



## Configuration Register Information

The following information is found in this appendix:

- [Configuration Bit Meanings, page C-1](#)
- [Displaying the Configuration Register While Running Cisco IOS, page C-5](#)
- [Displaying the Configuration Register While Running ROM Monitor, page C-5](#)
- [Setting the Configuration Register While Running Cisco IOS, page C-6](#)
- [Setting the Configuration Register While Running ROM Monitor, page C-6](#)

### Configuration Bit Meanings

Use the processor configuration register information contained in this appendix to do the following:

- Set and display the configuration register value
- Force the system into the bootstrap program
- 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 a Trivial File Transfer Protocol (TFTP) server

[Table C-1](#) lists the meaning of each of the configuration memory bits. Following the table is a more in-depth description of each setting.

**Table C-1** Configuration Register Bit Settings

Bit No.	Hex	Meaning
00–03	0x0000–0x000F	Boot field
06	0x0040	Causes the system software to ignore nonvolatile random-access memory (NVRAM) contents
07	0x0080	Original equipment manufacturer (OEM) bit enabled
08	0x0100	Break disabled
10	0x0400	IP broadcast with all zeros

**Table C-1 Configuration Register Bit Settings (continued)**

Bit No.	Hex	Meaning
11–12	0x800–0x1000	Console line speed
13	0x2000	Boots default ROM software if initial boot fails
14	0x4000	IP broadcasts do not have network numbers
15	0x8000	Enables diagnostic messages and ignores NVRAM contents

## Bits 0–3

The lowest four bits of the processor configuration register (bits 3, 2, 1, and 0) form the boot field. [Table C-2](#) provides information about the bits settings.

**Table C-2 Bits 0–3 Settings**

Boot Field	Meaning
0	Stays at the system bootstrap prompt (ROM monitor) on a reload or power cycle
1	Boots the boot helper image as a system image
2	Full boot process, which loads the Cisco IOS image into flash memory
2-F	Specifies a default filename for booting over the network from a TFTP server

The boot field specifies a number in binary. If you set the boot field value to 0, you must have a console port access to boot the operating system manually. Boot the operating system by entering the **b** command at the bootstrap prompt as follows:

```
> b [tftp] flash filename
```

Definitions of the various command options follow:

- b**—Boots the default system software from ROM
- b flash**—Boots the first file in flash memory
- b filename [host]**—Boots over the network using TFTP
- b flash filename**—Boots the file (*filename*) from flash memory

If you set the boot field value to a value of 2 through F, and there is a valid system **boot** command stored in the configuration file, the router boots the system software as directed by that value. (See [Table C-3](#).) 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.

If there are no **boot** commands in the configuration file, the router attempts to boot the first file in system flash memory. If no file is found in system flash memory, the router attempts to netboot a default file with a name derived from the value of the boot field (for example, cisco2-7201). If the netboot attempt fails, the boot helper image in boot flash memory will boot up.

If **boot** commands are in the configuration file, the router software processes each **boot** command in sequence until the process is successful or the end of the list is reached. If the end of the list is reached without a file being successfully booted, the router will retry the **netboot** commands up to six times if bit 13 of the configuration register is set, otherwise it will load the operating system software available

in ROMmon. If bit 13 is not set, the router will continue to netboot images indefinitely. The default setting for bit 13 is 0. If bit 13 is set, the system boots the boot helper image found in boot flash memory without any retries.

The server creates a default 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 image name. [Table C-3](#) lists the default boot filenames or actions.

**Note**

A **boot system configuration** command in the router configuration in NVRAM overrides the default netboot filename.

**Table C-3** Default Boot Filenames

Action/File Name	Bit 3	Bit 2	Bit 1	Bit 0
Bootstrap mode	0	0	0	0
ROM software	0	0	0	1
Flash software	0	0	1	0
cisco3-<image-name1>	0	0	1	1
cisco4-<image-name2>	0	1	0	0
cisco5-<image-name3>	0	1	0	1
cisco6-<image-name4>	0	1	1	0
cisco7-<image-name5>	0	1	1	1
cisco10-<image-name6>	1	0	0	0
cisco11-<image-name7>	1	0	0	1
cisco12-<image-name8>	1	0	1	0
cisco13-<image-name9>	1	0	1	1
cisco14-<image-name10>	1	1	0	0
cisco15-<image-name11>	1	1	0	1
cisco16-<image-name12>	1	1	1	0
cisco17-<image-name13>	1	1	1	1

## Bit 6

Bit 6 causes the system software to ignore nonvolatile random-access memory (NVRAM) contents.

## Bit 7

Bit 7 enables the OEM bit. It disables the bootstrap messages at startup.

## Bit 8

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 sixty seconds while the system reboots, regardless of the configuration settings.

## Bit 10 and Bit 14

Bit 10 controls the host portion of the IP 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 IP broadcast address. [Table C-4](#) shows the combined effect of bit 10 and bit 14.

