



ROM Monitor Overview and Basic Procedures

This chapter provides an overview of ROM Monitor concepts and operations.

This chapter includes the following main topics:

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- [Access ROM Monitor Mode, page 5-2](#)
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ROM Monitor Overview

The *ROM Monitor* is a bootstrap program that initializes the hardware and boots the Cisco IOS XE software when you power on or reload a router. When you connect a terminal to the router that is in ROM Monitor mode, the ROM Monitor command-line interface (CLI) prompt is displayed.

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

The *ROM Monitor software* is known by many names. It is sometimes called *ROMMON* because of the CLI prompt in ROM Monitor mode. The ROM Monitor software is also called the *boot software*, *boot image*, or *boot helper*. Although it is distributed with routers that use the Cisco IOS XE software, ROM Monitor is a separate program from the Cisco IOS XE software. During normal startup, the ROM Monitor initializes the router, and then control passes to the Cisco IOS XE software. After the Cisco IOS XE software takes over, the ROM Monitor is no longer in use.

Environmental Variables and the Configuration Register

Two primary connections exist between ROM Monitor and the Cisco IOS XE software: the ROM Monitor environment variables and the configuration register.

The ROM Monitor environment variables define the location of the Cisco IOS XE software and describe how to load it. After the ROM Monitor has initialized the router, it uses the environment variables to locate and load the Cisco IOS XE software.

The *configuration register* is a software setting that controls how a card starts up. One of the primary uses of the configuration register is to control whether the router 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 XE software prompt when you need to use ROM Monitor mode. When the maintenance in ROM Monitor mode is complete, you change the configuration register so the router reboots with the Cisco IOS XE software.

Accessing ROM Monitor Mode with a Terminal Connection

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

Network Management Access and ROM Monitor Mode

It is important to remember that ROM Monitor mode is a router mode, not a mode within the Cisco IOS XE software. It is best to remember that ROM Monitor software and the Cisco IOS XE software are two separate programs that run on the same router. At any given time, the router runs only one of these programs, .

One area that can be confusing when using ROM Monitor and the Cisco IOS XE software is the area that defines the IP configuration for the Management Ethernet interface. Most users are comfortable with configuring the Management Ethernet interface in the Cisco IOS XE software. When the router is in ROM Monitor mode, however, the router does not run the Cisco IOS XE software, so that Management Ethernet interface configuration is not available.

When you want to access other devices, such as a TFTP server, while in ROM Monitor mode on the router, you must configure the ROM Monitor variables with IP access information.

Access ROM Monitor Mode

The following sections describe how to enter the ROMMON mode, and contains the following sections:

- [Checking the Current ROMmon Version, page 5-2](#)
- [Commonly Used ROM Monitor Commands, page 5-4](#)
- [Changing the ROM Monitor Prompt, page 5-5](#)

Checking the Current ROMmon Version

To display the version of ROMmon running on a router, use the **show rom-monitor** command or the **show platform** command.

```
Router# show rom-monitor r0
```

```
Router#show rom-monitor r0
```

```
System Bootstrap, Version 15.4(3r)S, RELEASE SOFTWARE (fc1)
Copyright (c) 1994-2014 by cisco Systems, Inc.
```

```
.
```

```
Router#show platform
Chassis type: ISR4451/K9
```

Slot	Type	State	Insert time (ago)
0	ISR4451-X/K9	ok	00:03:25
0/0	ISR4451-X-4x1GE	ok	00:02:46
1	ISR4451-X/K9	ok	00:03:25
2	ISR4451-X/K9	ok	00:03:25
R0	ISR4451-X/K9	ok, active	00:03:25
F0	ISR4451-X/K9	ok, active	00:03:25
P0	PWR-4450-10	ok	00:03:10
P1	Unknown	ps, fail	never
P2	ACS-4450-FANASSY	ok	00:03:10

Slot	CPLD Version	Firmware Version
0	14061635	15.4(3r)S
1	14061635	15.4(3r)S
2	14061635	15.4(3r)S
R0	14061635	15.4(3r)S
F0	14061635	15.4(3r)S

```
Router#show rom-monitor r0
```

```
System Bootstrap, Version 15.4(3r)S1, RELEASE SOFTWARE (fc1)
Copyright (c) 1994-2014 by cisco Systems, Inc.
```

```
Router#show platform
Chassis type: ISR4351/K9
```

Slot	Type	State	Insert time (ago)
0	ISR4351/K9	ok	02:16:41
0/0	ISR4351-3x1GE	ok	02:15:47
1	ISR4351/K9	ok	02:16:41
2	ISR4351/K9	ok	02:16:41
R0	ISR4351/K9	ok, active	02:16:41
F0	ISR4351/K9	ok, active	02:16:41
P0	PWR-4450-AC	ok	never
P2	ACS-4450-FANASSY	ok	never

