
Step 2	<p>Connect a terminal to the RSP card console port and log in to the router.</p> <p>Example:</p> <pre>rommon B1></pre>	Connects a terminal or PC to the RSP card console port and establishes a router management session.
Step 3	<p>Place all the PSP cards in ROM Monitor mode. Use the config-register boot-mode rom-monitor location all command.</p> <p>Example:</p> <pre>RP/0/RSP0/CPU0:router(admin)# config-register boot-mode rom-monitor location all</pre>	
Step 4	<p>Insert the USB into the slot on the RSP. Use the reload location all command.</p> <p>Example:</p> <pre>RP/0/RSP0/CPU0:router(admin)# reload location all</pre>	<p>Reboots into the ROMMON mode and detects the newly inserted USB drive.</p> <p>Note After the RSP reboots into ROMMON, use the dev command to list the devices connected to the RSP. Ensure that the device of type compactflash is mounted.</p>
Step 5	<p>Use dir usb</p> <p>Example:</p> <pre>rommon B1> dir usb</pre>	Displays the contents of the USB drive.
Step 6	<p>Clear the ROM Monitor environmental variables on all RSP cards. Use unset BOOT and sync commands.</p> <p>Example:</p> <pre>rommon B2> unset BOOT rommon B3> sync</pre>	<p>Ensures that all RSP cards in the system are prepared for installation using the TURBOBOOT variable. Repeat for each RSP card in the system (LCC). Enter the settings exactly as shown. You must attach a terminal to each card for this procedure.</p> <p>All variable names are case sensitive.</p> <ul style="list-style-type: none"> • Clears the BOOT variable. • Saves the changes. <p>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.</p>
Step 7	<p>Set the TURBOBOOT variables on the RSP card. Use TURBOBOOT=on ,disk 0,format and sync commands.</p> <p>Example:</p> <pre>rommon B4> TURBOBOOT=on,disk0,format rommon B5> sync</pre>	<p>Sets the TURBOBOOT parameters and saves the configuration. Separate each parameter with a comma (.). These parameters are:</p> <ul style="list-style-type: none"> • To enable the installation process using the TURBOBOOT variable, specify on. • Specify a boot device where all software is installed on the RSP cards. We recommend disk0.

	Command or Action	Purpose
		<ul style="list-style-type: none"> The default option is <i>clean</i>. To replace the existing software without formatting the boot device, replace options with <i>clean</i>. To replace the existing software and format the boot device, replace options with <i>format</i>.
Step 8	Install Cisco IOS XR from the USB. Use mediaboot usb:\filename Example: <pre>rommon B6> mediaboot usb:\</pre>	Starts the boot process for the Cisco IOS XR Software on Cisco ASR 9000 Series Router. With the turboboot option set, all the files are installed on disk0.

What to Do Next

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



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
- Install additional software from the PIE files, as necessary. For more information, see the *Upgrading and Managing Cisco IOS XR Software* module of *Cisco ASR 9000 Series Aggregation Services Router System Management Configuration Guide*.

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 <i>What’s New</i> in Cisco Product Documentation located at: http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

Related Topic	Document Title
Save current router configuration Verify that interfaces are up and properly configured Install or upgrade software packages from PIE files	<i>Upgrading and Managing Cisco IOS XR Software</i> module of <i>Cisco ASR 9000 Series Aggregation Services Router Getting Started Guide</i>
Redundancy slot pairs	<i>Managing the Router Hardware</i> module of <i>Cisco ASR 9000 Series Aggregation Services Router Getting Started Guide</i>

Technical Assistance

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



CHAPTER 4

Managing Configuration Files in ROM Monitor

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

- [Information about Configuration Files, on page 39](#)
- [Specifying an Alternative Administration Configuration, on page 40](#)
- [Specifying an Alternative SDR Configuration, on page 46](#)
- [Specifying an Alternate Storage Location for Configuration Files, on page 52](#)
- [Additional References, on page 55](#)

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 RSP and contains system-wide configurations for items such as SDR name and node inventory.
- There is only one SDR configuration file in Cisco ASR 9000 Series Router, which is stored on the RSP to specify the parameters for routing, interfaces, SDR usernames, and other SDR-specific configurations.

The Cisco ASR 9000 Series Router contains only one SDR (the default SDR). In Cisco IOS-XR software, SDRs are a means of dividing a single physical system into multiple logically separated routers. Cisco ASR 9000 Series Aggregation Services Routers are single-shelf routers that support only one SDR per shelf.

For more information on SDRs and admin plane configuration, see the *Configuring Secure Domain Routers on Cisco IOS XR Software* module of the *System Management Configuration Guide for Cisco ASR 9000 Series Routers*.

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.



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 RSP is reset again, the permanent configuration file is used.

SUMMARY STEPS

1. Place the RSP and the standby RSP in ROM Monitor mode.
2. **confreg**
3. Enter boot type as 0.
4. **reset**
5. **confreg**
6. Enter boot type as 2.
7. **set**
8. **boot image -o config-file-path**
9. **confreg**
10. Enter boot type as 2.
11. **reset**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Place the RSP and the standby RSP in ROM Monitor mode.	

	Command or Action	Purpose
Step 2	<p>confreg</p> <p>Example:</p> <pre>rommon B1 > confreg Configuration Summary (Virtual Configuration Register: 0x1920) 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 boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 0</pre>	<p>Sets the configuration register of the standby RSP to ROM Monitor mode so that the standby RSP does not take control. Enter the confreg command at the ROM Monitor mode prompt to set the configuration register to ROM Monitor mode. You can also change the console baud rate, boot characteristics, boot type configuration settings, and enable diagnostic mode at the ROM Monitor mode.</p> <p>Note The configuration register is not an environment variable like TURBOBOOT. Do not enter an equal sign when entering the confreg command.</p>
Step 3	<p>Enter boot type as 0.</p> <p>Example:</p> <pre>enter boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 0</pre>	<p>Sets the boot type as 0 to enable ROM Monitor mode during the next system boot.</p>
Step 4	<p>reset</p> <p>Example:</p> <pre>rommon B2> reset</pre>	<p>Makes the configuration register settings for the standby RSP card effective.</p>
Step 5	<p>confreg</p> <p>Example:</p> <pre>rommon B1 > confreg Configuration Summary (Virtual Configuration Register: 0x1920) 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 boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 2</pre>	<p>Sets the active RSP configuration register to EXEC mode. You can also change the console baud rate, boot characteristics, boot type configuration settings, and enable diagnostic mode at the ROM Monitor mode.</p>
Step 6	<p>Enter boot type as 2.</p> <p>Example:</p> <pre>enter boot type:</pre>	<p>Sets the boot type as 2 to enable MBI validation mode or the EXEC mode during the next system boot.</p>

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

	Command or Action	Purpose
	<pre>0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 2</pre>	
Step 7	<p>set</p> <p>Example:</p> <pre>rommon B2> set</pre>	<p>Displays the current environment variable settings.</p> <p>Note The filename is set in the BOOT variable.</p>
Step 8	<p>boot image -o config-file-path</p> <p>Example:</p> <pre>rommon B3>boot tftp://223.255.254.254/images/comp-asr9k-mini.vm -o /disk1:/cfgarchives/admingold.conf</pre>	<p>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.</p> <p>Note The pathname should be a valid UNIX pathname (a slash [/] must be included after the device: "disk1:/").</p>
Step 9	<p>confreg</p> <p>Example:</p> <pre>rommon B3> confreg Configuration Summary (Virtual Configuration Register: 0x1920) 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 boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 2</pre>	<p>Sets the configuration register of the standby RSP to EXEC mode. You can also change the console baud rate, boot characteristics, boot type configuration settings and enable diagnostic mode at the ROM Monitor mode.</p>
Step 10	<p>Enter boot type as 2.</p> <p>Example:</p> <pre>enter boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 2</pre>	<p>Set the boot type as 2 for standby RSP to enable MBI validation mode or the EXEC mode during the next system boot.</p>
Step 11	<p>reset</p> <p>Example:</p> <pre>rommon B5 >reset</pre>	<p>Resets the standby RSP so that the new setting can take effect and the standby RSP card becomes operational.</p>

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 committed 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 RSP and the standby RSP in ROM Monitor mode.
2. **confreg**
3. Enter the boot type as 0.
4. **reset**
5. **confreg**
6. Enter the boot type as 2.
7. **set**
8. **IOX_ADMIN_CONFIG_FILE=drive:path/file**
9. **sync**
10. **boot**
11. **confreg**
12. Enter boot type as 2.
13. **reset**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Place the RSP and the standby RSP in ROM Monitor mode.	
Step 2	<p>confreg</p> <p>Example:</p> <pre>rommon B1 > confreg Configuration Summary (Virtual Configuration Register: 0x1920) enabled are: console baud: 9600</pre>	Sets the configuration register of the standby RSP to ROM Monitor mode so that the standby RSP does not take control. Enter the confreg command at the ROM Monitor mode prompt to set the configuration register to ROM Monitor mode. You can also change the console baud rate, boot characteristics, boot type configuration settings, and enable diagnostic mode at the ROM Monitor mode.