**Table C-4** Bit 10 and Bit 14 Settings

Bit 14	Bit 10	IP Address (<net> <host>)
Off	Off	<ones><ones>
Off	On	<zeros><zeros>
On	On	<net><zeros>
On	Off	<net><ones>

## Bit 11 and Bit 12

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

**Table C-5** Bit 11 and Bit 12 Settings

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

## Bit 13

Bit 13 determines the server response to a bootload failure. If **boot** commands are in the configuration file, the router software processes each **boot** command in sequence until the process is successful or the end of the list is reached. If the end of the list is reached without a file being successfully booted, the router will retry the **netboot** commands up to six times if bit 13 of the configuration register is set, otherwise it will load the operating system software available in ROMmon. If bit 13 is not set, the router will continue to netboot images indefinitely. The default setting for bit 13 is 0. If bit 13 is set, the system boots the boot helper image found in boot flash memory without any retries.

## Bit 15

Bit 15 enables diagnostic messages and ignores NVRAM contents.

# Displaying the Configuration Register While Running Cisco IOS

The configuration register can be viewed by using the **show version** or **show hardware** command.

The following is sample output of the **show version** command from a Cisco 7201 router.

```
Router# show version
Cisco IOS Software, 7200 Software (C7200P-ADVENTERPRISEK9-M), Version
12.4(biffDEV.061001), INTERIM SOFTWARE Copyright (c) 1986-2006 by Cisco Systems, Inc.
Compiled Sun 01-Oct-06 23:42 by biff
ROM: System Bootstrap, Version 12.4(4r)XD5, RELEASE SOFTWARE (fc1)
BOOTLDR: Cisco IOS Software, 7200 Software (C7200P-KBOOT-M), Version 12.4(TAZ3DEV.060927),
INTERIM SOFTWARE
c7201alpha1 uptime is 5 days, 18 hours, 32 minutes System returned to ROM by power-on
System image file is "disk0:c7200p-adventerprisek9-mz.2006-10-01.biffdev"
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 7201 (c7201) processor (revision A) with 917504K/65536K bytes of memory.
Processor board ID 222222222222
MPC7448 CPU at 1666Mhz, Implementation 0, Rev 2.2
1 slot midplane, Version 2.255
Last reset from power-on
1 FastEthernet interface
4 Gigabit Ethernet interfaces
2045K bytes of NVRAM.
62443K bytes of USB Flash usbflash0 (Read/Write)
250880K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
65536K bytes of Flash internal SIMM (Sector size 512K).
Configuration register is 0x2
```

## Displaying the Configuration Register While Running ROM Monitor

If the bootstrap prompt is ">", the **o** command displays the virtual configuration register currently in effect. It includes a description of the bits. See the following sample output:

```
>o
Configuration register + 02x100 at last boot
Bit#      Configuration register option settings:
15        Diagnostic mode disabled
14        IP broadcasts do not have network numbers
13        Boot default ROM software if network boot fails
12-11     Console speed is 9600 baud
10        IP broadcasts with ones
```

```

09          Do not use secondary bootstrap
08          Break disabled
07          OEM disabled
06          Ignore configuration disabled
05          Fast boot disabled
04          Fan boot disabled
03-00      Boot to ROM monitor

```

If the prompt is “rommon1”, the **confreg** command displays the virtual configuration register currently in effect. It includes a description of the bits. See the following sample output:

```

rommon 1 > confreg

Configuration Summary
enabled are:
load rom after netboot fails
console baud: 9600
boot: the ROM Monitor

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

```

## Setting the Configuration Register While Running Cisco IOS

The configuration register can be set in the configuration mode with the **config-register 0x value** command. See the following sample output:

```

Router# configure terminal
Enter configuration commands, one per line. End with CNTRL/Z.
Router(config)#config-register 0x2142
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console

```

## Setting the Configuration Register While Running ROM Monitor

If the prompt is “>”, the **o/r0x value** command sets the configuration register. See the following sample output:

```

>o/r 0x2102
>

```

If the prompt is “rommon1”, the **confreg** command sets the configuration register. It prompts the user about each bit. See the following sample output:

```

rommon 1 > confreg

Confiruatiun Summary
enabled are:
load rom after netboot fails
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
enable "use net in IP bcast address"? y/n [n]: n
disable "use rom after netboot fails"? y/n [n]: n
enable "use all zero broadcast"? y/n [n]: n
enable "break/abort has effect"? y/n [n]: n

```

```
enable "ignore system config info"? y/n [n]: n
change console baud rate? y/n [n]: n
change the boot characteristics? y/n [n]:y
enter to boot:
0 = ROM Monitor
1 = the boot helper image
2 - 15 = boot system
    [0]: 2

Configuration Summary:
enabled are:
load rom after netboot fails
console baud: 9600
boot: image sepcified by the boot system commands or default to: cisco2-c7201

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

You must reset or power cycle for new config to take effect
rommon 2 >
```

■ Setting the Configuration Register While Running ROM Monitor