Using ROM Monitor

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Many users do not use the ROM monitor at all, unless during power up or reload, the router does not find a valid system image, the last digit of the boot field in the configuration register is 0, or you enter the Break key sequence of the terminal that is plugged into the router console port during the first 60 seconds after reloading the router.

This document describes how to use the ROM monitor to manually load a system image, upgrade the system image when there are no TFTP servers or network connections, or for disaster recovery.

Contents

Platforms Supported by This Document

This document describes use of the ROM monitor with the Cisco Connected Grid Router 2010.

Prerequisites for Using the ROM Monitor

Connect a terminal or PC to the router console port. For help, see the hardware installation guide for your router.

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Information About the ROM Monitor

Before using the ROM monitor, you should understand the following concepts:

ROM Monitor Mode Command Prompt

The ROM monitor uses the `rommon x >` command prompt. The *x* variable begins at one and increments each time you press **Return** or **Enter** in ROM monitor mode.

Why is the Router in ROM Monitor Mode?

The router boots to ROM monitor mode when one of the following occurs:

- During power up or reload, the router did not find a valid system image.
- The last digit of the boot field in the configuration register is 0 (for example, 0x100 or 0x0).
- You enter the Break key sequence (typically, **Ctrl-Break**) of the terminal that is plugged into the router console port during the first 60 seconds after reloading the router.

To exit ROM monitor mode, see the "Exiting ROM Monitor Mode" section on page 112.

When do I use ROM Monitor?

Use ROM monitor when:

- Manually loading a system image—You can load a system image without configuring the router to load that image in future system reloads or power-cycles. This can be useful for testing a new system image or for troubleshooting. See the "Loading a System Image (boot)" section on page 93.
- Upgrading the system image when there are no TFTP servers or network connections, and a direct PC connection to the router console is the only viable option—See information about upgrading the system image in the configuration documentation for your router.
- Troubleshooting if the router crashes and hangs—See the "Troubleshooting Crashes and Hangs (stack, context, frame, sysret, meminfo)" section on page 107.
- Recovering from a system disaster—Use one of the following methods for recovering the system image or configuration file:

Note Recovering the system image is different from upgrading the system image. You need to recover the system image if it becomes corrupt or if it is deleted because of a disaster that affects the memory device severely enough to require deleting all data on the memory device to load a system image.

– TFTP download (**tftpdnld**)—Use this method if you can connect a TFTP server directly to the fixed LAN port on your router. See the "Downloading the System Image (tftpdnld)" section on page 103.

Tips for Using ROM Monitor Commands

- ROM monitor commands are case sensitive.
- You can halt any ROM monitor command by entering the Break key sequence (**Ctrl-Break**) on the PC or terminal. The Break key sequence varies, depending on the software on your PC or terminal. If **Ctrl-Break** does not work, see the *Standard Break Key Sequence Combinations During Password Recovery* troubleshooting tech note.
- To find out which commands are available on your router and to display command syntax options, see the "Displaying Commands and Command Syntax in ROM Monitor Mode (?, help, -?)" section on page 92.

Accessibility

The Cisco Connected Grid Router 2010 can be configured using the Cisco command-line interface (CLI). The CLI conforms to accessibility code 508 because it is text based and it relies on a keyboard for navigation. All functions of the router can be configured and monitored using the CLI.

For a complete list of guidelines and Cisco products adherence to accessibility, see Cisco Accessibility Products.

How to Use the ROM Monitor—Typical Tasks

This section provides the following procedures:

Note This section does not describe how to perform all possible ROM monitor tasks. Use the command help to list and perform any tasks that are not described in this document. See the "Displaying Commands and Command Syntax in ROM Monitor Mode (?, help, -?)" section on page 92.

Entering ROM Monitor Mode

This section provides two ways to enter ROM monitor mode:

- Using the Break Key Sequence to Interrupt the System Reload and Enter ROM Monitor Mode, page 88
- Setting the Configuration Register to Boot to ROM Monitor Mode, page 90

Prerequisites

Connect a terminal or PC to the router console port. For help, see the hardware installation guide for your router.

Using the Break Key Sequence to Interrupt the System Reload and Enter ROM Monitor Mode

This section describes how to enter ROM monitor mode by reloading the router and entering the Break key sequence.

Note Bit 8 controls the console Break key (see Table 1 on page 116):

- Setting bit 8 (Factory default) causes the processor to ignore the console Break key.
- Clearing bit 8 causes the processor to interpret Break as a command to force the router into the ROM monitor mode, halting normal operation.

Break can always be sent in the first 60 seconds while the router is rebooting, regardless of the configuration register settings.

SUMMARY STEPS

1. **enable**
2. **reload**
3. Press **Ctrl-Break**.

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**reload** **Example:** `Router# reload`	Reloads the operating system.
Step 3	Immediately press **Ctrl-Break**. **Example:** `Router# send break`	Interrupts the router reload and enters ROM monitor mode. • You must perform this step within 60 seconds after you enter the **reload** command. • The Break key sequence varies, depending on the software on your PC or terminal. If **Ctrl-Break** does not work, see *Standard Break Key Sequence Combinations During Password Recovery*.

Examples

This section provides an example of the **reload** command:

Sample Output for the reload Command

```
Use break key sequence to enter rom monitor
Router# reload

Proceed with reload? [confirm]

*Sep 23 15:54:25.871: %SYS-5-RELOAD: Reload requested by console. Reload Reason: Reload
command.
```

Note Clearing bit 8 causes the processor to interpret Break as a command to force the router into the ROM monitor mode, halting normal operation.

```
telnet> send break

*** System received an abort due to Break Key ***
signal= 0x3, code= 0x0, context= 0x431aaf40
PC = 0x4008b5dc, Cause = 0x20, Status Reg = 0x3400c102
```

Troubleshooting Tips

The Break key sequence varies, depending on the software on your PC or terminal. See *Standard Break Key Sequence Combinations During Password Recovery*.

What to Do Next

- Proceed to the "Displaying Commands and Command Syntax in ROM Monitor Mode (?, help, -?)" section on page 92.

- If you use the Break key sequence to enter ROM monitor mode when the router would otherwise have booted the system image, you can exit ROM monitor mode by doing one of the following:
  - Enter the **i** or **reset** command, which restarts the booting process and loads the system image.
  - Enter the **cont** command to continue the booting process and load the system image.

Setting the Configuration Register to Boot to ROM Monitor Mode

This section describes how to enter ROM monitor mode by setting the configuration register to boot to ROM monitor mode at the next system reload or power-cycle. For more information about the configuration register, see *Changing the Configuration Register Settings*.

Caution Do not set the configuration register using the **config-register 0x0** command after you have set the baud rate. To set the configuration register without affecting the baud rate, use the current configuration register setting by entering the **show ver | inc configuration** command, and then replacing the last (rightmost) number with a 0 in the configuration register command.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **config-register 0x0**
4. **exit**
5. **write memory**
6. **reload**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**config-register 0x0** **Example:** `Router(config)# config-register 0x0`	Changes the configuration register settings. • The 0x0 setting forces the router to boot to the ROM monitor at the next system reload.
Step 4	**exit** **Example:** `Router(config)# exit`	Exits global configuration mode.

