

# System Image, Microcode Image, and Configuration File Load Commands

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This chapter provides detailed descriptions of the commands used to load and copy system images, microcode images, and configuration files. System images contain the system software. Microcode images contain microcode to be downloaded to various hardware devices. Configuration files contain commands entered to customize the function of the router.

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**Note** Commands in this chapter that have been replaced by new commands continue to perform their normal functions in the current release, but are no longer documented. Support for these commands will cease in a future release. Table 3-1 maps the old commands with their replacements.

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**Table 3-1 Mapping Old Commands to New Commands**

Old Command	New Command
<code>configure network</code>	<code>copy rcp running-config</code> (for an rcp server) <code>copy tftp running-config</code> (for a TFTP server)
<code>configure overwrite-network</code>	<code>copy rcp startup-config</code> (for an rcp server) <code>copy tftp startup-config</code> (for a TFTP server)
<code>copy erase flash</code>	<code>erase flash</code>
<code>copy verify or copy verify flash</code>	<code>verify flash</code> (on all systems except Cisco 7500) <code>verify</code> (on Cisco 7000 and Cisco 7500)
<code>copy verify bootflash</code>	<code>verify bootflash</code>
<code>show configuration</code>	<code>show startup-config</code>
<code>tftp-server system</code>	<code>tftp-server</code>
<code>write erase</code>	<code>erase startup-config</code>
<code>write memory</code>	<code>copy running-config startup-config</code>
<code>write network</code>	<code>copy running-config rcp</code> (for an rcp server) <code>copy running-config tftp</code> (for a TFTP server)
<code>write terminal</code>	<code>show running-config</code>

For router configuration information and examples, refer to the “Loading System Images, Microcode Images, and Configuration Files” chapter in the *Router Products Configuration Guide*.

## async-bootp

To configure extended BOOTP requests for asynchronous interfaces as defined in RFC 1084, use the **async-bootp** global configuration command. Use the **no** form of this command to restore the default.

```
async-bootp tag [:hostname] data
no async-bootp
```

### Syntax Description

<i>tag</i>	Item being requested; expressed as filename, integer, or IP dotted-decimal address. See Table 3-2 for possible values.
<i>:hostname</i>	(Optional) This entry applies only to the host specified. The argument <i>:hostname</i> accepts both an IP address and a logical host name.
<i>data</i>	List of IP addresses entered in dotted-decimal notation or as logical host names, a number, or a quoted string.

**Table 3-2** Async-BOOTP Tag Keywords

Keyword	Description
<b>bootfile</b>	Specifies use of a server boot file from which to download the boot program. Use the optional <i>:hostname</i> and <i>data</i> arguments to specify the filename.
<b>subnet-mask</b> <i>mask</i>	Dotted-decimal address specifying the network and local subnetwork mask (as defined by RFC 950).
<b>time-offset</b> <i>offset</i>	Signed 32-bit integer specifying the time offset of the local subnetwork in seconds from Universal Coordinated Time (UTC).
<b>gateway</b> <i>address</i>	Dotted-decimal address specifying the IP addresses of gateways for this subnetwork. A preferred gateway should be listed first.
<b>time-server</b> <i>address</i>	Dotted-decimal address specifying the IP address of time servers (as defined by RFC 868).
<b>IEN116-server</b> <i>address</i>	Dotted-decimal address specifying the IP address of name servers (as defined by IEN 116).
<b>DNS-server</b> <i>address</i>	Dotted-decimal address specifying the IP address of Domain Name Servers (as defined by RFC 1034).
<b>log-server</b> <i>address</i>	Dotted-decimal address specifying the IP address of an MIT-LCS UDP log server.
<b>quote-server</b> <i>address</i>	Dotted-decimal address specifying the IP address of Quote of the Day servers (as defined in RFC 865).
<b>lpr-server</b> <i>address</i>	Dotted-decimal address specifying the IP address of Berkeley UNIX Version 4 BSD servers.
<b>impress-server</b> <i>address</i>	Dotted-decimal address specifying the IP address of Impress network image servers.
<b>rlp-server</b> <i>address</i>	Dotted-decimal address specifying the IP address of Resource Location Protocol (RLP) servers (as defined in RFC 887).

Keyword	Description
<b>hostname</b> <i>name</i>	The name of the client, which may or may not be domain qualified, depending upon the site.
<b>bootfile-size</b> <i>value</i>	A two-octet value specifying the number of 512-octet (byte) blocks in the default boot file.

### Default

If no extended BOOTP commands are entered, the router software generates a gateway and subnet mask appropriate for the local network.

### Command Mode

Global configuration

### Usage Guidelines

Use the EXEC command **show async-bootp** to list the configured parameters. Use the **no async-bootp** command to clear the list.

### Examples

The following example illustrates how to specify different boot files: one for a PC, and one for a Macintosh. With this configuration, a BOOTP request from the host on 128.128.1.1 results in a reply listing the boot filename as *pcboot*. A BOOTP request from the host named *mac* results in a reply listing the boot filename as *macboot*.

```
async-bootp bootfile :128.128.1.1 "pcboot"
async-bootp bootfile :mac "macboot"
```

The following example specifies a subnet mask of 255.255.0.0:

```
async-bootp subnet-mask 255.255.0.0
```

The following example specifies a negative time offset of the local subnetwork of -3600 seconds:

```
async-bootp time-offset -3600
```

The following example specifies the IP address of a time server:

```
async-bootp time-server 128.128.1.1
```

### Related Command

**show async-bootp**

## boot

To boot the router manually, use the **boot** ROM monitor command.

```
boot
boot filename [ip-address]
boot flash [filename]
boot flash [device:]partition-number:[filename]
boot flash [device:filename] (Cisco 7000 series only)
boot device:[filename] (Cisco 7500 series only)
```

### Syntax Description

<i>filename</i>	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.  (Optional) When used in conjunction with the <b>flash</b> keyword, the <i>filename</i> argument is the name of the system image file to boot from Flash memory. On all platforms except the Cisco 7000 series and Cisco 7500 series, the system obtains the image file from internal Flash memory. On the Cisco 7000 series and Cisco 7500 series, the <i>device:</i> argument specifies the Flash memory device from which to obtain the system image. See the <i>device:</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.
<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.
<b>flash</b>	(Optional) Boots the router from Flash memory.
<i>device:</i>	(Optional on all platforms except the Cisco 7500 series) On all platforms except the Cisco 7000 series and Cisco 7500 series, the only valid value is <b>flash</b> . The colon (:) is required.  On the Cisco 7000 series and Cisco 7500 series, valid devices are as follows: <ul style="list-style-type: none"><li>• <b>flash</b>. This device is the internal Flash memory in the Cisco 7000 series.</li><li>• <b>bootflash</b>. This device is the internal Flash memory in the Cisco 7500 series.</li><li>• <b>slot0</b>. This device is the Personal Computer Memory Card International Association (PCMCIA) slot on the Cisco 7000 series Route Processor (RP) card or the first PCMCIA slot on the Cisco 7500 series Route Switch Processor (RSP) card.</li><li>• <b>slot1</b>. This device is the second PCMCIA slot on the Cisco 7500 series RSP card.</li></ul> The colon (:) is required.

*partition-number:* Boots the router from Flash memory with the optional filename of the image you want loaded from the specified Flash partition. If you do not specify a filename, the first valid file in the specified partition of Flash memory is loaded.

### Default

If you enter the **boot** command and press Return, the router boots from ROM by default.

If you enter the **boot flash** command without a *filename*, the first valid file in Flash memory is loaded.

For other defaults, see the Syntax Description section.

### Command Mode

ROM monitor

### Usage Guidelines

Use this command only when your router cannot find the configuration information needed in nonvolatile random-access memory (NVRAM). To get to the ROM monitor prompt (>), enter the **reload** EXEC command, and then press the Break key during the first 60 seconds of startup, or change the boot bits in the configuration register to zero, for manual booting, and then issue the **reload** command.

Refer to the *Cisco 7000 Hardware Installation and Maintenance* publication for the correct jumper settings for the Cisco 7000 series.

### Examples

In the following example, the router is manually booted from ROM:

```
> boot
F3:
(ROM Monitor copyrights)
```

In the following example, a router boots the file *routertest* from a network server with the IP address 131.108.15.112:

```
> boot routertest 131.108.15.112
F3:
(ROM Monitor copyrights)
```

The following example shows the **boot flash** command without the *filename* argument. The first valid file in Flash memory is loaded.

In the following example, the **boot flash** command is used with the filename *gs7-k*. That is the file that will be loaded.

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

```
> boot flash flash:2:igs-bpx-1
F3: 3562264+98228+303632 at 0x30000B4
(ROM Monitor copyrights)
```

## Related Command

continue

## boot bootldr

To specify a Flash device and filename containing the rxboot image that ROM uses for booting, use the **boot bootldr** global configuration command. Use the **no** form of the command to remove this rxboot image specification.

**boot bootldr** *device:filename*  
**no boot bootldr**

### Syntax Description

*device:* Device containing the rxboot image that ROM uses. The colon (:) is required. Valid values are as follows:

- **flash.** This device is the internal Flash memory in the Cisco 7000 series.
- **bootflash.** This device is the internal Flash memory in the Cisco 7500 series.
- **slot0.** This device is the PCMCIA slot on the Cisco 7000 series Route Processor (RP) card or the first PCMCIA slot on the Cisco 7500 series Route Switch Processor (RSP) card.
- **slot1.** This device is the second PCMCIA slot on the Cisco 7500 series RSP card.

*filename* Name of the rxboot image file. The maximum filename length is 63 characters.

### Default

There is no default Flash device or filename.

### Command Mode

Global configuration

### Usage Guidelines

Use this command only with the Cisco 7000 series or Cisco 7500 series. The **boot bootldr** command sets the BOOTLDR environment variable in the current running configuration. You must specify both the device 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 running-config startup-config** command to save the environment variable from your running configuration to your startup configuration.

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The **no** form of the command sets the BOOTLDR environment variable to a null string. On the Cisco 7500 series, a null string causes the first image file in bootflash to be used as the rxboot image that ROM uses for booting.

### Examples

In the following example, the internal Flash memory on a Cisco 7000 series contains the rxboot image:

```
boot bootldr flash:boot-image
```

The following example specifies that the Flash memory card inserted in slot 0 of the RP or RSP card contains the rxboot image:

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

### Related Commands

**copy running-config startup-config**  
**show boot**  
**show flash**

## 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 flash [filename]**  
**no boot bootstrap flash [filename]**

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

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

### Syntax Description

<b>flash</b>	Indicates that the router will be booted from Flash memory.
<i>filename</i>	(Optional with <b>flash</b> .) Name of the system image to boot from a network server. If you omit the filename when booting from Flash, the router uses the first system image stored in Flash memory.
<b>mop</b>	Indicates that the router will be booted from a system image stored on a DEC MOP server.
<i>mac-address</i>	(Optional) MAC address of the MOP server on which the file resides. If the MAC address argument is not included, a broadcast message is sent to all MOP boot servers. The first MOP server to indicate that it has the file will be the server from which the router gets the boot image.
<i>interface</i>	(Optional) Interface out which the router should send MOP requests to reach the MOP server. The interface options are <b>async</b> , <b>dialer</b> , <b>Ethernet</b> , <b>loopback</b> , <b>null</b> , <b>serial</b> , and <b>tunnel</b> . If the interface argument is not specified, a request will be sent on all interfaces that have MOP enabled, and the interface from which the first response is received will be used to load the software.
<b>tftp</b>	(Optional) Indicates that the router will be booted 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.

### Default

No secondary bootstrap

### Command Mode

Global configuration

## Usage Guidelines

The **boot bootstrap** command, in conjunction with setting bit 9 on the configuration register of an AGS, CGS, or MGS router, causes the router to load a secondary bootstrap image over the network. The secondary bootstrap image then loads the specified system image file. The name of the secondary bootstrap file is boot-csc3 or boot-csc4, depending on the router model. 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.

## Example

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

```
boot bootstrap sysimage-2
```

## boot buffersize

To modify the buffer size used to load configuration files, use the **boot buffersize** global configuration command. Use the **no** form of this command to return to the default setting.

**boot buffersize** *bytes*  
**no boot buffersize**

### Syntax Description

*bytes*      Specifies the size of the buffer to be used. There is no minimum or maximum size that can be specified.

### Default

Buffer size of the NVRAM

### Command Mode

Global configuration

### Usage Guidelines

Normally, the router uses a buffer the size of the system NVRAM to hold configuration commands read from the network. You can increase this size if you have a very complex configuration.

### Example

The following example sets the buffer size to 64000:

```
configure terminal
boot buffersize 64000
```

## boot config

To specify the device and filename of the configuration file from which the router configures itself during initialization (startup), use the **boot config** global configuration command. Use the **no** form of the command to remove this specification.

**boot config** *device:filename*

**no boot config**

### Syntax Description

<i>device:</i>	Device containing the configuration file. The colon (:) is required. Valid devices are as follows: <ul style="list-style-type: none"><li>• <b>flash.</b> This device is the internal Flash memory in the Cisco 7000 series.</li><li>• <b>bootflash.</b> This device is the internal Flash memory in the Cisco 7500 series.</li><li>• <b>nvram.</b> The device is the router's nonvolatile random-access memory (NVRAM). If you specify NVRAM, omit the filename. The colon (:) is required.</li><li>• <b>slot0.</b> This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card.</li><li>• <b>slot1.</b> This device is the second PCMCIA slot on the Cisco 7500 series RSP card.</li></ul>
<i>filename</i>	Name of the configuration file. The configuration file must be an ASCII file. The maximum filename length is 63 characters.

### Default

NVRAM (**nvram:**)

### Command Mode

Global configuration

### Usage Guidelines

Use this command only with the Cisco 7000 series or Cisco 7500 series. You set the CONFIG\_FILE environment variable in the current running memory when you use the **boot config** command. This variable specifies the configuration file used for initialization (startup).

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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 running-config startup-config** command to save the environment variable from your running configuration to your startup configuration.

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If you specify **nvramp**: as the device, and it contains only a distilled version of the configuration, the router displays an error message and does not update the CONFIG\_FILE environment variable. (A distilled configuration is one that does not contain access lists.) If you specify a configuration file in the *filename* argument that does not exist or is not valid, the router displays an error message and does not update the CONFIG\_FILE environment variable.

The router uses the NVRAM configuration during initialization when the CONFIG\_FILE environment variable does not exist or when it is null (such as at first-time startup). If the router detects a problem with NVRAM or the configuration it contains, the router enters **setup** mode. Refer to the *Router Products Getting Started Guide* for more information on the **setup** command facility.

When you use the **no** form of this command, the router returns to using the NVRAM configuration as the startup configuration.

## Examples

In the following example, the first line specifies that a Cisco 7000 series router should use the configuration file *router-config* located in internal Flash memory to configure itself during initialization. The second line copies the specification to the startup configuration, ensuring that this specification will take effect upon the next reload:

```
Router (config)# boot config flash:router-config
^Z
Router# copy running-config startup-config
```

The following example instructs a Cisco 7500 series router to use the configuration file *router-config* located on the Flash memory card inserted in the second PCMCIA slot of the RSP card during initialization. The second line copies the specification to the startup configuration, ensuring that this specification will take effect upon the next reload:

```
Router (config)# boot config slot1:router-config
^Z
Router# copy running-config startup-config
```

## Related Commands

**copy running-config startup-config**  
**show boot**  
**show flash**

## boot host

To change the default name of the host configuration filename from which you want to load configuration commands, use the **boot host** global configuration command. Use the **no** form of this command to restore the host configuration filename to the default.

```
boot host mop filename [mac-address] [interface]
no boot host mop filename [mac-address] [interface]
```

```
boot host [tftp | rcp] filename [ip-address]
no boot host [tftp | rcp] filename [ip-address]
```

### Syntax Description

**mop** Indicates that the router will be configured from a configuration file stored on a DEC MOP server.

*filename* Name of the file from which you want to load configuration commands.

*mac-address* (Optional) MAC address of the MOP server on which the file resides. If the MAC address argument is not included, a broadcast message is sent to all MOP boot servers. The first MOP server to indicate that it has the file will be the server from which the router gets the boot image.

*interface* (Optional) Interface out which the router should send MOP requests to reach the MOP server. The interface options are **async**, **dialer**, **ethernet**, **serial**, and **tunnel**. If the interface argument is not specified, a request will be sent on all interfaces that have MOP enabled, and the interface from which the first response is received will be used to load the software.

**tftp** (Optional) Indicates that the router will be configured from a configuration file stored on a TFTP server.

**rcp** (Optional) Indicates that the router will be configured from a configuration file stored on an rcp server.

*ip-address* (Optional) IP address of the TFTP server on which the file resides. If omitted, this value defaults to the IP broadcast address of 255.255.255.255.

### Default

The router uses its host name to form a host configuration filename. To form this name, the router converts its name to all lowercase letters, removes all domain information, and appends *-cfg*.

### Command Mode

Global configuration

## Usage Guidelines

Use the **service config** command to enable the loading of the specified configuration file at reboot time. Without this command, the router ignores the **boot host** command and uses the configuration information in NVRAM. If the configuration information in NVRAM is invalid or missing, the **service config** command is enabled automatically.

The network server will attempt to load two configuration files from remote hosts. The first is the network configuration file containing commands that apply to all network servers on a network. The second is the host configuration file containing commands that apply to one network server in particular.

## Example

The following example sets the host filename to *wilma-*cfg** at address 192.31.7.19:

```
boot host /usr/local/tftpdir/wilma-cfg 192.31.7.19
```

## Related Commands

**boot network**  
**service config**

## boot network

To change the default name of the network configuration file from which you want to load configuration commands, use the **boot network** global configuration command. Use the **no** form of this command to restore the network configuration filename to the default.

