



Booting Commands

This chapter provides detailed descriptions of the commands used to modify the rebooting procedures of the router.

For configuration information and examples, refer to the “Rebooting a Router” chapter in the *Cisco IOS Configuration Fundamentals Configuration Guide*.



Note

Commands in this chapter replaced by new commands continue to perform their normal functions in the current release, but they are no longer documented. Support for these commands will cease in a future release. Table 32 maps the old command to its replacement.

Table 32 Mapping Old Command to New Command

Old Command	New Command
show boot	show bootvar

Flash Memory File System Types

Cisco platforms use one of three different Flash memory file system types. Some commands are supported on only one or two file system types. This chapter notes commands that are not supported on all file system types.

See Table 33 to determine which Flash memory file system type your platform uses.

Table 33 Flash Memory File System Types

Type	Platforms
Class A	Cisco 7000 family, C12000, LightStream1010
Class B	Cisco 1003, Cisco 1004, Cisco 1005, Cisco 2500 series, Cisco 3600 series, Cisco 4000 series, Cisco AS5200
Class C	Cisco MC3810, disk0 of SC3640

boot

To boot the router manually, use the **boot** ROM monitor command. The syntax of this command varies according to the platform and ROM monitor version. Refer to the documentation for your platform to determine which command to use.

boot

boot *file-url*

boot *filename* [*ip-address*]

boot flash [*flash-fs:*][*partition-number:*][*filename*]

Cisco 7000 series

boot *flash-fs:*[*filename*]

Cisco 1600 and Cisco 3600 series

boot [*flash-fs:*][*partition-number:*][*filename*]

Syntax Description

<i>file-url</i>	URL of the image to boot (for example, boot tftp://172.16.15.112/routertest).
<i>filename</i>	<p>When used in conjunction with the <i>ip-address</i> argument, the <i>filename</i> argument is the name of the system image file to boot from a network server. The filename is case sensitive.</p> <p>When used in conjunction with the flash keyword, the <i>filename</i> argument is the name of the system image file to boot from Flash memory.</p> <p>On all platforms except the Cisco 1600 series, Cisco 3600 series, and Cisco 7000 family, the system obtains the image file from internal Flash memory.</p> <p>On the Cisco 1600 series, Cisco 3600 series and Cisco 7000 family, the <i>flash-fs:</i> argument specifies the Flash memory device from which to obtain the system image. See the <i>flash-fs:</i> argument later in this table for valid device values. The filename is case sensitive. Without <i>filename</i>, the first valid file in Flash memory is loaded.</p>
<i>ip-address</i>	(Optional) IP address of the TFTP server on which the system image resides. If omitted, this value defaults to the IP broadcast address of 255.255.255.255.
flash	Boots the router from Flash memory. Note that this keyword is required in some boot images.

<i>flash-fs:</i>	(Optional) Specifying the Flash file system is optional for all platforms except the Cisco 7500 series. Possible file systems are: <ul style="list-style-type: none"> • flash:—Internal Flash memory on the Cisco 1600 series and Cisco 3600 series. This is the only valid Flash file system for the Cisco 1600 series. • bootflash:—Internal Flash memory on the Cisco 7000 family. • slot0:—Flash memory card in first PCMCIA slot on the Cisco 7000 family and Cisco 3600 series. • slot1:—Flash memory card in second PCMCIA slot on the Cisco 7000 family and Cisco 3600 series.
<i>partition-number:</i>	(Optional) Specifies the partition number of the file system the file should be loaded from. This argument is not available on all platforms.

Defaults

For most platforms, if you enter the **boot** command and press Return, the router boots from ROM by default. However, for some platforms, such as the Cisco 3600 series, if you enter the **boot** command and press **Enter**, the router boots the first image in Flash memory. Refer to the documentation for your platform for information about the default image.

If the *partition-number* is not specified, the first partition is used.

If the *filename* is not specified, the first file in the partition or file system is used.

For other defaults, see the “Syntax Description” section.

Command Modes

ROM monitor

Command History

Release	Modification
10.3	The command was introduced.

Usage Guidelines

Use this command only when your router cannot find the boot configuration information needed in nonvolatile random-access memory (NVRAM). To enter ROM monitor mode, use one of the following methods:

- Enter the **reload EXEC** command, then press the **Break** key during the first 60 seconds of startup.
- Set configuration register bits 0 to 3 to zero (for example, set the configuration register to 0x0) and enter the **reload** command.

The ROM Monitor prompt is either “>” or, for newer platforms, “rommon *x*>”. Enter only lowercase commands.

These commands work only if there is a valid image to boot. Also, from the ROM monitor prompt, issuing a prior reset command is necessary for the boot to be consistently successful.

Refer to your hardware documentation for information on correct jumper settings for your platform.

In the following example, the **boot flash flash:** command boots the relocatable image file igs-bpx-1 from partition 2 in Flash memory:

```
> boot flash flash:2:igs-bpx-1
F3: 3562264+98228+303632 at 0x30000B4

(ROM Monitor copyrights)
```

In the following example, the Cisco 7000 family accepts the **flash** keyword for compatibility but ignores it, and boots from slot0:

```
> boot flash slot0:gs7-k-mz.103-9
F3: 8468+3980384+165008 at 0x1000
```

In the following example, the command did not function because it must be entered in lowercase:

```
rommon 10 > BOOT
command "BOOT" not found
```

The following example boots the first file in the first partition of internal Flash memory of a Cisco 3600 router:

```
> boot flash:
```

The following example boots the first image file in the first partition of the Flash memory card in slot 0 of a Cisco 3600 router:

```
> boot slot0:
```

The following example shows the ROM monitor booting the first file in the first Flash memory partition on a Cisco 1600 series:

```
> boot flash:
```

Related Commands

Command	Description
continue	Returns to the EXEC mode from ROM monitor mode by completing the boot process.

boot bootldr

To specify the location of the boot image that ROM uses for booting, use the **boot bootldr** global configuration command. Use the **no** form of this command to remove this boot image specification.

boot bootldr *file-url*

no boot bootldr

Syntax Description	<i>file-url</i>	URL of the boot image on a Flash file system.
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Defaults	Refer to your platform documentation for the location of the default boot image.
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Command Modes	Global configuration
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Command History	Release	Modification
	11.0	The command was introduced.