	Command or Action	Purpose
	<pre>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 boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 0</pre>	<p>Note The configuration register is not an environment variable like TURBOBOOT. Do not enter an equal sign when entering the confreg command.</p>
Step 3	<p>Enter the boot type as 0.</p> <p>Example:</p> <pre>enter boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 0</pre>	<p>Sets the boot type as 0 to enable ROM Monitor mode during the next system boot.</p>
Step 4	<p>reset</p> <p>Example:</p> <pre>rommon B3> reset</pre>	<p>Makes the configuration register settings for the standby RSP card effective.</p>
Step 5	<p>confreg</p> <p>Example:</p> <pre>rommon B1 > confreg Configuration Summary (Virtual Configuration Register: 0x1920) 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 boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 2</pre>	<p>Sets the active RSP configuration register to EXEC mode. You can also change the console baud rate, boot characteristics, boot type configuration settings and enable diagnostic mode at the ROM Monitor mode.</p>
Step 6	<p>Enter the boot type as 2.</p> <p>Example:</p> <pre>enter boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 2</pre>	<p>Sets the boot type as 2 for the active RSP to enable MBI validation mode or the EXEC mode during the next system boot.</p>
Step 7	<p>set</p> <p>Example:</p>	<p>Displays the current environment variable settings.</p> <p>Note The filename is set in the IOX_ADMIN_CONFIG_FILE variable.</p>

	Command or Action	Purpose
	rommon B2> set	
Step 8	<p>IOX_ADMIN_CONFIG_FILE=drive:path/file</p> <p>Example:</p> <pre>rommon B3> IOX_ADMIN_CONFIG_FILE=/disk2:/cfgarchives/ admingold.conf</pre>	<p>Sets the IOX_ADMIN_CONFIG_FILE variable to specify the absolute path of a different admin configuration file.</p> <p>Note The IOX_ADMIN_CONFIG_FILE variable is overridden by the boot command when it is entered with the -o option.</p>
Step 9	<p>sync</p> <p>Example:</p> <pre>rommon B4> sync</pre>	Saves the changes.
Step 10	<p>boot</p> <p>Example:</p> <pre>rommon B5> boot</pre>	Boots the router.
Step 11	<p>confreg</p> <p>Example:</p> <pre>rommon B2 > confreg Configuration Summary (Virtual Configuration Register: 0x1920) 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 boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 2</pre>	Sets the configuration register of the standby RSP to EXEC mode. You can also change the console baud rate, boot characteristics, boot type configuration settings and enable diagnostic mode at the ROM Monitor mode.
Step 12	<p>Enter boot type as 2.</p> <p>Example:</p> <pre>enter boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 2</pre>	Sets the boot type as 2 for the standby RSP to enable MBI validation mode or the EXEC mode during the next system boot.
Step 13	<p>reset</p> <p>Example:</p> <pre>rommon B2 > reset</pre>	Resets the standby RSP so that the new setting takes effect and the standby RSP becomes operational.

Specifying an Alternative SDR Configuration

You can specify an alternative configuration for the default-SDR from ROM Monitor mode, using the methods described in the following sections. These procedures are run from the RSP card for the default-SDR.



Note For more information on SDR, see the *Configuring Secure Domain Routers on Cisco IOS XR Software* module of *System Management Configuration Guide for Cisco ASR 9000 Series Routers* .



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 RSP and the standby RSP in ROM Monitor mode.
2. **confreg**
3. Enter boot type as 0.
4. **reset**
5. **confreg**
6. Enter boot type as 2.
7. **set**
8. **boot image -a config-file-path**
9. **confreg**
10. Enter boot type as 2.
11. **reset**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Place the RSP and the standby RSP in ROM Monitor mode.	
Step 2	<p>confreg</p> <p>Example:</p> <pre>rommon B1 > confreg Configuration Summary (Virtual Configuration Register: 0x1920) 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 boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 0</pre>	<p>Sets the configuration register of the standby RSP to ROM Monitor mode so that the standby RSP does not take control. Enter the confreg command at the ROM Monitor mode prompt to set the configuration register to ROM Monitor mode. You can also change the console baud rate, boot characteristics, boot type configuration settings and enable diagnostic mode at the ROM Monitor mode.</p> <p>Note The configuration register is not an environment variable like TURBOBOOT. Do not enter an equal sign when entering the confreg command.</p>
Step 3	<p>Enter boot type as 0.</p> <p>Example:</p> <pre>enter boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 0</pre>	Sets the boot type as 0 to enable ROM Monitor mode during the next system boot.
Step 4	<p>reset</p> <p>Example:</p> <pre>rommon B2> reset</pre>	Makes the configuration register settings for the standby RSP card effective.
Step 5	<p>confreg</p> <p>Example:</p> <pre>rommon B1 > confreg Configuration Summary (Virtual Configuration Register: 0x1920) 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 boot type: 0 = ROM Monitor</pre>	Sets the active RSP configuration register to EXEC mode. You can also change the console baud rate, boot characteristics, boot type configuration settings, and enable diagnostic mode at the ROM Monitor mode.

	Command or Action	Purpose
	<pre>2 = MBI Validation Boot Mode [0]: 2</pre>	
Step 6	<p>Enter boot type as 2.</p> <p>Example:</p> <pre>enter boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 2</pre>	Sets the boot type as 2 to enable MBI validation mode or the EXEC mode during the next system boot.
Step 7	<p>set</p> <p>Example:</p> <pre>rommon B2> set</pre>	<p>Displays the current environment variable settings.</p> <p>Note The filename is set in the BOOT variable.</p>
Step 8	<p>boot image -a config-file-path</p> <p>Example:</p> <pre>rommon B3> boot tftp://223.255.254.254/images/comp-asr9k-mini.vm -a /disk1:/cfqarchives/SDRgold.conf</pre>	<p>Boots the router. Replace <i>image</i> with the filename listed in the boot variable, and replace <i>config-file-path</i> with the path and filename for the configuration file.</p> <p>The pathname should be a valid UNIX pathname (a slash [/] must be included after the device: "disk1:/").</p>
Step 9	<p>confreg</p> <p>Example:</p> <pre>rommon B3> confreg Configuration Summary (Virtual Configuration Register: 0x1920) 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 boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 2</pre>	Sets the configuration register of the standby RSP to EXEC mode. You can also change the console baud rate, boot characteristics, boot type configuration settings, and enable diagnostic mode at the ROM Monitor mode.
Step 10	<p>Enter boot type as 2.</p> <p>Example:</p> <pre>enter boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 2</pre>	Sets the boot type as 2 for standby RSP to enable MBI validation mode or the EXEC mode during the next system boot.
Step 11	<p>reset</p> <p>Example:</p>	Resets the standby RSP card so that the new setting can take effect and the standby RSP card becomes operational.

	Command or Action	Purpose
	<code>rommon B5 > reset</code>	

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 committed 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 RSP and the standby RSP in ROM Monitor mode.
2. **confreg**
3. Enter the boot type as 0.
4. **reset**
5. **confreg**
6. Enter the boot type as 2.
7. **set**
8. **IOX_CONFIG_FILE=drive:path/file**
9. **sync**
10. **boot**
11. **confreg**
12. Enter boot type as 2.
13. **reset**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Place the RSP and the standby RSP in ROM Monitor mode.	
Step 2	confreg Example: <code>rommon B1 > confreg</code>	Sets the configuration register of the standby RSP to ROM Monitor mode so that the standby RSP does not take control. Enter the confreg command at the ROM Monitor mode prompt to set the configuration register to ROM Monitor mode. You can also change the console baud rate,

	Command or Action	Purpose
	<pre>Configuration Summary (Virtual Configuration Register: 0x1920) 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 boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 0</pre>	<p>boot characteristics, boot type configuration settings, and enable diagnostic mode at the ROM Monitor mode.</p> <p>Note The configuration register is not an environment variable like TURBOBOOT. Do not enter an equal sign when entering the confreg command.</p>
Step 3	<p>Enter the boot type as 0.</p> <p>Example:</p> <pre>enter boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 0</pre>	<p>Sets the boot type as 0 to enable ROM Monitor mode during the next system boot.</p>
Step 4	<p>reset</p> <p>Example:</p> <pre>rommon B3> reset</pre>	<p>Makes the configuration register settings for the standby RSP card effective.</p>
Step 5	<p>confreg</p> <p>Example:</p> <pre>rommon B1 > confreg Configuration Summary (Virtual Configuration Register: 0x1920) 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 boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 2</pre>	<p>Sets the active RSP configuration register to EXEC mode. You can also change the console baud rate, boot characteristics, boot type configuration settings and enable diagnostic mode at the ROM Monitor mode.</p>
Step 6	<p>Enter the boot type as 2.</p> <p>Example:</p> <pre>enter boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 2</pre>	<p>Sets the boot type as 2 for the active RSP to enable MBI validation mode or the EXEC mode during the next system boot.</p>