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

**boot network [tftp | rcp]** *filename* [*ip-address*]  
**no boot network [tftp | rcp]** *filename* [*ip-address*]

### Syntax Description

<b>mop</b>	Configures the router to download the configuration file from a network server using the Digital Maintenance Operation Protocol (MOP) protocol.
<i>filename</i>	Name of the file from which you want to load configuration commands. The default filename is <i>network-config</i> .
<i>mac-address</i>	(Optional) If <b>mop</b> is specified, the MAC address of the network server on which the file resides. If the MAC address argument is not included, a broadcast message is sent to all MOP boot servers. The first server to indicate that it has the file will be the server from which the router gets the boot image.
<i>interface</i>	(Optional) If <b>mop</b> is specified, the interface out which the router should send MOP requests to reach the server. The interface options are <b>async</b> , <b>dialer</b> , <b>ethernet</b> , <b>serial</b> , and <b>tunnel</b> . If the interface argument is not specified, a request will be sent on all interfaces that have MOP enabled, and the interface from which the first response is received will be used to load the software.
<b>tftp</b>	(Optional) Configures the router to download the configuration file from a network server using TFTP. If omitted and <b>rcp</b> is not specified, defaults to <b>tftp</b> .
<b>rcp</b>	(Optional) Configures the router to download the configuration file from a network server using rcp. If omitted, defaults to <b>tftp</b> .
<i>ip-address</i>	(Optional) If <b>rcp</b> or <b>tftp</b> is specified, the IP address of the network server on which the compressed image file resides. If the IP address is omitted, this value defaults to the IP broadcast address of 255.255.255.255.

### Default

The default filename is *network-config*. The default transfer protocol type is TFTP, if neither **tftp** nor **rcp** is specified.

### Command Mode

Global configuration

## Usage Guidelines

When booting from a network server, routers ignore routing information, static IP routes, and bridging information. As a result, intermediate routers are responsible for handling rcp or TFTP requests correctly. Before booting from a network server, verify that a server is available by using the **ping** command.

Use the **service config** command to enable the loading of the specified configuration file at reboot time. Without this command, the router ignores the **boot network** command and uses the configuration information in NVRAM. If the configuration information in NVRAM is invalid or missing, the **service config** command is enabled automatically.

The network server will attempt to load two configuration files from remote hosts. The first is the network configuration file containing commands that apply to all network servers on a network. Use the **boot network** command to identify the network configuration file.

The rcp software requires that a client send the remote username on each rcp request to the network server. When the **boot network rcp** command is executed, the router software sends the router host name as the both the remote and local usernames. The rcp implementation searches for the configuration files to be used relative to the account directory of the remote username on the network server, if the server has a directory structure, for example, as do UNIX systems.

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**Note** For rcp, if you do not explicitly specify a remote username by issuing the **ip rcmd remote-username** command and the router host name is used, an account for the router host name must be defined on the destination server. If the network administrator of the destination server did not establish an account for the router host name, this command will not execute successfully.

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If you copy the system image to a personal computer used as a file server, the remote host computer must support the remote shell (rsh) protocol.

## Examples

The following example changes the network configuration filename to *bridge\_9.1* and uses the default broadcast address:

```
boot network bridge_9.1
service config
```

The following example changes the network configuration filename to *bridge\_9.1*, specifies that rcp is to be used as the transport mechanism, and gives 131.108.1.111 as the IP address of the server on which the network configuration file resides:

```
boot network rcp bridge_9.1 131.108.1.111
service config
```

## Related Commands

**boot host**  
**service config**

## 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 flash [device:][partition-number:][filename]**  
**no boot system flash [device:][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] filename [ip-address]**  
**no boot system [rcp | tftp] filename [ip-address]**

**no boot system**

### Syntax Description

#### **flash**

On all platforms except the Cisco 7000 series and Cisco 7500 series, 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.

On the Cisco 7000 series and Cisco 7500 series, this keyword boots the router from a Flash device, as specified by the *device:* argument. On the Cisco 7000 series, when you omit all arguments that follow this keyword, the system searches internal Flash and then the PCMCIA slots (starting with slot 0) for the first bootable image. On the Cisco 7500 series, when you omit all arguments that follow this keyword, the system searches the PCMCIA slot 0 for the first bootable image.

#### *device:*

(Optional) Device containing the system image to load at startup. The colon (:) is required. Valid devices are as follows:

- **flash.** This device is the internal Flash memory. Optionally, use this device on all platforms except the Cisco 7500 series. The **flash** option is the only valid device option for all platforms except the Cisco 7000 series and the Cisco 7500 series. For the Cisco 7000 series, this device is the default if you do not specify a device.
- **bootflash.** This device is the internal Flash memory in the Cisco 7500 series.
- **slot0.** This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card. For the Cisco 7500 series, this device is the default if you do not specify a device.
- **slot1.** This device is the second PCMCIA slot on the Cisco 7500 series RSP card.

<i>partition-number:</i>	(Optional) Number of the Flash memory partition that boots the router with the image 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 not used with the Cisco 7000 series and the Cisco 7500 series.
<i>filename</i>	(Optional when used with <b>boot system flash</b> .) 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 device, the specified partition of Flash memory, or the default Flash device if you also omit the <i>device:</i> argument.
<b>mop</b>	Boots the router from a system image stored on a Digital MOP server. Do not use this keyword with the Cisco 7500 series.
<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 will be 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 <b>async</b> , <b>dialer</b> , <b>ethernet</b> , <b>serial</b> , and <b>tunnel</b> . 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.
<b>rom</b>	Boots the router from ROM. Do not use this keyword with the Cisco 7500 series.
<b>rcp</b>	(Optional) Boots the router from a system image stored on a network server using rcp. If you omit this keyword, the transport mechanism defaults to <b>tftp</b> .
<b>tftp</b>	(Optional) Boots the router from a system image stored on a TFTP server. This is the default when you do not specify any keyword ( <b>flash</b> , <b>mop</b> , <b>rom</b> , <b>tftp</b> , or <b>rcp</b> ).
<i>ip-address</i>	(Optional) IP address of the TFTP server containing the system image file. If omitted, this value defaults to the IP broadcast address of 255.255.255.255.

### Default

If you 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 for booting from a network server. 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 (cisco-*cpu*). See the appropriate hardware installation guide for details on the configuration register and default filename. See also the command **config-register**. See also the “Syntax Description” section preceding this section.

On the Cisco 7000 series and Cisco 7500 series, if you omit a keyword (**flash**, **mop**, **rom**, **rcp**, or **tftp**) from the **boot system** command, the system defaults to booting from a system image stored on a TFTP server.

### Command Mode

Global configuration

### 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. Use the **boot system rom** command to specify use of the ROM system image as a backup to other **boot** commands in the configuration.

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** The **no boot system** global configuration command disables all **boot system** configuration commands regardless of argument. Specifying the **flash** keyword or the *filename* argument with the **no boot system** command disables only the command specified by these arguments.

---

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.)

The **rcp** protocol requires that a client send the remote username in an **rcp** request to a server. When the router executes the **boot system rcp** command, by default the router software sends the router host name as the both the remote and local usernames. The **rcp** software searches for the system image to boot from the remote server relative to the directory of the remote username (if the server has a directory structure as UNIX systems do, for example).

For the Cisco 7000 series and the Cisco 7500 series, 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.

For routers with the RP card (Cisco 7000 series), valid devices are **flash** and **slot0**. On the Cisco 7000 series, the following forms of the **boot system** command specify a list of bootable images in the BOOT environment variable:

- **boot system flash flash:[filename]**  
**no boot system flash flash:[filename]**
- **boot system flash slot0:[filename]**  
**no boot system flash slot0:[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 tftp filename [ip-address]**  
**no boot system tftp filename [ip-address]**
- **boot system rcp filename [ip-address]**  
**no boot system rcp filename [ip-address]**

You can omit the device **flash:** from the **boot system flash flash:[filename]** command because the default device on a Cisco 7000 series is **flash**. Therefore, **boot system flash [filename]** is the same as **boot system flash flash:[filename]**.

For routers with the RSP card (Cisco 7500 series), valid devices are **bootflash**, **slot0**, **slot1**, and **tftp**. On the Cisco 7500 series, the following forms of the **boot system** command specify a list of bootable images in the BOOT environment variable:

- **boot system flash bootflash:[filename]**  
**no boot system flash bootflash:[filename]**
- **boot system flash slot0:[filename]**  
**no boot system flash slot0:[filename]**
- **boot system flash slot1:[filename]**  
**no boot system flash slot1:[filename]**
- **boot system tftp filename [ip-address]**  
**no boot system tftp filename [ip-address]**

---

**Note** When you use the **boot system** global configuration commands on the Cisco 7000 series and Cisco 7500 series, 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 running-config startup-config** command to save the environment variable from your running configuration to your startup configuration.

---

If an entry in the BOOT environment variable list does not specify a device, the router assumes the device is **tftp**. When **tftp** is the device, the router first loads the rxboot image to boot the system image file from a network server. If an entry in the BOOT environment variable list specifies an invalid device, the router skips that entry. To view the contents of the BOOT environment variable, use the **show boot** command.

To remove a single entry from the bootable image list, use the **no** form of a specific command. For example, to remove the entry that specifies a bootable image on a Flash memory card inserted in the second slot of the RSP card, 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. Issuing this command sets the BOOT environment variable to a null string, wiping out all entries. 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 running-config startup-config** command.

---

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

---

## Examples

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

```
boot system cs3-rx.90-1 192.31.7.24
boot system cs3-rx.83-2 192.31.7.19
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 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 RP card or the Cisco 7500 series RSP card:

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

## Related Commands

**config-register**  
**copy flash rcp**  
**copy flash tftp**  
**copy rcp flash**  
**copy running-config startup-config**  
**copy tftp flash**  
**ip rcmd remote-username**  
**show boot**

## cd

To set the default Flash device for the system, use the **cd** EXEC command.

**cd** [*device*:]

### Syntax Description

<i>device</i> :	(Optional) Default device. The colon (:) is required. Valid devices are as follows:
	<ul style="list-style-type: none"><li>• <b>flash</b>. This device is the internal Flash memory in the Cisco 7000 series. For the Cisco 7000 series, this device is the initial default device and the default device when you omit the <i>device</i>: argument.</li></ul>
	<ul style="list-style-type: none"><li>• <b>bootflash</b>. This device is the internal Flash memory in the Cisco 7500 series.</li></ul>
	<ul style="list-style-type: none"><li>• <b>slot0</b>. This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card. For the Cisco 7500 series, this device is the initial default device and the default device when you omit the <i>device</i>: argument.</li></ul>
	<ul style="list-style-type: none"><li>• <b>slot1</b>. This device is the second PCMCIA slot on the Cisco 7500 series RSP card.</li></ul>

### Default

For the Cisco 7000 series, **flash** is the initial default device and the default device when you omit the *device*: argument.

For the Cisco 7500 series, **slot0** is the initial default device and the default device when you omit the *device*: argument.

### Command Mode

EXEC

### Usage Guidelines

Use this command only with the Cisco 7000 series or the Cisco 7500 series. For all EXEC commands that have an optional *device*: argument, the system uses the device specified by the **cd** command when you omit the optional *device*: argument. For example, the **dir** command contains an optional *device*: argument and displays a list of files on a Flash memory device. When you omit this *device*: argument, the system shows a list of the files on the Flash device specified by the **cd** command.

**Example**

The following example sets the default device to the Flash memory card inserted in the slot 0 of the RP or RSP card:

```
cd slot0:
```

**Related Commands**

**copy**  
**delete**  
**dir**  
**pwd**  
**show flash**  
**undelete**

## config-register

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

**config-register** *value*

### Syntax Description

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

### Default

For the router models without Flash memory, the default is 0x101, which causes the router to boot from ROM and the Break key to be ignored. For router models with Flash memory, the default is 0x10F, which causes the router to boot from Flash memory and the Break key to be ignored.

### Command Mode

Global configuration

### Usage Guidelines

This command applies only to the Cisco 2000, Cisco 3000, Cisco 4000 series, or to the Cisco 7000 series. All other models use a hardware 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. Bit 8 controls the console Break key; when set to 1, it causes the Break key to be ignored. The remaining bits control other features of the router and are typically set to 0.

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 value to 0x100, you must boot the operating system manually with the **boot** command.
- If you set the configuration register value to 0x101, the router boots using the default ROM software.
- If you set the configuration register to any value from 0x102 to 0x10F, 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.

### Example

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

```
config-register 0x010F
```

Related Commands

**boot system**

**o**

**show version**

# configure

To enter global configuration mode, use the **configure** privileged EXEC command. You must be in global configuration mode to enter global configuration commands.

**configure {terminal | memory | network}**

## Syntax Description

<b>terminal</b>	Executes configuration commands from the terminal.
<b>memory</b>	For all platforms except the Cisco 7000 series and the Cisco 7500 series, executes the commands stored in NVRAM.
	For the Cisco 7000 series and the Cisco 7500 series, executes the configuration specified by the CONFIG_FILE environment variable.
<b>network</b>	The <b>copy rcp running-config</b> or <b>copy tftp running-config</b> command replaces the <b>configure network</b> command. If you use rcp, see the <b>copy rcp</b> command for more information on <b>copy rcp running-config</b> . If you use TFTP, see the <b>copy tftp</b> command for more information on <b>copy tftp running-config</b> .

## Default

For all platforms except the Cisco 7000 series and the Cisco 7500 series, there is no default.

For the Cisco 7000 series and the Cisco 7500 series, the router uses the NVRAM configuration (if valid) when the CONFIG\_FILE environment variable does not exist or is null (such as at first-time startup).

## Command Mode

Privileged EXEC

## Usage Guidelines

If you do not specify **terminal** or **memory**, the router prompts you for the source of configuration commands. If you specify **terminal**, the router executes the commands you enter at the system prompts.

On all platforms except the Cisco 7000 series and the Cisco 7500 series, if you specify **memory**, the router executes the commands located in NVRAM. On the Cisco 7000 series and the Cisco 7500 series, if you specify **memory**, the router executes the commands pointed to by the CONFIG\_FILE environment variable. The CONFIG\_FILE environment variable specifies the device and filename of the configuration file that the router uses to configure itself during initialization. Possible devices are as follows:

- **flash:** This device is the internal Flash memory in the Cisco 7000 series. This device is the initial default device.
- **bootflash:** This device is the internal Flash memory in the Cisco 7500 series.
- **nvramp:** The device is the router's NVRAM.

- **slot0:** This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card. For the Cisco 7500 series, this device is the initial default device.
- **slot1:** This device is the second PCMCIA slot on the Cisco 7500 series RSP card.

When the CONFIG\_FILE environment variable specifies NVRAM, the router executes the NVRAM configuration only if it is an entire configuration, not a distilled version. A distilled configuration is one that does not contain access lists.

To view the contents of the CONFIG\_FILE environment variable, use the **show boot** command. To modify the CONFIG\_FILE environment variable, use the **boot config** command and then save your changes by issuing the **copy running-config startup-config** command.

After you enter the **configure** command, the system prompt changes from `<router-name>#` to `<router-name>(config)#`, indicating that you are in global configuration mode. To leave global configuration mode and return to the privileged EXEC prompt, press **Ctrl-Z**.

---

**Note** The commands **configure net network** and **configure net host** no longer clear line parameters.

---

## Examples

In the following example, the router is configured from the terminal:

```
Router# configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
```

In the following example, a Cisco 7000 series or Cisco 7500 series router executes the commands pointed to by the CONFIG\_FILE environment variable:

```
configure memory
```

## Related Commands

**boot config**  
**copy running-config startup-config**  
**show boot**  
**show running-config**  
**show startup-config**

## **configure overwrite-network**

The **copy rcp startup-config** or **copy tftp startup-config** command replaces the **configure overwrite-network** command. If you use rcp, see the **copy rcp** command for more information on **copy rcp startup-config**. If you use TFTP, see the **copy tftp** command for more information on **copy tftp startup-config**.

## continue

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

**continue**

### Syntax Description

This command has no arguments or keywords.

### Command Mode

ROM monitor

### Usage Guidelines

Use this command when you are in ROM monitor mode, and you want to return to EXEC mode to use the system image instead of reloading. On most platforms, the angle bracket (>) indicates that you are in ROM monitor mode. On the Cisco 1003, Cisco 4500, and Cisco 7500, *rommon>* is the default ROM monitor prompt. Typically, you are in ROM monitor mode when you manually load a system image or perform diagnostic tests. Otherwise, you 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.

### Example

In the following example, the **continue** command takes you from ROM monitor to EXEC mode:

```
> continue  
Router#
```

### Related Command

**boot**

## copy

On the Cisco 7000 series or the Cisco 7500 series, to copy any file from a Flash device or NVRAM to another destination, use the following **copy** EXEC command:

**copy** *file\_id* {**running-config** | **startup-config** | *file\_id*} (Cisco 7000 series and Cisco 7500 series only)

### Syntax Description

#### *file\_id*

Specifies a *device:filename* as the source or destination of the copy operation. The *device* is optional; but when it is used, the colon (:) is required. Valid devices are as follows:

- **flash:** This device is the internal Flash memory on the Cisco 7000 series.
- **bootflash:** This device is the internal Flash memory in the Cisco 7500 series.
- **slot0:** This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card.
- **slot1:** This device is the second PCMCIA slot on the Cisco 7500 series RSP card.
- **nvram:** This device is the router's NVRAM. If you specify NVRAM, omit the filename.

The *filename* is the name of the source or destination file. You must always provide a source filename. You can omit the destination filename, in which case the system uses the source filename. Wildcards are not permitted. The maximum filename length is 63 characters.

#### **running-config**

Specifies the currently running configuration as the destination of the copy operation.

#### **startup-config**

Specifies the configuration used for initialization as the destination of the copy operation. (Note that the CONFIG\_FILE environment variable specifies the startup configuration on a Cisco 7000 series and a Cisco 7500 series.)

### Default

If you omit the source or destination device, the router uses the default device specified by the **cd** command. If you omit the destination filename, the router uses the source filename.

### Command Mode

#### EXEC

## Usage Guidelines

Use this **copy** command with the Cisco 7000 series and the Cisco 7500 series.

On the Cisco 7000 series and Cisco 7500 series, the **copy** commands generally copy a file from a source to a destination. Some invalid combinations exist. Specifically, you cannot copy a running configuration to a running configuration, a startup configuration to a startup configuration, or TFTP to rcp.

When the destination is specified by the CONFIG\_FILE or BOOTLDR environment variable, the router prompts you for confirmation before proceeding with the copy. When the destination is the only valid image in the BOOT environment variable, the router also prompts you for confirmation before proceeding with the copy.

The CONFIG\_FILE environment variable specifies the configuration used during router initialization. The BOOTLDR environment variable specifies the Flash device and filename containing the rxboot image that ROM uses for booting. The BOOT environment variable specifies a list of bootable images on various devices. To view the contents of environment variables, use the **show boot** command. To modify the CONFIG\_FILE environment variable, use the **boot config** command. To modify the BOOTLDR environment variable use the **boot bootldr** command. To modify the BOOT environment variable, use the **boot system** command. To save your modifications, use the **copy running-config startup-config** command.

If you do not specify a source or destination device, the router uses the default device specified by the **cd** command.

## Examples

The following example copies the *router-config1* file from the internal Flash memory of a Cisco 7500 series router to the *router-backupconfig* file on the Flash memory card inserted in the first slot of the RSP card:

