

ROM Monitor

the firmware that runs when the router is powered up or reset. The ROM monitor can help you isolate or rule out hardware problems encountered when installing your router.

This appendix contains the following sections:

- Entering the ROM Monitor
- ROM Monitor Commands
- ROM Monitor Syntax Conventions
- Command Descriptions

Entering the ROM Monitor

In normal operation, the ROM monitor helps to initialize the processor hardware and boot the operating system software. To use the ROM monitor, you must have console port access. Refer to the section “Console Port” in the chapter “Installing the Router.”

From the operating system software, you can configure the router to remain in the ROM monitor the next time it boots by setting virtual configuration register bits 3, 2, 1, and 0 to zero. From the console, enter the following configuration command:

```
configuration-register 0x0
```

The new configuration register value, 0x0, is effective after the router is rebooted with the **reload** command. The router remains in the ROM monitor and does not boot the operating system.

If the configuration value remains 0x0, you must manually boot the operating system from the console. Refer to the **boot** command in the section “Command Descriptions” later in this appendix.

ROM Monitor Commands



Timesaver Break (system interrupt) is always enabled for five seconds after the router reboots, regardless of whether it is configured on or off in the configuration register (see the appendix “Virtual Configuration Register”). During this five-second window, you can break to the ROM monitor prompt by pressing the Break key.

The ROM monitor prompt is as follows:

```
rommon 1 >
```

In this example, 1 (the number one) is the line number and is incremented at each prompt.

ROM Monitor Commands

Enter **?** or **help** at the ROM monitor prompt to display a list of available commands and options, as follows:

```
rommon 1 > ?
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 cookie PROM in hex
dev            list the device table
dir            list files in file system
dis            disassemble instruction stream
dnld           serial download a program module
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
stack          produce a stack trace
sync           write monitor environment to NVRAM
sysret         print out info from last system return
unalias        unset an alias
unset          unset a monitor variable
xmodem         x/ymodem image download
rommon 2 >
```

Note To display information about command syntax, enter the command name followed by the **-?** option.

Commands are case-sensitive. You can cancel any command by pressing the Break key at the console.

ROM Monitor Syntax Conventions

The ROM monitor syntax in this appendix uses the following conventions:

- Brackets [] denote an optional field. If a minus option is followed by a colon (for example [-s:]) you must provide an argument for the option.
- A term in *italics* means that you must fill in the appropriate information.

Command Descriptions

The following ROM monitor commands are among the most useful:

- **boot** or **b**—Boot an image. The **boot** command with no arguments boots the first image in Flash memory.

The router does not have a dedicated boothelper image ([rx] boot) as used by some other Cisco routers. Any system image can be used for this purpose. The default boothelper image is the first image in Flash memory, but this can be overridden by setting the BOOTLDR Monitor environment variable to point to another image. The boothelper image is invoked anytime the ROM monitor does not recognize the device ID in the boot command.

b filename [:host] boots from the specified file over the network using TFTP. If a host is specified, by either name or IP address, the router boots from that host.

b device [:name] boots the Cisco IOS) software from the specified device. If the filename *name* is not specified, the router boots from the first file in the device. Some examples are shown as follows:

— **b flash:**—Boot from the first file in the first partition of Flash memory.

Command Descriptions

- **b slot0:**—Boot from the first file in the first partition of the slot 0 PCMCIA card.
- **b slot0:2:**—Boot from the first file in the second partition of the slot 0 PCMCIA card.
- **b lost0:3:imagename**—Boot from the file named *imagename* in the third partition of the slot 0 PCMCIA card.
- **b flash**—The ROM monitor will boot from the boothelper image because it does not recognize the device ID. The boothelper image is the first file in the first Partition of Flash memory.
- **b imagename**—The ROM monitor will boot from the boothelper image because it does not recognize the device ID. This form of the command is used to netboot the image named *imagename*.
- **b**—The ROM monitor will boot the default boothelper image, the first file in the first partition of Flash memory.