	Command or Action	Purpose
Step 7	set Example: <pre>rommon B3> set</pre>	Displays the current environment variable settings. Note The filename is set in the IOX_CONFIG_FILE variable.
Step 8	IOX_CONFIG_FILE=drive:path/file Example: <pre>rommon B1> IOX_CONFIG_FILE=/disk2:/cfgarchives/ admingold.conf</pre>	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 9	sync Example: <pre>rommon B1> sync</pre>	Saves the changes.
Step 10	boot Example: <pre>rommon B1> boot</pre>	Boots the router.
Step 11	confreg Example: <pre>rommon B2 > confreg Configuration Summary (Virtual Configuration Register: 0x1920) 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 boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 2</pre>	Sets the configuration register of the standby RSP to exec mode. You can also change the console baud rate, boot characteristics, boot type configuration settings and enable diagnostic mode at the ROM Monitor mode.
Step 12	Enter boot type as 2. Example: <pre>enter boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 2</pre>	Sets the boot type as 2 for the standby RSP to enable MBI validation mode or the EXEC mode during the next system boot.

	Command or Action	Purpose
Step 13	reset Example: <pre>rommon B2 > reset</pre>	Resets the standby RSP so that the new setting takes effect and the standby RSP 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 RSP and the standby RSP in ROM Monitor mode.
2. **confreg**
3. Enter the boot type as 0.
4. **reset**
5. **confreg**
6. Enter the boot type as 2.
7. **set**
8. **IOX_CONFIG_MEDIUM=location:/path**
9. **sync**
10. **boot**
11. **confreg**
12. Enter boot type as 2.
13. **reset**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Place the RSP and the standby RSP in ROM Monitor mode.	
Step 2	confreg Example: <pre>rommon B1 > confreg</pre> <pre>Configuration Summary (Virtual Configuration Register: 0x1920) 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</pre>	Sets the configuration register of the standby RSP to ROM Monitor mode so that the standby RSP does not take control. Enter the confreg command at the ROM Monitor mode prompt to set the configuration register to ROM Monitor mode. You can also change the console baud rate, boot characteristics, boot type configuration settings and enable diagnostic mode at the ROM Monitor mode. 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
	<pre>change the boot characteristics? y/n [n]: y enter boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 0</pre>	
Step 3	<p>Enter the boot type as 0.</p> <p>Example:</p> <pre>enter boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 0</pre>	Sets the boot type as 0 to enable ROM Monitor mode during the next system boot.
Step 4	<p>reset</p> <p>Example:</p> <pre>rommon B3> reset</pre>	Makes the configuration register settings for the standby RSP card effective.
Step 5	<p>confreg</p> <p>Example:</p> <pre>rommon B1 > confreg</pre> <pre>Configuration Summary (Virtual Configuration Register: 0x1920) 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 boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 2</pre>	Sets the active RSP configuration register to EXEC mode. You can also change the console baud rate, boot characteristics, boot type configuration settings, and enable diagnostic mode at the ROM Monitor mode.
Step 6	<p>Enter the boot type as 2.</p> <p>Example:</p> <pre>enter boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 2</pre>	Sets the boot type as 2 for the active RSP to enable MBI validation mode or the EXEC mode during the next system boot.
Step 7	<p>set</p> <p>Example:</p> <pre>rommon B3> set</pre>	<p>Displays the current environment variable settings.</p> <p>Note The filename is set in the IOX_CONFIG_MEDIUM variable.</p>

	Command or Action	Purpose
Step 8	<p>IOX_CONFIG_MEDIUM=<i>location:/path</i></p> <p>Example:</p> <pre>rommon B1> IOX_CONFIG_FILE=/disk2:/cfgarchives/ admingold.conf</pre>	<p>Sets the IOX_CONFIG_MEDIUM variable to specify a different location.</p> <p>For the Cisco ASR 9000 Series Router, replace <i>location</i> with disk0 or disk1. Replace <i>path</i> with the path to the directory in which you want to store the configuration files.</p> <p>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.</p>
Step 9	<p>sync</p> <p>Example:</p> <pre>rommon B1> sync</pre>	Saves the changes.
Step 10	<p>boot</p> <p>Example:</p> <pre>rommon B1> boot</pre>	Boots the router.
Step 11	<p>confreg</p> <p>Example:</p> <pre>rommon B2 > confreg Configuration Summary (Virtual Configuration Register: 0x1920) 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 boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 2</pre>	Sets the configuration register of the standby RSP to EXEC mode. You can also change the console baud rate, boot characteristics, boot type configuration settings, and enable diagnostic mode at the ROM Monitor mode.
Step 12	<p>Enter boot type as 2.</p> <p>Example:</p> <pre>enter boot type: 0 = ROM Monitor 2 = MBI Validation Boot Mode [0]: 2</pre>	Sets the boot type as 2 for the standby RSP to enable MBI validation mode or the EXEC mode during the next system boot.

	Command or Action	Purpose
Step 13	reset Example: rommon B2 > reset	Resets the standby RSP so that the new setting takes effect and the standby RSP becomes operational.

Additional References

The following sections provide references related to the ROM Monitor.

Related Documents

Related Topic	Document Title
SDRs and admin plane configuration	<i>Configuring Secure Domain Routers on Cisco IOS XR Software</i> module of <i>System Management Configuration Guide for Cisco ASR 9000 Series Routers</i>

Technical Assistance

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



CHAPTER 5

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.

- [Information About Password Recovery, on page 57](#)
- [Recovering the Root Password on Single-RSP Routers, on page 57](#)
- [Recovering the Root Password on Redundant-RSP Routers, on page 58](#)
- [Bypassing ksh Authentication, on page 60](#)
- [Additional References, on page 60](#)

Information About Password Recovery

If the root password is forgotten, it can be recovered only at the Route Switch Processor (RSP) card. To recover the password at the RSP card, set the configuration register to 0x142 on the active RSP 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-RSP Routers

Use the following procedure to recover the router password from a router with a single RSP:

SUMMARY STEPS

1. Place the router in ROM Monitor (ROMMON) mode.
2. Set the RSP configuration register to 0x142 at the ROM Monitor prompt:
3. Reset or power cycle the router so that the new setting takes effect:
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.

DETAILED STEPS

	Command or Action	Purpose
Step 1	Place the router in ROM Monitor (ROMMON) mode.	
Step 2	Set the RSP configuration register to 0x142 at the ROM Monitor prompt: Example: rommon B1> confreg 0x142	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. Example: router RP/0/RSP0/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/RSP0/CPU0:router#	The router password is recovered successfully.

Recovering the Root Password on Redundant-RSP Routers

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

SUMMARY STEPS

1. Place both RSPs in ROM Monitor mode.

2. Set the configuration register of the standby RSP to ROM Monitor mode so that the standby RSP does not take control during the password recovery. To set the configuration register to ROM Monitor mode, enter the **confreg** command at the ROM Monitor mode prompt.
3. For more information about configuration prompts that are displayed when you enter the **confreg** command. Set the boot type as 0 to enable ROM Monitor mode during the next system boot.
4. Set the active RSP configuration register to 0x142:
5. Reset or power cycle the router so that the new setting takes effect.
6. 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:
7. Set the configuration register of the standby RSP card to EXEC mode. Set the boot type as 2 to enable MBI validation mode or the EXEC mode during the next system boot.
8. Reset the standby RSP so that the new setting takes effect and the standby RSP becomes operational.

DETAILED STEPS

	Command or Action	Purpose
Step 1	Place both RSPs in ROM Monitor mode.	
Step 2	Set the configuration register of the standby RSP to ROM Monitor mode so that the standby RSP does not take control during the password recovery. To set the configuration register to ROM Monitor mode, enter the confreg command at the ROM Monitor mode prompt. Example: rommon B1> confreg	Note The configuration register is not an environment variable like TURBOBOOT. Do not enter an equal sign “(=)” when entering the confreg command.
Step 3	For more information about configuration prompts that are displayed when you enter the confreg command. Set the boot type as 0 to enable ROM Monitor mode during the next system boot.	
Step 4	Set the active RSP configuration register to 0x142:	rommon B1> confreg 0x142
Step 5	Reset or power cycle the router so that the new setting takes effect.	rommon B2> reset
Step 6	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: Example: router RP/0/RSP0/CPU0 is now available Press RETURN to get started. --- Administrative User Dialog ---	The router password is recovered successfully.