```
copy bootflash:router-config1 slot0:router-backupconfig
```

In the following example, the router copies the *router-image* file from the Flash memory card inserted in the slot 0 of the RP or RSP card on a Cisco 7000 series or Cisco 7500 series, respectively, to the startup configuration:

```
copy slot0:router-image startup-config
```

The following example copies the NVRAM configuration file to the *router-backupconfig* file on the Flash memory card inserted in slot0 of the RP or RSP card:

```
copy nvram: slot0:router-backupconfig
```

## Related Commands

**boot config**  
**copy running-config startup-config**  
**delete**  
**dir**  
**show boot**  
**verify**

## copy bootflash

To copy a bootstrap image from Flash memory to a network server on the Cisco 4500 series, use the **copy bootflash** EXEC command.

**copy bootflash {rcp | tftp}**

### Syntax Description

**rcp** Specifies a copy operation to a network server using rcp.

**tftp** Specifies a TFTP server as the destination of the copy operation.

### Command Mode

EXEC

### Usage Guidelines

Use this command only on the Cisco 4500 router. You can use the network server copy of the bootstrap image as a backup copy or to verify that the copy in Flash memory is the same as the original file.

Use the **copy bootflash rcp** command to copy a bootstrap image from Flash memory to a network server using rcp. The rcp protocol requires that a client send the remote username of an rcp request to the server. When you issue the **copy bootflash rcp** command, by default the router software sends the username associated with the current TTY, if that name is valid. For example, if the user is connected to the router through Telnet and the user was authenticated through the **username** command, then the router software sends that username as the remote username.

---

**Note** For Cisco, TTYs are commonly used in communication servers. The concept of TTY originated with UNIX. For UNIX systems, each physical device is represented in the file system. Terminals are called *TTY devices*, which stands for *teletype*, the original UNIX terminal.

---

If the TTY username is invalid, the router software uses the router host name as the both the remote and local usernames. To specify a different remote username to be sent to the rcp server, use the **ip rcmd remote-username** command. The rcp software copies the bootstrap image to an appropriate remote server. You can also specify the path of an existing directory along with the remote username.



**Caution** The remote username must be associated with an account on the destination server. If you do not use the command to specify the name of a remote user associated with an account on the server, then the remote username associated with the current TTY process must be associated with an account on the server. If there is no username for the current TTY process, then the router host name must be associated with an account on the server. If the network administrator of the destination server did not establish accounts for the remote username used, this command will not execute successfully.

If you copy the bootstrap image to a personal computer used as a file server, the remote host computer must support rcp.

Use the **copy bootflash tftp** command to copy a bootflash image from Flash memory to a TFTP server.

## Examples

The following example shows how to use the **copy bootflash rcp** command on a Cisco 4500 router:

```
Router(config)# ip rcmd remote-username netadmin1
Router# copy bootflash rcp

System flash directory, partition 2:
File  Length  Name/status
  1    984     junk
[1048 bytes used, 8387560 available, 8388608 total]
Address or name of remote host [223.255.254.254]?
Source file name? junk
Destination file name [junk]? junk
Verifying checksum for 'junk' (file # 1)...  OK
Copy 'junk' from Flash to server
  as 'junk'? [yes/no]y
-
Upload to server done
Flash copy took 0:00:00 [hh:mm:ss]
```

You will see a spinning line during the copy process.

The following example illustrates how to use the **copy bootflash tftp** command on a Cisco 4500 router:

```
Router# copy bootflash tftp

System flash directory, partition 2:
File  Length  Name/status
  1    984     junk
[1048 bytes used, 8387560 available, 8388608 total]
Address or name of remote host [223.255.254.254]?
Source file name? junk
Destination file name [junk]? junk
Verifying checksum for 'junk' (file # 1)...  OK
Copy 'junk' from Flash to server
  as 'junk'? [yes/no]y
-
Upload to server done
Flash copy took 0:00:00 [hh:mm:ss]
```

## Related Commands

**copy mop bootflash**  
**copy rcp bootflash**  
**copy tftp bootflash**  
**verify bootflash**  
**erase bootflash**  
**ip rcmd remote-username**  
**show bootflash**

## copy flash

To copy a file from Flash memory to another destination, use one of the following **copy flash** EXEC commands:

**copy flash {rcp | tftp}**

**copy flash {rcp | tftp | file\_id}** (Cisco 7000 series and Cisco 7500 series only)

### Syntax Description

<b>rcp</b>	Specifies a copy operation to a network server using rcp.
<b>tftp</b>	Specifies a TFTP server as the destination of the copy operation.
<i>file_id</i>	Specifies a <i>device;filename</i> as the destination of the copy operation. The <i>device</i> argument is optional; but when it is used, the colon (:) is required. Valid devices are as follows: <ul style="list-style-type: none"> <li>• <b>flash:</b> This device is the internal Flash memory on the Cisco 7000 series.</li> <li>• <b>bootflash:</b> This device is the internal Flash memory in the Cisco 7500 series.</li> <li>• <b>slot0:</b> This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card.</li> <li>• <b>slot1:</b> This device is the second PCMCIA slot on the Cisco 7500 series RSP card.</li> <li>• <b>nram:</b> This device is the router's NVRAM. If you specify NVRAM, omit the filename. The colon (:) is required.</li> </ul>
The <i>filename</i> argument is the name of the destination file. You must always provide a source filename. You can omit the destination filename, in which case the system uses the source filename. Wildcards are not permitted. The maximum filename length is 63 characters.	

### Default

On the Cisco 7000 series and the Cisco 7500 series, if you omit the destination device, the router uses the default device specified by the **cd** command. If you omit the destination filename, the router uses the source filename.

Command Mode  
EXEC

## Usage Guidelines

On all platforms except the Cisco 7500 series, the **copy flash** command copies from internal Flash memory.

On the Cisco 7500 series, the **copy flash** command copies from one of the three Flash memory devices on the Cisco 7500 series. The system prompts you to enter a specific device and filename. You can enter one of the following as the source device on the Cisco 7500 series:

- **bootflash:** This device is the internal Flash memory in the router.
- **slot0:** This device is the first PCMCIA slot on the RSP card.
- **slot1:** This device is the second PCMCIA slot on the RSP card.

You must follow the source device with a colon (:) and a filename.

Use the **copy flash rcp** command to copy a system image from Flash memory to a network server using rcp. You can use the copy of the system image as a backup copy. You can also use it to verify that the copy in Flash memory is the same as the original file.

The rcp software requires that a client send the remote username on each rcp request to the server. When you issue the **copy flash rcp** command, by default the router software sends the remote username associated with the current TTY, if that name is valid. For example, if the user is connected to the router through Telnet and was authenticated through the **username** command, then the router software sends that username as the remote username.

If the TTY username is invalid, the router software uses the router host name as the both the remote and local usernames.

---

**Note** TTYs are commonly used in Cisco communications servers. The concept of TTY originated with UNIX. For UNIX systems, each physical device is represented in the file system. Terminals are called *TTY devices*, which stands for *teletype*, the original UNIX terminal.

---

To specify a different remote username to be sent to the server, use the **ip rcmd remote-username** command. You can also specify the path of an existing directory along with the remote username.



**Caution** The remote username must be associated with an account on the destination server. If you do not use the **ip rcmd remote-username** command to specify the name of a remote user associated with an account on the server, then the remote username associated with the current TTY process must be associated with an account on the server. If there is no username for the current TTY process, then the router host name must be associated with an account on the server. If the network administrator of the destination server did not establish accounts for the remote username used, this command will not execute successfully when a default remote username is used.

If you copy the system image to a personal computer used as a file server, the computer must support the rsh protocol.

Use the **copy flash tftp** command to copy a system image from Flash memory to a TFTP server. As with the **copy flash rcp** command, you can use the copy of the system image as a backup or to verify that the copy in Flash is the same as the original file.

On the Cisco 7000 series and Cisco 7500 series, the **copy** commands generally copy a file from a source to a destination. Some invalid combinations exist. Specifically, you cannot copy a running configuration to a running configuration, a startup configuration to a startup configuration, or TFTP to rcp. If you do not specify a source or destination device, the router uses the default device specified by the **cd** command.

On the Cisco 7000 series and Cisco 7500 series, when the destination is also specified by the **CONFIG\_FILE** environment variable, the router prompts you for confirmation before proceeding with the copy. The **CONFIG\_FILE** environment variable specifies the configuration used during router initialization. To view the contents of the **CONFIG\_FILE** environment variable, use the **show boot** command. To modify the **CONFIG\_FILE** environment variable, use the **boot config** command. To save your modifications to the **CONFIG\_FILE** environment variable, use the **copy running-config startup-config** command.

## Examples

The following example shows how to use the **copy flash rcp** command on a Cisco 4500 router:

```
Router# configure terminal
Router# ip rcmd remote-username netadmin1
Ctrl-Z
Router# copy flash rcp

System flash directory, partition 2:
File  Length  Name/status
    1    984    junk
[1048 bytes used, 8387560 available, 8388608 total]
Address or name of remote host [223.255.254.254]?
Source file name? junk
Destination file name [junk]? junk
Verifying checksum for 'junk' (file # 1)...  OK
Copy 'junk' from Flash to server
  as 'junk'? [yes/no]y
-
Upload to server done
Flash copy took 0:00:00 [hh:mm:ss]
```

You will see a spinning line during the copy process.

The following example illustrates how to use the **copy flash rcp** command:

```
Router# copy flash rcp
IP address of remote host [255.255.255.255]? 101.2.13.110
Name of file to copy? gsxx
writing gsxx - copy complete
```

The following example illustrates how to use the **copy flash rcp** command when copying from a particular partition of Flash memory:

```
Router# copy flash rcp
System flash partition information:
Partition  Size     Used     Free     Bank-Size   State      Copy-Mode
      1      4096K   2048K   2048K   2048K      Read Only   RXBOOT-FLH
      2      4096K   2048K   2048K   2048K      Read/Write  Direct

[ Type ?<number> for partition directory; ? for full directory; q to abort]
Which partition? [default = 1]
```

The system will prompt if there are two or more partitions. If the partition entered is not valid, the process terminates. You have the option to enter a partition number, a question mark (?) for a directory display of all partitions, or a question mark and a number (*?number*) for a directory display of a particular partition. The default is the first partition.

```
System flash directory, partition 2:  
File  Length  Name/status  
1  3459720  master/igs-bfpx.100-4.3  
[3459784 bytes used, 734520 available, 4194304 total]  
Address or name of remote host [ABC.CISCO.COM]?  
Source file name?
```

The file will be copied from the partition given by the user earlier:

```
Destination file name [default = source name]?  
Verifying checksum for 'master/igs-bfpx.100-4.3' (file # 1)...  OK  
Copy 'master/igs-bfpx.100-4.3' from Flash to server  
as 'master/igs-bfpx.100-4.3'? [yes/no] yes
```

The following example illustrates how to use the **copy flash tftp** command:

```
Router# copy flash tftp  
IP address of remote host [255.255.255.255]? 101.2.13.110  
Name of file to copy? gsxx  
writing gsxx - copy complete
```

The following example illustrates how to use the **copy flash tftp** command when copying from a particular partition of Flash memory:

```
Router# copy flash tftp  
System flash partition information:  
Partition  Size  Used  Free  Bank-Size  State  Copy-Mode  
1  4096K  2048K  2048K  2048K  Read Only  RXBOOT-FLH  
2  4096K  2048K  2048K  2048K  Read/Write  Direct  
  
[Type ?<number> for partition directory; ? for full directory; q to abort]  
Which partition? [default = 1]
```

The system will prompt if there are two or more partitions. If the partition entered is not valid, the process terminates. You have the option to enter a partition number, a question mark (?) for a directory display of all partitions, or a question mark and a number (*?number*) for a directory display of a particular partition. The default is the first partition.

```
System flash directory, partition 2:  
File  Length  Name/status  
1  3459720  master/igs-bfpx.100-4.3  
[3459784 bytes used, 734520 available, 4194304 total]  
Address or name of remote host [ABC.CISCO.COM]?  
Source file name?
```

The file will be copied from the partition given by the user earlier:

```
Destination file name [default = source name]?  
Verifying checksum for 'master/igs-bfpx.100-4.3' (file # 1)...  OK  
Copy 'master/igs-bfpx.100-4.3' from Flash to server  
as 'master/igs-bfpx.100-4.3'? [yes/no] yes
```

The following example shows how to use the **copy flash** command on the Cisco 7000 series or the Cisco 7500 series:

```
copy flash slot0:new-config
```

Related Commands

**boot config**  
**boot system flash**  
**cd**  
**copy running-config startup-config**  
**ip rcmd remote-username**  
**show boot**

## copy mop

To copy a file from a MOP server to the router, use one of the following the **copy mop** EXEC commands:

**copy mop bootflash** (Cisco 4500 series only)

**copy mop flash**

### Syntax Description

<b>bootflash</b>	Specifies to copy a bootstrap image from a MOP server to internal Flash memory on a Cisco 4500 series.
<b>flash</b>	Specifies internal Flash memory as the destination of the copy operation.

### Default

None

### Command Mode

EXEC

### Usage Guidelines

The Cisco 7500 series does not support the **copy mop** command.

Use the **copy mop bootflash** command to copy a bootstrap image from a MOP server to the internal Flash memory on a Cisco 4500 series router. The router prompts for the name of the image file. It provides an option to erase the existing boot image in Flash before writing the new image into Flash. If no free space is available, or if files have never been written to Flash memory, you must erase Flash memory before copying the MOP image.

You do not need to specify the address of a MOP server. The router automatically solicits a MOP boot server for the specified file by sending a multicast file-request message.

The copying process takes several minutes; the actual time differs from network to network.

Before booting from Flash memory, verify that the checksum of the image in Flash memory matches the checksum listed in the README file that was distributed with the boot software image. The checksum of the boot image in Flash memory is displayed when the **copy mop bootflash** command completes. The README file was copied to the MOP server automatically when you installed the boot software image.



**Caution** If the checksum values do not match, do not reboot the router. Instead, reissue the **copy mop bootflash** command and compare the checksums again. If the checksum is repeatedly wrong, copy the original boot software image back into Flash memory *before* you reboot the router from Flash memory.

Use the **copy mop flash** command to copy a system image from a MOP server to internal Flash memory. MOP must be enabled on the relevant interfaces before you can use this command.

The router prompts for the MOP filename. It provides an option to erase existing Flash memory before writing onto it. The entire copying process takes several minutes and will differ from network to network.

Before booting from Flash memory, verify that the checksum of the image in Flash memory matches the checksum listed in the README file that was distributed with the system software image. The checksum of the image in Flash memory is displayed at the bottom of the screen when you issue the **copy mop flash** command.



**Caution** If the checksum value is not correct according to the value in the README file, do not reboot the router. Issue the **copy mop flash** command and compare the checksums again. If the checksum is repeatedly wrong, copy the original system software image back into Flash memory *before* you reboot the router from Flash memory. If you have a corrupted image in Flash memory and try to boot from Flash memory, the router will start the system image contained in ROM (assuming booting from a network server is not configured). If ROM does not contain a fully functional system image, the router might not function and will have to be reconfigured through a direct console port connection.

## Examples

The following example shows a sample output from the **copy mop flash** command. In this example, the system image *junk*, which already exists in Flash memory, is copied to Flash memory, and there is enough memory to copy the file without erasing any existing files.

```
Router# copy mop flash

System flash directory:
File  Length  Name/status
 1    984     junk [deleted]
 2    984     junk
[2096 bytes used, 8386512 available, 8388608 total]
Source file name? junk
Destination file name [junk]?

Erase flash device before writing? [confirm]
Flash contains files. Are you sure you want to erase? [confirm]

Copy 'junk' from server
  as 'junk' into Flash WITH erase? [yes/no]yes
Erasing device... eeeeeeeeeeeeeeeeeeeeeeeee...erased
Loading junk from 1234.5678.9abc via Ethernet0: !
[OK - 984/8388608 bytes]

Verifying checksum... OK (0x14B3)
Flash copy took 0:00:01 [hh:mm:ss]
```

The following example shows sample output resulting from copying a system image into a partition of Flash memory. The system will prompt only if there are two or more read/write partitions or one read-only and one read/write partition and dual Flash bank support in boot ROMs. If the partition entered is not valid, the process terminates. You have the option to enter a partition number, a question mark (?) for a directory display of all partitions, or a question mark and a number (?number) for a directory display of a particular partition. The default is the first read/write partition.