	Command or Action	Purpose
Step 5	**write memory** **Example:** `Router# write memory`	Sets to boot the system image from flash memory.

Step 6	**reload**
	
	Example:
	`Router# reload`
	
	`<output deleted>`
	
	`rommon 1>`
		Reloads the operating system.
		• Because of the 0x0 configuration register setting, the router boots to ROM monitor mode.

Examples

The following example shows how to set the configuration register to boot to ROM monitor mode:

```
Router>
Router> enable
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# config-register 0x0
Router(config)# exit
Router#
*Sep 23 16:01:24.351: %SYS-5-CONFIG_I: Configured from console by console
Router# write memory
Building configuration...
[OK]
Router# reload
Proceed with reload? [confirm]

*Sep 23 16:01:41.571: %SYS-5-RELOAD: Reload requested by console. Reload Reason: Reload
command.

System Bootstrap, Version 12.4(13r)T, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2006 by cisco Systems, Inc.

Initializing memory for ECC
.
Router platform with 262144 Kbytes of main memory
Main memory is configured to 64 bit mode with ECC enabled


Readonly ROMMON initialized
rommon 1 >
```

What to Do Next

Proceed to the "Displaying Commands and Command Syntax in ROM Monitor Mode (?, help, -?)" section on page 92.

Displaying Commands and Command Syntax in ROM Monitor Mode (?, help, -?)

This section describes how to display ROM monitor commands and command syntax options.

SUMMARY STEPS

1. **?**
   or
   help
2. *command* **-?**

DETAILED STEPS

	Command or Action	Purpose

Step 1	**?**
	or
	help
	
	Example:
	`rommon 1 > ?`
	
	Example:
	`rommon 1 > help`
		Displays a summary of all available ROM monitor commands.

Step 2	*command* **-?** **Example:** `rommon 16 > display -?`	Displays syntax information for a ROM monitor command.

Examples

This section shows the help command example:

```
rommon 10 > help
alias               set and display aliases command
boot                boot up an external process
break               set/show/clear the breakpoint
confreg             configuration register utility
cont                continue executing a downloaded image
context             display the context of a loaded image
cookie              display contents of motherboard cookie PROM in hex
dev                 list the device table
dir                 list files in file system
frame               print out a selected stack frame
help                monitor builtin command help
history             monitor command history
iomemset            set IO memory percent
meminfo             main memory information
repeat              repeat a monitor command
reset               system reset
rommon-pref         Select ROMMON
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
tftpdnld            tftp image download
unalias             unset an alias
unset               unset a monitor variable
hwpart              Read HW resources partition
rommon 11 >
```

Displaying Files in a File System (dir)

To display a list of the files and directories in the file system, use the **dir** command, as shown in the following examples. You might need to enter the **reset** command before viewing the flash memory directory.

```
rommon 1 > reset

System Bootstrap, Version 12.4(20100226:194457) [petechiu-v150rm7 138], DEVELOPMENT
SOFTWARE Copyright (c) 1994-2010 by cisco Systems, Inc.

Total memory size = 1024 MB
Field Upgradeable ROMMON Integrity test ______________________________________
ROM: Digitally Signed Development Software
CGR-2010/K9 platform with 1048576 Kbytes of main memory Main memory is configured to 72
bit mode with ECC enabled


Upgrade ROMMON initialized
rommon 1 >
-------------


rommon 1 > dir flash:
program load complete, entry point: 0x80803000, size: 0x1b340
Directory of flash:

2      47089944  -rw- cgr2010-universalk9-mz.SPA.151-1.T
rommon 5 >  dir usbflash1:
program load complete, entry point: 0x80903000, size: 0x4c440
open(): Open Error = -1
dir: cannot open device "usbflash1:"
```

Loading a System Image (boot)

This section describes how to load a system image using the **boot** ROM monitor command.

Prerequisites

Determine the filename and location of the system image that you want to load. Two images can be downloaded for Cisco CGR 2010: cgr2010-universalk9-mz.SPA.151-1.T and cgr2010-universalnovpnk9-mpe-mz.SPA.151-1.T.

SUMMARY STEPS

1. **boot**
   or
   boot flash:[*filename*]
   or
   boot *filename tftpserver*
   or
   boot [*filename*]
   or
   boot usbflash:[*filename*]

DETAILED STEPS

	Command or Action	Purpose

Step 1	**boot**
	or
	boot flash:[*filename*]
	or
	boot *filename tftpserver*
	or
	boot [*filename*]
	or
	boot usbflash:[*filename*]
	
	Example:
	`ROMMON > boot`
	
	Example:
	`ROMMON > boot flash:`
	
	Example:
	`ROMMON > boot someimage 172.16.30.40`
	
	Example:
	`ROMMON > boot someimage`
	
	Example:
	`ROMMON > boot usbflash0:someimage`
		In the following order, the examples here direct the router to:
		• Boot the first image in flash memory.
		• Boot the first image or a specified image in flash memory.
		Note In IOS, **flash0** will alias onto **flash**. But Rommon does not support aliasing. So, the **boot** system command should always use **flash0:**.
		• Boot the specified image over the network from the specified TFTP server (hostname or IP address).
		• Boot from the boothelper image because it does not recognize the device ID. This form of the command is used to boot a specified image from a network (TFTP) server.
		• Boot the image stored on the USB flash device.
		Note Platforms can boot from USB in ROM monitor with or without a compact flash device. It is not necessary to use a bootloader image from the compact flash device. Partitions, such as usbflash0:2:image_name, are not supported on USB flash drives. The **boot usbflash<x>**: command will boot the first file on the device, if it is a valid image.
		You can override the default boothelper image setting by setting the BOOTLDR Monitor environment variable to point to another image. Any system image can be used for this purpose.
		• Options for the **boot** command are **-x** (load image but do not execute) and **-v** (verbose).