Usage Guidelines	The boot bootldr command sets the BOOTLDR environment variable in the current running configuration. You must specify both the Flash file system and the filename.
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Note

When you use this global configuration command, you affect only the running configuration. You must save the environment variable setting to your startup configuration to place the information under ROM monitor control and to have the environment variable function as expected. Use the **copy system:running-config nvram:startup-config** command to save the environment variable from your running configuration to your startup configuration.

The **no** form of the command sets the BOOTLDR environment variable to a null string. On the Cisco 7000 family, a null string causes the first image file in bootflash to be used as the boot image that ROM uses for booting.

Use the **show boot** command to display the current value for the BOOTLDR environment variable.

Examples	In the following example, the internal Flash memory contains the boot image:
----------	--

```
boot bootldr bootflash:boot-image
```

The following example specifies that the Flash memory card inserted in slot 0 contains the boot image:

```
boot bootldr slot0:boot-image
```

Related Commands

Command	Description
copy system:running-config nvram:startup-config	Copies any file from a source to a destination.
show bootvar	Displays the contents of the BOOT environment variable, the name of the configuration file pointed to by the CONFIG_FILE environment variable, the contents of the BOOTLDR environment variable, and the configuration register setting.
show (Flash file system)	Displays the layout and contents of a Flash memory file system.

boot bootstrap

To configure the filename that is used to boot a secondary bootstrap image, use the **boot bootstrap** global configuration command. Use the **no** form of this command to disable booting from a secondary bootstrap image.

boot bootstrap *file-url*

no boot bootstrap *file-url*

boot bootstrap flash [*filename*]

no boot bootstrap flash [*filename*]

boot bootstrap [**tftp**] *filename* [*ip-address*]

no boot bootstrap [**tftp**] *filename* [*ip-address*]

Syntax Description

<i>file-url</i>	URL of the bootstrap image.
flash	Boots the router from Flash memory.
<i>filename</i>	(Optional with flash) Name of the system image to boot from a network server or from Flash memory. If you omit the filename when booting from Flash memory, the router uses the first system image stored in Flash memory.
tftp	(Optional) Boots the router from a system image stored on a TFTP server.
<i>ip-address</i>	(Optional) IP address of the TFTP server on which the system image resides. If omitted, this value defaults to the IP broadcast address of 255.255.255.255.

Defaults

No secondary bootstrap

Command Modes

Global configuration

Command History

Release	Modification
10.0	The command was introduced.

Usage Guidelines

The **boot bootstrap** command causes the router to load a secondary bootstrap image over the network. The secondary bootstrap image then loads the specified system image file. See the appropriate hardware installation guide for details on the configuration register and secondary bootstrap filename.

Use this command when you have attempted to load a system image but have run out of memory even after compressing the system image. Secondary bootstrap allows you to load a larger system image through a smaller secondary image.

Examples

In the following example, the system image file sysimage-2 will be loaded by using a secondary bootstrap image:

```
boot bootstrap bootflash:sysimage-2
```

boot system

To specify the system image that the router loads at startup, use one of the following **boot system** global configuration commands. Use a **no** form of this command to remove the startup system image specification.

boot system *file-url*

no boot system *file-url*

boot system flash [*flash-fs*][:*partition-number*][:*filename*]

no boot system flash [*flash-fs*][:*partition-number*][:*filename*]

boot system mop *filename* [*mac-address*] [*interface*]

no boot system mop *filename* [*mac-address*] [*interface*]

boot system rom

no boot system rom

boot system {**rcp** | **tftp** | **ftp**} *filename* [*ip-address*]

no boot system {**rcp** | **tftp** | **ftp**} *filename* [*ip-address*]

no boot system

Syntax Description

<i>file-url</i>	URL of the system image to load at system startup.
flash	<p>On all platforms except the Cisco 1600 series, Cisco 3600 series, and Cisco 7000 family, this keyword boots the router from internal Flash memory. If you omit all arguments that follow this keyword, the system searches internal Flash for the first bootable image.</p> <p>On the Cisco 1600 series, Cisco 3600 series, and Cisco 7000 family, this keyword boots the router from a Flash device, as specified by the device: argument. On the Cisco 1600 series and Cisco 3600 series, if you omit all optional arguments, the router searches internal Flash memory for the first bootable image. On the Cisco 7000 family, when you omit all arguments that follow this keyword, the system searches the PCMCIA slot 0 for the first bootable image.</p>

<i>flash-fs:</i>	(Optional) Flash file system containing the system image to load at startup. The colon (:) is required. Valid file systems are as follows: <ul style="list-style-type: none"> • flash:—Internal Flash memory on the Cisco 1600 series and Cisco 3600 series. For the Cisco 1600 series and Cisco 3600 series, this file system is the default if you do not specify a file system. This is the only valid file system for the Cisco 1600 series, • bootflash:—Internal Flash memory in the Cisco 7000 family. • slot0:—First PCMCIA slot on the Cisco 3600 series and Cisco 7000 family. For the Cisco 7000 family, this file system is the default if you do not specify a file system. • slot1:—Flash memory card in the second PCMCIA slot on the Cisco 3600 series and Cisco 7000 family.
<i>partition-number:</i>	(Optional) Number of the Flash memory partition that contains the system image to boot, specified by the optional <i>filename</i> argument. If you do not specify a filename, the router loads the first valid file in the specified partition of Flash memory. This argument is only valid on routers which can be partitioned.
<i>filename</i>	(Optional when used with boot system flash) Name of the system image to load at startup. It is case sensitive. If you do not specify a filename, the router loads the first valid file in the specified Flash file system, the specified partition of Flash memory, or the default Flash file system if you also omit the <i>flash-fs:</i> argument.
mop	Boots the router from a system image stored on a Digital MOP server. Do not use this keyword with the Cisco 3600 series or Cisco 7000 family.
<i>mac-address</i>	(Optional) Media Access Control (MAC) address of the MOP server containing the specified system image file. If you do not include the MAC address argument, the router sends a broadcast message to all MOP boot servers. The first MOP server to indicate that it has the specified file is the server from which the router gets the boot image.
<i>interface</i>	(Optional) Interface the router uses to send out MOP requests to the MOP server. The interface options are async , dialer , ethernet , serial , and tunnel . If you do not specify the interface argument, the router sends a request out on all interfaces that have MOP enabled. The interface that receives the first response is the interface the router uses to load the software.
rom	Boots the router from ROM. Do not use this keyword with the Cisco 3600 series or the Cisco 7000 family.
rcp	Boots the router from a system image stored on a network server using rcp.
tftp	Boots the router from a system image stored on a TFTP server.
ftp	Boots the router from a system image stored on an FTP server.
<i>ip-address</i>	(Optional) IP address of the server containing the system image file. If omitted, this value defaults to the IP broadcast address of 255.255.255.255.