```
Router# copy mop flash
System flash partition information:
Partition  Size     Used     Free     Bank-Size   State      Copy-Mode
          1  4096K   2048K   2048K   2048K      Read Only  RXBOOT-FLH
          2  4096K   2048K   2048K   2048K      Read/Write Direct

[Type ?<no> for partition directory; ? for full directory; q to abort]
Which partition? [default = 2]
```

If the partition is read-only and has dual Flash bank support in boot ROMs, the session continues as follows:

```
***** NOTICE *****
Flash load helper v1.0
This process will accept the copy options and then terminate
the current system image to use the ROM based image for the copy.
Routing functionality will not be available during that time.
If you are logged in via telnet, this connection will terminate.
Users with console access can see the results of the copy operation.
---- **** -----*
Proceed? [confirm]
System flash directory, partition 1:
File  Length  Name/status
     1  3459720  master/igs-bfpx.100-4.3
[3459784 bytes used, 734520 available, 4194304 total]
Source file name? master/igs-bfpx-100.4.3
Destination file name [default = source name]?
```

The file will be copied into the partition given by the user earlier:

```
Loading master/igs-bfpx.100-4.3 from 131.108.1.111: !
Erase flash device before writing? [confirm]
Flash contains files. Are you sure? [confirm]
Copy 'master/igs-bfpx.100-4.3' from MOP server
as 'master/igs-bfpx.100-4.3' into Flash WITH erase? [yes/no] yes
```

If the partition is read-write, the session continues as follows:

```
System flash directory, partition 2:
File  Length  Name/status
     1  3459720  master/igs-bfpx.100-4.3
[3459784 bytes used, 734520 available, 4194304 total]
Source file name? master/igs-bfpx.100-4.3
Destination file name [default = source name]?
```

The file will be copied into the partition given by the user earlier:

```
Loading master/igs-bfpx.100-4.3 from 131.108.1.111: !
Erase flash device before writing? [confirm]
Flash contains files. Are you sure? [confirm]
Copy 'master/igs-bfpx.100-4.3' from MOP server
as 'master/igs-bfpx.100-4.3' into Flash WITH erase? [yes/no] yes
```

The following example shows how to use the **copy mop bootflash** command to copy the bootstrap image *junk*:

```
Router# copy mop bootflash

System flash directory:
File  Length  Name/status
 1    984     junk [deleted]
 2    984     junk
[2096 bytes used, 8386512 available, 8388608 total]
Source file name? junk
Destination file name [junk]?

Erase flash device before writing? [confirm]
Flash contains files. Are you sure want to erase? [confirm]

Copy 'junk' from server
  as 'junk' into Flash WITH erase? [yes/no]yes
Erasing device... eeeeeeeeeeeeeeeeeeeeeeeee...erased
Loading junk from 1234.5678.9abc via Ethernet0: !
[OK - 984/8388608 bytes]

Verifying checksum... OK (0x14B3)
Flash copy took 0:00:01 [hh:mm:ss]
```

### Related Commands

**boot config**  
**boot system flash**  
**cd**  
**copy bootflash tftp**  
**copy flash tftp**  
**copy tftp bootflash**  
**delete**  
**dir**  
**erase bootflash**  
**show boot**  
**show bootflash**  
**verify**  
**verify bootflash**  
**verify flash**

## copy rcp

To copy a file from a network server to the router or to another destination using rcp, use one of the following **copy rcp** EXEC commands. The **copy rep running-config** command replaces the **configure network** command. The **copy rep startup-config** command replaces the **configure overwrite-network** command.

**copy rcp bootflash** (Cisco 4500 series only)

**copy rcp {flash | running-config | startup-config}**

**copy rcp {flash | running-config | startup-config |file\_id}** (Cisco 7000 series and Cisco 7500 series only)

### Syntax Description

<b>bootflash</b>	Specifies to copy a bootstrap image from a network server to Flash memory on a Cisco 4500 series using rcp.
<b>flash</b>	Specifies internal Flash memory as the destination of the copy operation. The Cisco 7500 series cannot use this keyword; all other platforms can.
<b>running-config</b>	Specifies the currently running configuration as the destination of the copy operation.
<b>startup-config</b>	Specifies the configuration used for initialization as the destination of the copy operation.
<i>file_id</i>	Specifies a <i>device:filename</i> as the destination of the copy operation. The <i>device</i> argument is optional; but when it is used, the colon (:) is required. Valid devices are as follows: <ul style="list-style-type: none"><li>• <b>flash:</b> This device is the internal Flash memory on the Cisco 7000 series.</li><li>• <b>bootflash:</b> This device is the internal Flash memory in the Cisco 7500 series.</li><li>• <b>slot0:</b> This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card.</li><li>• <b>slot1:</b> This device is the second PCMCIA slot on the Cisco 7500 series RSP card.</li><li>• <b>nram:</b> This device is the router's NVRAM. If you specify NVRAM, omit the filename. The colon (:) is required. The Cisco 7000 series cannot use this keyword.</li></ul> The <i>filename</i> argument is the name of the destination file. You must always provide a source filename. You can omit the destination filename, in which case the system uses the source filename. Wildcards are not permitted. The maximum filename length is 63 characters.

## Default

On the Cisco 7000 series and the Cisco 7500 series, if you omit the destination device, the router uses the default device specified by the **cd** command. If you omit the destination filename, the router uses the source filename.

## Command Mode

EXEC

## Usage Guidelines

The rcp protocol requires that a client send the remote username of an rcp request to the server. When you issue one of the **copy rcp** commands, by default the router software sends the username associated with the current TTY, if that name is valid. For example, if the user is connected to the router through Telnet and the user was authenticated through the **username** command, then the router software sends that username as the remote username.

---

**Note** For Cisco, TTYs are commonly used in communication servers. The concept of TTY originated with UNIX. For UNIX systems, each physical device is represented in the file system. Terminals are called *TTY devices*, which stands for *teletype*, the original UNIX terminal.

---

If the TTY username is invalid, the router software uses the router host name as the both the remote and local usernames. To specify a different remote username to be sent to the rcp server, use the **ip rcmd remote-username** command. You can also specify the path of an existing directory along with the remote username.



**Caution** The remote username must be associated with an account on the destination server. If you do not use the **ip rcmd remote-username** command to specify the name of a remote user associated with an account on the server, then the remote username associated with the current TTY process must be associated with an account on the server. If there is no username for the current TTY process, then the router host name must be associated with an account on the server. If the network administrator of the destination server did not establish accounts for the remote username used, this command will not execute successfully when a default remote username is used.

If you copy a bootstrap image, system image, or configuration file from a personal computer used as a file server, the remote host computer must support rsh protocol.

Use the **copy rcp bootflash** command to copy a bootstrap image from a network server to Flash memory on a Cisco 4500 router using rcp. The router prompts for the name or address of the server and the name of the file to be copied. It provides an option to erase existing Flash memory before writing onto it, and allows you to confirm the erasure. The entire copying process takes several minutes and differs from network to network.

Before loading the router from Flash memory, verify that the checksum of the bootstrap image in Flash memory matches the checksum listed in the README file that was distributed with the system software image.

The checksum of the bootstrap image in Flash memory is displayed at the bottom of the screen when you issue the **copy rcp bootflash** command. The README file was copied to the server automatically when you installed the system software.



**Caution** If the checksum value does not match the value in the README file, do not reboot the router. Reissue the **copy rcp bootflash** command and compare the checksums again. If the checksum is repeatedly wrong, copy the original bootstrap image back into Flash memory *before* you reboot the router from Flash memory. If you have a corrupted image in Flash memory and try to boot from Flash, the router will start the system image contained in ROM (assuming booting from a network server is not configured).

Use the **copy rcp flash** to copy a system image from a network server to the router's internal Flash memory using rcp. The router prompts for the address of the rcp server and rcp filename. When you issue this command, the system provides an option to erase existing Flash memory before writing onto it. The entire copying process takes several minutes and differs from network to network.

Before booting from Flash memory, verify that the checksum of the image in internal Flash memory matches the checksum listed in the README file that was distributed with the system software image. The checksum of the image in Flash memory is displayed at the bottom of the screen when you issue the **copy rcp flash** command. The README file was copied to the rcp server automatically when you installed the system software image.



**Caution** If the checksum value does not match the value in the README file, do not reboot the router. Reissue the **copy rcp flash** command and compare the checksums again. If the checksum is repeatedly wrong, copy the original system software image back into Flash memory *before* you reboot the router from Flash memory. If you have a corrupted image in Flash memory and try to boot from Flash, the router will start the system image contained in ROM (assuming booting from a network server is not configured). If ROM does not contain a fully functional system image, the router will not function and will have to be reconfigured through a direct console port connection.

Use the **copy rcp running-config** command to copy a configuration file from a network server to the router's running configuration environment using rcp. You can copy either a host configuration file or a network configuration file. Accept the default value of *host* to copy and load a host configuration file containing commands that apply to one network server in particular. Enter *network* to copy and load a network configuration file containing commands that apply to all network servers on a network.

---

**Note** When using rcp, the **copy rcp running-config** command replaces the **configure network** command.

---

Use the **copy rcp startup-configuration** command to copy a host or network configuration file from a network server to the router's startup configuration environment using rcp. Accept the default value of *host* to copy and store a host configuration file containing commands that apply to one network server in particular. Enter *network* to copy and store a network configuration file containing commands that apply to all network servers on a network.

On all platforms except the Cisco 7000 series and the Cisco 7500 series, the **copy rcp startup-config** command copies a configuration file from the network server to NVRAM. On the Cisco 7000 series and Cisco 7500 series, the command copies a configuration file from the network server to the location specified by the **CONFIG\_FILE** environment variable. The **CONFIG\_FILE** environment variable specifies the configuration used during router initialization.

---

**Note** When using rcp, the **copy rcp startup-config** command replaces the **configure overwrite-network** command.

---

On the Cisco 7000 series and Cisco 7500 series, the **copy** commands generally copy a file from a source to a destination. Some invalid combinations exist. Specifically, you cannot copy a running configuration to a running configuration, a startup configuration to a startup configuration, or TFTP to rcp.

On the Cisco 7000 series and the Cisco 7500 series, the **copy rcp** command generally copies a file from a network server to another destination using rcp. If you do not specify a source or destination device, the router uses the default device specified by the **cd** command.

On the Cisco 7000 series and the Cisco 7500 series, when the destination is also specified by the **CONFIG\_FILE** environment variable, the router prompts you for confirmation before proceeding with the copy. To view the contents of the **CONFIG\_FILE** environment variable, use the **show boot** command. To modify the **CONFIG\_FILE** environment variable, use the **boot config** command. To save your modifications, use the **copy running-config startup-config** command.

## Examples

The following example shows how to use the **copy rcp bootflash** command on a Cisco 4500 router:

```

Router# configure terminal
Router(config)# ip rcmd remote-username netadmin1
Ctrl-Z
Router# copy rcp bootflash

Boot flash directory:
File  Length  Name/status
 1  2622607  c4500-xboot
[2622672 bytes used, 1571632 available, 4194304 total]

Address or name of remote host [255.255.255.255]? 223.255.254.254
Source file name? c4500-xboot.101
Destination file name [c4500-xboot.101]?
Accessing file 'c4500-xboot.101' on 223.255.254.254...
Loading c4500-xboot.101 from 223.255.254.254 (via Ethernet0): -[OK]

Erase flash device before writing? [confirm]
Flash contains files. Are you sure you want to erase? [confirm]

Copy 'c4500-xboot.101' from TFTP server into
bootflash as 'c4500-xboot.101' WITH erase? [yes/no] yes
Erasing device... eeeeeeeeeeeeeee ...erased
Loading c4500-xboot.101 from 223.255.254.254 (via Ethernet0):-
[OK - 2622607/4194304 bytes]

Verifying checksum...  OK (0xE408)
Flash copy took 0:00:10 [hh:mm:ss]

```

You will see a spinning line during the copy process.

The following example shows how to use the **copy rcp flash** command on a Cisco 4500 system. The interface might differ slightly on other systems. This example copies a system image named *junk* from the *netadmin1* directory on the remote server named *SERVER1.CISCO.COM* with an IP address of 131.108.101.101 to the router's Flash memory. To ensure that enough Flash memory is available to accommodate the system image to be copied, the router software allows you to erase the contents of Flash memory first.

```
Router# configure terminal

Router(config)# rcmd remote-username netadmin1
Ctrl-Z
Router# copy rcp flash

System flash directory, partition 2:
File  Length  Name/status
 1    984     junk [deleted]
 2    984     junk
[2096 bytes used, 83886512 available, 8388608 total]
Address or name of remote host [255.255.255.255]? 131.108.101.101
Source file name? junk
Destination file name [junk]?
Accessing file 'junk' on 131.108.101.101...
Loading dirt/ssangiah/junk .from 131.108.101.101 (via Ethernet0): ! [OK]

Erase flash device before writing? [confirm]
Flash contains files. Are you sure you want to erase? [confirm]

Copy 'junk' from server
  as 'junk' into Flash WITH erase? [yes/no]yes
Erasing device... eeeeeeeeeeeeeeeeeeeeeeeeeeeee...erased
Loading junk from 131.108.101.101 (via Ethernet0): !
[OK - 984/8388608 bytes]

Verifying checksum... OK (0x14B3)
Flash copy took 0:00:01 [hh:mm:ss]
```

The following example shows sample output resulting from copying a system image into a partition of Flash memory. The system prompts only if there are two or more read/write partitions or one read-only and one read/write partition and dual Flash bank support in boot ROMs. If the partition entered is not valid, the process terminates. You have the option to enter a partition number, a question mark (?) for a directory display of all partitions, or a question mark and a number (?*number*) for a directory display of a particular partition. The default is the first read/write partition.

```
Router# copy rcp flash

System flash partition information:
Partition  Size     Used     Free     Bank-Size   State      Copy-Mode
          1  4096K   2048K   2048K   2048K      Read Only  RXBOOT-FLH
          2  4096K   2048K   2048K   2048K      Read/Write Direct

[Type ?<no> for partition directory; ? for full directory; q to abort]
Which partition? [default = 2]
```

If the partition is read-only and has dual Flash bank support in boot ROM, the session continues as follows:

```
***** NOTICE *****
Flash load helper v1.0
This process will accept the copy options and then terminate
the current system image to use the ROM based image for the copy.
Routing functionality will not be available during that time.
If you are logged in via telnet, this connection will terminate.
Users with console access can see the results of the copy operation.
----- **** -----
Proceed? [confirm]
System flash directory, partition 1:
File  Length  Name/status
  1  3459720  master/igs-bfpx.100-4.3
[3459784 bytes used, 734520 available, 4194304 total]
Address or name of remote host [255.255.255.255]? 131.108.1.1
Source file name? master/igs-bfpx-100.4.3
Destination file name [default = source name]?
```

The file will be copied into the partition given by the user earlier:

```
Loading master/igs-bfpx.100-4.3 from 131.108.1.111: !
Erase flash device before writing? [confirm]
Flash contains files. Are you sure? [confirm]
Copy 'master/igs-bfpx.100-4.3' from TFTP server
as 'master/igs-bfpx.100-4.3' into Flash WITH erase? [yes/no] yes
```

If the partition is read-write, the session continues as follows:

```
System flash directory, partition 2:
File  Length  Name/status
  1  3459720  master/igs-bfpx.100-4.3
[3459784 bytes used, 734520 available, 4194304 total]
Address or name of remote host [255.255.255.255]? 131.108.1.1
Source file name? master/igs-bfpx.100-4.3
Destination file name [default = source name]?
```

The file will be copied into the partition given by the user earlier:

```
Accessing file 'master/igs-bfpx.100-4.3' on ABC.CISCO.COM...
Loading master/igs-bfpx.100-4.3 from 131.108.1.111: !
Erase flash device before writing? [confirm]
Flash contains files. Are you sure? [confirm]
Copy 'master/igs-bfpx.100-4.3' from TFTP server
as 'master/igs-bfpx.100-4.3' into Flash WITH erase? [yes/no] yes
```

The following example shows how to use the **copy rcp running-config** command on a Cisco 4500 system. The interface might differ slightly on other systems. This example specifies a remote username of *netadmin1*. Then it copies and runs a host configuration filename *host1-config* from the *netadmin1* directory on the remote server with an IP address of 131.108.101.101.

```
Router# configure terminal
Router(config)# ip rcmd remote-username netadmin1
Ctrl-Z
Router# copy rcp running-config

Host or network configuration file [host]?
Address of remote host [255.255.255.255]? 131.108.101.101
Name of configuration file [Router-config]? host1-config
Configure using host1-config from 131.108.101.101? [confirm]
Connected to 131.108.101.101
Loading 1112 byte file host1-config:! [OK]
Router#
%SYS-5-CONFIG: Configured from host1-config by rcp from 131.108.101.101
```

The following example shows how to use **copy rcp startup-config** command on a Cisco 4000 system. The interface might differ slightly on other systems. This example specifies a remote username of *netadmin1*. Then it copies and stores a host configuration file *host2-cfg* from the *netadmin1* directory on the remote server with an IP address of 131.108.101.101.