	Command or Action	Purpose
	<pre> Enter root-system username: user Enter secret: Enter secret again: RP/0/RSP0/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/RSP0/CPU0:router# </pre>	
Step 7	Set the configuration register of the standby RSP card to EXEC mode. Set the boot type as 2 to enable MBI validation mode or the EXEC mode during the next system boot.	<code>rommon B3> confreg</code>
Step 8	Reset the standby RSP so that the new setting takes effect and the standby RSP becomes operational.	<code>rommon B4> reset</code>

Bypassing ksh Authentication

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

- Active RSP card disk0 corruption
- Loss of Qnet connectivity
- Inability to determine the node ID of the RSP card(Active RSP)

For information and instructions to bypass ksh authentication, see the *Configuring AAA Services on Cisco IOS XR Software* chapter of *System Security Configuration Guide for Cisco ASR 9000 Series Routers*.

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 <i>System Security Configuration Guide for Cisco ASR 9000 Series Routers</i>

Technical Assistance

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

Additional References



CHAPTER 6

Upgrading and Downgrading ROM Monitor Firmware

This chapter describes how to upgrade or downgrade the ROM Monitor Firmware.

- [Information About ROM Monitor Firmware](#) , on page 63
- [Upgrading or Downgrading ROM Monitor Using the FPD PIE](#), on page 64
- [ROM Monitor Upgrades: Examples](#), on page 68
- [Additional References](#), on page 76

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 ASR 9000 Series 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.

The ROM Monitor firmware on all Route Processors (RP)s must be compatible with the current Cisco IOS XR software release running on the router before it is upgraded to the latest Cisco IOS XR Software Release.

If the router is brought up with an incompatible version of the ROM Monitor software, then the standby RP may fail to boot.



Note ROMMON versions are backward compatible. You need not downgrade the ROMMON versions if the current version is higher than the listed compatible version.

ROMMON A and ROMMON B

Each node in a Cisco ASR 9000 Series 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. ROMMON A is a backup for ROMMON B. When you upgrade the ROMMON B, the router uses the unmodified ROMMON A if the ROM Monitor upgrade is interrupted or fails for any reason.

Failures are most likely to occur during ROMMON upgrades or downgrades and unlikely to fail during normal usage. A failure in ROMMON A results in an inactive card that must be returned to the authorized merchandiser.



Note We recommend that you upgrade ROMMON on all the boards to the latest version provided in FPD pie for any particular 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 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 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 RSP, perform a redundancy switchover, reload the second RSP, and then reload all other nodes in the system.

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

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 Serial Interface Processors (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. For more information on upgrading FPDs, see *Upgrading FPD on Cisco IOS XR Software* module in the *Cisco ASR 9000 Series Aggregation Services Router System Management Configuration Guide*.

The following procedure upgrades or downgrades the ROM Monitor firmware using the ROM Monitor image contained in the FPD software package installation envelope (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.
- Do not perform hardware reload or OIR during FPD upgrade because it can result in corrupt FPDs of hardware.

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 location** <node-id> 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 FPD PIE is installed on your router. For more information on installing software PIEs, see the *Upgrading and Managing Cisco IOS XR Software* module in *Cisco ASR 9000 Series Aggregation Services Router System Management Configuration Guide*.

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]**
5. **exit**
6. If you are upgrading a single node on a router, including a standby RSP, go to Step 9.
7. If you are upgrading a router with redundant RSPs, and want to perform a graceful reload, go to Step 10.
8. If you are upgrading a router with a single RSP, or want to perform a cold restart on all nodes, go to Step 11.
9. Reload a single node.
10. Gracefully reload all nodes on a system that includes redundant RSPs.
11. Reload all nodes in the system (cold restart).
12. **show platform**

DETAILED STEPS

	Command or Action	Purpose
Step 1	show hw-module fpd location all Example: RP/0/RSP0/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/RSP0/CPU0:router# admin	Enters administration EXEC mode from EXEC mode.

	Command or Action	Purpose
Step 3	show fpd package Example: <pre>RP/0/RSP0/CPU0:router(admin)# show fpd package</pre>	(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.
Step 4	upgrade hw-module fpd rommon location [all node-id] Example: <pre>RP/0/RSP0/CPU0:router(admin)# upgrade hw-module fpd rommon location 0/RSP1/CPU0</pre>	Upgrades the ROMMON B images on the specified card (<i>node-id</i>) or all cards (all). Note <ul style="list-style-type: none"> • Before you continue to reload the card, you should see a message indicating that the upgrade was completed successfully. • The use of force option when doing an fpd upgrade is not recommended except under explicit direction from Cisco Engineering or TAC.
Step 5	exit Example: <pre>RP/0/RSP0/CPU0:router(admin)# exit</pre>	Exits administration EXEC mode and returns to EXEC mode.
Step 6	If you are upgrading a single node on a router, including a standby RSP, go to Step 9.	Continues to reload the node.
Step 7	If you are upgrading a router with redundant RSPs, 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 RSP, 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. Example: <pre>RP/0/RSP0/CPU0:router# hw-module location 0/RSP1/CPU0 reload</pre>	Reloads a single node within a router, such as a standby RSP. The new ROM Monitor firmware is not active on a node until the card is reloaded. Replace <i>node-id</i> with the node ID you specified when upgrading ROM Monitor. Go to Step 12 to verify that the correct ROMMON firmware is active on each node.
Step 10	Gracefully reload all nodes on a system that includes redundant RSPs. Example: <pre>RP/0/RSP0/CPU0:router# cfs check RP/0/RSP0/CPU0:router# RP/0/RSP0/CPU0:router# hw-module location 0/RSP1/CPU0 reload RP/0/RSP0/CPU0:router# show redundancy</pre>	Gracefully reloads all nodes on a system that includes redundant RSPs. The new ROM Monitor firmware is not active on a node until the card is reloaded. (Optional) Use cfs check command to ensure the sanity of the configuration file system for the default-SDR. Reload the standby RSP to activate the new ROM Monitor firmware. Specify the <i>node-id</i> of the standby RSP.

	Command or Action	Purpose
	<pre>RP/0/RSP0/CPU0:router# redundancy switchover RP/0/RSP0/CPU0:router# show redundancy RP/0/RSP0/CPU0:router# admin RP/0/RSP0/CPU0:router(admin)# show platform RP/0/RSP0/CPU0:router(admin)# hw-module location 0/1/CPU0 reload RP/0/RSP0/CPU0:router(admin)# hw-module location 0/2/CPU0 reload RP/0/RSP0/CPU0:router(admin)# hw-module location 0/SM0/SP reload RP/0/RSP0/CPU0:router(admin)# hw-module location 0/SM1/SP reload RP/0/RSP0/CPU0:router(admin)# hw-module location 0/SM2/SP reload RP/0/RSP0/CPU0:router(admin)# hw-module location 0/SM3/SP reload RP/0/RSP0/CPU0:router(admin)# show platform</pre>	<p>Wait till the standby RSP fully boots.</p> <p>Use the show redundancy command to verify the redundancy status of the RSPs. Wait for the standby RSP to return to “Ready” state.</p> <p>Use the redundancy switchover command to cause the primary (active) RSP to fail over to the redundant standby RSP. The control switches over to the standby RSP.</p> <p>Note</p> <ul style="list-style-type: none"> The standby RSP must be ready to take over. <p>Use the show redundancy command to verify the status of the RSPs. Wait for the standby RSP to return to ready state.</p> <p>Use the admin command to enter administration EXEC mode.</p> <p>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.</p> <p>Use the hw-module location node-id reload command to reload each additional card where the ROM Monitor firmware was changed. Each node must be reloaded to activate the new ROM Monitor firmware.</p> <p>Replace <i>node-id</i> with the node ID you specified when upgrading ROM Monitor.</p> <p>Use the hw-module location node-id reload command to reload all upgraded nodes in the system.</p> <p>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.</p>
<p>Step 11</p>	<p>Reload all nodes in the system (cold restart).</p> <p>Example:</p> <pre>RP/0/RSP0/CPU0:router# cfs check RP/0/RSP0/CPU0:router# admin RP/0/RSP0/CPU0:router(admin)# reload location all</pre>	<p>Reloads all nodes, including the RSP. Use these commands if you are upgrading a router with a single RSP, or wish to perform a cold restart of all nodes. The new ROM Monitor firmware is not active on a node until the card is reloaded.</p> <p>Reloading the primary RSP interrupts all service.</p> <p>(Optional) Use the cfs check command to ensure the sanity of the configuration file system for the default-SDR.</p> <p>Enters administration EXEC mode.</p> <p>Use the reload location all command in administration EXEC mode to reload all nodes in the system.</p>

	Command or Action	Purpose
Step 12	show platform Example: RP/0/RSP0/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