Slot	CPLD Version	Firmware Version
0	14080523	15.4(3r)S1
1	14080523	15.4(3r)S1
2	14080523	15.4(3r)S1
R0	14080523	15.4(3r)S1
F0	14080523	15.4(3r)S1

```
Router# show rom
Router# show rom?
rom-monitor romvar
```

```

Router# show romvar
ROMMON variables:
PS1 = rommon ! >
TFTP_FILE = /noash/overlord_627.bin
DEFAULT_GATEWAY = 50.0.0.1
TFTP_SERVER = 172.18.40.12
IP_SUBNET_MASK = 255.255.255.0
MCP_STARTUP_TRACEFLAGS = 00000000:00000000
RET_2_RTS =
? = 0
LICENSE_BOOT_LEVEL = adventerprise,all:esg;
IP_ADDRESS = 172.18.40.56
BSI = 0
RET_2_RCALTS =
RANDOM_NUM = 1707176976
Router# reload

```

```

rommon 1 > set
PS1=rommon ! >
SR_INIT_SHELL=aux_do_system_shell
TFTP_FILE=/noash/overlord_627.bin
DEFAULT_GATEWAY=50.0.0.1
TFTP_SERVER=172.18.40.12
IP_SUBNET_MASK=255.255.255.0
MCP_STARTUP_TRACEFLAGS=00000000:00000000
RET_2_RTS=
?=0
LICENSE_BOOT_LEVEL=adventerprise,all:esg;
IP_ADDRESS=172.18.40.56
BSI=0
RANDOM_NUM=1707176976
RET_2_RCALTS=1350127173

```

Commonly Used ROM Monitor Commands

Table 5-1 summarizes the commands commonly used in ROM Monitor. For specific instructions on using these commands, refer to the relevant procedure in this document.

Table 5-1 Commonly Used ROM Monitor Commands

ROMMON Command	Description
boot image	Manually boots a Cisco IOS XE software image.
boot image -o config-file-path	Manually boots the Cisco IOS XE software with a temporary alternative administration configuration file.
confreg	Changes the config-register setting.
dev	Displays the available local storage devices.
dir	Displays the files on a storage device.
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.

Table 5-2 describes the available **help** commands for ROM Monitor mode.

Table 5-2 Help Commands in ROMMON

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



Note

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

Examples

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

```
rommon 1 > ?
alias                set and display aliases command
boot                 boot up an external process
break                set/show/clear the breakpoint
confreg              configuration register utility
context              display the context of a loaded image
cookie               display contents of cookie PROM in hex
dev                  list the device table
dir                  list files in file system
dis                  display instruction stream
frame                print out a selected stack frame
help                 monitor builtin command help
history              monitor command history
meminfo              main memory information
repeat               repeat a monitor command
reset                system reset
set                  display the monitor variables
showmon              display currently selected ROM monitor
stack                produce a stack trace
sync                 write monitor environment to NVRAM
sysret               print out info from last system return
tsec                 print out info from the ethernet driver
unalias              unset an alias
unset                unset a monitor variable
```

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 8 > PS1="ISR4400 rommon ! > "
ISR4400 rommon 9 >
```

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 should be “ISR4400 rommon ”, followed by the line number, and then followed by “ > “ 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 > confreg

          Configuration Summary
(Virtual Configuration Register: )
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 Variable Settings

The ROM Monitor environment variables define the attributes of the ROM Monitor. 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:

```
IP_ADDRESS=10.0.0.2
```

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

This section includes the following topics:

- [Frequently Used Environmental Variables, page 5-7](#)
- [Displaying Environment Variable Settings, page 5-7](#)
- [Entering Environment Variable Settings, page 5-8](#)
- [Saving Environment Variable Settings, page 5-8](#)

Frequently Used Environmental Variables

Table 5-3 shows the main ROM Monitor environmental variables. For instructions on how to use these variables, see the relevant instructions in this document.

Table 5-3 Frequently Used ROM Monitor Environmental Variables

Environmental variable	Description
IP_ADDRESS = <i>ip_address</i>	Sets the IP address for the Management Ethernet interface.
IP_SUBNET_MASK = <i>ip_address</i>	Sets the subnet mask for the Management Ethernet interface.
DEFAULT_GATEWAY = <i>ip_address</i>	Sets the default gateway that serves.
TFTP_SERVER = <i>ip_address</i>	Sets the IP address of the TFTP server where a bootable software image is located.
TFTP_FILE = <i>path/file</i>	Sets the directory and filename of a bootable software image.
BOOT = <i>path/file</i>	Identifies the boot software for a node. This variable is usually set automatically when the router boots.

Displaying Environment Variable Settings

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

```
rommon 1 > showmon
Current image running (0/1): Boot ROM0

System Bootstrap, Version 12.2(20120829:165313)
DEVELOPMENT SOFTWARE
Copyright (c) 1994-2012 by cisco Systems, Inc.