```
Router# configure terminal
Router(config)# ip rcmd remote-username netadmin1
Ctrl-Z
Router# copy rcp startup-config

Host or network configuration file [host]?
Address of remote host [255.255.255.255]? 131.108.101.101
Name of configuration file[rtr2-cfg]? host2-cfg
Configure using rtr2-cfg from 131.108.101.101?[confirm]
Connected to 131.108.101.101
Loading 1112 byte file rtr2-cfg:[OK]
[OK]
Router#
%SYS-5-CONFIG_NV:Non-volatile store configured from rtr2-config by
rcp from 131.108.101.101
```

The following example uses the **copy rcp file\_id** command to copy the *router-image* file from a network server using rcp to the Flash memory card inserted in slot 0 of the RP or RSP card:

```
copy rcp slot0:router-image
```

### Related Commands

**boot config**  
**boot system flash**  
**cd**  
**copy flash rcp**  
**copy running-config rcp**  
**copy running-config startup-config**  
**copy startup-config rcp**  
**ip rcmd remote-username**  
**show boot**  
**verify flash**

## copy running-config

To copy the router's running configuration file to another destination, use one of the following **copy running-config** EXEC commands. The **copy running-config startup-config** command replaces the **write memory** command. The **copy running-config rcp** or **copy running-config tftp** command replaces the **write network** command.

**copy running-config {rcp | startup-config | tftp}**

**copy running-config {rcp | startup-config | tftp | file\_id}** (Cisco 7000 series and Cisco 7500 series only)

### Syntax Description

<b>rcp</b>	Specifies a copy operation to a network server using rcp.
<b>startup-config</b>	Specifies the configuration used for initialization as the destination of the copy operation. The Cisco 4500 series cannot use this keyword.
<b>tftp</b>	Specifies a TFTP server as the destination of the copy operation.
<i>file_id</i>	<p>Specifies a <i>device:filename</i> as the destination of the copy operation. The <i>device</i> argument is optional; but when it is used, the colon (:) is required. Valid devices are as follows:</p> <ul style="list-style-type: none"> <li>• <b>flash:</b> This device is the internal Flash memory on the Cisco 7000 series.</li> <li>• <b>bootflash:</b> This device is the internal Flash memory in the Cisco 7500 series.</li> <li>• <b>slot0:</b> This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card.</li> <li>• <b>slot1:</b> This device is the second PCMCIA slot on the Cisco 7500 series RSP card.</li> <li>• <b>nvrw:</b> This device is the router's NVRAM. If you specify NVRAM, omit the filename. The colon (:) is required. The Cisco 7000 series cannot use this keyword.</li> </ul>

The *filename* argument is the name of the destination file. You must always provide a source filename. You can omit the destination filename, in which case the system uses the source filename. Wildcards are not permitted. The maximum filename length is 63 characters.

### Default

On the Cisco 7000 series and the Cisco 7500 series, if you omit the destination device, the router uses the default device specified by the **cd** command. If you omit the destination filename, the router uses the source filename.

Command Mode

EXEC

### Usage Guidelines

Use the **copy running-config {rcp | tftp}** command to copy the current configuration file to a network server using rcp or TFTP. The configuration file copy can serve as a backup copy. You are prompted for a destination host and filename.

The rcp protocol requires that a client send the remote username of an rcp request to the server. When you issue the **copy running-config rcp** command, by default the router software sends the username associated with the current TTY, if that name is valid. For example, if the user is connected to the router through Telnet and the user was authenticated through the **username** command, then the router software sends that username as the remote username.

If the TTY username is invalid, the router software uses the router host name as the both the remote and local usernames.

---

**Note** For Cisco, TTYs are commonly used in communication servers. The concept of TTY originated with UNIX. For UNIX systems, each physical device is represented in the file system. Terminals are called *TTY devices*, which stands for *teletype*, the original UNIX terminal.

---

To specify a different remote username to be sent to the server, use the **ip rcmd remote-username** command. You can also specify the path of an existing directory along with the remote username.



**Caution** The remote username must be associated with an account on the destination server. If you do not use the **ip rcmd remote-username** command to specify the name of a remote user associated with an account on the server, then the remote username associated with the current TTY process must be associated with an account on the server. If there is no username for the current TTY process, then the router host name must be associated with an account on the server. If the network administrator of the destination server did not establish accounts for the remote username used, this command will not execute successfully when a default remote username is used.

If you copy the configuration file to a personal computer used as a file server, the computer must support the rsh protocol.

To run this command, the router must contain Flash memory.

On all platforms except the Cisco 7000 series and the Cisco 7500 series, the **copy running-config startup-config** command copies the currently running configuration to NVRAM. Use this command in conjunction with the **reload** command to restart the router with the configuration information stored in NVRAM.

If you issue the **copy running-config startup-config** command from a bootstrap system image, you receive a warning instructing you to indicate whether you want your previous NVRAM configuration to be overwritten and configuration commands lost. This warning does not appear if NVRAM contains an invalid configuration or if the previous configuration in NVRAM was generated by a bootstrap system image.

On the Cisco 7000 series and Cisco 7500 series, the **copy** commands generally copy a file from a source to a destination. Some invalid combinations exist. Specifically, you cannot copy a running configuration to a running configuration, a startup configuration to a startup configuration, or TFTP to rcp.

On the Cisco 7000 series or Cisco 7500 series, the **copy running-config startup-config** command copies the currently running configuration to the location specified by the CONFIG\_FILE environment variable. This variable specifies the device and configuration file used for initialization. When the CONFIG\_FILE environment variable points to NVRAM or when this variable does not exist (such as at first-time startup), the router writes the current configuration to NVRAM. If the current configuration is too large for NVRAM, the router displays a message and stops executing the command. Use this command in conjunction with the **reload** command to restart the router with the configuration information stored in the CONFIG\_FILE environment variable.

When the CONFIG\_FILE environment variable specifies a valid device other than **nvram**: (that is, **flash**, **bootflash**, **slot0**, or **slot1**), the router writes the current configuration to the specified device and filename and stores a distilled version of the configuration in NVRAM. A distilled version of the configuration is one that does not contain access list information. If NVRAM already contains a copy of a complete configuration, the router prompts you to confirm the copy.

To view the contents of the CONFIG\_FILE environment variable, use the **show boot** command. To modify the CONFIG\_FILE environment variable, use the **boot config** command. To save your modifications to the CONFIG\_FILE environment variable, use the **copy running-config startup-config** command.

## Examples

The following example shows how to use the **copy running-config rcp** command on a Cisco 4500 system. The interface may differ slightly on other systems. This example specifies a remote username of *netadmin1*. Then it copies the running configuration file, named *Rtr2-*cfg** to the *netadmin1* directory on the remote host with an IP address of 131.108.101.101.

```
Router# configure terminal
Router(config)# ip rcmd remote-username netadmin1
Ctrl-Z
Router# copy running-config rcp
Remote host[]? 131.108.101.101

Name of configuration file to write [Rtr2-cfg]?
Write file rtr2-cfg on host 131.108.101.101?[confirm]
Building configuration...[OK]
Connected to 131.108.101.101
```

The following example shows the **copy running-config startup-config** command and the warning the system provides if you are trying to save configuration information from bootstrap into the system:

```
Router(boot)#copy running-config startup-config

Warning: Attempting to overwrite an NVRAM configuration written
by a full system image. This bootstrap software does not support
the full configuration command set. If you perform this command now,
some configuration commands may be lost.
Overwrite the previous NVRAM configuration?[confirm]
```

Enter **no** to escape writing the configuration information to memory.

In the following example, a Cisco 7000 series or Cisco 7500 series router copies the running configuration to the startup configuration specified by the CONFIG\_FILE variable:

```
copy running-config startup-config
```

The following example copies the running configuration to a file named *router-config1* on the Flash memory card inserted in slot 0 of the RP or RSP card on a Cisco 7000 series or Cisco 7500 series, respectively:

```
copy running-config slot0:router-config1
```

#### Related Commands

**boot config**  
**cd**  
**copy rep running-config**  
**copy rep startup-config**  
**copy startup-config**  
**ip rcmd remote-username**  
**reload**  
**show boot**

## copy startup-config

To copy the router's startup configuration file to another destination, use one of the following **copy startup-config** EXEC commands:

**copy startup-config {rcp | running-config | tftp}**

**copy startup-config {rcp | running-config | tftp | file\_id}** (Cisco 7000 series and Cisco 7500 series only)

### Syntax Description

<b>rcp</b>	Specifies a copy operation to a network server using rcp.
<b>running-config</b>	Specifies the currently running configuration as the destination of the copy operation.
<b>tftp</b>	Specifies a TFTP server as the destination of the copy operation.
<i>file_id</i>	Specifies a <i>device:filename</i> as the destination of the copy operation. The <i>device</i> argument is optional; but when it is used, the colon (:) is required. Valid devices are as follows: <ul style="list-style-type: none"> <li><b>flash:</b> This device is the internal Flash memory on the Cisco 7000 series.</li> <li><b>bootflash:</b> This device is the internal Flash memory in the Cisco 7500 series.</li> <li><b>slot0:</b> This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card.</li> <li><b>slot1:</b> This device is the second PCMCIA slot on the Cisco 7500 series RSP card.</li> <li><b>nvramp:</b> This device is the router's NVRAM. If you specify NVRAM, omit the filename. The colon (:) is required. The Cisco 7000 series cannot use this keyword.</li> </ul>

The *filename* argument is the name of the destination file. You must always provide a source filename. You can omit the destination filename, in which case the system uses the source filename. Wildcards are not permitted. The maximum filename length is 63 characters.

### Default

On the Cisco 7000 series and the Cisco 7500 series, if you omit the destination device, the router uses the default device specified by the **cd** command. If you omit the destination filename, the router uses the source filename.

Command Mode  
EXEC

### Usage Guidelines

On all platforms except the Cisco 7000 series and the Cisco 7500 series, this command copies the contents of the configuration file in NVRAM to a network server or to the currently running configuration.

On the Cisco 7000 series and Cisco 7500 series, the **copy** commands generally copy a file from a source to a destination. Some invalid combinations exist. Specifically, you cannot copy a running configuration to a running configuration, a startup configuration to a startup configuration, or TFTP to rcp.

On the Cisco 7000 series and Cisco 7500 series, the command copies the configuration file pointed to by the CONFIG\_FILE environment variable to another destination. To view the contents of the CONFIG\_FILE environment variable, use the **show boot** command. To modify the CONFIG\_FILE environment variable, use the **boot config** command. To save your modifications to the CONFIG\_FILE environment variable, use this **copy running-config startup-config** command.

The rcp protocol requires that a client send the remote username of an rcp request to the server. When you issue the **copy startup-config rcp** command, by default the router software sends the username associated with the current TTY, if that name is valid. For example, if the user is connected to the router through Telnet and the user was authenticated through the **username** command, then the router software sends that username as the remote username.

If the TTY username is invalid, the router software uses the router host name as the both the remote and local usernames.

---

**Note** For Cisco, TTYs are commonly used in communication servers. The concept of TTY originated with UNIX. For UNIX systems, each physical device is represented in the file system. Terminals are called *TTY devices*, which stands for *teletype*, the original UNIX terminal.

---

To specify a different remote username to be sent to the server, use the **ip rcmd remote-username** command. You can also specify the path of an existing directory along with the remote username.



**Caution** The remote username must be associated with an account on the destination server. If you do not use the **ip rcmd remote-username** command to specify the name of a remote user associated with an account on the server, then the remote username associated with the current TTY process must be associated with an account on the server. If there is no username for the current TTY process, then the router host name must be associated with an account on the server. If the network administrator of the destination server did not establish accounts for the remote username used, this command will not execute successfully when a default remote username is used.

If you copy the configuration file to a personal computer used as a server, the computer must support the rsh protocol.

## Examples

The following example shows how to use the **copy startup-config rcp** command on a Cisco 4500 router. The interface might differ slightly on other systems.

```
Router# configure terminal
Router(config)# ip rcmd remote-username netadmin2
Ctrl-Z
Router# copy startup-config rcp
Remote host[]? 131.108.101.101

Name of configuration file to write [rtr2-config]? <cr>
Write file rtr2-config on host 131.108.101.101?[confirm] <cr>
! [OK]
```

On a Cisco 7000 series or Cisco 7500 series, the following example uses the **copy startup-config** command to copy the startup configuration file (specified by the CONFIG\_FILE environment variable) to a Flash memory card inserted in slot 0 of the RP or RSP card:

```
copy startup-config slot0:router-config
```

## Related Commands

**boot config**  
**copy rcp startup-config**  
**copy running-config**  
**ip rcmd remote-username**  
**show boot**

## copy tftp

To copy a file from a TFTP server to the router or to another destination, use one of the following **copy tftp** EXEC commands. The **copy tftp running-config** command replaces the **configure network** command. The **copy tftp startup-config** command replaces the **configure overwrite-network** command.

**copy tftp bootflash** (Cisco 4500 series only)

**copy tftp {flash | running-config | startup-config}**

**copy tftp {flash | running-config | startup-config | file\_id}** (Cisco 7000 series and Cisco 7500 series only)

### Syntax Description

<b>bootflash</b>	Specifies to copy a bootstrap image from a TFTP server to internal Flash memory on a Cisco 4500 series.
<b>flash</b>	Specifies internal Flash memory as the destination of the copy operation. The Cisco 7500 series cannot use this keyword; all other platforms can.
<b>running-config</b>	Specifies the currently running configuration as the destination of the copy operation.
<b>startup-config</b>	Specifies the configuration used for initialization as the destination of the copy operation.
<i>file_id</i>	Specifies a <i>device:filename</i> as the destination of the copy operation. The <i>device</i> argument is optional; but when it is used, the colon (:) is required. Valid devices are as follows: <ul style="list-style-type: none"><li>• <b>flash:</b> This device is the internal Flash memory on the Cisco 7000 series.</li><li>• <b>bootflash:</b> This device is the internal Flash memory in the Cisco 7500 series.</li><li>• <b>slot0:</b> This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card.</li><li>• <b>slot1:</b> This device is the second PCMCIA slot on the Cisco 7500 series RSP card.</li><li>• <b>nram:</b> This device is the router's NVRAM. If you specify NVRAM, omit the filename. The colon (:) is required.</li></ul> The <i>filename</i> argument is the name of the destination file. You must always provide a source filename. You can omit the destination filename, in which case the system uses the source filename. Wildcards are not permitted. The maximum filename length is 63 characters.

## Default

On the Cisco 7000 series and the Cisco 7500 series, if you omit the destination device, the router uses the default device specified by the **cd** command. If you omit the destination filename, the router uses the source filename.

## Command Mode

EXEC

## Usage Guidelines

The system prompts for the address of the TFTP server and TFTP filename if you do not provide them at the command line. When copying to internal Flash memory, the system provides an option to erase existing internal Flash memory before writing onto it. The entire copying process takes several minutes and differs from network to network.

Before booting from Flash memory, verify that the checksum of the image in Flash memory matches the checksum listed in the README file that was distributed with the system software image. The checksum of the image in Flash memory is displayed at the bottom of the screen when you issue the **copy tftp flash** command. The README file was copied to the TFTP server automatically when you installed the system software image.



**Caution** If the checksum value is not correct according to the value in the README file, do not reboot the router. Issue the **copy tftp flash** command and compare the checksums again. If the checksum is repeatedly wrong, copy the original system software image back into Flash memory *before* you reboot the router from Flash memory. If you have a corrupted image in Flash memory and try to boot from Flash, the router will start the system image contained in ROM (assuming booting from a network server is not configured). If ROM does not contain a fully functional system image, the router will not function and will have to be reconfigured through a direct console port connection.

---

**Note** When using TFTP, the **copy tftp running-config** command replaces the **configure network** command and the **copy tftp startup-config** command replaces the **configure overwrite-network** command.

---

On the Cisco 7000 series and Cisco 7500 series, the **copy** commands generally copy a file from a source to a destination. Some invalid combinations exist. Specifically, you cannot copy a running configuration to a running configuration, a startup configuration to a startup configuration, or TFTP to rcp.

## Examples

The following example shows sample output of copying a system image named *junk* into Flash memory:

```
Router# copy tftp flash

System flash directory, partition 2:
File  Length  Name/status
 1    984     junk [deleted]
 2    984     junk
[2096 bytes used, 8386512 available, 8388608 total]
Address or name of remote host [255.255.255.255]? 223.255.254.254
Source file name? junk
Destination file name [junk]?
Accessing file 'junk' on 223.255.254.254...
Loading dirt/ssangiah/junk .from 223.255.254.254 (via Ethernet0): - [OK]

Erase flash device before writing? [confirm]
Flash contains files. Are you sure you want to erase? [confirm]

Copy 'junk' from server
  as 'junk' into Flash WITH erase? [yes/no]yes
Erasing device... eeeeeeeeeeeeeeeeeeeeeeeee...erased
Loading junk from 223.255.254.254 (via Ethernet0): -
[OK - 984/8388608 bytes]

Verifying checksum... OK (0x14B3)
Flash copy took 0:00:01 [hh:mm:ss]
```

You will see a spinning line during the copy process. A series of “V” characters indicates that a checksum verification of the image is occurring after the image is written to Flash memory.

The following example shows sample output resulting from copying a system image into a partition of Flash memory. The system will prompt only if there are two or more read/write partitions or one read-only and one read/write partition and dual Flash bank support in boot ROMs. If the partition entered is not valid, the process terminates. You can enter a partition number, a question mark (?) for a directory display of all partitions, or a question mark and a number (*?number*) for directory display of a particular partition. The default is the first read/write partition.