Examples

The following example shows how to load boot flash memory and the resulting command text output:

```
rommon 6 > boot flash:
Please reset before booting
rommon 1 > reset

System Bootstrap, Version 12.4(20100226:194457) [petechiu-v150rm7 138], DEVELOPMENT
SOFTWARE Copyright (c) 1994-2010 by cisco Systems, Inc.

Total memory size = 1024 MB
Field Upgradeable ROMMON Integrity test ______________________________________
ROM: Digitally Signed Development Software
CGR-2010/K9 platform with 1048576 Kbytes of main memory Main memory is configured to 72
bit mode with ECC enabled


Upgrade ROMMON initialized
rommon 1 >
-------------

rommon 1 > boot flash:
program load complete, entry point: 0x80803000, size: 0x1b340
program load complete, entry point: 0x80803000, size: 0x1b340


IOS Image Load Test
___________________
Digitally Signed Development Software
program load complete, entry point: 0x81000000, size: 0x2ce85e0
Self decompressing the image : ##################################################]

Smart Init is enabled
smart init is sizing iomem
                 TYPE      MEMORY_REQ
          GRWIC Slot 0      0x00200000
          GRWIC Slot 1      0x00200000
          GRWIC Slot 2      0x00200000
          GRWIC Slot 3      0x00200000
    Onboard devices &
         buffer pools      0x0228F000
----------------------------------------------
               TOTAL:      0x02A8F000

Rounded IOMEM up to: 44Mb.
Using 4 percent iomem. [44Mb/1024Mb]

              Restricted Rights Legend

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subject to restrictions as set forth in subparagraph
(c) of the Commercial Computer Software - Restricted
Rights clause at FAR sec. 52.227-19 and subparagraph
(c) (1) (ii) of the Rights in Technical Data and Computer
Software clause at DFARS sec. 252.227-7013.

           cisco Systems, Inc.
           170 West Tasman Drive
           San Jose, California 95134-1706
```

```
Cisco IOS Software, CGR2010 Software (CGR2010-UNIVERSALK9-MZ), Version 15.1-1.T
Copyright (c) 1986-2009 by Cisco Systems, Inc.
Compiled Mon 30-Nov-09 06:13 by stshen
```

Note The following warning message does not appear if the proper CompactFlash card is installed in the ISR.

```
WARNING: Unsupported compact flash detected. Use of this card during normal
         operation can impact and severely degrade performance of the system.
         Please use supported high temperature compact flashcards only.

This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
third-party authority to import, export, distribute or use encryption.
Importers, exporters, distributors and users are responsible for
compliance with U.S. and local country laws. By using this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.

Cisco CISCOCGR2010/K9 (revision 1.0) with 1003520K/45056K bytes of memory.
Processor board ID FHH1338P00R
2 Gigabit Ethernet interfaces
32 Low-speed serial(sync/async) interfaces
DRAM configuration is 64 bits wide with parity enabled.
255K bytes of non-volatile configuration memory.
250880K bytes of ATA System CompactFlash 0 (Read/Write)

SETUP: new interface NVI0 placed in "shutdown" state


Press RETURN to get started!


*Mar  1 00:00:03.603: %IOS_LICENSE_IMAGE_APPLICATION-6-LICENSE_LEVEL: Module nad
*Mar  1 00:00:03.695: %IOS_LICENSE_IMAGE_APPLICATION-6-LICENSE_LEVEL: Module na9
*Dec  3 18:11:39.235: %IFMGR-7-NO_IFINDEX_FILE: Unable to open nvram:/ifIndex-ty
*Dec  3 18:11:57.355: %HWIC_SERIAL-6-STARTUP: GRWIC Serial initialized
*Dec  3 18:11:59.335: %HWIC_SERIAL-6-STARTUP: GRWIC Serial initialized
*Dec  3 18:12:01.315: %HWIC_SERIAL-6-STARTUP: GRWIC Serial initialized
*Dec  3 18:12:03.291: %HWIC_SERIAL-6-STARTUP: GRWIC Serial initialized
*Dec  3 18:12:06.863: initialized snmp mgmt interface
*Dec  3 18:12:07.131: %LINK-3-UPDOWN: Interface GigabitEthernet0/0, changed stap
*Dec  3 18:12:07.131: %LINK-3-UPDOWN: Interface GigabitEthernet0/1, changed stap
*Dec  3 18:12:07.131: %LINK-3-UPDOWN: Interface Serial0/0/0, changed state to dn
*Dec  3 18:12:07.131: %LINK-3-UPDOWN: Interface Serial0/0/1, changed state to up
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/0/2, changed state to dn
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/0/3, changed state to dn
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/0/4, changed state to up
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/0/5, changed state to dn
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/0/6, changed state to dn
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/0/7, changed state to dn
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/1/0, changed state to up
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/1/1, changed state to up
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/1/2, changed state to dn
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/1/3, changed state to dn
```

```
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/1/4, changed state to dn
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/1/5, changed state to dn
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/1/6, changed state to dn
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/1/7, changed state to dn
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/2/0, changed state to dn
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/2/1, changed state to dn
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/2/2, changed state to dn
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/2/3, changed state to dn
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/2/4, changed state to dn
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/2/5, changed state to dn
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/2/6, changed state to dn
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/2/7, changed state to dn
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/3/0, changed state to up
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/3/1, changed state to up
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/3/2, changed state to dn
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/3/3, changed state to up
*Dec  3 18:12:07.135: %LINK-3-UPDOWN: Interface Serial0/3/4, changed state to dn
*Dec  3 18:12:07.139: %LINK-3-UPDOWN: Interface Serial0/3/5, changed state to dn
*Dec  3 18:12:07.139: %LINK-3-UPDOWN: Interface Serial0/3/6, changed state to dn
*Dec  3 18:12:07.139: %LINK-3-UPDOWN: Interface Serial0/3/7, changed state to dn
*Dec  3 18:12:08.291: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEtp
*Dec  3 18:12:08.291: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEtp
*Dec  3 18:12:08.291: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0n
*Dec  3 18:12:08.295: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0p
*Dec  3 18:12:08.295: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0n
*Dec  3 18:12:08.295: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0n
*Dec  3 18:12:08.295: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0p
*Dec  3 18:12:08.295: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0n
*Dec  3 18:12:08.295: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0n
*Dec  3 18:12:08.295: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0n
*Dec  4 10:12:09.435 PST: %SYS-6-CLOCKUPDATE: System clock has been updated fro.
*Dec  4 10:12:11.187 PST: %LINEPROTO-5-UPDOWN: Line protocol on Interface NVI0,p
*Dec  4 10:12:11.455 PST: %LINK-5-CHANGED: Interface Serial0/0/1, changed staten
*Dec  4 10:12:11.455 PST: %LINK-5-CHANGED: Interface Serial0/0/2, changed staten
*Dec  4 10:12:11.455 PST: %LINK-5-CHANGED: Interface Serial0/0/3, changed staten
*Dec  4 10:12:11.455 PST: %LINK-5-CHANGED: Interface Serial0/0/4, changed staten
*Dec  4 10:12:11.455 PST: %LINK-5-CHANGED: Interface Serial0/0/5, changed staten
*Dec  4 10:12:11.455 PST: %LINK-5-CHANGED: Interface Serial0/0/6, changed staten
*Dec  4 10:12:11.455 PST: %LINK-5-CHANGED: Interface Serial0/0/7, changed staten
*Dec  4 10:12:11.455 PST: %LINK-5-CHANGED: Interface Serial0/1/1, changed staten
*Dec  4 10:12:11.455 PST: %LINK-5-CHANGED: Interface Serial0/1/2, changed staten
*Dec  4 10:12:12.455 PST: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serian
*Dec  4 10:12:12.455 PST: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serian
*Dec  4 10:12:12.455 PST: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serian
*Dec  4 10:12:12.879 PST: %LINEPROTO-5-UPDOWN: Line protocol on Interface Gigabn
*Dec  4 10:12:13.079 PST: %LINEPROTO-5-UPDOWN: Line protocol on Interface Gigabn
*Dec  4 10:12:16.291 PST: %LINK-3-UPDOWN: Interface GigabitEthernet0/0, changedn
*Dec  4 10:12:16.311 PST: %LINK-3-UPDOWN: Interface GigabitEthernet0/1, changedn
*Dec  4 10:12:17.283 PST: %SYS-5-CONFIG_I: Configured from memory by console
*Dec  4 10:12:17.819 PST: %SYS-5-RESTART: System restarted --
Cisco IOS Software, CGR2010 Software (CGR2010-UNIVERSALK9-MZ), Version 15.1-1.T
Copyright (c) 1986-2009 by Cisco Systems, Inc.
Compiled Mon 30-Nov-09 06:13 by stshen
*Dec  4 10:12:17.827 PST: %SNMP-5-COLDSTART: SNMP agent on host uut is undergoit
*Dec  4 10:12:19.087 PST: %SSH-5-ENABLED: SSH 2.0 has been enabled
*Dec  4 10:12:19.223 PST: %LINK-5-CHANGED: Interface Serial0/2/1, changed staten
*Dec  4 10:12:19.223 PST: %LINK-5-CHANGED: Interface Serial0/2/2, changed staten
*Dec  4 10:12:19.347 PST: %LINK-5-CHANGED: Interface Serial0/2/3, changed staten
*Dec  4 10:12:19.347 PST: %LINK-5-CHANGED: Interface Serial0/2/4, changed staten
*Dec  4 10:12:19.347 PST: %LINK-5-CHANGED: Interface Serial0/2/5, changed staten
*Dec  4 10:12:19.347 PST: %LINK-5-CHANGED: Interface Serial0/2/6, changed staten
*Dec  4 10:12:19.347 PST: %LINK-5-CHANGED: Interface Serial0/2/7, changed staten
*Dec  4 10:12:19.347 PST: %LINK-5-CHANGED: Interface Serial0/3/2, changed staten
*Dec  4 10:12:19.347 PST: %LINK-5-CHANGED: Interface Serial0/3/3, changed staten
```

```
*Dec  4 10:12:19.347 PST: %LINK-5-CHANGED: Interface Serial0/3/4, changed staten
*Dec  4 10:12:20.347 PST: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serian
*Dec  4 10:12:20.347 PST: %LINEPROTO-5-UPDOWN: Line protocol on Interface NVI0,n
Router>
```