This section provides the troubleshooting tips for the upgrade procedure:

- 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 ROMMON A is used for any card in the router, following SYSLOG message is displayed during system boot up:

```
LC/0/5/CPU0:Nov 5 12:29:12.311 : rommon_fpd_agent[202]: rommon instance 0 has image A
programmed. Upgrade the possibly corrupt image B using "upgrade hw-module fpd" CLI in
admin mode.
```

- If both ROMMAN 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.
- If a lower version of the ROM Monitor is detected based on the version check performed during system boot, following error message is displayed:

```
RP/0/RSP1/CPU0:Nov 19 07:19:02.628 : rommon_fpd_agent[308]:
%PLATFORM-UPGRADE_FPD-4-DOWN_REV : lc rommon instance 0 is down-rev (V0.63), upgrade
to (V0.64). Use the "upgrade hw-module fpd" CLI in admin mode.
```

ROM Monitor Upgrades: Examples

This section provides the following configuration examples:

ROM Monitor Upgrade: Example

The following example shows how to display ROM monitor image information for all cards in the router:

```
RP/0/RSP1/CPU0:router(admin)# show hw-module fpd location all

Sun Jun 6 04:34:58.956 DST
```

```

=====
Existing Field Programmable Devices
=====
Location      Card Type      HW      Current SW Upg/
Version      Type Subtype Inst  Version  Dng?
=====
0/RSP0/CPU0  A9K-RSP-4G      4.8    lc  fpga3  0      1.18    No
              4.8    lc  fpga1  0      1.05    No
              4.8    lc  fpga2  0      1.15    No
              4.8    lc  cbc    0      1.02    No
              4.8    lc  fpga4  0      3.08    No
              4.8    lc  hsbi   0      4.00    No
              4.8    lc  rommon 0      1.04    No
-----
0/RSP0/CPU0  ASR-9010-FAN    1.0    lc  cbc    1      4.00    No
-----
0/RSP0/CPU0  ASR-9010-FAN    1.0    lc  cbc    2      4.00    No
-----
0/1/CPU0     A9K-40GE-B      1.0    lc  fpga1  0      0.42    No
              1.0    lc  fpga2  0      0.09    No
              1.0    lc  cbc    0      2.02    No
              1.0    lc  cp1d1  0      0.19    No
              1.0    lc  rommon 0      1.03    No
-----
0/1/CPU0     A9K-40GE-B      1.0    lc  fpga1  1      0.42    No
-----
0/4/CPU0     A9K-8T/4-B      1.0    lc  fpga1  0      0.42    No
              1.0    lc  fpga2  0      0.10    No
              1.0    lc  cbc    0      2.02    No
              1.0    lc  cp1d2  0      0.08    No
              1.0    lc  cp1d1  0      0.19    No
              1.0    lc  cp1d3  0      0.03    No
              1.0    lc  rommon 0      1.03    No
              1.0    lc  fpga3  0      14.42   No
-----
0/4/CPU0     A9K-8T/4-B      1.0    lc  fpga1  1      0.42    No
-----
0/6/CPU0     A9K-4T-B        1.0    lc  fpga1  0      0.42    No
              1.0    lc  fpga2  0      0.10    No
              1.0    lc  cbc    0      2.02    No
              1.0    lc  cp1d2  0      0.08    No
              1.0    lc  cp1d1  0      0.19    No
              1.0    lc  cp1d3  0      0.03    No
              1.0    lc  rommon 0      1.03    No
              1.0    lc  fpga3  0      14.42   No
-----
0/6/CPU0     A9K-4T-B        1.0    lc  fpga1  1      0.42    No
-----

```

The following example shows how to upgrade the ROM Monitor image when a lower version of ROM Monitor firmware is detected. In the example, the ROM Monitor image for the 0/RSP1/CPU0 node ID is updated:

```
RP/0/RSP0/CPU0:router(admin)# upgrade hw-module fpd rommon location 0/RSP1/CPU0
```

```
% RELOAD REMINDER:
```

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

- The output of "show hw-module fpd location" command will not display correct version information after the upgrade if the target module is not reloaded.

Continue? [confirm]

Starting the upgrade/download of following FPD:

```

=====
Location      Type Subtype Upg/Dng   Current   Upg/Dng
              =====  =====  =====  =====  =====
0/RSP1/CPU0  lc   rommon  upg       0.63      0.64
-----
RP/0/RSP1/CPU0:Nov 19 07:24:11.553 : lc_fpd_upgrade[243]: %PLATFORM-UPGRADE_FPD-6-START :
Starting to upgrade rommon subtype image from 0.63 to 0.64 for this card on location
0/RSP1/CPU0
RP/0/RSP1/CPU0:Nov 19 07:24:11.561 : rommon_fpd_agent[308]: Start Upgrade...
RP/0/RSP1/CPU0:Nov 19 07:24:11.561 : rommon_fpd_agent[308]: Programming fpd instance 0...with
file
/net/node0_RSP0_CPU0/dev/shmem/asr9k-fpd-3.7.2.10I/fpd/ucode/rommon-viking-8641d-rsp2-B.bin
RP/0/RSP1/CPU0:Nov 19 07:24:21.098 : lc_fpd_upgrade[243]: %PLATFORM-UPGRADE_FPD-6-PASSED :
Successfully upgrade rommon subtype image for this card on location 0/RSP1/CPU0

% Successfully upgraded 1 FPD for A9K-RSP-4G-HDD on location 0/RSP1/CPU0

```

The following example shows reload of the 0/RSP1/CPU0 node:

```

RP/0/RSP0/CPU0:router(admin)# hw-module location 0/RSP1/CPU0 reload

WARNING: This will take the requested node out of service.
Do you wish to continue?[confirm(y/n)] y
RP/0/RSP0/CPU0:Nov 19 07:26:45.060 : shelfmgr[323]: %PLATFORM-SHELFMGR-6-USER_RESET : Node
0/RSP1/CPU0 is reset due to user reload request
RP/0/RSP0/CPU0:Nov 19 07:26:51.866 : shelfmgr[323]: %PLATFORM-SHELFMGR-6-NODE_STATE_CHANGE
: 0/RSP1/CPU0 card type:1049346 nstate:ROMMON
RP/0/RSP0/CPU0:Nov 19 07:27:11.153 : shelfmgr[323]: %PLATFORM-SHELFMGR_HAL-6-BOOT_REQ_RECEIVED
: Boot Request from 0/RSP1/CPU0, Rommon Version: 0.64
RP/0/RSP0/CPU0:Nov 19 07:27:11.155 : shelfmgr[323]: %PLATFORM-SHELFMGR-6-NODE_STATE_CHANGE
: 0/RSP1/CPU0 card type:1049346 nstate:MBI-BOOTING
RP/0/RSP0/CPU0:Nov 19 07:29:26.661 : shelfmgr[323]: %PLATFORM-SHELFMGR-6-NODE_STATE_CHANGE
: 0/RSP1/CPU0 card type:1049346 nstate:IOS XR RUN
RP/0/RSP0/CPU0:Nov 19 07:29:52.066 : redcon[303]: %HA-REDCON-1-STANDBY_READY : standby card
is ready

```

Verify the upgrade using the **show hw-module fpd location all** command, as shown in the following command:

```

RP/0/RSP0/CPU0:router(admin)# show hw-module fpd location all

=====
Existing Field Programmable Devices
=====
Location      Card Type      HW          Current SW Upg/
              =====  =====  =====  =====  =====
0/RSP0/CPU0  A9K-RSP-4G     4.8   lc   fpga3   0       1.18   No
              =====  =====  =====  =====  =====
              lc   fpga1   0       1.05   No
              lc   fpga2   0       1.15   No
              lc   cbc     0       1.02   No
              lc   fpga4   0       3.08   No
              lc   hsbi    0       4.00   No
              lc   rommon  0       1.04   No
-----
0/RSP0/CPU0  ASR-9010-FAN   1.0   lc   cbc     1       4.00   No