Defaults

If you configure the router to boot from a network server but do not specify a system image file with the **boot system** command, the router uses the configuration register settings to determine the default system image filename. The router forms the default boot filename by starting with the word *cisco* and then appending the octal equivalent of the boot field number in the configuration register, followed by a hyphen (-) and the processor type name (*cisconn-cpu*). See the appropriate hardware installation guide for details on the configuration register and default filename. See also the **config-register** or **confreg** command. For additional information about defaults, see the preceding “Syntax Description” section.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

For this command to work, the **config-register** command must be set properly.

Enter several **boot system** commands to provide a fail-safe method for booting your router. The router stores and executes the **boot system** commands in the order in which you enter them in the configuration file. If you enter multiple boot commands of the same type—for example, if you enter two commands that instruct the router to boot from different network servers—then the router tries them in the order in which they appear in the configuration file. If a **boot system** command entry in the list specifies an invalid device, the router skips that entry. Use the **boot system rom** command to specify use of the ROM system image as a backup to other **boot** commands in the configuration.

For some platforms, the boot image must be loaded before the system image is loaded. However, on many platforms, the boot image is loaded only if the router is booting from a network server or if the flash file system is not specified. If the file system is specified, the router will boot faster because it does not have to load the boot image first.

This section contains the following usage guideline sections:

- Change the List of Boot System Commands
- Boot Compressed Images
- Understand the rcp Protocol
- Stop Booting and Enter ROM Monitor Mode
- Cisco 1600 series, Cisco 3600 series, and Cisco 7000 family notes

Change the List of Boot System Commands

To remove a single entry from the bootable image list, use the **no** form of the command with an argument. For example, to remove the entry that specifies a bootable image on a Flash memory card inserted in the second slot, use the **no boot system flash slot1:[filename]** command. All other entries in the list remain.

To eliminate all entries in the bootable image list, use the **no boot system** command. At this point, you can redefine the list of bootable images using the previous **boot system** commands. Remember to save your changes to your startup configuration by issuing the **copy system:running-config nvram:startup-config** command.

Each time you write a new software image to Flash memory, you must delete the existing filename in the configuration file with the **no boot system flash filename** command. Then add a new line in the configuration file with the **boot system flash filename** command.

**Note**

If you want to rearrange the order of the entries in the configuration file, you must first issue the **no boot system** command and then redefine the list.

Boot Compressed Images

You can boot the router from a compressed image on a network server. When a network server boots software, both the image being booted and the running image must fit into memory. Use compressed images to ensure that enough memory is available to boot the router. You can compress a software image on any UNIX platform using the **compress** command. Refer to your UNIX platform's documentation for the exact usage of the **compress** command. (You can also uncompress data with the UNIX **uncompress** command.)

Understand the rcp Protocol

The rcp protocol requires a client to send the remote username in an rcp request to a server. When the router executes the **boot system rcp** command, the Cisco IOS software sends the host name as both the remote and local usernames by default. For the rcp protocol to execute properly, an account must be defined on the network server for the remote username configured on the router.

If the server has a directory structure, the rcp software searches for the system image to boot from the remote server relative to the directory of the remote username.

By default, the router software sends host name as the remote username. You can override the default remote username by using the **ip rcmd remote-username** command. For example, if the system image resides in the home directory of a user on the server, you can specify that user's name as the remote username.

Understand TFTP

You need a TFTP server running in order to fetch the router image from the host.

Understand FTP

You need to an FTP server running in order to fetch the router image from the host. You also need an account on the server or anonymous file access to the server.

Stop Booting and Enter ROM Monitor Mode

During the first 60 seconds of startup, you can force the router to stop booting by pressing the Break key. The router will enter ROM Monitor mode, where you can change the configuration register value or boot the router manually.

Cisco 1600 series, Cisco 3600 series, and Cisco 7000 family notes

For the Cisco 3600 series and Cisco 7000 family, the **boot system** command modifies the BOOT environment variable in the running configuration. The BOOT environment variable specifies a list of bootable images on various devices.

**Note**

When you use the **boot system** global configuration command on the Cisco 1600 series, Cisco 3600 series, and Cisco 7000 family, you affect only the running configuration. You must save the BOOT environment variable settings to your startup configuration to place the information under ROM monitor control and to have the environment variable function

as expected. Use the **copy system:running-config nvram:startup-config** command to save the environment variable from your running configuration to your startup configuration.

To view the contents of the BOOT environment variable, use the **show bootenv** command.