```
Router# copy tftp flash

System flash partition information:
Partition  Size     Used     Free     Bank-Size   State      Copy-Mode
      1    4096K   2048K   2048K   2048K     Read Only   RXBOOT-FLH
      2    4096K   2048K   2048K   2048K     Read/Write  Direct

[Type ?<no> for partition directory; ? for full directory; q to abort]
Which partition? [default = 2]
```

If the partition is read-only and has dual Flash bank support in boot ROM, the session continues as follows:

```
***** NOTICE *****
Flash load helper v1.0
This process will accept the copy options and then terminate
the current system image to use the ROM based image for the copy.
Routing functionality will not be available during that time.
If you are logged in via telnet, this connection will terminate.
Users with console access can see the results of the copy operation.
----- **** -----
Proceed? [confirm]
System flash directory, partition 1:
File  Length  Name/status
  1  3459720  master/igs-bfpx.100-4.3
[3459784 bytes used, 734520 available, 4194304 total]
Address or name of remote host [255.255.255.255]? 131.108.1.1
Source file name? master/igs-bfpx-100.4.3
Destination file name [default = source name]?
```

The file will be copied into the partition given by the user earlier:

```
Loading master/igs-bfpx.100-4.3 from 131.108.1.111: !
Erase flash device before writing? [confirm]
Flash contains files. Are you sure? [confirm]
Copy 'master/igs-bfpx.100-4.3' from TFTP server
as 'master/igs-bfpx.100-4.3' into Flash WITH erase? [yes/no] yes
```

If the partition is read-write, the session continues as follows:

```
System flash directory, partition 2:
File  Length  Name/status
  1  3459720  master/igs-bfpx.100-4.3
[3459784 bytes used, 734520 available, 4194304 total]
Address or name of remote host [255.255.255.255]? 131.108.1.1
Source file name? master/igs-bfpx.100-4.3
Destination file name [default = source name]?
```

The file will be copied into the partition given by the user earlier:

```
Accessing file 'master/igs-bfpx.100-4.3' on ABC.CISCO.COM...
Loading master/igs-bfpx.100-4.3 from 131.108.1.111: !
Erase flash device before writing? [confirm]
Flash contains files. Are you sure? [confirm]
Copy 'master/igs-bfpx.100-4.3' from TFTP server
as 'master/igs-bfpx.100-4.3' into Flash WITH erase? [yes/no] yes
```

## Related Commands

**boot config**  
**boot system flash**  
**copy flash tftp**  
**show boot**  
**verify**  
**verify flash**

## **copy verify**

The **verify** or **verify flash** command replaces this command. Refer to the descriptions of the **verify** and **verify flash** commands for more information.

## **copy verify bootflash**

The **verify bootflash** command replaces this command. Refer to the description of the **verify bootflash** command for more information.

## delete

To delete any file on a Flash memory device, use the **delete** EXEC command.

**delete** [*device:*]*filename*

### Syntax Description

*device:*

(Optional) Device containing the file to be deleted. The colon (:) is required. Valid devices are as follows:

- **flash.** This device is the internal Flash memory in the Cisco 7000 series. This device is the initial default device.
- **bootflash.** This device is the internal Flash memory in the Cisco 7500 series.
- **slot0.** This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card. For the Cisco 7500 series, this device is the initial default device.
- **slot1.** This device is the second PCMCIA slot on the Cisco 7500 series RSP card.

*filename*

Name of the file to be deleted. The maximum filename length is 63 characters.

### Default

For the Cisco 7000 series, the initial default device is **flash:**. For the Cisco 7500 series, the initial default device is **slot0:**. Otherwise, the default device is that specified by the **cd** command.

### Command Mode

EXEC

### Usage Guidelines

Use this command only with the Cisco 7000 series and the Cisco 7500 series.

If you omit the device, the router uses the default device specified by the **cd** command.

If you attempt to delete the configuration file specified by the CONFIG\_FILE or BOOTLDR environment variable, the system prompts you to confirm the deletion. Also, if you attempt to delete the last valid system image specified in the BOOT environment variable, the system prompts you to confirm the deletion. When you delete a file, the router simply marks the file as deleted, but does not erase the file. This feature allows you to later recover a “deleted” file using the **undelete** command. You can delete and undelete a file up to 15 times. To permanently delete all “deleted” files on a Flash memory device, use the **squeeze** command.

---

**Note** With the Cisco 7000 series, you can only use the **undelete** and **squeeze** commands on the Flash memory card inserted in the PCMCIA slot (**slot0**) of the RP card. You cannot use this command on a Cisco 7000’s internal Flash memory.

---

**Example**

The following example deletes the *router-backupconfig* file from the Flash card inserted in first slot of the RSP card:

```
delete slot0:router-backupconfig
```

**Related Commands**

**cd**  
**dir**  
**show boot**  
**squeeze**  
**undelete**

## dir

To display a list of files on a Flash memory device, use the **dir** EXEC command.

```
dir [/all | /deleted | /long] [device:][filename]
```

### Syntax Description

<b>/all</b>	(Optional) Lists deleted files, undeleted files, and files with errors.
<b>/deleted</b>	(Optional) Lists only the deleted files.
<b>/long</b>	(Optional) Lists only valid files. Valid files are those that are undeleted and without errors.
<i>device:</i>	(Optional) Device containing the file(s) to list. The colon (:) is required. Valid devices are as follows: <ul style="list-style-type: none"><li>• <b>flash.</b> This device is the internal Flash memory in the Cisco 7000 series. This device is the initial default device.</li><li>• <b>bootflash.</b> This device is the internal Flash memory in the Cisco 7500 series.</li><li>• <b>slot0.</b> This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card. For the Cisco 7500 series, this device is the initial default device.</li><li>• <b>slot1.</b> This device is the second PCMCIA slot on the Cisco 7500 series RSP card.</li></ul>
<i>filename</i>	(Optional) Name of the file(s) to display on a specified device. The files can be of any type. You can use wildcards in the filename. A wildcard character (*) matches all patterns. Strings after a wildcard are ignored.

### Default

For the Cisco 7000 series, the initial default device is **flash:**. For the Cisco 7500 series, the initial default device is **slot0:**. Otherwise, the default device is that specified by the **cd** command. When you omit all keywords and arguments, the router displays only undeleted files for the default device specified by the **cd** command in short format.

**Command Mode**  
EXEC

### Usage Guidelines

Use this command only with the Cisco 7000 series and the Cisco 7500 series. If you omit the device, the router uses the default device specified by the **cd** command.

When you use one of the keywords (**/all**, **/deleted**, **/long**), the system displays file information in long format. The long format includes the following categories:

- File's index number (#).
- Whether the file contains an error (*E*) or is deleted (*D*).
- File's *type* (1 = configuration file, 2 = image file). The router displays these values only when the file's type is certain. When the file's type is unknown, the system displays a zero or FFFFFFFF in this field.
- File's cyclic redundant check (*crc*).
- Offset into the file system of the next file (*seek*).
- Length of the file's name (*nlen*).
- Length of the file itself (*length*).
- Date and time the file was created (*date/time*).
- File's name (*name*).

When you omit all keywords (**/all**, **/deleted**, **/long**), the system displays file information in short format. Short format includes the following categories:

- File's index number (#)
- Length of the file itself (*length*)
- Date and time the file was created (*date/time*)
- File's name (*name*)

## Examples

The following example instructs the router to list undeleted files for the default device specified by the **cd** command. Notice that the router displays the information in short format because no keywords are used.

```
Gouda#dir
-#- -length- -----date/time----- name
1   620      May 4  1993 21:38:04 config1
2   620      May 4  1993 21:38:14 config2

7993896 bytes available (1496 bytes used)
```

The following example displays the long version of the same device:

```
Gouda#dir /long
-#- ED --type-- --crc-- -seek-- nlen -length- -----date/time----- name
1   .. 1      37CEC52E 202EC    7   620      May 4  1993 21:38:04 config1
2   .. 1      37CEC52E 205D8    7   620      May 4  1993 21:38:14 config2

7993896 bytes available (1496 bytes used)
```

## Related Commands

**cd**  
**delete**  
**undelete**

## erase

To erase a saved configuration, use one of the following **erase** EXEC commands. The **erase startup-config** command replaces the **write erase** command.

**erase startup-config**

**erase [device:]filename** (Cisco 7000 series and Cisco 7500 series only)

### Syntax Description

#### **startup-config**

On all platforms except the Cisco 7000 and the Cisco 7500 series, erases the startup configuration in NVRAM.

On the Cisco 7000 series and the Cisco 7500 series, erases or deletes the configuration pointed to by the CONFIG\_FILE environment variable.

#### *device:*

(Optional) Device containing the file to delete. The colon (:) is required. Valid devices are as follows:

- **flash.** This device is the internal Flash memory in the Cisco 7000 series. This device is the initial default device.
- **bootflash.** This device is the internal Flash memory in the Cisco 7500 series.
- **slot0.** This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card. For the Cisco 7500 series, this device is the initial default device.
- **slot1.** This device is the second PCMCIA slot on the Cisco 7500 series RSP card.

#### *filename*

Name of the file to delete. The files can be of any type. This command does not support wildcards in the filename.

### Default

For the Cisco 7000 series, the initial default device is **flash:**. For the Cisco 7500 series, the initial default device is **slot0:**. Otherwise, the default device is that specified by the **cd** command.

### Command Mode

EXEC

### Usage Guidelines

Use the **erase startup-config** command on all platforms to erase the startup configuration. On all platforms except the Cisco 7000 series or Cisco 7500 series, this command erases the configuration stored in NVRAM.

When you use the **erase startup-config** command on the Cisco 7000 series and the Cisco 7500 series, the router erases or deletes the configuration pointed to by CONFIG\_FILE environment variable. The CONFIG\_FILE environment variable specifies the configuration file used for initialization. If the CONFIG\_FILE environment variable points to NVRAM, the router erases

NVRAM. If the CONFIG\_FILE environment variable specifies a Flash memory device and configuration filename, the router deletes the configuration file. That is, the router marks the file as “deleted.”

Use the **erase** [device:]filename command only with the Cisco 7000 series or the Cisco 7500 series. This command functions like the **delete** command. That is, when you erase a specific file, the system marks the file as deleted, allowing you to later undelete an erased file. See the **delete** and **undelete** commands for more information. If you omit the device, the router uses the default device specified by the **cd** command.

If you attempt to erase the configuration file specified by the CONFIG\_FILE or BOOTLDR environment variable, the system prompts you to confirm the deletion. Also, if you attempt to erase the last valid system image specified in the BOOT environment variable, the system prompts you to confirm the deletion.

---

**Note** On the Cisco 7000 series, the **erase** [device:]filename command differs from the **erase flash** command. The **erase** [device:]filename command erases a specified file located in internal Flash or on the Flash memory card inserted in the PCMCIA slot. The **erase flash** command erases internal Flash memory.

---

## Examples

The following example illustrates how to erase the configuration located in NVRAM or specified by the CONFIG\_FILE environment variable:

```
erase startup-config
```

The following example deletes the *myconfig* file from a Flash memory card inserted in the slot 0 of the RP or RSP card:

```
erase slot0:myconfig
```

## Related Commands

**boot config**  
**delete**  
**show boot**  
**show startup-config**  
**undelete**

## **erase bootflash**

To erase the boot image in Flash memory on the Cisco 4500, use the **erase bootflash** EXEC command.

**erase bootflash**

### Syntax Description

This command has no arguments or keywords.

### Command Mode

EXEC

### Usage Guidelines

You can use this command only on routers that have two banks of Flash memory: one bank for the boot image and the second bank for the system image.

### Example

The following example erases the boot image in Flash memory:

```
erase bootflash
```

### Related Commands

**copy bootflash tftp**  
**copy mop bootflash**  
**copy tftp bootflash**  
**verify bootflash**  
**show bootflash**

## erase flash

To erase internal Flash memory, use the **erase flash** EXEC command. This command replaces the **copy erase flash** command.

**erase flash**

### Syntax Description

This command has no arguments or keywords.

### Command Mode

EXEC

### Usage Guidelines

The Cisco 7500 series does not support this command.

### Example

The following example illustrates how to use this command. Note that this example reflects the dual Flash bank feature available only on low-end systems (the AccessPro PC card, Cisco 2500 series, Cisco 3000 series, and Cisco 4000 series).

```
Router# erase flash

System flash partition information:
Partition  Size     Used     Free     Bank-Size   State      Copy-Mode
      1      4096K   2048K   2048K   2048K      Read Only   RXBOOT-FLH
      2      4096K   2048K   2048K   2048K      Read/Write  Direct

[Type ?<no> for partition directory; ? for full directory; q to abort]
Which partition? [default = 2]
```

The system will prompt only if there are two or more read/write partitions. If the partition entered is not valid or is the read-only partition, the process terminates. You can enter a partition number, a question mark (?) for a directory display of all partitions, or a question mark and a number (?*number*) for directory display of a particular partition. The default is the first read/write partition.

```
System flash directory, partition 2:
File  Length  Name/status
      1  3459720  master/igs-bfp.100-4.3
[3459784 bytes used, 734520 available, 4194304 total]

Erase flash device, partition 2? [confirm] <Return>
```

## format

To format Flash memory, use the **format** EXEC command.

```
format [spare spare-number] device1: [[device2:][monlib-filename]]
```



**Caution** The following formatting procedure erases all information in the Flash memory. To prevent the loss of important data, proceed carefully.

### Syntax Description

<b>spare</b>	(Optional) Reserves spare sectors as specified by the <i>spare-number</i> argument when formatting a device.
<i>spare-number</i>	(Optional) Number of the spare sectors to reserve on formatted device. Valid values are 0 to 16. The default value is zero.
<b><i>device1</i>:</b>	Device to format. The colon (:) is required. Valid devices are as follows: <ul style="list-style-type: none"><li>• <b>bootflash</b>. This device is the internal Flash memory in the Cisco 7500 series.</li><li>• <b>slot0</b>. This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card.</li><li>• <b>slot1</b>. This device is the second PCMCIA slot on the Cisco 7500 series RSP card.</li></ul>
<b><i>device2</i>:</b>	(Optional) Device containing the monlib file to use for formatting <i>device1</i> . The colon (:) is required. Valid devices are as follows: <ul style="list-style-type: none"><li>• <b>bootflash</b>. This device is the internal Flash memory in the Cisco 7500 series.</li><li>• <b>slot0</b>. This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card. For the Cisco 7500 series, this device is the initial default device.</li><li>• <b>slot1</b>. This device is the second PCMCIA slot on the Cisco 7500 series RSP card.</li></ul>
<b><i>monlib-filename</i></b>	(Optional) Name of the ROM monitor library file (monlib file) to use for formatting <i>device1</i> . The default monlib file is the one bundled with the system software.

### Default

The default monlib file is the one bundled with the system software.

## Command Mode

### EXEC

#### Usage Guidelines

Use this command with the Cisco 7000 series PCMCIA slot or the Cisco 7500 series. On the Cisco 7000 series, use the **format** command to format your Flash memory card inserted in slot 0 of the RP card. On the Cisco 7500 series, use the **format** command to format internal Flash memory (bootflash) or your Flash memory cards.

In some cases, you might need to insert a new PCMCIA Flash memory card and load images or backup configuration files onto it. Before you can use a new Flash memory card, you must format it.

Flash memory cards have sectors that can fail. On the Cisco 7000 series and the Cisco 7500 series, you can reserve certain Flash memory sectors as “spares” for use when other sectors fail. Use the **format** command to specify between 0 and 16 sectors as spares. If you reserve a small number of spare sectors for emergencies, you do not waste space because you can use most of the Flash memory card. If you specify zero spare sectors and some sectors fail, you must reformat the Flash memory card and thereby erase all existing data.

The monlib file is the ROM monitor library. The ROM monitor uses the monlib file to access files in the Flash file system. The Cisco IOS Release 11.0 system software contains a monlib file.

In the command syntax, *device1* is the device to format and *device2* contains the monlib file to use. When you omit the **[[device2:][monlib-filename]]** argument, the system formats *device1* using the monlib that is bundled with the system software. When you omit *device2* from the **[[device2:][monlib-filename]]** argument, the system formats *device1* using the named monlib file from the device specified by the **cd** command. When you omit *monlib-filename* from the **[[device2:][monlib-filename]]** argument, the system formats *device1* using *device2*’s monlib file. When you specify the whole **[[device2:][monlib-filename]]** argument, the system formats *device1* using the specified monlib file from the specified device. Note that you can specify *device1*’s own monlib file in this argument. When the system cannot find a monlib file, the system terminates the formatting process.



**Caution** You can read from or write to Flash memory cards formatted for Cisco 7000 series Route Processor (RP) cards in your Cisco 7500 series, but you cannot boot the Cisco 7500 series from a Flash memory card that is formatted for the Cisco 7000 series. Similarly, you can read from or write to Flash memory cards formatted for Cisco 7500 series in your Cisco 7000 series, but you cannot boot the Cisco 7000 series from a Flash memory card that is formatted for the Cisco 7500 series.

#### Example

The following example shows the **format** command that formats a Flash memory card inserted in slot 0 of the RP or RSP card:

```
Router# format slot0:
Running config file on this device, proceed? [confirm]y
All sectors will be erased, proceed? [confirm]y
Enter volume id (up to 31 characters): <Return>
Formatting sector 1 (erasing)
Format device slot0 completed
```

When the router returns you to the EXEC prompt, the new Flash memory card is successfully formatted and ready for use.

Related Commands

**copy**  
**delete**  
**dir**  
**show file**  
**show flash**  
**squeeze**  
**undelete**

## ip arp-server

Use the **ip arp-server** interface configuration command to allow the router to act as a Reverse Address Resolution Protocol (RARP) server. Use the **no** form of this command to restore the interface to the default of no RARP server support.

**ip arp-server** *ip-address*  
**no ip arp-server** *ip-address*

### Syntax Description

*ip-address* IP address that is to be provided in the source protocol address field of the RARP response packet. Normally, this is set to whatever address you configure as the primary address for the interface.

### Default

Disabled

### Command Mode

Interface configuration

### Usage Guidelines

This feature makes diskless booting of clients possible between network subnets where the client and server are on separate subnets.

RARP server support is configurable on a per interface basis, so that the router does not interfere with RARP traffic on subnets that do not need RARP assistance from the router.

The router answers incoming RARP requests only if both of the following two conditions are met:

- The **ip arp-server** command has been configured for the interface on which the request was received.
- There is a static entry found in the IP ARP table that maps the MAC address contained in the RARP request to an IP address.

Use the **show ip arp** EXEC command to display the contents of the IP ARP cache.

Sun Microsystems, Inc. makes use of RARP and UDP-based network services to facilitate network-based booting of SunOS on their workstations. By bridging RARP packets and using both the **ip helper-address** interface configuration command and the **ip forward-protocol** global configuration command, the router should be able to perform the necessary packet switching to enable booting of Sun workstations across subnets. Unfortunately, some Sun workstations assume that the sender of the RARP response, in this case the router, is the host the client can contact to TFTP load the bootstrap image. This causes the workstations to fail to boot.

By using the **ip arp-server** feature, the router can be configured to answer these RARP requests, and the client machine should be able to reach its server by having its TFTP requests forwarded through the router that acts as the RARP server.

In the case of RARP responses to Sun workstations attempting to diskless boot, the IP address specified in the **ip rarp-server** interface configuration command should be the IP address of the TFTP server. In addition to configuring RARP service, the router must also be configured to forward UDP-based Sun portmapper requests to completely support diskless booting of Sun workstations. This can be accomplished using configuration commands of the form:

```
ip forward-protocol udp 111
interface interface name
ip helper-address target-address
```

RFC 903 documents the Reverse Address Resolution Protocol.

## Examples

The following partial example configures the router to act as a RARP server. The router is configured to use the primary address of the specified interface in its RARP responses.