```

0/RSP0/CPU0	ASR-9010-FAN	1.0	lc	cbc	2	4.00	No
0/RSP0/CPU0	A9K-BPID2-10-SLOT	1.0	lc	cbc	3	7.00	No
0/RSP1/CPU0	A9K-RSP-4G	4.8	lc	fpga3	0	1.18	No
			lc	fpga1	0	1.05	No
			lc	fpga2	0	1.15	No
			lc	cbc	0	1.02	No
			lc	fpga4	0	3.08	No
			lc	hsbi	0	4.00	No
			lc	rommon	0	1.04	No
0/1/CPU0	A9K-4T-L	1.0	lc	fpga1	0	0.42	No
			lc	fpga2	0	0.10	No
			lc	cbc	0	2.02	No
			lc	cp1d2	0	0.08	No
			lc	cp1d1	0	0.19	No
			lc	cp1d3	0	0.03	No
			lc	rommon	0	1.03	No
			lc	fpga3	0	14.42	No
0/1/CPU0	A9K-4T-L	1.0	lc	fpga1	1	0.42	No
0/2/CPU0	A9K-2T20GE-B	1.0	lc	fpga1	0	0.42	No
			lc	fpga2	0	0.16	No
			lc	cbc	0	2.02	No
			lc	cp1d2	0	0.11	No
			lc	cp1d1	0	0.19	No
			lc	cp1d3	0	0.09	No
			lc	rommon	0	1.03	No
0/2/CPU0	A9K-2T20GE-B	1.0	lc	fpga1	1	0.42	No
0/3/CPU0	A9K-SIP-700	0.31	lc	fpga1	0	0.22	No
			lc	cbc	0	3.03	Yes
			lc	rommon	0	1.02	Yes
			lc	fpga2	0	5.14	No
			lc	cp1d1	0	0.15	No
0/3/1	SPA-2XCHOC12/DS0	1.0	spa	rommon	1	2.02	No
			spa	fpga1	1	1.36	No
			spa	fpga2	1	1.00	No
0/4/CPU0	A9K-8T/4-L	1.0	lc	fpga1	0	0.42	No
			lc	fpga2	0	0.10	No
			lc	cbc	0	2.02	No
			lc	cp1d2	0	0.08	No
			lc	cp1d1	0	0.19	No
			lc	cp1d3	0	0.03	No
			lc	rommon	0	1.03	No
			lc	fpga3	0	14.42	No
0/4/CPU0	A9K-8T/4-L	1.0	lc	fpga1	1	0.42	No
0/6/CPU0	A9K-40GE-L	1.0	lc	fpga1	0	0.42	No
			lc	fpga2	0	0.09	No
			lc	cbc	0	2.02	No
			lc	cp1d1	0	0.19	No
			lc	rommon	0	1.03	No
0/6/CPU0	A9K-40GE-L	1.0	lc	fpga1	1	0.42	No

NOTES:

1. One or more FPD needs an upgrade or a downgrade. This can be accomplished using the "admin upgrade hw-module fpd" CLI.

The following example shows how to upgrade ROMMON B:

**Note**

The use of **force** option when doing an fpd upgrade is not recommended except under explicit direction from Cisco Engineering or TAC.

```
RP/0/RSP0/CPU0:router(admin)# upgrade hw-module fpd rommon location 0/RSP1/CPU0
```

```
% RELOAD REMINDER:
```

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

```
Continue? [confirm]
```

```
Starting the upgrade/download of following FPD:
```

```
=====
Location      Type Subtype Upg/Dng   Current Upg/Dng
              Type          Version  Version
=====
0/RSP1/CPU0  lc   rommon  upg      0.64    1.0
=====
```

```
RP/0/RSP1/CPU0:Dec 11 16:18:01.982 : lc_fpd_upgrade[240]: %PLATFORM-UPGRADE_FPD-6-START :
Starting to upgrade rommon subtype image from 0.64 to 1.0 for this card on location
0/RSP1/CPU0
RP/0/RSP1/CPU0:Dec 11 16:18:01.989 : rommon_fpd_agent[303]: Start Upgrade...
RP/0/RSP1/CPU0:Dec 11 16:18:01.990 : rommon_fpd_agent[303]: Programming fpd instance 0...with
file
/net/node0_RSP0_CPU0/dev/shmem/asr9k-fpd-3.7.1.23I/fpd/ucode/rommon-viking-8641d-rsp2-B.bin
RP/0/RSP1/CPU0:Dec 11 16:18:11.604 : lc_fpd_upgrade[240]: %PLATFORM-UPGRADE_FPD-6-PASSED :
Successfully upgrade rommon subtype image for this card on location 0/RSP1/CPU0

% Successfully upgraded 1 FPD for A9K-RSP-4G-HDD on location 0/RSP1/CPU0
```

```
RP/0/RSP0/CPU0:ios(admin)# hw-module location 0/RSP1/CPU0 reload
```

Graceful Reload of a Cisco ASR 9000 Series Router: Example

In the following example, a Cisco ASR 9000 Series Router is gracefully reloaded following a ROM Monitor firmware upgrade or downgrade:

```
RP/0/RSP0/CPU0:router# cfs check
```

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



```
RP/0/RSP0/CPU0:router# hw-module location 0/RSP1/CPU0 reload
WARNING: This will take the requested node out of service.
Do you wish to continue?[confirm(y/n)] y

RP/0/RSP0/CPU0:router# show redundancy
Redundancy information for node 0/RSP0/CPU0:
=====
Node 0/RSP0/CPU0 is in ACTIVE role
Partner node (0/RSP1/CPU0) is in STANDBY role
Standby node in 0/RSP1/CPU0 is ready
Standby node in 0/RSP1/CPU0 is NSR-ready

Reload and boot info
-----
A9K-RSP-4G-HDD reloaded Thu Dec 11 14:50:47 2008: 2 hours, 27 minutes ago
Active node booted Thu Dec 11 14:50:47 2008: 2 hours, 27 minutes ago
Standby node boot Thu Dec 11 17:15:16 2008: 2 minutes ago
Standby node last went not ready Thu Dec 11 17:16:27 2008: 1 minute ago
Standby node last went ready Thu Dec 11 17:17:27 2008: 39 seconds ago
There have been 0 switch-overs since reload

RP/0/RSP0/CPU0:router# redundancy switchover
Proceed with switchover 0/RSP0/CPU0 -> 0/RSP1/CPU0? [confirm]
Initiating switch-over.

<Move to node 0/RSP1/CPU0>

RP/0/RSP1/CPU0:router# show redundancy
Redundancy information for node 0/RSP1/CPU0:
=====
Node 0/RSP1/CPU0 is in ACTIVE role
Partner node (0/RSP0/CPU0) is in STANDBY role
Standby node in 0/RSP0/CPU0 is ready
Standby node in 0/RSP0/CPU0 is NSR-ready

Reload and boot info
-----
A9K-RSP-4G-HDD reloaded Thu Dec 11 14:50:47 2008: 2 hours, 35 minutes ago
Active node booted Thu Dec 11 17:15:15 2008: 11 minutes ago
Last switch-over Thu Dec 11 17:19:29 2008: 7 minutes ago
Standby node boot Thu Dec 11 17:22:57 2008: 3 minutes ago
Standby node last went not ready Thu Dec 11 17:24:06 2008: 2 minutes ago
Standby node last went ready Thu Dec 11 17:25:06 2008: 1 minute ago
There has been 1 switch-over since reload

RP/0/RSP1/CPU0:router# hw-module location 0/RSP0/CPU0 reload
WARNING: This will take the requested node out of service.
Do you wish to continue?[confirm(y/n)] y

RP/0/RSP1/CPU0:router# show redundancy
Redundancy information for node 0/RSP1/CPU0:
=====
Node 0/RSP1/CPU0 is in ACTIVE role
Partner node (0/RSP0/CPU0) is in STANDBY role
Standby node in 0/RSP0/CPU0 is ready
Standby node in 0/RSP0/CPU0 is NSR-ready

Reload and boot info
-----
A9K-RSP-4G-HDD reloaded Thu Dec 11 14:50:47 2008: 2 hours, 41 minutes ago
Active node booted Thu Dec 11 17:15:15 2008: 16 minutes ago
Last switch-over Thu Dec 11 17:19:29 2008: 12 minutes ago
```

```
Standby node boot Thu Dec 11 17:28:56 2008: 3 minutes ago
Standby node last went not ready Thu Dec 11 17:30:02 2008: 2 minutes ago
Standby node last went ready Thu Dec 11 17:31:02 2008: 1 minute ago
There has been 1 switch-over since reload
```

```
RP/0/RSP1/CPU0:router# admin
```

```
RP/0/RSP1/CPU0:router(admin)# show platform
```

Node	Type	State	Config State
0/RSP0/CPU0	A9K-RSP-4G-HDD(Standby)	IOS XR RUN	PWR,NSHUT,MON
0/RSP1/CPU0	A9K-RSP-4G-HDD(Active)	IOS XR RUN	PWR,NSHUT,MON
0/FT0/SP	FAN TRAY	READY	
0/0/CPU0	A9K-4T-B	IOS XR RUN	PWR,NSHUT,MON
0/2/CPU0	A9K-40GE-E	IOS XR RUN	PWR,NSHUT,MON
0/6/CPU0	A9K-8T/4-E	IOS XR RUN	PWR,NSHUT,MON

```
RP/0/RSP1/CPU0:router(admin)# hw-module location 0/0/CPU0 reload
```

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

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

```
RP/0/RSP1/CPU0:router(admin)# hw-module location 0/2/CPU0 reload
```

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

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

```
RP/0/RSP1/CPU0:router(admin)# hw-module location 0/6/CPU0 reload
```