What to Do Next

If you want to configure the router to load a specified image at the next system reload or power-cycle, see the following documents:

- Booting Commands" chapter of *Cisco IOS Configuration Fundamentals Command Reference*
- *Cisco IOS Configuration Fundamentals and Network Management Configuration Guide*

Modifying the Configuration Register

This section describes how to modify the configuration register using the **confreg** ROM monitor command. You can also modify the configuration register setting from the Cisco IOS CLI using the **config-register** command in global configuration mode.

Caution Do not set the configuration register using the **config-register 0x0** command after setting the baud rate. To set the configuration register without affecting the baud rate, use the current configuration register setting by entering the **show ver | inc configuration** command and then replacing the last (rightmost) number with a 0 in the configuration register command.

Restrictions

The modified configuration register value is automatically written into NVRAM, but the new value does not take effect until you reset or power-cycle the router.

SUMMARY STEPS

1. **confreg** [*value*]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**confreg** [*value*] **Example:** `rommon > confreg 0x2102`	Changes the configuration register settings while in ROM monitor mode. • Optionally, enter the new hexadecimal value for the configuration register. The value range is from 0x0 to 0xFFFF. • If you do not enter the value, the router prompts for each bit of the 16-bit configuration register.

Examples

In the following example, the configuration register is set to boot the system image from flash memory:

```
rommon 3 > confreg 0x2102
```

In the following example, no value is entered; therefore, the system prompts for each bit in the register:

```
rommon 4 > confreg


           Configuration Summary
   (Virtual Configuration Register: 0x2102)
enabled are:
load rom after netboot fails
console baud: 9600
boot: image specified by the boot system commands
      or default to: cisco2-CISCOCGR2010/K9

do you wish to change the configuration? y/n  [n]:  y
enable  "diagnostic mode"? y/n  [n]:  y
enable  "use net in IP bcast address"? y/n  [n]:  y
disable "load rom after netboot fails"? y/n  [n]:  y
enable  "use all zero broadcast"? y/n  [n]:  y
enable  "break/abort has effect"? y/n  [n]:  y
enable  "ignore system config info"? y/n  [n]:  y
change console baud rate? y/n  [n]:  y
0=9600, 1=4800, 2=1200, 3=2400, 4=19200, 5=38400, 6=57600, 7=115200
enter rate  [0]:  0
change the boot characteristics? y/n  [n]:  y
enter to boot:
 0 = ROM Monitor
 1 = the boot helper image
 2-15 = boot system
    [2]:  0


           Configuration Summary
   (Virtual Configuration Register: 0xc440)
enabled are:
diagnostic mode
use net in IP bcast address
use all zero broadcast
break/abort has effect
ignore system config info
console baud: 9600
boot: the ROM Monitor

do you wish to change the configuration? y/n  [n]: <cr>
You must reset or power cycle for new config to take effect
rommon 5 >
```

Obtaining Information on USB Flash Devices

This section describes how to obtain information on USB devices that are installed in the router. For instructions on booting from a USB flash device, see the "Loading a System Image (boot)" section on page 93.

SUMMARY STEPS

1. **dir usbflash** [**x**]:
2. **dev**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**dir usbflash** [**x**]: **Example:** `rommon > dir usbflash1:`	Displays the contents of the USB flash device, including directories, files, permissions, and sizes. • **0**—USB flash device inserted in port 0 • **1**—USB flash device inserted in port 1
Step 2	**dev** **Example:** `ROMMON > dev`	Shows the targeted USB flash devices that are inserted in the router and the valid device names that may or may not be currently inserted.

Examples

Sample Output for the dir usbFlash Command

In some cases, you need to use the reset command first.

```
rommon 8 > dir usbflash:
Please reset before executing this command
rommon 9 > reset

System Bootstrap, Version 12.4(20100226:194457) [petechiu-v150rm7 138], DEVELOPMENT
SOFTWARE Copyright (c) 1994-2010 by cisco Systems, Inc.

Total memory size = 1024 MB
Field Upgradeable ROMMON Integrity test ______________________________________
ROM: Digitally Signed Development Software
CGR-2010/K9 platform with 1048576 Kbytes of main memory Main memory is configured to 72
bit mode with ECC enabled


Upgrade ROMMON initialized
rommon 1 >
-------------

Upgrade ROMMON initialized
rommon 1 > dir usbflash:
program load complete, entry point: 0x80903000, size: 0x4c440
open(): Open Error = -1
dir: cannot open device "usbflash:"
```

Note The Cisco CGR 2010 in this example does not have USB flash.