```
arp 128.105.2.5 0800.2002.ff5b arpa
interface ethernet 0
ip address 128.105.3.100 255.255.255.0
ip rarp-server 128.105.3.100
```

In the following example, the router is configured to act as a RARP server, with TFTP and portmapper requests forwarded to the Sun server:

```
! Allow the router to forward broadcast portmapper requests
ip forward-protocol udp 111
! Provide the router with the IP address of the diskless sun
arp 128.105.2.5 0800.2002.ff5b arpa
interface ethernet 0
! Configure the router to act as a RARP server, using the Sun Server's IP
! address in the RARP response packet.
ip rarp-server 128.105.3.100
! Portmapper broadcasts from this interface are sent to the Sun Server.
ip helper-address 128.105.3.100
```

## Related Commands

A dagger (†) indicates that the command is documented in another chapter.

**ip forward-protocol** †  
**ip helper-address** †

## ip rcmd domain-lookup

Use the **ip rcmd domain-lookup** global configuration command to enable Domain Name System (DNS) security for rcp and rsh. To bypass DNS security for rcp and rsh, use the **no** form of this command.

```
ip rcmd domain-lookup
no ip rcmd domain-lookup
```

### Syntax Description

This command has no arguments or keywords.

### Default

Enabled

### Command Mode

Global configuration

### Usage Guidelines

If you do not want to use DNS for rcmd queries, but DNS has been enabled with the **ip domain-lookup** command, use the **no ip rcmd domain-lookup** command.

This command will turn off DNS lookups for rsh and rcp only. The **no ip domain-lookup** command takes precedence over the **ip rcmd domain-lookup** command. If **ip domain-lookup** is disabled with the **no ip domain-lookup** command, DNS will be bypassed for rcp and rsh, even if **ip rcmd domain-lookup** is enabled.

---

**Note** Cisco IOS Release 10.3 added the **ip** keyword to **rcmd** commands. If you are upgrading from Release 10.2 to Release 10.3, this keyword is automatically added to any **rcmd** commands you have in your Release 10.2 configuration files.

---

### Example

In the following example, DNS security is enabled for rcp and rsh:

```
ip rcmd domain-lookup
```

### Related Command

A dagger (†) indicates that the command is documented in another chapter.

**ip domain-lookup** †

## ip rcmd rcp-enable

To configure the router to allow remote users to copy files to and from the router, use the **ip rcmd rcp-enable** global configuration command. Use the **no** form of this command to disable a router that is enabled for rcp.

```
ip rcmd rcp-enable
no ip rcmd rcp-enable
```

### Syntax Description

This command has no arguments or keywords.

### Default

To ensure security, the router is not enabled for rcp by default.

### Command Mode

Global configuration

### Usage Guidelines

To allow a remote user to execute rcp commands on the router, you must also create an entry for the remote user in the local router's authentication database.

The **no ip rcmd rcp-enable** command does not prohibit a local user from using rcp to copy system images and configuration files to and from the router.

To protect against undesirable users copying the system image or configuration files without consent, the router is not enabled for rcp by default.

---

**Note** Cisco IOS Release 10.3 added the **ip** keyword to **rcmd** commands. If you are upgrading from Release 10.2 to Release 10.3, this keyword is automatically added to any **rcmd** commands you have in your Release 10.2 configuration files.

---

### Example

The following example shows how to enable the router for rcp:

```
rcp-enable
```

### Related Command

**ip rcmd remote-host**

## ip rcmd remote-host

To allow remote users to execute commands on the router using rsh or rcp, use the **ip rcmd remote-host** global configuration command to create an entry for the remote user in a local authentication database. Use the **no** form of this command to remove an entry for a remote user from the local authentication database.

**ip rcmd remote-host** *local-username {ip-address | host} remote-username [enable]*  
**no ip rcmd remote-host** *local-username {ip-address | host} remote-username [enable]*

### Syntax Description

<i>local-username</i>	Name of the user on the local router. You can specify the router host name as the username. This name needs to be communicated to the network administrator or the user on the remote system. To be allowed to remotely execute commands on the router, the remote user must specify this value correctly.
<i>ip-address</i>	IP address of the remote host from which the local router will accept remotely executed commands. Either the IP address or the host name is required.
<i>host</i>	Name of the remote host from which the local router will accept remotely executed commands. Either the host name or the IP address is required.
<i>remote-username</i>	Name of the user on the remote host from which the router will accept remotely executed commands.
<b>enable</b>	(Optional) Enables the remote user to execute privileged EXEC commands using rsh. This keyword does not apply to rcp.

Command Mode  
 Global configuration

### Usage Guidelines

A TCP connection to a router is established using an IP address. Using the host name is valid only when you are initiating an rcp or rsh command from a local router. The host name is converted to an IP address using DNS or host-name aliasing.

To allow a remote user to execute rcp or rsh commands on a local router, you must create an entry for the remote user in the local router's authentication database. You must also enable the router to act as an rsh or rcp server.

To enable the router to act as an rsh server, issue the **ip rcmd rsh-enable** command. To enable the router to act as an rcp server, issue the **ip rcmd rcp-enable** command. The router cannot act as a server for either of these protocols unless you explicitly enable the capacity.

A local authentication database, which is similar in concept and use to a UNIX *.rhosts* file, is used to enforce security on the router through access control. Each entry that you configure in the authentication database identifies the local user, the remote host, and the remote user. To permit a remote user of rsh to execute commands in privileged EXEC mode, specify the **enable** keyword.

An entry that you configure in the router authentication database differs from an entry in a UNIX *.rhost* file in the following aspect. Because the *.rhosts* file on a UNIX system resides in the home directory of a local user account, an entry in a UNIX *.rhosts* file does not need to include the local username; the local username is determined from the user account. To provide equivalent support on a router configured, specify the local username along with the remote host and remote username in each authentication database entry that you configure.

For a remote user to be able to execute commands on the router in its capacity as a server, the local username, host address or name, and remote username sent with the remote client request must match values configured in an entry in the local authentication file.

A remote client host should be registered with DNS. The router software uses DNS to authenticate the remote host's name and address. Because DNS can return several valid IP addresses for a host name, the router software checks the address of the requesting client against all of the IP addresses for the named host returned by DNS. If the address sent by the requester is considered invalid, that is, it does not match any address listed with DNS for the host name, then the router software will reject the remote-command execution request.

Note that if no DNS servers are configured for the router, then the router cannot authenticate the host in this manner. In this case, the router software will send a broadcast request to attempt to gain access to DNS services on another server. If DNS services are not available, you must use the **no ip domain-lookup** command to disable the router's attempt to gain access to a DNS server by sending a broadcast request.

If DNS services are not available and, therefore, you bypass the DNS security check, the router software will accept the request to remotely execute a command *only if* all three values sent with the request match exactly the values configured for an entry in the local authentication file.

---

**Note** Cisco IOS Release 10.3 added the **ip** keyword to **rcmd** commands. If you are upgrading from Release 10.2 to Release 10.3, this keyword is automatically added to any **rcmd** commands you have in your Release 10.2 configuration files.

---

### Example

The following example allows the remote user *netadmin3* on a remote host with the IP address 131.108.101.101 to execute commands on *router1* using the rsh protocol. For rsh, user *netadmin3* is allowed to execute commands in privileged EXEC mode.

```
ip rcmd remote-host router1 131.108.101.101 netadmin3 enable
```

### Related Commands

A dagger (†) indicates that the command is documented in another chapter.

**ip rcmd rcp-enable**  
**ip rcmd rsh-enable**  
**no ip domain-lookup** †

## ip rcmd remote-username

To configure the remote username to be used when requesting a remote copy using *rcp*, use the **ip rcmd remote-username** global configuration command. To remove from the configuration the remote username, use the **no** form of this command.

**ip rcmd remote-username** *username*  
**no ip rcmd remote-username** *username*



**Caution** The remote username must be associated with an account on the destination server.

### Syntax Description

<i>username</i>	Name of the remote user on the server. This name is used for <i>rcp</i> copy requests. All files and images to be copied are searched for or written relative to the directory of the remote user's account, if the server has a directory structure, for example, as do UNIX systems.
-----------------	--

### Default

If you do not issue this command, the router software sends the remote username associated with the current TTY process, if that name is valid, for *rcp* copy commands. For example, if the user is connected to the router through Telnet and the user was authenticated through the **username** command, then the router software sends that username as the remote username.

### Command Mode

Global configuration

### Usage Guidelines

The *rcp* protocol requires that a client send the remote username on an *rcp* request to the server. Use this command to specify the remote username to be sent to the server for an *rcp* copy request. If the server has a directory structure, as do UNIX systems, all files and images to be copied are searched for or written relative to the directory of the remote user's account.

---

**Note** Cisco IOS Release 10.3 added the **ip** keyword to **rcmd** commands. If you are upgrading from Release 10.2 to Release 10.3, this keyword is automatically added to any **rcmd** commands you have in your Release 10.2 configuration files.

---

If the username for the current TTY process is not valid, the router software sends the host name as the remote username. For *rcp* boot commands, the router software sends the router host name by default.

**Note** For Cisco, TTYS are commonly used in communication servers. The concept of TTY originated with UNIX. For UNIX systems, each physical device is represented in the file system. Terminals are called *TTY devices*, which stands for *teletype*, the original UNIX terminal.

---

### Example

The following example shows how to use this command:

```
configure terminal
ip rcmd remote-username netadmin1
^Z
```

### Related Commands

**boot network rcp**  
**boot system rcp**  
**copy**  
**copy flash rcp**  
**copy rcp bootflash**  
**copy rcp flash**  
**copy rcp running-config**  
**copy rcp startup-config**  
**copy running-config rcp**  
**copy startup-config rcp**

## ip rcmd rsh-enable

To configure the router to allow remote users to execute commands on the router using rsh, use the **ip rcmd rsh-enable** global configuration command. Use the **no** form of this command to disable a router that is enabled for rsh.

```
ip rcmd rsh-enable
no ip rcmd rsh-enable
```

### Syntax Description

This command has no arguments or keywords.

### Default

To ensure security, the router is not enabled for rsh by default.

### Command Mode

Global configuration

### Usage Guidelines

Use this command to enable the router to receive rsh requests from remote users. In addition to issuing this command, to allow a remote user to execute rsh commands on the router, you must create an entry for the remote user in the local router's authentication database.

The **no ip rcmd rsh-enable** command does not prohibit a local user of the router from executing a command on other routers and UNIX hosts on the network using rsh.

---

**Note** Cisco IOS Release 10.3 added the **ip** keyword to **rcmd** commands. If you are upgrading from Release 10.2 to Release 10.3, this keyword is automatically added to any **rcmd** commands you have in your Release 10.2 configuration files.

---

### Example

The following example shows how to enable the router as an rsh server:

```
ip rcmd rsh-enable
```

### Related Command

**ip rcmd remote-host**

## microcode

To specify the location of the microcode you want to download from Flash memory into the writable control store (WCS) on a Cisco 7000 series or Cisco 7500 series, use the **microcode** interface configuration command.

```
microcode interface [flash | rom | system] [flash filename]
no microcode interface [flash | rom] [flash filename]
microcode interface [flash file_id | rom | system]
no microcode interface [flash file_id | rom | system] (Cisco 7500 series only)
```

### Syntax Description

**interface** One of the following interface processor names: **aip**, **fip**, **fsip**, **hip**, **mip**, **trip**, **eip**, or **sp**.

**flash** (Optional) If the **flash** keyword is specified, a *filename* argument is required, unless you are using the **no microcode interface flash** command.

**rom** (Optional) If the **rom** keyword is specified, no further arguments are necessary. For example, the command **microcode fip rom** specifies that all FDDI Interface Processors (FIPs) should be loaded from their onboard ROM microcode. This onboard ROM microcode is not the same as the eight ROMs on the RP that contain the system image.

**system** (Optional) If **system** is specified, the router loads the microcode from the microcode bundled into the system image you are running for that interface type.

**filename** (Optional) Filename of the microcode in Flash memory that you want to download. This argument is only used with the **flash** keyword. If you use the **flash** keyword, the name of the microcode file in Flash is required unless the command is **no microcode interface flash**. (This command results in the same default condition as the command **microcode interface rom**, which indicates that the card should be loaded from its onboard ROM microcode.)

**file\_id** Specifies a *device:filename* of the microcode file to download. The colon (:) is required. Valid devices are as follows:

- **bootflash:** This device is the internal Flash memory in the Cisco 7500 series.
- **slot0:** This device is the first PCMCIA slot on the Cisco 7500 series RSP card.
- **slot1:** This device is the second PCMCIA slot on the Cisco 7500 series RSP card.

The *filename* is the name of the microcode file.

### Default

The default is to load from the microcode bundled in the system image.

## Command Mode

### Interface configuration

#### Examples

In the following example, all FIP cards will use their onboard ROM microcode:

```
microcode fip rom
```

In the following example, all FIP cards will be loaded with the microcode found in Flash memory file *fip.v141-7* when the system is booted, when a card is inserted or removed, or when the **microcode reload** interface configuration command is issued. The configuration is then written to the startup configuration file.

```
microcode fip flash fip.v141-7
^Z
> copy running-config startup-config
```

#### Related Command

**microcode reload**

## **microcode reload**

To signal to the Cisco 7000 series that all microcode configuration commands have been entered and the processor cards should be reloaded, use the **microcode reload** interface configuration command.

**microcode reload**

### Syntax Description

This command has no arguments or keywords.

### Command Mode

Interface configuration

### Example

In the following example, all controllers are reset, the specified microcode is loaded, and the CxBus complex is reinitialized according to the microcode configuration commands that have been written to memory:

```
microcode reload
```

### Related Command

**microcode**

## mop device-code

To identify the type of device sending MOP sysid messages and request program messages, use the **mop device-code** global configuration command. Use the **no** form of this command to set the identity to the default value.

```
mop device-code {cisco | ds200}  
no mop device-code {cisco | ds200}
```

### Syntax Description

**cisco** Denotes a Cisco device code.

**ds200** Denotes a DECserver 200 device code.

### Default

Cisco device code

### Command Mode

Global configuration

### Usage Guidelines

The sysid messages and request program messages use the identity information indicated by this command.

### Example

The following example identifies a DECserver 200 device as sending MOP sysid and request program messages:

```
mop device-code ds200
```

### Related Command

A dagger (†) indicates that the command is documented in another chapter.

**mop sysid** †

## **mop retransmit-timer**

To configure the length of time the router waits before retransmitting boot requests to a MOP server, use the **mop retransmit-timer** global configuration command. Use the **no** form of this command to reinstate the default value.

```
mop retransmit-timer seconds  
no mop retransmit-timer
```

### Syntax Description

**seconds** Sets the length of time, in seconds, that the router waits before retransmitting a message. The value is a number from 1 to 20.

### Default

4 seconds

### Command Mode

Global configuration

### Usage Guidelines

By default, when the router transmits a request that requires a response from a MOP boot server and the server does not respond, the message will be retransmitted after 4 seconds. If the MOP boot server and router are separated by a slow serial link, it may take longer than 4 seconds for the router to receive a response to its message. Therefore, you might want to configure the router to wait longer than 4 seconds before retransmitting the message if you are using such a link.

### Example

In the following example, if the MOP boot server does not respond within 10 seconds after the router sends a message, the server will retransmit the message:

```
mop retransmit-timer 10
```

### Related Commands

A dagger (†) indicates that the command is documented in another chapter.

**mop device-code**  
**mop retries**  
**mop enabled**<sup>†</sup>

## mop retries

To configure the number of times a router will retransmit boot requests to a MOP server, use the **mop retries** global configuration command. Use the **no** form of this command to reinstate the default value.

```
mop retries count  
no mop retries
```

### Syntax Description

*count*      Indicates the number of times a router will retransmit a MOP boot request. The value is a number from 3 to 24.

### Default

8 times

### Command Mode

Global configuration

### Example

In the following example, the router will attempt to retransmit a message to an unresponsive host 11 times before declaring a failure:

```
mop retries 11
```

### Related Commands

A dagger (†) indicates that the command is documented in another chapter.

**mop device-code**  
**mop retransmit-timer**  
**mop enabled** †

To list the value of the boot field (bits 0-3) 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.

### Default

Refer to the appropriate hardware installation guide for default values.

### Command Mode

ROM monitor

### Usage Guidelines

To get to the ROM monitor prompt at a Cisco 2000, Cisco 3000, Cisco 4000, or Cisco 7000 series, 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 an example of 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 Command

**config-register**

## partition flash

To separate Flash memory into two partitions, use the **partition flash** global configuration command. Use the **no** form of this command to undo partitioning, and restore Flash memory to one partition.