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

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

```
RP/0/RSP1/CPU0:router(admin)# show platform
```

Node	Type	State	Config State
0/RSP0/CPU0	A9K-RSP-4G-HDD(Standby)	IOS XR RUN	PWR,NSHUT,MON
0/RSP1/CPU0	A9K-RSP-4G-HDD(Active)	IOS XR RUN	PWR,NSHUT,MON
0/FT0/SP	FAN TRAY	READY	
0/0/CPU0	A9K-4T-B	IOS XR RUN	PWR,NSHUT,MON
0/2/CPU0	A9K-40GE-E	IOS XR RUN	PWR,NSHUT,MON
0/6/CPU0	A9K-8T/4-E	IOS XR RUN	PWR,NSHUT,MON

```
RP/0/RSP1/CPU0:router(admin)# show hw-module fpd location all
```

```
===== Existing Field Programmable Devices =====
HW                                     Current SW Upg/
Location  Card Type  Version Type Subtype Inst  Version  Dng?
=====
0/RSP0/CPU0  A9K-RSP-4G  4.8   lc  fpga3  0    1.18    No
              lc  fpga1  0    1.05    No
              lc  fpga2  0    1.15    No
              lc  cbc    0    1.02    No
              lc  fpga4  0    3.08    No
              lc  hsbi   0    4.00    No
              lc  rommon 0    1.04    No
-----
0/RSP0/CPU0  ASR-9010-FAN  1.0   lc  cbc    1    4.00    No
-----
0/RSP0/CPU0  ASR-9010-FAN  1.0   lc  cbc    2    4.00    No
-----
0/RSP0/CPU0  A9K-BPID2-10-SLOT  1.0   lc  cbc    3    7.00    No
-----
0/RSP1/CPU0  A9K-RSP-4G  4.8   lc  fpga3  0    1.18    No
              lc  fpga1  0    1.05    No
```

			lc	fpga2	0	1.15	No
			lc	cbc	0	1.02	No
			lc	fpga4	0	3.08	No
			lc	hsbi	0	4.00	No
			lc	rommon	0	1.04	No

0/1/CPU0	A9K-4T-L	1.0	lc	fpga1	0	0.42	No
			lc	fpga2	0	0.10	No
			lc	cbc	0	2.02	No
			lc	cpld2	0	0.08	No
			lc	cpld1	0	0.19	No
			lc	cpld3	0	0.03	No
			lc	rommon	0	1.03	No
			lc	fpga3	0	14.42	No

0/1/CPU0	A9K-4T-L	1.0	lc	fpga1	1	0.42	No

0/2/CPU0	A9K-2T20GE-B	1.0	lc	fpga1	0	0.42	No
			lc	fpga2	0	0.16	No
			lc	cbc	0	2.02	No
			lc	cpld2	0	0.11	No
			lc	cpld1	0	0.19	No
			lc	cpld3	0	0.09	No
			lc	rommon	0	1.03	No

0/2/CPU0	A9K-2T20GE-B	1.0	lc	fpga1	1	0.42	No

0/3/CPU0	A9K-SIP-700	0.31	lc	fpga1	0	0.22	No
			lc	cbc	0	3.03	Yes
			lc	rommon	0	1.02	Yes
			lc	fpga2	0	5.14	No
			lc	cpld1	0	0.15	No

0/3/1	SPA-2XCHOC12/DS0	1.0	spa	rommon	1	2.02	No
			spa	fpga1	1	1.36	No
			spa	fpga2	1	1.00	No

0/4/CPU0	A9K-8T/4-L	1.0	lc	fpga1	0	0.42	No
			lc	fpga2	0	0.10	No
			lc	cbc	0	2.02	No
			lc	cpld2	0	0.08	No
			lc	cpld1	0	0.19	No
			lc	cpld3	0	0.03	No
			lc	rommon	0	1.03	No
			lc	fpga3	0	14.42	No

0/4/CPU0	A9K-8T/4-L	1.0	lc	fpga1	1	0.42	No

0/6/CPU0	A9K-40GE-L	1.0	lc	fpga1	0	0.42	No
			lc	fpga2	0	0.09	No
			lc	cbc	0	2.02	No
			lc	cpld1	0	0.19	No
			lc	rommon	0	1.03	No

0/6/CPU0	A9K-40GE-L	1.0	lc	fpga1	1	0.42	No

NOTES:

- One or more FPD needs an upgrade or a downgrade. This can be accomplished using the "admin upgrade hw-module fpd" CLI.

Additional References

Related Documents

Related Topic	Document Title
Hardware component commands	<i>Interface and Hardware Component Command Reference for Cisco ASR 9000 Series Routers</i>
System management commands	<i>System Management Command Reference for Cisco ASR 9000 Series Routers</i>

Technical Assistance

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



CHAPTER 7

Image Refresh Using the Archive and Restore Feature

This chapter describes how to backup the most recent Cisco IOS XR software and configuration files available on the Cisco ASR 9000 Series Aggregation Services Routers, and restore the latest Cisco IOS XR software and configuration files using the Archive and Restore feature. This feature is available on RSP2 cards, but not on RSP3 cards.

- [Information About Image Refresh, on page 77](#)
- [Prerequisites, on page 77](#)
- [Archiving Cisco IOS XR Image on a Local Disk, on page 78](#)
- [Restoring Cisco IOS XR Image from the local device, on page 80](#)

Information About Image Refresh

The Cisco IOS XR software and configuration files available on the Cisco ASR 9000 Series Aggregation Services Routers can be backed up and restored using the Archive and Restore feature. This Archive and Restore feature is built into the Cisco ASR 9000 Series Routers Micro Image. A Micro Image is a factory supplied service image that is locally resident on all Cisco ASR 9000 Series Routers RSP cards. A Micro Image allows administrators to perform these service tasks:

- Format Cisco ASR 9000 Series Routers media storage devices
- Archive content from the Cisco ASR 9000 Series Routers
- Restore content to the Cisco ASR 9000 Series Routers
- Review any prior failure logs
- Edit power module cookie

Prerequisites

Before implementing the Archive and Restore feature on the Cisco ASR 9000 Series Routers, verify that the these prerequisites have been met:

- ROMMON version 1.0 or a later version has been installed.

- Cisco IOS XR Release 3.9.0 or a later release has been installed.
- The minimum size of compactflash is 1 GB or higher on all RSP cards.

Archiving Cisco IOS XR Image on a Local Disk

The Cisco IOS XR software and configuration files can also be saved on a local storage device, such as a compactflash disk. You can backup the content of the active RSP card on the compactflash disk. This process creates a backup of these media devices and variables on the compactflash device:

- /disk0:
- /disk0a:
- /disk1:
- /disk1a:
- /bootflash:
- Few variables in NVRAM (puf extension files and ROMMON environment variables)

SUMMARY STEPS

1. **TURBOBOOT=on, {boot-device},[format | clean],[nodisablebreak]**
2. Verify the existence of compactflash in the Active RSP card.
3. **format compactflash:**
4. **show platform** command and **show redundancy summary** command
5. **run** command followed by **ksh /pkg/sbin/archive compactflash:**
6. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	TURBOBOOT=on, {boot-device},[format clean],[nodisablebreak] Example: <pre>rommon B9> TURBOBOOT=on,disk0,format,nodisablebreak</pre>	Sets the TURBOBOOT parameters and saves the configuration in the ROM Monitor configuration mode. Separate each parameter with a comma (,).
Step 2	Verify the existence of compactflash in the Active RSP card. Example: <pre>RP/0/RSP0/CPU0:router# dir compactflash:</pre>	Ensures that the compactflash device is present in the RSP card.
Step 3	format compactflash: Example:	Formats the compactflash device to ensure that its filesystem is initialised to a consistent state.

	Command or Action	Purpose
	RP/0/RSP0/CPU0:router# format compactflash:	Note This step has to be performed on the Active RSP only.
Step 4	<p>show platform command and show redundancy summary command</p> <p>Example:</p> <pre>RP/0/RSP0/CPU0:router# show platform RP/0/RSP0/CPU0:router# show redundancy summary</pre>	<p>Ensures that no Online Insertion and Removal (OIR), configuration changes or reloads are occurring during the format process. Also, ensure that the system is in Cisco IOS XR RUN state.</p> <p>Note This step has to be performed on the Active RSP only.</p>
Step 5	<p>run command followed by ksh /pkg/sbin/archive compactflash:</p> <p>Example:</p> <pre>RP/0/RSP0/CPU0:ios#run # ksh /pkg/sbin/archive compactflash:</pre>	Archives the data available on all available disks to the compactflash device.
Step 6	<p>exit</p> <p>Example:</p> <pre># cd /compactflash: # ls # cd snapshot</pre>	Verifies that the compactflash device contains the backup image of the active RSP in a snapshot directory. You can verify this using the dir command from XR or ls command from ksh in the snapshot directory.