Modifying the I/O Memory (iomemset)

This section describes how to modify the I/O memory percentage setting using the memory-size **iomemset** command.

Note Use the **iomemset** command only if it is needed for temporarily setting the I/O memory percentage from ROM monitor mode. Using this command improperly can adversely affect the functioning of the router.

The Cisco IOS software can override the I/O memory percentage if the **memory-size iomem** command is set in the NVRAM configuration. If the Cisco IOS command is present in the NVRAM configuration, the I/O memory percentage set in the ROM monitor with the **iomemset** command is used only the first time the router is booted up. Subsequent reloads use the I/O memory percentage set using the **memory-size iomem** command that is saved in the NVRAM configuration.

If you need to set the router I/O memory permanently using a manual method, use the **memory-size iomem** Cisco IOS command. If you set the I/O memory percentage from the Cisco IOS software, you must restart the router for I/O memory to be properly set.

SUMMARY STEPS

1. **iomemset** *i/o-memory percentage*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**iomemset** *i/o-memory percentage* **Example:** `rommon> iomemset 15`	• Reallocates the percentage of DRAM used for I/O memory and processor memory.

Examples

In the following example, the percentage of DRAM used for I/O memory is set to 15:

```
rommon 2 > iomemset
usage: iomemset [smartinit | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 ]
rommon 3 >
rommon 3 > iomemset 15

Invoking this command will change the io memory percent
*****WARNING:IOS may not keep this value*****
Do you wish to continue? y/n: [n]: y

rommon 2 > meminfo
-----------------------------------------
Current Memory configuration is:
On-board: Size = 1024 MB: Start Phy Addr = 0x00000000_00000000
-------------------------------------------------
Main memory size: 1024 MB in 72 bit mode.
Available main memory starts at 0x81000000, size 1032192KB
Smart Init is enabled.
NVRAM size: 256KB

Manufacturer's JEDEC ID code:
On-board:
rommon 3 >
```

Upgrading of ROM Monitor command Using Cisco IOS

This section describes how to upgrade the ROM Monitor using Cisco IOS. The **upgrade rom-monitor** command results in a power-on reset of the router and the CLI will ask if you want to continue. If you answer yes, the CLI will proceed with the upgrade.

```
Router# upgrade rom-monitor ?
  file        the name of the SREC file
  preference  Select ROMMON to be booted on reload

Router# upgrade rom-monitor file ?
  archive:  SREC file to use
  cns:      SREC file to use
  flash0:   SREC file to use
  flash1:   SREC file to use
  flash:    SREC file to use
  ftp:      SREC file to use
  http:     SREC file to use
  https:    SREC file to use
  null:     SREC file to use
  nvram:    SREC file to use
  pram:     SREC file to use
  rcp:      SREC file to use
  scp:      SREC file to use
  system:   SREC file to use
  tar:      SREC file to use
  tftp:     SREC file to use
  tmpsys:   SREC file to use
  xmodem:   SREC file to use
  ymodem:   SREC file to use

Router# upgrade rom-monitor file flash:CGR2010_RM2_0227.srec?
flash:CGR2010_RM2_0227.srec

Router# upgrade rom-monitor file flash:CGR2010_RM2_0227.srec Platform Field Upgradeable
ROMMON LOAD test ___________________________________________
RSA Signature Verification Passed ...
ROM: Digitally Signed Development Software

This command will result in a  'power-on reset' of the router!
Continue? [yes/no]: yes
ROMMON image upgrade in progress.
Erasing boot flash
eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee
eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee
eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee
Programming boot flash pppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppp

Now Reloading

System Bootstrap, Version 12.4(20100218:213341) [ypatel-cgs2010_RM2 109], DEVELOPMENT
SOFTWARE Copyright (c) 1994-2010 by cisco Systems, Inc.

Total memory size = 1024 MB

 Running new upgrade for first time

System Bootstrap, Version 12.4(20100226:194457) [petechiu-v150rm7 138], DEVELOPMENT
SOFTWARE Copyright (c) 1994-2010 by cisco Systems, Inc.

Total memory size = 1024 MB
Field Upgradeable ROMMON Integrity test _______________________________________
ROM: Digitally Signed Development Software
```

```
CGR-2010/K9 platform with 1048576 Kbytes of main memory Main memory is configured to 72
bit mode with ECC enabled


Upgrade ROMMON initialized
rommon 1 >
```

Downloading the System Image (tftpdnld)

This section describes how to download a Cisco IOS software image from a remote TFTP server to the router flash memory using the **tftpdnld** command in ROM monitor mode.

Caution Use the **tftpdnld** command only for disaster recovery because it can erase all existing data in flash memory before it downloads a new software image to the router.

Before you can enter the **tftpdnld** command, you must set the ROM monitor environment variables.

Prerequisites

Connect the TFTP server to a fixed network port on your router.

Restrictions

- LAN ports on network modules or interface cards are not active in ROM monitor mode. Therefore, only a fixed port on your router can be used for a TFTP download. Use a fixed Ethernet port on the router that is either of the two Gigabit Ethernet ports on Cisco routers with those ports.
- You can only download files to the router. You cannot use the **tftpdnld** command to retrieve files from the router.

SUMMARY STEPS

1. **IP_ADDRESS=***ip_address*
2. **IP_SUBNET_MASK=***ip_address*
3. **DEFAULT_GATEWAY=***ip_address*
4. **TFTP_SERVER=***ip_address*
5. **TFTP_FILE=**[*directory-path*/]*filename*
6. **FE_PORT**=[0 | 1]
7. **FE_SPEED_MODE**=[0 | 1 | 2 | 3 | 4 | 5]
8. **GE_PORT**=[0 | 1]
9. **GE_SPEED_MODE**=[0 | 1 | 2 | 3 | 4 | 5]
10. **MEDIA_TYPE**=[0 | 1]
11. **TFTP_CHECKSUM=**[0 | 1]
12. **TFTP_DESTINATION=[**flash: | usbflash0: | usbflash1:]
13. **TFTP_MACADDR**=*MAC_address*