Examples

The following example illustrates a list specifying two possible internet network locations for a system image, with the ROM software being used as a backup:

```
boot system tftp://192.168.7.24/cs3-rx.90-1
boot system tftp://192.168.7.19/cs3-rx.83-2
boot system rom
```

The following example boots the system boot relocatable image file igs-bpx-1 from partition 2 of the Flash device:

```
boot system flash:2:igs-bpx-1
```

The following example instructs the router to boot from an image located on the Flash memory card inserted in slot 0 of the Cisco 7000 RSP7000 card, Cisco 7200 NPE card, or Cisco 7500 series RSP card:

```
boot system slot0:new-config
```

This example specifies the file new-ios-image as the system image for a Cisco 3600 series router to load at startup. This file is located in the fourth partition of the Flash memory card in slot 0:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# boot system slot0:4:dirt/images/new-ios-image
```

This example boots from the image file c1600-y-1 in partition 2 of Flash memory of a Cisco 1600 series:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# boot system flash:2:c1600-y-1
```

Related Commands

Command	Description
config-register	Changes the configuration register settings.
copy	Copies any file from a source to a destination.
ip rcmd remote username	Configures the remote username to be used when requesting a remote copy using rcp.
show bootvar	Displays the contents of the BOOT environment variable, the name of the configuration file pointed to by the CONFIG_FILE environment variable, the contents of the BOOTLDR environment variable, and the configuration register setting

config-register

To change the configuration register settings, use the **config-register** global configuration command.

config-register *value*

Syntax Description

<i>value</i>	Hexadecimal or decimal value that represents the 16-bit configuration register value that you want to use the next time the router is restarted. The value range is from 0x0 to 0xFFFF (0 to 65535 in decimal).
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Defaults

Refer to the documentation for your platform for the default configuration register value. For many newer platforms, the default is 0x2102, which causes the router to boot from Flash memory and the Break key to be ignored.

Command Modes

Global configuration

Command History

Release	Modification
10.0	The command was introduced.

Usage Guidelines

This command applies only to platforms that use a software configuration register.

The lowest four bits of the configuration register (bits 3, 2, 1, and 0) form the boot field. The boot field determines if the router boots manually, from ROM, or from Flash or the network.

To change the boot field value and leave all other bits set to their default values, follow these guidelines:

- If you set the configuration register boot field value to 0x0, you must boot the operating system manually with the **boot** command.
- If you set the configuration register boot field value to 0x1, the router boots using the default ROM software.
- If you set the configuration register boot field to any value from 0x2 to 0xF, the router uses the boot field value to form a default boot filename for booting from a network server.

For more information about the configuration register bit settings and default filenames, see the appropriate router hardware installation guide.

Examples

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

```
config-register 0x2102
```

Related Commands	Command	Description
	boot system	Specifies the system image that the router loads at startup.
		bridge acquireForwards any frames for stations that the system has learned about dynamically.
	confreg	Changes the configuration register settings while in ROM Monitor mode.
	o	Lists the value of the boot field (bits 0-3) in the configuration register.
	show version	Displays the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot images.

confreg

To change the configuration register settings while in ROM Monitor mode, use the **confreg** ROM Monitor command.

confreg [*value*]

Syntax Description

<i>value</i>	(Optional) Hexadecimal value that represents the 16-bit configuration register value that you want to use the next time the router is restarted. The value range is from 0x0 to 0xFFFF.
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Defaults

Refer to your platform documentation for the default configuration register value.

Command Modes

ROM Monitor

Command History

Release	Modification
10.0	The command was introduced.

Usage Guidelines

Not all versions in the ROM Monitor support this command. Refer to your platform documentation for more information on ROM Monitor mode.

If you use this command without specifying the configuration register value, the router prompts for each bit of the configuration register.

The lowest four bits of the configuration register (bits 3, 2, 1, and 0) form the boot field. The boot field determines if the router boots manually, from ROM, or from Flash or the network.

To change the boot field value and leave all other bits set to their default values, follow these guidelines:

- If you set the configuration register boot field value to 0x0, you must boot the operating system manually with the **boot** command.
- If you set the configuration register boot field value to 0x1, the router boots using the default ROM software.
- If you set the configuration register boot field to any value from 0x2 to 0xF, the router uses the boot field value to form a default boot filename for booting from a network server.

For more information about the configuration register bit settings and default filenames, see the appropriate router hardware installation guide.

Examples

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

```
confreg 0x210F
```

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

```
rommon 7 > confreg

Configuration Summary
enabled are:
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]:
enable "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 [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.
rommon 8>
```

continue

To return to EXEC mode from ROM monitor mode, use the **continue** ROM monitor command.

continue

Syntax Description This command has no arguments or keywords.

Defaults No default behavior or values

Command Modes ROM monitor

Command History	Release	Modification
	11.0	The command was introduced.

Usage Guidelines Use this command to return to EXEC mode from ROM monitor mode, to use the system image instead of reloading. On older platforms, the angle bracket (>) indicates the router is in ROM monitor mode. On newer platforms, “rommon *number*>” is the default ROM monitor prompt. Typically, the router is in ROM monitor mode when you manually load a system image or perform diagnostic tests. Otherwise, the router will most likely never be in this mode.



Caution

While in ROM monitor mode, the Cisco IOS system software is suspended until you issue either a reset or the **continue** command.

Examples In the following example, the **continue** command switches the router from ROM monitor to EXEC mode:

```
> continue
Router#
```

Related Commands	Command	Description
	boot	Boots the router manually.

0

To list the value of the boot field (bits 0 to 3) in the configuration register, use the ROM Monitor **o** command. To reset the value of the boot field so that the router boots from ROM, use the ROM Monitor **o/r** command.

o

o/r

Syntax Description This command has no arguments or keywords.

Defaults Refer to the appropriate hardware installation guide for default values.

Command Modes ROM Monitor

Command History

Release	Modification
10.0	The command was introduced.

Usage Guidelines

Not all platforms support the **o** command.

To get to the ROM monitor prompt, use the **reload EXEC** command if the configuration register has a boot value of 0. (For systems with a software configuration register, a value can be included on the **o/r** command line.) Use the **i** command in conjunction with the **o/r** command to initialize the router. (The **i** command is documented in the hardware installation and maintenance publication for your product.) The **o/r** command resets the configuration register to 0x141, which disables the Break key, ignores the NVRAM configuration, and boots the default system image from ROM.