Options to the boot command are **-x**, load image but do not execute, and **-v**, verbose.

The Cisco IOS commands **show version** and **show hardware** will display the source of the currently running image.

- **dev**—List boot device identifications on the router, for example:

```
rommon 10 > dev
Devices in device table:
   id  name
flash: flash
slot0: PCMCIA slot 0
slot1: PCMCIA slot 1
eprom: eprom
```

- **dir device**—List the files on the named device, for example:

```
rommon 11 > dir flash:
      File size           Checksum   File name
2229799 bytes (0x220627)  0x469e   C3600-j-m2
```

- **help**—Display a summary of ROM monitor commands (equivalent to ?).
- **reset** or **i**—Reset and initialize the router, similar to power-on.

Debugging Commands

Most debugging commands are functional only when Cisco IOS software has crashed or is aborted. If you enter a debugging command and Cisco IOS crash information is not available, the following error message displays:

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

- **stack** or **k**—Produce a stack trace.
- **context**—Display processor context.
- **frame**—Display an individual stack frame.
- **sysret**—Display return information from the last booted system image. This information includes the reason for terminating the image, a stack dump of up to eight frames, and, if an exception is involved, the address where the exception occurred, for example:

```
rommon 8 > sysret
System Return Info:
count: 19,  reason: user break
pc:0x60043754,  error address: 0x0
Stack Trace:
FP: 0x80007e78, PC: 0x60043754
FP: 0x80007ed8, PC: 0x6001540c
FP: 0x80007ef8, PC: 0x600087f0
FP: 0x80007f18, PC: 0x80008734
```

Command Descriptions

- **meminfo**—Display size in bytes, starting address, available range of main memory, the starting point and size of packet memory, and size of nonvolatile memory (NVRAM), for example:

```
rommon 9 > meminfo
```

```
Main memory size: 16 MB in 32-bit mode.  
Available main memory starts at 0xa000e000, size 16328KB  
IO (packet) memory size: 25 percent of main memory.  
NVRAM size: 128KB
```

Configuration Register

The virtual configuration register resides in NVRAM and is identical in operation to other Cisco routers. You can view or modify the virtual configuration register from either the ROM monitor or the operating system software. For procedures for changing the virtual configuration register from the operating system, and for information about register settings, see the appendix “Virtual Configuration Register.”

To change the virtual configuration register from the ROM monitor, enter **confreg** by itself for menu mode, or enter the new value of the register in hexadecimal.

- **confreg** [*hexnum*]—Change the virtual configuration register to the value specified. The value is always interpreted as hexadecimal. Entering **confreg** without an argument displays the contents of the virtual configuration register and prompts you to alter the contents by describing the meaning of each bit.

In either case, the new virtual configuration register value is written into NVRAM, but is not effective until you reset or power-cycle the router.

The following display shows an example of menu mode:

```
rommon 7 > confreg
```

```
Configuration Summary  
enabled are:  
break/abort has effect  
console baud: 9600  
boot: the ROM Monitor  
  
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]:
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]: y
enter rate: 0 = 9600, 1 = 4800, 2 = 1200, 3 = 2400
           4 = 19200, 5 = 38400, 6 = 57600, 7 = 115200 [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
[0]: 0
```

Configuration Summary

```
enabled are:
diagnostic mode
console baud: 9600
boot: the ROM Monitor

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

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

Disaster Recovery

The **xmodem** command establishes a connection between a console and the router console or auxiliary port for disaster recovery if both the boot and system images are erased from Flash memory. For a description of the disaster recovery procedure, refer to the section “Recovering Software Images” in the chapter “Troubleshooting.”

- **xmodem** [*filename*]—Establish an xmodem connection between the console and the router. The optional parameter *filename* specifies the source file containing the Cisco IOS image.

Other options are:

- **-c**, use cyclic redundancy check (CRC-16)
- **-y**, use Ymodem transfer protocol
- **-r**, copy image to DRAM for launch
- **-x**, do not launch image on completion of download