14. **TFTP_RETRY_COUNT=***retry_times*
15. **TFTP_TIMEOUT=***time*
16. **TFTP_VERBOSE=***setting*
17. **set**
18. **tftpdnld** [**-hr**]
19. **y**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**IP_ADDRESS=***ip_address* **Example:** `rommon > IP_ADDRESS=172.16.23.32`	Sets the IP address of the router.
Step 2	**IP_SUBNET_MASK=***ip_address* **Example:** `rommon > IP_SUBNET_MASK=255.255.255.224`	Sets the subnet mask of the router.
Step 3	**DEFAULT_GATEWAY=***ip_address* **Example:** `rommon > DEFAULT_GATEWAY=172.16.23.40`	Sets the default gateway of the router.
Step 4	**TFTP_SERVER=***ip_address* **Example:** `rommon > TFTP_SERVER=172.16.23.33`	Sets the TFTP server from which the software will be downloaded.
Step 5	**TFTP_FILE=**[*directory-path/*]*filename* **Example:** `rommon > TFTP_FILE=archive/rel22/c2801-i-mz`	Sets the name and location of the file that will be downloaded to the router.
Step 6	**FE_PORT=**[**0** | **1**] **Example:** `rommon > FE_PORT=0`	(Optional) Sets the input port to use one of the Fast Ethernet ports.
Step 7	**FE_SPEED_MODE=**[**0** | **1** | **2** | **3** | **4**] **Example:** `rommon > FE_SPEED_MODE=3`	(Optional) Sets the Fast Ethernet port speed mode, with these options: • **0**—10 Mbps, half-duplex • **1**—10 Mbps, full-duplex • **2**—100 Mbps, half-duplex • **3**—100 Mbps, full-duplex • **4**—Automatic selection (default)

	Command or Action	Purpose
Step 8	**GE_PORT=**[**0** | **1**] **Example:** `rommon > GE_PORT=0`	(Optional) Sets the input port to use one of the Gigabit Ethernet ports.
Step 9	**GE_SPEED_MODE=**[**0** | **1** | **2** | **3** | **4** | **5**] **Example:** `rommon > GE_SPEED_MODE=3`	(Optional) Sets the Gigabit Ethernet port speed mode, with these options: • **0**—10 Mbps, half-duplex • **1**—10 Mbps, full-duplex • **2**—100 Mbps, half-duplex • **3**—100 Mbps, full-duplex • **4**—1 Gbps, full-duplex • **5**—Automatic selection (default)
Step 10	**MEDIA_TYPE=**[**0** | **1**] **Example:** `rommon > MEDIA_TYPE=1`	(Optional) Sets the Gigabit Ethernet connection media type, RJ-45 (0) or SFP (1). Small form-factor pluggable (SFP) mode is applicable only if GE_PORT=0 (gig 0/0); RJ-45 mode is available on both gig 0/0 and gig 0/1 (GE_PORT = 0 or 1).
Step 11	**TFTP_CHECKSUM=**[**0** | **1**] **Example:** `rommon > TFTP_CHECKSUM=0`	(Optional) Determines whether the router performs a checksum test on the downloaded image. • **1**—Checksum test is performed (default). • **0**—No checksum test is performed.
Step 12	**TFTP_DESTINATION=**[**flash:** | **usbflash0:** | **usbflash1:**] **Example:** `rommon > TFTP_DESTINATION=usbflash0:`	(Optional) Designates the targeted flash device as compact flash or USB flash. • **flash:**—Compact flash device (default). • **usbflash0:**—USB flash device inserted in port 0 • **usbflash1:**—USB flash device inserted in port 1
Step 13	**TFTP_MACADDR=***MAC_address* **Example:** `rommon > TFTP_MACADDR=000e.8335.f360`	(Optional) Sets the Media Access Controller (MAC) address for this router.
Step 14	**TFTP_RETRY_COUNT=***retry_times* **Example:** `rommon > TFTP_RETRY_COUNT=10`	(Optional) Sets the number of times that the router attempts Address Resolution Protocol (ARP) and TFTP download. The default is 7.
Step 15	**TFTP_TIMEOUT=***time* **Example:** `TFTP_TIMEOUT=1800`	(Optional) Sets the amount of time, in seconds, before the download process times out. The default is 2400 seconds (40 minutes).

	Command or Action	Purpose

Step 16	**TFTP_VERBOSE=***setting*
	
	Example:
	`rommon > TFTP_VERBOSE=2`
		(Optional) Configures how the router displays file download progress, with these options:
		• **0**—No progress is displayed.
		• **1**—Exclamation points (!!!) are displayed to indicate file download progress. This is the default setting.
		• **2**—Detailed progress is displayed during the file download process; for example:
		`Initializing interface.`
		`Interface link state up.`
		`ARPing for 1.4.0.1`
		`ARP reply for 1.4.0.1 received.`
		`MAC address 00:00:0c:07:ac:01`

Step 17	**set** **Example:** `rommon > set`	Displays the ROM monitor environment variables. Verify that you correctly configured the ROM monitor environment variables.
Step 18	**tftpdnld** [**-h**] [**-r**] **Example:** `rommon > tftpdnld`	Downloads the system image specified by the ROM monitor environment variables. • Entering **-h** displays command syntax help text. • Entering **-r** downloads and boots the new software but does not save the software to flash memory. • Using no option (that is, using neither **-h** nor **-r**) downloads the specified image and saves it in flash memory.
Step 19	**y** **Example:** `Do you wish to continue? y/n:  [n]:  y`	Confirms that you want to continue with the TFTP download.

Examples

Sample Output for Recovering the System Image (tftpdnld)

```
rommon 16 > IP_ADDRESS=171.68.171.0
rommon 17 > IP_SUBNET_MASK=255.255.254.0
rommon 18 > DEFAULT_GATEWAY=171.68.170.3
rommon 19 > TFTP_SERVER=171.69.1.129
rommon 20 > TFTP_FILE=c2801-is-mz.113-2.0.3.Q
rommon 21 > tftpdnld

              IP_ADDRESS: 171.68.171.0
         IP_SUBNET_MASK: 255.255.254.0
       DEFAULT_GATEWAY: 171.68.170.3
           TFTP_SERVER: 171.69.1.129
             TFTP_FILE: c2801-is-mz.113-2.0.3.Q

     Invoke this command for disaster recovery only.
     WARNING: all existing data in all partitions on flash will be lost!
     Do you wish to continue? y/n:  [n]:  y
```

```
Receiving c2801-is-mz.113-2.0.3.Q from 171.69.1.129 !!!!!.!!!!!!!!!!!!!!!!!!!.!!
File reception completed.
Copying file c2801-is-mz.113-2.0.3.Q to flash.
Erasing flash at 0x607c0000
program flash location 0x60440000
rommon 22 >
```

Sample Output for the set ROM Monitor Command

```
rommon 3 > set
PS1=rommon ! >
IP_SUBNET_MASK=255.255.0.0
TFTP_SERVER=223.255.254.254
DEFAULT_GATEWAY=15.1.0.1
IP_ADDRESS=15.1.28.21
BOOT=
GE_PORT=0
RTC_STAT=0
WARM_REBOOT=FALSE
TFTP_FILE=jruiz/cgr2010-universalk9-mz.SSA.151-0.17.T
LICENSE_BOOT_LEVEL=datak9,datak9:cgr2010;
?=1
CRASHINFO=flash:crashinfo_20070725-212015
RET_2_RTS=09:38:37 PST Fri Dec 4 2009
BSI=0
RET_2_RCALTS=
RANDOM_NUM=1201472235
```

What to Do Next

If you want to configure the router to load a specified image at the next system reload or power-cycle, see the "Loading and Managing System Images" section in *Cisco IOS Configuration Fundamentals Command Reference*.