Examples

The following is a sample display from the **o** command:

```
> o
Bit# Configuration register option settings:
15 Diagnostic mode disabled
14 IP broadcasts do not have network numbers
13 Do not 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 enabled
07 OEM disabled
06 Ignore configuration disabled
03-00 Boot to ROM monitor
>
```

The following is an example of the **o/r** and **i** commands used to reset and boot the default system image from ROM:

```
> o/r  
> i
```

Related Commands	Command	Description
	config-register	Changes the configuration register settings.
	confreg	Changes the configuration register settings while in ROM Monitor mode.

reload

To reload the operating system, use the **reload** EXEC command.

reload [*text* | **in** [*hh:mm*] [*text*] | **at** *hh:mm* [*month day* | *day month*] [*text*] | **cancel**]

Syntax Description	
<i>text</i>	(Optional) Reason for the reload, 1 to 255 characters long.
in [<i>hh:mm</i>]	(Optional) Schedule a reload of the software to take effect in the specified minutes or hours and minutes. The reload must take place within approximately 24 days.
at <i>hh:mm</i>	(Optional) Schedule a reload of the software to take place at the specified time (using a 24-hour clock). If you specify the month and day, the reload is scheduled to take place at the specified time and date. If you do not specify the month and day, the reload takes place at the specified time on the current day (if the specified time is later than the current time), or on the next day (if the specified time is earlier than the current time). Specifying 00:00 schedules the reload for midnight. The reload must take place within approximately 24 days.
<i>month</i>	(Optional) Name of the month, any number of characters in a unique string.
<i>day</i>	(Optional) Number of the day in the range 1 to 31.
cancel	(Optional) Cancel a scheduled reload.

Command Modes EXEC

Command History	Release	Modification
	10.0	The command was introduced.

Usage Guidelines

The **reload** command halts the system. If the system is set to restart on error, it reboots itself. Use the **reload** command after configuration information is entered into a file and saved to the startup configuration.

You cannot reload from a virtual terminal if the system is not set up for automatic booting. This prevents the system from dropping to the ROM monitor and thereby taking the system out of the remote user's control.

If you modify your configuration file, the system prompts you to save the configuration. During a save operation, the system asks you if you want to proceed with the save if the CONFIG_FILE environment variable points to a startup configuration file that no longer exists. If you say "yes" in this situation, the system goes to **setup** mode upon reload.

When you schedule a reload to occur at a later time, it must take place within approximately 24 days.

The **at** keyword can only be used if the system clock has been set on the router (either through NTP, the hardware calendar, or manually). The time is relative to the configured time zone on the router. To schedule reloads across several routers to occur simultaneously, the time on each router must be synchronized with NTP.

To display information about a scheduled reload, use the **show reload** command.

Examples

The following example immediately reloads the software on the router:

```
Router# reload
```

The following example reloads the software on the router in 10 minutes:

```
Router# reload in 10
Router# Reload scheduled for 11:57:08 PDT Fri Apr 21 1996 (in 10 minutes)
Proceed with reload? [confirm]
Router#
```

The following example reloads the software on the router at 1:00 p.m. today:

```
Router# reload at 13:00
Router# Reload scheduled for 13:00:00 PDT Fri Apr 21 1996 (in 1 hour and 2 minutes)
Proceed with reload? [confirm]
Router#
```

The following example reloads the software on the router on April 20 at 2:00 a.m.:

```
Router# reload at 02:00 apr 20
Router# Reload scheduled for 02:00:00 PDT Sat Apr 20 1996 (in 38 hours and 9 minutes)
Proceed with reload? [confirm]
Router#
```

The following example cancels a pending reload:

```
Router# reload cancel
%Reload cancelled.
```

Related Commands

Command	Description
<code>copy system:running-config nvram:startup-config</code>	Copies any file from a source to a destination.
<code>show reload</code>	Displays the reload status on the router.

show boot

The **show bootvar** command replaces the **show boot** command. See the **show bootvar** command in this chapter for more information.

show bootvar

To display the contents of the BOOT environment variable, the name of the configuration file pointed to by the CONFIG_FILE environment variable, the contents of the BOOTLDR environment variable, and the configuration register setting, use the **show bootvar** EXEC command.

show bootvar

Syntax Description This command has no arguments or keywords.

Command Modes EXEC

Command History	Release	Modification
	11.3 AA	The command was introduced.

Usage Guidelines The **show bootvar** command replaces the **show boot** command.

The **show bootvar** command allows you to view the current settings for the following environment variables:

- BOOT
- CONFIG_FILE
- BOOTLDR

The BOOT environment variable specifies a list of bootable images on various devices. The CONFIG_FILE environment variable specifies the configuration file used during system initialization. The BOOTLDR environment variable specifies the Flash device and filename containing the rxboot image that ROM uses for booting. You set these environment variables with the **boot system**, **boot config**, and **boot bootldr** commands, respectively.

When you use this command on a Cisco 7507 or Cisco 7513 configured for High System Availability (HSA), this command also shows you the environment variable settings for both the master and slave RSP card.

HSA refers to how quickly your router returns to an operational status after a failure occurs. On the Cisco 7507 and Cisco 7513, you can install two RSP cards in a single router to improve system availability.

Examples

The following is sample output from the **show bootvar** command:

```
Router# show bootvar

BOOT variable =
CONFIG_FILE variable = nvram:
Current CONFIG_FILE variable = slot0:router-config
BOOTLDR variable not exist

Configuration register is 0x0

Router#
```

In the sample output, the BOOT environment variable contains a null string. That is, a list of bootable images is not specified.

The CONFIG_FILE environment variable points to the configuration file in NVRAM as the startup (initialization) configuration. The run-time value for the CONFIG_FILE environment variable points to the router-config file on the Flash memory card inserted in the first slot of the RSP card. That is, during the run-time configuration, you have modified the CONFIG_FILE environment variable using the **boot config** command, but you have not saved the run-time configuration to the startup configuration. To save your run-time configuration to the startup configuration, use the **copy system:running-config nvram:startup-config** command. If you do not save the run-time configuration to the startup configuration, then the system reverts back to the saved CONFIG_FILE environment variable setting for initialization information upon reload. In this sample, the system reverts back to NVRAM for the startup configuration file.