Compiled Wed 08/29/2012 12:53:32.67

CPLD Version      : 35 (MM/DD/YY): 09/03/12 (2.3)
FPGA Version      : 0x82020300 (2.3.0)
FPGA Active       : read-only image
Board Version     : 2 (P1C)
PCH Version       : 10 (B0)
DP CPU Version    : 00 (1.0)
FPGA-ENV Version: 0105
HDD Status        : 0A30
MEFW Version      : 6.0.50.1244
System Straps     : 00000F00 BE036FF1 B2EB6E8F
Hardware Anchor   : F01001R06.0116f365a2012-07-17
Certificate       : 946944F17906C95E
Microloader       : MA0001R04.013eb9f7f2012-06-22
Module 0/1        : Absent
Module 0/2        : Absent
Module 0/3        : Absent
Module 0/4        : Absent
Module 1/0        : Absent
Module 2/0        : Absent
PCH Enum Errs    : 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 router:

```
rommon > IP_ADDRESS=1.1.1.1
rommon > IP_SUBNET_MASK=255.255.254.0
rommon > DEFAULT_GATEWAY=1.1.0.1
```

Saving Environment Variable Settings

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

```
rommon > sync
```



Note

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

Exiting ROM Monitor Mode

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

SUMMARY STEPS

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

DETAILED STEPS

	Command or Action	Purpose
Step 1	confreg Example: rommon 1> confreg	Initiates the configuration register configuration prompts.
Step 2	Respond to each prompt as instructed.	See the example that follows this procedure for more information.
Step 3	reset Example: rommon 2> reset	Resets and initializes the router.

Configuration Example

```
rommon 3 > confreg

                Configuration Summary
(Virtual Configuration Register: 0x0)
enabled are:
[ 0 ] break/abort has effect
[ 1 ] console baud: 9600
boot: ..... the ROM Monitor

do you wish to change the configuration? y/n [n]: y
enable "diagnostic mode"? y/n [n]:
enable "use net in IP bcast address"? y/n [n]:
enable "load rom after netboot fails"? y/n [n]:
enable "use all zero broadcast"? y/n [n]:
disable "break/abort has effect"? y/n [n]:
enable "ignore system config info"? y/n [n]:
change console baud rate? y/n [n]:
change the boot characteristics? y/n [n]:

                Configuration Summary
(Virtual Configuration Register: 0x0)
enabled are:
[ 0 ] break/abort has effect
[ 1 ] console baud: 9600
boot: ..... the ROM Monitor

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

Upgrading the ROMmon for a Router

Use this procedure to upgrade the ROMmon on a router:

-
- Step 1** (Optional) Run the **show platform** command or the **show rom-monitor slot** command on the router to see the current release numbers of ROMmon on the hardware. See the [“Checking the Current ROMmon Version”](#) section on page 5-2 for information about interpreting the output of the command that you run.
 - Step 2** If the ROMmon image has not been copied onto the router, copy the PKG file that is made available as part of this ROMmon release onto the bootflash: or usb[0-1]: file system using the copy source-location destination-location command. For example, if you are upgrading to Release 15.2(1r)S, copy the isr4400-rommon-154-3r.S.pkg file.
 - Step 3** Run the **dir file-system** command to verify that the ROMmon file is copied into the specified directory.
 - Step 4** Run the **upgrade rom-monitor filename location all** command to begin the ROMmon image upgrade, where *location* is the path to the ROMmon file.



Caution

Do not remove hardware, turn off power, or interrupt the router in any way during the ROMmon upgrade. Although the router should be able to recover from most interruptions during the ROMmon upgrade, certain scenarios may cause unpredictable problems.

- Step 5** Messages pertaining to the upgrade are displayed on the console. After the display of these messages stops and the router prompt is available, run the **reload** command to reload the router.
- Step 6** If autoboot has not been enabled by using the **config-register 0x2102** command, run the **boot filesystem:/file-location** command at the ROMmon prompt to boot the Cisco IOS XE image, where *filesystem:/file-location* is the path to the consolidated package file. The ROMmon upgrade is not permanent for any piece of hardware until the Cisco IOS XE image is booted.
- Step 7** Run the **enable** command at the user prompt to enter the privileged EXEC mode after the boot is complete.
- Step 8** Run the **show platform** command or the **show rom-monitor slot** command to verify whether the ROMmon has been upgraded.
-