Troubleshooting Crashes and Hangs (stack, context, frame, sysret, meminfo)

This section lists and describes some ROM monitor commands that can be used to troubleshoot router crashes and hangs.

Most ROM monitor **debug** commands are functional only when the router crashes or hangs. If you enter a **debug** command when crash information is not available, the following error message appears:

```
"xxx: kernel context state is invalid, can not proceed."
```

The ROM monitor commands in this section are all optional and can be entered in any order.

Router Crashes

A router or system *crash* is a situation in which the system detects an unrecoverable error and restarts itself. The errors that cause crashes are typically detected by processor hardware, which automatically branches to special error-handling code in the ROM monitor. The ROM monitor identifies the error, prints a message, saves information about the failure, and restarts the system. For detailed information about troubleshooting crashes, see *Troubleshooting Router Crashes* and *Understanding Software-forced Crashes*.

Router Hangs

A router or system *hang* is a situation in which the system does not respond to input at the console port or to queries, such as Telnet and SNMP, sent from the network.

Router hangs occur when:

- The console does not respond
- Traffic does not pass through the router

Router hangs are discussed in detail in *Troubleshooting Router Hangs*.

ROM Monitor Console Communication Failure

Under certain configuration situations where there is improper configuration, it can be impossible to establish a console connection with the router because of a speed mismatch or other incompatibility. The most obvious symptom is a set of erroneous characters in the console display.

If a ROM monitor failure of this type occurs, you may need to change a jumper setting on the motherboard so that the router can reboot for troubleshooting. Procedures for accessing the motherboard and jumper locations are described in the installation of internal components section of the hardware installation document for your router.

The jumper to be changed is DUART DFLT, which sets the console connection data baud rate to 9600, regardless of user configuration. The jumper forces the data rate to an acceptable value.

Restrictions

Do not manually reload or power-cycle the router unless reloading or power cycling is required for troubleshooting a router crash. System reload or power-cycle can cause important information that is needed for determining the root cause of the problem to be lost.

SUMMARY STEPS

1. **stack**
   or
   k
2. **context**
3. **frame** [*number*]
4. **sysret**
5. **meminfo**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**stack** or **k** **Example:** `rommon > stack`	(Optional) Obtains a stack trace. • For detailed information on how to effectively use this command in ROM monitor mode, see *Troubleshooting Router Hangs*.
Step 2	**context** **Example:** `rommon > context`	(Optional) Displays the CPU context at the time of the fault. • If it is available, the context from kernel mode and process mode of a loaded image is displayed.
Step 3	**frame** [*number*] **Example:** `rommon > frame 4`	(Optional) Displays an entire individual stack frame. • The default is 0 (zero), which is the most recent frame.
Step 4	**sysret** **Example:** `rommon > sysret`	(Optional) Displays return information from the last booted system image. • The return information includes the reason for terminating the image, a stack dump of up to eight frames, and, if an exception is involved, the address at which the exception occurred.
Step 5	**meminfo** [-l] **Example:** `rommon > meminfo`	(Optional) Displays memory information, including: • Main memory size, starting address, and available range • Packet memory size • NVRAM size Alternatively, using the **meminfo -l** command provides information on supported DRAM configurations for the router.

Examples

This section provides the following examples:

- Sample Output for the stack ROM Monitor Command, page 109
- Sample Output for the context ROM Monitor Command, page 110
- Sample Output for the frame ROM Monitor Command, page 111
- Sample Output for the sysret ROM Monitor Command, page 111
- Sample Output for the meminfo ROM Monitor Command, page 111

Sample Output for the stack ROM Monitor Command

```
rommon 6> stack
```

```
Kernel Level Stack Trace:
Initial SP = 0x642190b8, Initial PC = 0x607a0d44, RA = 0x61d839f8
Frame 0 : FP= 0x642190b8, PC= 0x607a0d44,   0 bytes
Frame 1 : FP= 0x642190b8, PC= 0x61d839f8,  24 bytes
Frame 2 : FP= 0x642190d0, PC= 0x6079b6c4,  40 bytes
Frame 3 : FP= 0x642190f8, PC= 0x6079ff70,  32 bytes
Frame 4 : FP= 0x64219118, PC= 0x6079eaec,   0 bytes

Process Level Stack Trace:
Initial SP = 0x64049cb0, Initial PC = 0x60e3b7f4, RA = 0x60e36fa8
Frame 0 : FP= 0x64049cb0, PC= 0x60e3b7f4,  24 bytes
Frame 1 : FP= 0x64049cc8, PC= 0x60e36fa8,  24 bytes
Frame 2 : FP= 0x64049ce0, PC= 0x607a5800, 432 bytes
Frame 3 : FP= 0x64049e90, PC= 0x607a8988,  56 bytes
Frame 4 : FP= 0x64049ec8, PC= 0x64049f14,   0 bytes
```

Sample Output for the context ROM Monitor Command

```
rommon 7> context
Kernel Level Context:
 Reg       MSW        LSW     | Reg       MSW        LSW
------  ---------- ---------- | -----   ---------- ----------
zero   : 00000000   00000000  | s0     : 00000000   34018001
AT     : 00000000   24100000  | s1     : 00000000   00000001
v0     : 00000000   00000003  | s2     : 00000000   00000003
v1     : 00000000   00000000  | s3     : 00000000   00000000
a0     : 00000000   0000002b  | s4     : 00000000   64219118
a1     : 00000000   00000003  | s5     : 00000000   62ad0000
a2     : 00000000   00000000  | s6     : 00000000   63e10000
a3     : 00000000   64219118  | s7     : 00000000   63e10000
t0     : 00000000   00070808  | t8     : ffffffff   e7400884
t1     : 00000000   00000000  | t9     : 00000000   00000000
t2     : 00000000   63e10000  | k0     : 00000000   00000000
t3     : 00000000   34018001  | k1     : 00000000   63ab871c
t4     : ffffffff   ffff80fd  | gp     : 00000000   63c1c2d8
t5     : ffffffff   fffffffe  | sp     : 00000000   642190b8
t6     : 00000000   3401ff02  | s8     : 00000000   6429274c
t7     : 00000000   6408d464  | ra     : 00000000   61d839f8
HI     : ffffffff   e57fce22  | LO     : ffffffff   ea545255
EPC    : 00000000   607a0d44  | ErrPC  : ffffffff   bfc05f2c
Stat   : 34018002             | Cause  : 00000020

Process Level Context:
 Reg       MSW        LSW     | Reg       MSW        LSW
------  ---------- ---------- | -----   ---------- ----------
zero   : 00000000   00000000  | s0     : 00000000   6401a6f4
AT     : 00000000   63e10000  | s1     : 00000000   00000000
v0     : 00000000   00000000  | s2     : 00000000   64049cf0
v1     : 00000000   00000440  | s3     : 00000000   63360000
a0     : 00000000   00000000  | s4     : 00000000   63360000
a1     : 00000000   00070804  | s5     : 00000000   62ad0000
a2     : 00000000   00000000  | s6     : 00000000   63e10000
a3     : 00000000   00000000  | s7     : 00000000   63e10000
t0     : 00000000   00000000  | t8     : ffffffff   e7400884
t1     : 00000000   64928378  | t9     : 00000000   00000000
t2     : 00000000   00000001  | k0     : 00000000   644822e8
t3     : ffffffff   ffff00ff  | k1     : 00000000   61d86d84
t4     : 00000000   6079eee0  | gp     : 00000000   63c1c2d8
t5     : 00000000   00000001  | sp     : 00000000   64049cb0
t6     : 00000000   00000000  | s8     : 00000000   6429274c
t7     : 00000000   6408d464  | ra     : 00000000   60e36fa8
HI     : ffffffff   e57fce22  | LO     : ffffffff   ea545255
EPC    : 00000000   60e3b7f4  | ErrPC  : ffffffff   ffffffff
Stat   : 3401ff03             | Cause  : ffffffff
```