The BOOTLDR environment variable does not yet exist. That is, you have not created the BOOTLDR environment variable using the **boot bootldr** command.

The following example is output from the **show bootvar** command for a Cisco 7513 configured for HSA:

```
Router# show bootvar

BOOT variable =
CONFIG_FILE variable =
Current CONFIG_FILE variable =
BOOTLDR variable does not exist

Configuration register is 0x0

current slave is in slot 7
BOOT variable =
CONFIG_FILE variable =
BOOTLDR variable does not exist

Configuration register is 0x0

Router#
```

Related Commands

Command	Description
boot bootstrap	Configures the filename that is used to boot a secondary bootstrap image.
boot config	Specifies the device and filename of the configuration file from which the router configures itself during initialization (startup). This command is available only on Class A file system platforms.

Command	Description
boot system	Specifies the system image that the router loads at startup.
show version	Displays the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot images.

show reload

To display the reload status on the router, use the **show reload** EXEC command.

show reload

Syntax Description This command has no arguments or keywords.

Command Modes EXEC

Command History	Release	Modification
	11.2	The command was introduced.

Usage Guidelines You can use the **show reload** command to display a pending software reload. To cancel the reload, use the **reload cancel** privileged EXEC command.

Examples The following sample output from the **show reload** command shows that a reload is schedule for 12:00 a.m. (midnight) on Saturday, April 20:

```
Router# show reload
Reload scheduled for 00:00:00 PDT Sat April 20 1996 (in 12 hours and 12 minutes)
Router#
```

Related Commands	Command	Description
	reload	Reloads the operating system.

show version

To display the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot images, use the **show version** EXEC command.

show version

Syntax Description This command has no arguments or keywords.

Command Modes EXEC

Command History	Release	Modification
	10.0	The command was introduced.

Usage Guidelines You can also use this command with a Cisco 7507 or Cisco 7513 configured with High System Availability (HSA). HSA refers to how quickly your router returns to an operational status after a failure occurs. On the Cisco 7507 and Cisco 7513, you can install two RSP cards in a single router to improve system availability.

When used with HSA, this command also displays the currently running slave RSP card and the Cisco IOS release that it is running.

Examples

The following is sample output from the **show version** command:

```
Router1> show version

Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-J-M), Experimental Version 11.3(19970915:164752) [
hampton-nitro-baseline 249]
Copyright (c) 1986-1997 by cisco Systems, Inc.
Compiled Wed 08-Oct-97 06:39 by hampton
Image text-base: 0x60008900, data-base: 0x60B98000

ROM: System Bootstrap, Version 11.1(11855) [beta 2], INTERIM SOFTWARE
BOOTFLASH: 7200 Software (C7200-BOOT-M), Version 11.1(472), RELEASE SOFTWARE (fc
1)

Router1 uptime is 23 hours, 33 minutes
System restarted by abort at PC 0x6022322C at 10:50:55 PDT Tue Oct 21 1997
System image file is "tftp://171.69.1.129/hampton/nitro/c7200-j-mz"

cisco 7206 (NPE150) processor with 57344K/8192K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0 (512KB Level 2 Cache)
Last reset from power-on
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
8 Ethernet/IEEE 802.3 interface(s)
2 FastEthernet/IEEE 802.3 interface(s)
4 Token Ring/IEEE 802.5 interface(s)
4 Serial network interface(s)
1 FDDI network interface(s)
125K bytes of non-volatile configuration memory.
1024K bytes of packet SRAM memory.

20480K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
20480K bytes of Flash PCMCIA card at slot 1 (Sector size 128K).
4096K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x0
```

Table 34 describes significant fields shown in these displays.

Table 34 *show version Field Descriptions*

Field	Description
IOS (tm) 7200 Software (C7200-J-M), Experimental Version 11.3	Always specify the complete version number when reporting a possible software problem. In the example output, the version number is 11.3.
ROM: System Bootstrap, Version 11.1(11855) [beta 2], INTERIM SOFTWARE	Bootstrap version string.
BOOTFLASH: 7200 Software (C7200-BOOT-M), Version 11.1(472), RELEASE SOFTWARE	Boot version string.
Router1 uptime is	The amount of time the system has been up and running.

Table 34 *show version Field Descriptions (continued)*

Field	Description
System restarted by	Also displayed is a log of how the system was last booted, both as a result of normal system startup and of system error. For example, information can be displayed to indicate a bus error that is generally the result of an attempt to access a nonexistent address, as follows: System restarted by bus error at PC 0xC4CA, address 0x210C0C0
System image file is	If the software was booted over the network, the Internet address of the boot host is shown. If the software was loaded from onboard ROM, this line reads “running default software.”
cisco 7206 (NPE150) processor	The remaining output in each display shows the hardware configuration and any nonstandard software options.
Configuration register is	The configuration register contents, displayed in hexadecimal notation.

The output of the **show version EXEC** command can also provide certain messages, such as bus error messages. If such error messages appear, report the complete text of this message to your technical support specialist.

