

Software Configuration Register

This appendix describes the router software configuration register, the factory default settings, and the procedures for changing those settings.

Software Configuration Register Settings

The router has a 16-bit software register, which is written into the nonvolatile memory. Use the processor configuration register information contained in this appendix to do the following:

- Change software configuration register settings
- Setting and displaying the configuration register value
- Force the system into the bootstrap monitor
- Select a boot source and default boot filename
- Enable or disable the Break function
- Control broadcast addresses
- Set the console terminal baud rate
- Load operating software from ROM
- Enable booting from TFTP server

Table B-1 lists the meaning of each of the software configuration memory bits, and Table B-2 defines the boot field names.

Table B-1 Software Configuration Bit Meanings

Bit No.	Hex	Meaning
00–03	0x0000–0x000F	Boot Field (see Table B-2)
06	0x0040	Ignore NVM contents
07	0x0080	OEM bit enabled
08	0x0100	Break disabled
10	0x0400	IP broadcast with all zeros
11–12	0x0800–0x1000	Console line speed
13	0x2000	Boot default ROM software if network boot fails
14	0x4000	IP broadcasts do not have net numbers
15	0x8000	Enable diagnostic messages and ignore NVM contents

Table B-2 Explanation of Boot Field (Configuration Register Bits 00–03)

Boot Field	Meaning
00	Stays at the system bootstrap prompt
01	Boots system image on EPROM
02-F	Specifies a default netboot filename Enables boot system commands that override default netboot filename ¹

1. Values of the boot field are 2–15 in the form *cisco<n>-processor_name*, where $2 \leq n \leq 15$.

Changing Configuration Register Settings

To change software configuration register settings when the operating system is running, use the **config-register** command following and restart the server. Configuration register changes take effect only when the server restarts: that is, when you switch the power off and on or when you issue a **reload** command from the console.

In order to issue the **configure** or **reload** commands, you must first enable the *privileged* mode of operation. At the *router>* prompt, enter **enable**. The system will prompt you for the privileged password. After you enter the password, the prompt will change to a pound sign (*router#*). Enter the user configuration dialogue with the **config-terminal** command.

To set the contents of the configuration register, use the **config-register value** configuration command. *Value* is a hexadecimal number preceded by *0x*. The software configuration register is stored in nonvolatile memory. For example, the default switch register contents can be set with the command **config-register 0x1**. To exit the user configuration dialogue, press the Ctrl-Z key combination. To exit the privileged mode, enter **disable** at the prompt.

The new value settings will be saved to memory; however, the new settings do not take effect until the system software is reloaded.

To display the configuration register value currently in effect and the value that will be used at the next reload, if the two values are different, use the **show version** command.

The lowest four bits of the processor configuration register (bits 3, 2, 1, and 0) form the *boot field*. (See Table B-2.) The boot field specifies a number in binary. If you set the boot field value to 0, you must boot the operating system manually by entering the **b** command at the bootstrap prompt. If you

set the boot field value to 1 (the factory default), the router boots using the default ROM software. If you set the boot field to any other bit pattern, the router uses the resulting number to form a default boot filename for netbooting. (See Table B-3.)

Note A **boot system** configuration command in the router configuration in NVRAM will override the default netboot filename.

The server creates a boot filename as part of the automatic configuration processes. To form the boot filename, the server starts with *cisco* and links the octal equivalent of the boot field number, a dash, and the processor-type name. Table B-3 lists the default boot filenames or actions for the processor.

Table B-3 Default Boot Filenames

Action/Filename	Bit 3	Bit 2	Bit 1	Bit 0
Bootstrap monitor	0	0	0	0
ROM software	0	0	0	1
cisco2-igs	0	0	1	0
cisco3-igs	0	0	1	1
cisco4-igs	0	1	0	0
cisco5-igs	0	1	0	1
cisco6-igs	0	1	1	0
cisco7-igs	0	1	1	1
cisco10-igs	1	0	0	0
cisco11-igs	1	0	0	1
cisco12-igs	1	0	1	0
cisco13-igs	1	0	1	1
cisco14-igs	1	1	0	0
cisco15-igs	1	1	0	1
cisco16-igs	1	1	1	0
cisco17-igs	1	1	1	1

Bit 8 controls the console Break key. Setting bit 8 (the 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 system into the bootstrap monitor, halting normal operation. A Break can be sent in the first 60 seconds while the system reboots, regardless of the configuration settings.

Bit 10 controls the host portion of the Internet broadcast address. Setting bit 10 causes the processor to use all zeros; clearing bit 10 (the factory default) causes the processor to use all ones. Bit 10 interacts with bit 14, which controls the network and subnet portions of the broadcast address. Table B-4 shows the combined effect of bits 10 and 14.

Table B-4 Configuration Register Settings for Broadcast Address Destination

Bit 14	Bit 10	Address (<net> <host>)
off	off	<ones> <ones>
off	on	<zeros> <zeros>
on	on	<net> <zeros>
on	off	<net> <ones>

Bit 13 determines the server response to a bootload failure. Setting bit 13 causes the server to load operating software from ROM after five unsuccessful attempts to load a boot file from the network. Clearing bit 13 causes the server to continue attempting to load a boot file from the network indefinitely. By factory default, bit 13 is cleared to 0.

Bits 11 and 12 in the configuration register determine the baud rate of the console terminal. Table B-5 shows the bit settings for the four available baud rates. (The factory-set default baud rate is 9600.)

Table B-5 System Console Terminal Baud Rate Settings

Baud	Bit 12	Bit 11
9600	0	0
4800	0	1
1200	1	0
2400	1	1

To enable booting from the standalone bootstrap mode, set bits 3, 2, 1, and 0 to a value between 2 and 15 in conjunction with the software configuration command **boot system filename**. To disable break and enable the **boot system** command while in the system software image, enter the following commands at the # prompt:

```

config
conf 0x010F
    
```

To exit configuration editor, press the Ctrl-Z key combination.

If you break to the system bootstrap monitor, use the **o/r** command, followed by the **i** command to reboot the router with the default configuration register and ignore NVRAM. This is commonly used as a foolproof method to load an image and set your configuration registers. You do not need to use the **write memory** command to save the changed configuration register values.