Sample Output for the frame ROM Monitor Command

```
rommon 6 > frame 2
Stack Frame 2, SP = 0x642190d0, Size = 40 bytes
[0x642190d0 : sp + 0x000] = 0xffffffff
[0x642190d4 : sp + 0x004] = 0xbfc05f2c
[0x642190d8 : sp + 0x008] = 0xffffffff
[0x642190dc : sp + 0x00c] = 0xffffffff
[0x642190e0 : sp + 0x010] = 0x6401a6f4
[0x642190e4 : sp + 0x014] = 0x00000000
[0x642190e8 : sp + 0x018] = 0x64049cf0
[0x642190ec : sp + 0x01c] = 0x63360000
[0x642190f0 : sp + 0x020] = 0x63360000
[0x642190f4 : sp + 0x024] = 0x6079ff70
```

Sample Output for the sysret ROM Monitor Command

```
rommon 8> sysret
System Return Info:
count: 19,  reason: user break
pc:0x801111b0,  error address: 0x801111b0
Stack Trace:
FP: 0x80005ea8, PC: 0x801111b0
FP: 0x80005eb4, PC: 0x80113694
FP: 0x80005f74, PC: 0x8010eb44
FP: 0x80005f9c, PC: 0x80008118
FP: 0x80005fac, PC: 0x80008064
FP: 0x80005fc4, PC: 0xfff03d70
FP: 0x80005ffc, PC: 0x00000000
FP: 0x00000000, PC: 0x00000000
```

Sample Output for the meminfo ROM Monitor Command

```
rommon 2 > meminfo
----------------------------------------
Current Memory configuration is:
On-board: Size = 1024 MB: Start Phy Addr = 0x00000000_00000000
-------------------------------------------------
Main memory size: 1024 MB in 72 bit mode.
Available main memory starts at 0x81000000, size 1032192KB
Smart Init is enabled.
NVRAM size: 256KB

Manufacturer's JEDEC ID code:
On-board:
rommon 3 >
```

You can also use the **meminfo -l** command to show the supported DRAM configurations for the router. The following is sample output for the command:

```
rommon 4 > meminfo -l
The following memory configs are supported:
-------------------------------------------------
On-board
-----------------
1024 MB
rommon 3 >
```

Troubleshooting Tips

See the following documents:

- *Troubleshooting Router Crashes*
- *Understanding Software-forced Crashes*
- *Troubleshooting Router Hangs*

Exiting ROM Monitor Mode

This section describes how to exit ROM monitor mode and enter the Cisco IOS command-line interface (CLI). The method that you use to exit ROM monitor mode depends on how your router entered ROM monitor mode:

- If you reload the router and enter the Break key sequence to enter ROM monitor mode when the router would otherwise have booted the system image, you can exit ROM monitor mode by doing either of the following:
  - Enter the **i** command or the **reset** command, which restarts the booting process and loads the system image.
  - Enter the **cont** command, which continues the booting process and loads the system image.
- If your router entered ROM monitor mode because it could not locate and load the system image, perform the steps in the following procedure.

SUMMARY STEPS

1. **dir flash:** [*directory*]
2. **boot flash:** [*directory*] [*filename*]
   or
   boot *filename tftpserver*
   or
   boot [*filename*]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**dir flash:**[*directory*] **Example:** `rommon > dir flash:`	Displays a list of the files and directories in flash memory. • Locate the system image that you want the router to load. • If the system image is not in flash memory, use the second or third option in Step 2.

Step 2	**boot flash:**[*directory*] [*filename*]
	or
	boot *filename tftpserver*
	or
	boot [*filename*]
	
	Example:
	`ROMMON > boot flash:myimage`
	
	Example:
	`ROMMON > boot someimage 172.16.30.40`
	
	Example:
	`ROMMON > boot`
		In order, the examples here direct the router to:
		• Boot the first image or a specified image in flash memory.
		• Boot the specified image over the network from the specified TFTP server (hostname or IP address).
		• Boot from the boothelper image because it does not recognize the device ID. This form of the command is used to netboot a specified image.
		You can override the default boothelper image setting by setting the BOOTLDR Monitor environment variable to point to another image. Any system image can be used for this purpose.
		Note Options to the boot command are **-x** (load image but do not execute) and **-v** (verbose).

Examples

Sample Output for the dir flash: Command in ROM Monitor mode

```
rommon 2 > dir flash:
program load complete, entry point: 0x80803000, size: 0x1b340
Directory of flash:

2       47089944  -rw-     cgr2010-universalk9-mz.SSA.151-0.17.T
rommon 3 >
```

What to Do Next

If you want to configure the router to load a specified image at the next system reload or power-cycle, see the "Loading and Managing System Images" section in *Cisco IOS Configuration Fundamentals Command Reference*.

Additional References

The following sections provide references related to using the ROM monitor.

Related Documents

Related Topic	Document Title
Connecting your PC to the router console port	Hardware installation guide for your router
Break key sequence combinations for entering ROM monitor mode within the first 60 seconds of rebooting the router	*Standard Break Key Sequence Combinations During Password Recovery*
Using the boot image (Rx-boot) to recover or upgrade the system image	*How to Upgrade from ROMmon Using the Boot Image*
Booting and configuration register commands	*Cisco IOS Configuration Fundamentals Command Reference*
Loading and maintaining system images; rebooting	*Cisco IOS Configuration Fundamentals and Network Management Configuration Guide*
Choosing and downloading system images	Software Center at http://www.cisco.com/kobayashi/sw-center/index.shtml
Router crashes	*Troubleshooting Router Crashes* *Understanding Software-forced Crashes*
Router hangs	*Troubleshooting Router Hangs*

Technical Assistance

Description	Link
Technical Assistance Center (TAC) home page, containing 30,000 pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.[1]	http://www.cisco.com/public/support/tac/home.shtml

1. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.