The following is sample output from the **show version** command on a Cisco 7500 series router with an RSP2 and three VIP2s with a variety of interfaces:

```
Router# show version

Cisco Internetwork Operating System Software
IOS (tm) GS Software (RSP-JV-M), Experimental Version 11.1(12816)
[getchell 108]
Copyright (c) 1986-1996 by cisco Systems, Inc.
Compiled Mon 03-Jun-96 11:39 by getchell
Image text-base: 0x600108A0, data-base: 0x60910000

ROM: System Bootstrap, Version 5.3(16645) [szhang 571], INTERIM SOFTWARE

Router uptime is 4 minutes
System restarted by reload
System image file is "slot0:dirt/vip2/master/rsp-jv-mz.960603", booted via tftp from
172.18.2.3

cisco RSP2 (R4600) processor with 24576K bytes of memory.
R4600 processor, Implementation 32, Revision 2.0
Last reset from power-on
G.703/E1 software, Version 1.0.
SuperLAT software copyright 1990 by Meridian Technology Corp).
Bridging software.
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
TN3270 Emulation software (copyright 1994 by TGV Inc).
Primary Rate ISDN software, Version 1.0.
Chassis Interface.
1 CIP controller (3 IBM Channels).
1 CIP2 controller (3 IBM Channels).
1 EIP controller (6 Ethernet).
1 HIP controller (1 HSSI).
1 FSIP controller (8 Serial).
1 AIP controller (1 ATM).
1 TRIP controller (4 Token Ring).
1 FIP controller (1 FDDI).
1 MIP controller (2 T1).
3 VIP2 controllers (1 FastEthernet)(13 Ethernet)(4 Serial)(4 Token Ring)(1
Fddi).
1 FEIP controller (1 FastEthernet).
19 Ethernet/IEEE 802.3 interfaces.
2 FastEthernet/IEEE 802.3 interfaces.
8 Token Ring/IEEE 802.5 interfaces.
12 Serial network interfaces.
1 HSSI network interface.
2 FDDI network interfaces.
1 ATM network interface.
2 Channelized T1/PRI ports.
125K bytes of non-volatile configuration memory.

8192K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash PCMCIA card at slot 1 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).
No slave installed in slot 7.
Configuration register is 0x0
```

Table 35 describes the fields in this display for Cisco 7500 series routers with an RSP2 route switch processor.

Table 35 *show version Field Descriptions on Cisco 7500 Series Routers*

Field	Description
IOS (tm) GS Software, Version 11.1	Always specify the complete version number when reporting a possible software problem. In the example output, the version number is 11.1.
ROM: System Bootstrap, Version 5.3(16645) [szhang 571], INTERIM SOFTWARE	Bootstrap version string.
Router uptime is... System restarted by... System image file is...	The amount of time the system has been up and running, how the system was restarted, and the name of the system image file.
System last reset by	Also displayed is a log of how the system was last booted, both as a result of normal system startup and of system error. For example, information can be displayed to indicate a bus error that is generally the result of an attempt to access a nonexistent address, as follows: System restarted by bus error at PC 0xC4CA, address 0x210C0C0.
cisco RSP2 (R4600) processor...	The remaining output in each display shows the software currently running, hardware configuration, and any nonstandard software options. The configuration register contents are displayed in hexadecimal notation.

The following is sample output of the **show version** command from a Cisco 7513. In this example, the current slave is processor slot 7.

Router# **show version**

```
Cisco Internetwork Operating System Software
IOS (tm) GS Software (RSP-P-M), Experimental Version 11.1(5479) [dbath 119]
Copyright (c) 1986-1995 by cisco Systems, Inc.
Compiled Wed 08-Nov-95 17:51 by dbath
Image text-base: 0x600088A0, data-base: 0x603B6000

ROM: System Bootstrap, Version 5.3(18168) [mansonw 63], INTERIM SOFTWARE

Router uptime is 4 days, 31 minutes
System restarted by reload
System image file is "slot0:dirt/dbath/rsp-p-mz-ark-1", booted via tftp from 172.31.7.19

cisco RSP2 (R4600) processor with 16384K bytes of memory.
R4600 processor, Implementation 32, Revision 2.0
Last reset from power-on
G.703/E1 software, Version 1.0.
Primary Rate ISDN software, Version 1.0.
Chassis Interface.
 1 CIP controller (3 IBM Channels).
 1 CIP2 controller (3 IBM Channels).
 1 EIP controller (6 Ethernet).
 1 FSIP controller (8 Serial).
 1 AIP controller (1 ATM).
 1 TRIP controller (4 Token Ring).
 1 FIP controller (1 FDDI).
 1 MIP controller (2 T1).
 6 Ethernet/IEEE 802.3 interfaces.
 4 Token Ring/IEEE 802.5 interfaces.
 8 Serial network interfaces.
 1 FDDI network interface.
 1 ATM network interface.
 2 Channelized T1/PRI ports.
125K bytes of non-volatile configuration memory.

8192K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).

Slave in slot 7 is running Cisco Internetwork Operating System Software
IOS (tm) GS Software (RSP-DW-M), Experimental Version 11.1(5479) [dbath 118]
Copyright (c) 1986-1995 by cisco Systems, Inc.
Compiled Wed 08-Nov-95 16:57 by dbath

Configuration register is 0x0
```

Related Commands

Command	Description
reload	Reloads the operating system.

slave auto-sync config

To turn on automatic synchronization of configuration files for a Cisco 7507 or Cisco 7513 router that is configured for High System Availability (HSA), use the **slave auto-sync config** global configuration command. To turn off automatic synchronization, use the **no** form of the command.

slave auto-sync config

no slave auto-sync config

Syntax Description This command has no arguments or keywords.

Defaults Enabled

Command Modes Global configuration

Command History	Release	Modification
	11.1	The command was introduced.

Usage Guidelines Use this command for a Cisco 7507 or Cisco 7513 that is configured for HSA. HSA refers to how quickly your router returns to an operational status after a failure occurs. On the Cisco 7507 and Cisco 7513, you can install two RSP cards in a single router to improve system availability.

In automatic synchronization mode, when you issue a **copy EXEC** command that specifies the master's startup configuration (**nvram:startup-config**) as the target, the master also copies the same file to the slave's startup configuration (**slavenvram:startup-config**). Use this command when implementing HSA for simple hardware backup or for software error protection to ensure that the master and slave RSP contain the same configuration files.

Examples The following example turns on automatic configuration file synchronization. When the **copy system:running-config nvram:startup-config** command is issued, the running configuration is saved to the startup configurations of both the master RSP and the slave RSP.

```
Router(config)# slave auto-sync config
Router(config)# end
Router# copy system:running-config nvram:startup-config
```

Related Commands	Command	Description
	slave sync config	Manually synchronizes configuration files on the master and slave RSP cards of a Cisco 7507 or Cisco 7513.

slave default-slot

To specify the default slave Route Switch Processor card on a Cisco 7507 or Cisco 7513 router, use the **slave default-slot** global configuration command.

slave default-slot *processor-slot-number*

Syntax Description

<i>processor-slot-number</i>	Number of processor slot that contains the default slave RSP. On the Cisco 7507, valid values are 2 or 3. On the Cisco 7513, valid values are 6 or 7. The default is the higher number processor slot.
------------------------------	--

Defaults

The default slave is the RSP card located in the higher number processor slot. On the Cisco 7507, processor slot 3 contains the default slave RSP. On the Cisco 7513, processor slot 7 contains the default slave RSP.