Archiving Cisco IOS XR Image on a Local Disk: Example

```
RP/0/RSP0/CPU0:Router# dir compactflash:
```

```
Mon Nov 23 19:16:48.920 UTC
```

```
Directory of compactflash:
```

```
3          drwx  4096          Mon Nov 23 19:16:48 2009  LOST.DIR
```

```
919867392 bytes total (919859200 bytes free)
```

```
RP/0/RSP0/CPU0:Router# format compactflash:
```

```
Fri Nov 20 00:37:13.432 UTC
```

```
Format will destroy all data on "compactflash:". Continue? [confirm]
```

```
RP/0/RSP0/CPU0:Nov 20 00:37:14.771 : syslog_dev[93]: mkdosfs:
```

```
RP/0/RSP0/CPU0:Nov 20 00:37:14.771 : syslog_dev[93]: mkdosfs: Format complete: FAT16
(16384-byte clusters), 998624 kB available.
```

```
Device partition compactflash: is now formatted and is available for use.
```

```
RP/0/RSP0/CPU0:Router# show platform
```

```
Sun Jun  6 04:37:35.842 DST
```

```
Node              Type                               State           Config State
```

```
-----
0/RSP0/CPU0       A9K-RSP-4G(Active)                 IOS XR RUN      PWR, NSHUT, MON
0/1/CPU0          A9K-40GE-B                          IOS XR RUN      PWR, NSHUT, MON
```

```

0/4/CPU0          A9K-8T/4-B          IOS XR RUN          PWR, NSHUT, MON
0/6/CPU0          A9K-4T-B            IOS XR RUN          PWR, NSHUT, MON

RP/0/RSP0/CPU0:Router# show redundancy summary

Sun Jun  6 04:38:07.306 DST
  Active Node      Standby Node
  -----
  0/RSP0/CPU0      N/A
RP/0/RSP0/CPU0:Router# run
Fri Nov 20 00:37:18.558 UTC
# ksh /pkg/sbin/archive compactflash:
This operation will remove any earlier backups in /compactflash:/snapshot:
Enter Yes, to continue: Yes
Continuing
Space available in compactflash: 998608 KBytes
Space needed for this archive 443136 KBytes
Archive disk0: to compactflash: Please wait ...
Computing MD5 signature of disk0: on compactflash: Please wait ...
Completed archive of disk0: to compactflash:
Archive disk0a: to compactflash: Please wait ...
Computing MD5 signature of disk0a: on compactflash: Please wait ...
Completed archive of disk0a: to compactflash:
Archive disk1: to compactflash: Please wait ...
Computing MD5 signature of disk1: on compactflash: Please wait ...
Completed archive of disk1: to compactflash:
Archive diskla: to compactflash: Please wait ...
Computing MD5 signature of diskla: on compactflash: Please wait ...
Completed archive of diskla: to compactflash:
Archive bootflash: to compactflash: Please wait ...
Computing MD5 signature of bootflash: on compactflash: Please wait ...
Completed archive of bootflash: to compactflash:
Saving common NVRAM variables
 1464.12s real   11.62s user   40.88s system
Archive to compactflash: success
# cd /compactflash:
# ls
.          ..          LOST.DIR   snapshot
# cd snapshot
# ls
.          disk0a.cpio  license_opid.puf
..         disk0a.md5   nvram.values
bootflash.cpio  disk1.cpio  placed.puf
bootflash.md5  disk1.md5   powerup_info.puf
disk0.cpio     diskla.cpio
disk0.md5     diskla.md5
# exit
RP/0/RSP0/CPU0:Router#

```

Restoring Cisco IOS XR Image from the local device

Restoring means refreshing the content of the active RSP card. Restoring refreshes the Cisco ASR 9000 Series Routers with images from the compactflash device. The content of these devices and a few variables get updated.

- /disk0:
- /disk0a:

- /disk1:
- /disk1a:
- /bootflash:
- Few items in NVRAM (puf files and installation-related ROMMON variables)



Note After this restore operation is complete, the previously-saved content in the devices is irrecoverably lost.

SUMMARY STEPS

1. **admin** command, **config-register boot-mode rom-monitor location all** command and **reload location all** command
2. **boot hsbi:**
3. **format_all**
4. **fullbake**
5. **show platform** command and **show redundancy summary** command

DETAILED STEPS

	Command or Action	Purpose
Step 1	admin command, config-register boot-mode rom-monitor location all command and reload location all command Example: <pre>RP/0/RSP0/CPU0:router(admin)# config-register boot-mode rom-monitor location all RP/0/RSP0/CPU0:router(admin)# reload location all</pre>	Place all RSPs in ROM Monitor mode.
Step 2	boot hsbi: Example: <pre>rommon B9> boot hsbi:</pre>	From ROM Monitor mode, load a micro image by entering the boot hsbi command at the ROMMON prompt. This command lets you restore a previously-archived image.
Step 3	format_all Example: <pre># format all</pre>	Enter format_all command on the standby RSP.
Step 4	fullbake Example: <pre># fullbake Phase 1 - Read and compare FATs Phase 2 - Check cluster chains Phase 3 - Check directories Phase 4 - Check for lost files</pre>	Insert the compactflash device consisting of previously-saved archive images in the active RSP card. Run the fullbake command to execute the restore operation. Note This command performs a device format, followed with the restore operation.

	Command or Action	Purpose
Step 5	<p>show platform command and show redundancy summary command</p> <p>Example:</p> <pre>RP/0/RSP0/CPU0:router# show platform RP/0/RSP0/CPU0:router# show redundancy summary</pre>	<p>Reboot the active RSP to run the restored Cisco IOS XR software on it. The Cisco IOS XR software on the active notices the standby RSP and provide the requisite images. Both the active and the standby RSPs run the Cisco IOS-XR release.</p>

Restoring Cisco IOS XR Image from the Local Device: Example

```
Rommon P4E-31 B1 >boot hsbi:
Beginning HSBI boot:
Loading B image:
.....
program load complete, entry point: 0x1fbfb0, size: 0x3bb854
Attempting to start second CPU
SMP initialized.
Config = SMP, Running = SMP
#####
BSP: Board type : RO-RSP2
Use private TLB mappings
*****
Welcome to micro XR on a ASR9K RSP
BUILD DATE: Thu Aug 27 02:47:38 PDT 2009
To start C/F: ksh /etc/cf_start
To stop C/F: ksh /etc/cf_stop
To format C/F drive with DOS: ksh /etc/cf_dos_init (cf_start first)
To format C/F drive with QNX: ksh /etc/cf_qnx_init (cf_start first)
To format eUSB0 drive: ksh /etc/usb0_init
To format eUSB1 drive: ksh /etc/usb1_init
To format both usb: ksh /etc/usb_init
To format configflash: ksh /etc/flash1_init
To format bootflash: ksh /etc/flash0_init
To start hard drive: ksh /etc/hd_start
To format hard drive: ksh /etc/hd_init
To format HD, eUSB and bootflash: ksh /etc/format_all (diskboot)
To edit Power Module cookie: pwrcookie <module_num> edit

*****

#

# format_all
Step 1/6: format bootflash

Formatting sector 1
Step 2/6: format HD
Step 3/6: format eUSB0
Step 4/6: format eUSB1
Step 5/6: format configflash

Formatting sector 1
Step 6/6 clear NVRAM syslog files
Set BOOT=
#
# fullbake
Phase 1 - Read and compare FATs
```

```
Phase 2 - Check cluster chains
Phase 3 - Check directories
Phase 4 - Check for lost files

423408 kb used, 575248 kb free, 14 files, 3 directories
Filesystem is clean.
Step 1/6: format bootflash

Formatting sector 1
Step 2/6: format HD
Step 3/6: format eUSB0
Step 4/6: format eUSB1
Step 5/6: format configflash

Formatting sector 1
Step 6/6 clear NVRAM syslog files
This operation will remove all installed software on this RSP, and
replace with software from /compactflash:/snapshot
Enter Yes, to continue: Continuing
Restoring image to disk0: from compactflash: Please wait ...
Restored archive of disk0: from compactflash:
Restoring image to disk0a: from compactflash: Please wait ...
Restored archive of disk0a: from compactflash:
Restoring image to disk1: from compactflash: Please wait ...
Restored archive of disk1: from compactflash:
Restoring image to disk1a: from compactflash: Please wait ...
Restored archive of disk1a: from compactflash:
Restoring image to bootflash: from compactflash: Please wait ...
Restored archive of bootflash: from compactflash:
Restoring common NVRAM variables
Set BOOT=disk0:asr9k-os-mbi-3.9.0.31I/mbiasr9k-rp.vm,1;
 395.58s real    2.51s user    2.53s system
Restore from compactflash: success
#
```