Command Modes

Global configuration

Command History

Release	Modification
11.1	The command was introduced.

Usage Guidelines

Use this command for a Cisco 7507 or Cisco 7513 that is configured for High System Availability (HSA). HSA refers to how quickly your router returns to an operational status after a failure occurs. On the Cisco 7507 and Cisco 7513, you can install two RSP cards in a single router to improve system availability.

The router uses the default slave information when booting:

- If a system boot is due to powering up the router or using the **reload** command, then the specified default slave will be the slave RSP.
- If a system boot is due to a system crash or hardware failure, then the system ignores the default slave designation, and makes the crashed or faulty RSP card the slave RSP.

Examples

The following example sets the default slave RSP to processor slot 2 on a Cisco 7507:

```
slave default-slot 2
```

Related Commands

Command	Description
reload	Reloads the operating system.

slave image

To specify the image that the slave Route Switch Processor runs on a Cisco 7507 or Cisco 7513 router, use the **slave image** global configuration command.

```
slave image {system | file-url}
```

Syntax Description	
system	Loads the slave image that is bundled with the master system image. This is the default.
<i>file-url</i>	Loads the slave image from the specified file in a Flash file system. If you do not specify a filename, the first file on the specified Flash file system is the default file.

Defaults The default is to load the image from the system bundle.

Command Modes Global configuration

Command History	Release	Modification
	11.1	This command was introduced.

Usage Guidelines Use this command for a Cisco 7507 or Cisco 7513 router that is configured for High System Availability (HSA). HSA refers to how quickly your router returns to an operational status after a failure occurs. On the Cisco 7507 and Cisco 7513 router, you can install two RSP cards in a single router to improve system availability.

Use the **slave image** command to override the slave image that is bundled with the master image.

When using HSA for simple hardware backup, ensure that the slave image is in the same location on the master and the slave RSP card. Thus, if the slave RSP card becomes the master, it will be able to find the slave image and download it to the new slave.

Examples The following example specifies that the slave RSP run the `rsp-dw-mz.unicode.111-3.2` image from slot 0:

```
slave image slot0:rsp-dw-mz.unicode.111-3.2
```

Related Commands	Command	Description
	slave reload	Forces a reload of the image that the slave RSP card is running on a Cisco 7507 or Cisco 7513 router.

slave reload

To force a reload of the image that the slave Route Switch Processor card is running on a Cisco 7507 or Cisco 7513 router, use the **slave reload** global configuration command.

slave reload

Syntax Description This command has no arguments or keywords.

Command Modes Global configuration

Command History	Release	Modification
	11.1	The command was introduced.

Usage Guidelines Use this command for a Cisco 7507 or Cisco 7513 that is configured for High System Availability (HSA). HSA refers to how quickly your router returns to an operational status after a failure occurs. On the Cisco 7507 and Cisco 7513 router, you can install two RSP cards in a single router to improve system availability.

After using the **slave image** global configuration command to specify the image that the slave RSP runs on a Cisco 7507 or Cisco 7513 router, use the **slave reload** command to reload the slave with the new image. The **slave reload** command can also be used to force the slave to reboot its existing image.

Examples The following example reloads an inactive slave RSP card. If the slave successfully reloads, it will return to an active slave state. If the master RSP fails, the slave RSP will become the master.

```
slave reload
```

Related Commands	Command	Description
	slave image	Specifies the image that the slave RSP runs on a Cisco 7507 or Cisco 7513 router.

slave sync config

To manually synchronize configuration files on the master and slave Route Switch Processor cards of a Cisco 7507 or Cisco 7513 router, use the **slave sync config** privileged EXEC command.

slave sync config

Syntax Description This command has no arguments or keywords.

Defaults Automatic synchronization is turned on.

Command Modes Privileged EXEC

Command History	Release	Modification
	11.1	The command was introduced.

Usage Guidelines Use this command for a Cisco 7507 or Cisco 7513 router that is configured for High System Availability (HSA). HSA refers to how quickly your router returns to an operational status after a failure occurs. On the Cisco 7507 and Cisco 7513 router, you can install two RSP cards in a single router to improve system availability.

This command allows you to synchronize the configuration files of the master and slave RSP cards on a case-by-case basis when you do not have automatic synchronization turned on. This command copies the master's configuration file to the slave RSP card.



Note

You *must* use this command when you insert a new slave RSP card into a Cisco 7507 or Cisco 7513 router for the first time to ensure the new slave is configured consistently with the master.

Examples The following example synchronizes the configuration files on the master and slave RSP card:

```
slave sync config
```

Related Commands	Command	Description
	slave auto-sync config	Turns on automatic synchronization of configuration files for a Cisco 7507 or Cisco 7513 router that is configured for HSA.

slave terminal

To enable access to the slave Route Switch Processor console, use the **slave terminal** global configuration command. The **no** form of this command disables access to the slave RSP console.

slave terminal

no slave terminal

Syntax Description This command has no arguments or keywords.

Defaults Enabled

Command Modes Global configuration

Command History	Release	Modification
	11.1	The command was introduced.

Usage Guidelines The slave console does not have enable password protection. Thus, an individual connected to the slave console port can enter privileged EXEC mode and view or erase the configuration of the router. Use the **no slave terminal** command to disable slave console access and prevent security problems. When the slave console is disabled, users cannot enter commands.

If slave console access is disabled, the following message appears periodically on the slave console:

```
%%Slave terminal access is disabled. Use "slave terminal" command in master RSP
configuration mode to enable it.
```

Examples The following example disables console access to the slave RSP:

```
no slave terminal
```