```
partition flash partitions [size1 size2]  
no partition flash
```

### Syntax Description

*partitions* Number of partitions in Flash memory. Can be 1 or 2.

*size1* (Optional) Size of the first partition in megabytes.

*size2* (Optional) Size of the second partition in megabytes.

### Default

Flash memory consists of one partition.

If this command is entered but partition size is not specified, two partitions of equal size will be created.

### Command Mode

Global configuration

### Usage Guidelines

Although the software supports up to eight partitions, current hardware allows only two. To undo partitioning, use either the **partition flash 1** or **no partition flash** command. If one or more files exist in the second partition, you must manually erase the second partition with the **erase flash** command before reverting to a single partition.

When creating two partitions, you must not truncate a file or cause the spillover of a file into the second partition.

### Example

The following example creates two partitions of 4 MB each in Flash memory:

```
partition flash 2 4 4
```

## pwd

To show the current setting of the **cd** command, use the **pwd** EXEC command.

**pwd**

### Syntax Description

This command has no arguments or keywords.

### Default

This command has no default.

### Command Mode

EXEC

### Usage Guidelines

Use this command with the Cisco 7000 series and the Cisco 7500 series.

Use the **pwd** command to show what device is specified as the system's default device by the **cd** command. For all EXEC commands that have an optional *device:* argument, the system uses the device specified by the **cd** command when you omit the optional *device:* argument.

For example, the **dir** command contains an optional *device:* argument and displays a list of files on a Flash memory device. When you omit this *device:* argument, the system shows a list of the files on the Flash device specified by the **cd** command.

### Examples

The following example shows that the present working device specified by the **cd** command is slot 0 of the RP or RSP card:

```
Gouda>pwd
slot0
Gouda>
```

The following example uses the **cd** command to change the present working device to slot 1 of the RSP card and then uses the **pwd** command to display that present working device:

```
Gouda>cd slot1:
Gouda>pwd
slot1
Gouda>
```

Similarly, the following example uses the **cd** command on the Cisco 7500 series to change the present working device to bootflash and then uses the **pwd** command to display that present working device:

```
Gouda>cd bootflash:
Gouda>pwd
bootflash
Gouda>
```

Related Command

**cd**

## reload

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

```
reload
```

### Syntax Description

This command has no arguments or keywords.

### Command Mode

EXEC

### 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.

### Example

The following example illustrates how to enter the **reload** command at the privileged EXEC prompt:

```
reload
```

### Related Command

**copy running-config startup-config**

## rsh

To execute a command remotely on a remote rsh host, use the **rsh** privileged EXEC command.

```
rsh {ip-address | host} [/user username] remote-command
```

### Syntax Description

<i>ip-address</i>	IP address of the remote host on which to execute the rsh command. Either the IP address or the host name is required.
<i>host</i>	Name of the remote host on which to execute the command. Either the host name or the IP address is required.
<b>/user</b> <i>username</i>	(Optional) Remote username.
<i>remote-command</i>	Command to be executed remotely. This is a required parameter.

### Default

If you do not specify the **/user** keyword and argument, the router sends a default remote username. As the default value of the remote username, the router software sends the username associated with the current TTY process, if that name is valid. For example, if the user is connected to the router through Telnet and the user was authenticated through the **username** command, then the router software sends that username as the remote username. If the TTY username is invalid, the router software uses the router host name as the both the remote and local usernames.

---

**Note** For Cisco, TTYs are commonly used in communications servers. The concept of TTY originated with UNIX. For UNIX systems, each physical device is represented in the file system. Terminals are called *TTY devices*, which stands for *teletype*, the original UNIX terminal.

---

### Command Mode

Privileged EXEC

### Usage Guidelines

Use the **rsh** command to execute commands remotely. The host on which you remotely execute the command must support the rsh protocol, and the *.rhosts* files on the rsh host must include an entry that permits you to remotely execute commands on that host.

For security reasons, the router software does not default to a remote login if no command is specified, as does UNIX. Instead, the router provides Telnet and connect services that you can use rather than rsh.

## Example

The following command specifies that user *sharon* attempts to remotely execute the UNIX **ls** command with the *-a* argument on the remote host *mysys.cisco.com*. The command output resulting from the remote execution follows the command example:

```
Router1# rsh mysys.cisco.com /user sharon ls -a
.
..
.alias
.cshrc
.emacs
.exrc
.history
.login
.mailrc
.news
.oldnews
.rhosts
.twmrc
.xsession
jazz
```

## service compress-config

To compress configuration files on the Cisco 7000 series, Cisco 4000 series, Cisco 3000, and AGS+ routers, which have NVRAM, use the **service compress-config** global configuration command. To disable compression, use the **no** form of this command.

```
service compress-config
no service compress-config
```

### Syntax Description

This command has no arguments or keywords.

### Default

Disabled

### Command Mode

Global configuration

### Usage Guidelines

If the file compression completes successfully, the following message is displayed:

```
Compressing configuration from configuration-size to compressed-size
[OK]
```

If the boot ROMs do not recognize a compressed configuration, the following message is displayed:

```
Boot ROMs do not support NVRAM compression Config NOT written to NVRAM
```

If the file compression fails, the following message is displayed:

```
Error trying to compress nvram
```

One way to determine whether a configuration file will compress enough to fit into NVRAM is to use a text editor to enter the configuration, then use the UNIX **compress** command to check the compressed size. To get a closer approximation of the compression ratio, use the UNIX command **compress -b12**.

Once the configuration file has been compressed, the router functions normally. A **show startup-config** command would uncompress the configuration before displaying it. At boot time, the system would recognize that the configuration file was compressed, uncompress it, and proceed normally.

To disable compression of the configuration file, enter configuration mode and specify the **no service compress-config** command. Then enter the **copy running-config startup-config** command. The router displays an OK message if it is able to successfully write the uncompressed configuration to NVRAM. Otherwise, the router displays an error message indicating that the configuration is too large to store. If the configuration file is larger than the physical NVRAM, the following message is displayed:

```
##Configuration too large to fit uncompressed in NVRAM Truncate configuration? [confirm]
```

To truncate and save the configuration, type **Y**. To not truncate and not save the configuration, type **N**.

**Example**

In the following example, the configuration file is compressed:

```
service compress-config
```

**Related Command**

**show startup-config**

## service config

To enable autoloading of configuration files from a network server, use the **service config** global configuration command. Use the **no** form of this command to restore the default.

```
service config
no service config
```

### Syntax Description

This command has no arguments or keywords.

### Default

Disabled, except on systems without NVRAM or with invalid or incomplete information in NVRAM. In these cases, autoloading of configuration files from a network server is enabled automatically.

### Command Mode

Global configuration

### Usage Guidelines

Usually, the **service config** command is used in conjunction with the **boot host** or **boot network** command. You must enter the **service config** command to enable the router to automatically configure the system from the file specified by the **boot host** or **boot network** command.

The **service config** command can also be used without the **boot host** or **boot network** command. If you do not specify host or network configuration filenames, the router uses the default configuration files. The default network configuration file is *network-*cfg**. The default host configuration file is *host-*cfg**, where host is the host name of the router. If the router cannot resolve its host name, the default host configuration file is *router-*cfg**.

### Example

In the following example, the router is configured to autoload the default host configuration file:

```
boot host
service config
```

### Related Commands

**boot host**  
**boot network**

## show async-bootp

To display the extended BOOTP request parameters that have been configured for asynchronous interfaces, use the **show async-bootp** privileged EXEC command.

**show async-bootp**

### Syntax Description

This command has no arguments or keywords.

### Command Mode

#### Privileged EXEC

### Sample Display

The following is a sample output of the **show async-bootp** command:

```
Router# show async-bootp

The following extended data will be sent in BOOTP responses:

bootfile (for address 128.128.1.1) "pcboot"
bootfile (for address 131.108.1.111) "dirtboot"
subnet-mask 255.255.0.0
time-offset -3600
time-server 128.128.1.1
```

Table 3-3 describes significant fields shown in the display.

**Table 3-3 Show Async-BOOTP Field Descriptions**

Field	Description
bootfile... "pcboot"	Boot file for address 128.128.1.1 is named pcboot.
subnet-mask 255.255.0.0	Subnet mask.
time-offset -3600	Local time is one hour (3600 seconds) earlier than UTC time.
time-server 128.128.1.1	Address of the time server for the network.

### Related Command

#### async-bootp

## show boot

To display the contents of the BOOT environment variable, the name of the configuration file pointed to by the CONFIG\_FILE environment variable, and the contents of the BOOTLDR environment variable, use the **show boot** EXEC command.

**show boot**

### Syntax Description

This command has no arguments or keywords.

### Command Mode

EXEC

### Usage Guidelines

Use this command with the Cisco 7000 series and the Cisco 7500 series. The **show boot** 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.

### Sample Display

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

```
Cyclone#show boot
BOOT variable =
CONFIG_FILE variable = nvram:
Current CONFIG_FILE variable = slot0:router-config
BOOTLDR variable not exist

Configuration register is 0x0

Cyclone#
```

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 running-config 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.

#### Related Commands

**boot bootldr**

**boot config**

**boot system**

**show version**

## show bootflash

To verify boot Flash memory on the Cisco 4500, use the **show bootflash** EXEC command.

**show bootflash**

### Syntax Description

This command has no arguments or keywords.

### Command Mode

EXEC

### Usage Guidelines

You can use this command only on routers that have two banks of Flash: one bank for the boot image and the second bank for the system image.

The **show bootflash** command displays the type of boot Flash memory present, any files that may currently exist in boot Flash memory, and the amount of boot Flash memory used and remaining.

### Sample Display

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

```
Router# show bootflash
Boot flash directory:
File  name/status
  1  c4500-xboot
[1387336 bytes used, 2806968 bytes available]
```

Table 3-4 describes the fields shown in the output.

**Table 3-4 Show Bootflash Field Descriptions**

Field	Description
Boot File	Number of the boot file.
flash directory: name/status	Name and status of the boot file. The status is displayed if appropriate and can be one of the following: <ul style="list-style-type: none"><li>• [deleted]—File has been deleted.</li><li>• [invalid checksum]—File has an incorrect checksum.</li></ul>

## **show configuration**

The **show startup-config** command replaces this command. Refer to the description of the **show startup-config** command for more information.

## show file

To display the configuration stored in a specified file, use the **show file** EXEC command.

**show file** [*device:*] *filename*

### Syntax Description

<i>device:</i>	(Optional) Device containing the configuration file. The colon (:) is required. Valid devices are as follows: <ul style="list-style-type: none"><li>• <b>flash</b>. This device is the internal Flash memory in the Cisco 7000 series. This device is the initial default device.</li><li>• <b>bootflash</b>. This device is the internal Flash memory in the Cisco 7500 series.</li><li>• <b>nvramp</b>. The device is the router's NVRAM. If you specify NVRAM, omit the filename. The colon (:) is required.</li><li>• <b>slot0</b>. This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card. For the Cisco 7500 series, this device is the initial default device.</li><li>• <b>slot1</b>. This device is the second PCMCIA slot on the Cisco 7500 series RSP card.</li></ul>
<i>filename</i>	If you omit the <i>device:</i> argument, the system uses the default device specified by the <b>cd</b> command.

  
| *filename* | Name of the file. The file can be of any type. The maximum filename length is 63 characters. |

Command Mode  
EXEC

### Usage Guidelines

Use this command for the Cisco 7000 series and the Cisco 7500 series. When showing the configuration, the router informs you whether the displayed configuration is a complete configuration or a distilled version. A distilled configuration is one that does not contain access lists.

### Sample Display

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

```
Router#show file slot0:router-config
Using 534 out of 129016 bytes
!
version 10.3
!
hostname Cyclops
!
enable-password xxxx
service pad
!
```

```
boot system dross-system 131.108.13.111
boot system dross-system 131.108.1.111
!
exception dump 131.108.13.111
!
no ip ipname-lookup
!
decnet routing 13.1
decnet node-type area
decnet max-address 1023
!
interface Ethernet 0
ip address 131.108.1.1 255.255.255.0
ip helper-address 131.120.1.0
ip accounting
ip gdp
decnet cost 3
!
ip domain-name CISCO.COM
ip name-server 255.255.255.255
!
end
```

#### Related Commands

**boot bootldr**  
**cd**  
**configure**  
**dir**

## show flash

To display the layout and contents of Flash memory, use one of the following **show flash** EXEC commands:

**show flash [all | chips | detailed | err | partition *number* [all | chips | detailed | err] | summary]**

**show flash [all | chips | filesystems] [device:]** (Cisco 7000 series PCMCIA slot and Cisco 7500 series only)

### Syntax Description

<b>all</b>	(Optional) On all platforms except the Cisco 7000 series PCMCIA slot and the Cisco 7500 series, <b>all</b> shows complete information about Flash memory, including information about the individual ROM devices in Flash memory and the names and sizes of all system image files stored in Flash memory, including those that are invalidated.  On the Cisco 7000 series PCMCIA slot and the Cisco 7500 series, <b>all</b> shows the following information: <ul style="list-style-type: none"><li>• The same information as that displayed by the <b>dir</b> command when you use the <b>/all</b> and <b>/long</b> keywords together</li><li>• The same information as that displayed by the <b>filesystems</b> keyword</li><li>• The same information as that displayed by the <b>chips</b> keyword</li></ul>
<b>chips</b>	(Optional) Shows information per partition and per chip, including which bank the chip is in plus its code, size, and name.
<b>detailed</b>	(Optional) Shows detailed file directory information per partition, including file length, address, name, Flash checksum, computer checksum, bytes used, bytes available, total bytes, and bytes of system Flash memory.
<b>err</b>	(Optional) Shows write or erase failures in the form of number of retries.
<b>partition <i>number</i></b>	(Optional) Shows output for the specified partition number. If you specify the <b>partition</b> keyword, you must specify a partition number. You can use this keyword only when Flash memory has multiple partitions.
<b>summary</b>	(Optional) Shows summary information per partition, including the partition size, bank size, state, and method by which files can be copied into a particular partition. You can use this keyword only when Flash memory has multiple partitions.
<b>filesystems</b>	(Optional) Shows the Device Info Block, the Status Info, and the Usage Info.

*device:*

(Optional) Specifies the device about which to show Flash information. The device is optional; but when it is used, the colon (:) is required. When it is omitted, the default device is that specified by the **cd** command. Valid devices are as follows:

- **bootflash**. This device is the internal Flash memory in the Cisco 7500 series.
- **slot0**. This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card.
- **slot1**. This device is the second PCMCIA slot on the Cisco 7500 series RSP card.

## Command Mode

EXEC

### Usage Guidelines

The **show flash** command displays the type of Flash memory present, any files that might currently exist in Flash memory, and the amounts of Flash memory used and remaining.

For the Cisco 7000 series PCMCIA slot and the Cisco 7500 series, when you specify a PCMCIA slot as the device, the router displays the layout and contents of the Flash memory card inserted in the specified slot of the RP or RSP card. When you omit the *device:* argument, the router displays the default device specified by the **cd** command. Use the **pwd** command to show the current default device.

### Sample Displays

The following is sample output from the **show flash** command on the Cisco 3000 and Cisco 7000 series:

```
Router# show flash
4096K bytes of flash memory sized on embedded flash.

File      name/status
0        ahp4/gs7-k
1        micro/eip1-0
2        micro/spl-3
3        micro/trip1-1
4        micro/hipl-0
5        micro/fipl-1
6        fsipuicode
7        spuicode
8        tripuicode
9        fipuicode
10       eipuicode
11       hipuicode
12       sipuicode
13       sp_q160-1
14       ahp4/sp160-3 [deleted]
15       ahp4/sp160-3
[682680/4194304 bytes free/total]
```

Table 3-5 describes the **show flash** display fields for the Cisco 3000 series and the internal Flash memory of the Cisco 7000 series.

**Table 3-5 Show Flash Field Descriptions**

Field	Description
File	Number of file in Flash memory.
name/status	Files that currently exist in Flash memory.
bytes free	Amount of Flash memory remaining.
[deleted]	Flag indicating that another file exists with the same name or that the process has been abnormally terminated.

As the display shows, the Flash memory can store and display multiple, independent software images for booting itself or for TFTP server software for other products. This feature is useful for storing default system software. These images can be stored in compressed format (but cannot be compressed by the router).

To eliminate any files from Flash memory (invalidated or otherwise) and free up all available memory space, the entire Flash memory must be erased; individual files cannot be erased from Flash memory.

The following is a sample output from the **show flash** command on a router that has Flash memory partitioned:

```
Router# show flash

System flash directory, partition 1:
  File  Length  Name/status
    1    3459720  master/igs-bfpx.100-4.3
  [3459784 bytes used, 734520 available, 4194304 total]
4096K bytes of processor board System flash (Read Only)

System flash directory, partition 2:
  File  Length  Name/status
    1    3459720  igs-kf
  [3459784 bytes used, 734520 available, 4194304 total]
4096K bytes of processor board System flash (Read/Write)
```

The following is a sample output from the **show flash all** command on the Cisco 3000 series and the internal Flash memory of the Cisco 7000 series. The format of the display is different on different router models. The format of your display might differ.

```
Router# show flash all

4096K bytes of flash memory sized on embedded flash.

  Chip   socket   code   bytes   name
    0       U63    89BD  0x040000  INTEL 28F020
    1       U62    89BD  0x040000  INTEL 28F020
    2       U61    89BD  0x040000  INTEL 28F020
    3       U60    89BD  0x040000  INTEL 28F020
    4       U48    89BD  0x040000  INTEL 28F020
    5       U47    89BD  0x040000  INTEL 28F020
    6       U46    89BD  0x040000  INTEL 28F020
    7       U45    89BD  0x040000  INTEL 28F020
    8       U30    89BD  0x040000  INTEL 28F020
    9       U29    89BD  0x040000  INTEL 28F020
   10      U28    89BD  0x040000  INTEL 28F020
   11      U27    89BD  0x040000  INTEL 28F020
```

```

12      U17      89BD  0x040000  INTEL 28F020
13      U16      89BD  0x040000  INTEL 28F020
14      U15      89BD  0x040000  INTEL 28F020
15      U14      89BD  0x040000  INTEL 28F020

Flash file directory:
File  name/status
      addr      length    fcksum  ccksum
0  gs7-k
      0x12000080  2601100  0x4015  0x4015
1  micro/eip1-0
      0x1227B14C  53364    0x0     0x0
2  micro/sp1-3
      0x12288200  55418    0x0     0x0
3  micro/trip1-1
      0x12295ABC  105806   0x0     0x0
4  micro/hip1-0
      0x122AF84C  35528    0x0     0x0
5  micro/fip1-1
      0x122B8354  97070    0x0     0x0
6  fsipucode
      0x122CFEC4  6590    0x0     0x0
7  spucode
      0x122D18C4  55418    0x0     0x0
8  tripucode
      0x122DF180  105806   0x0     0x0
9  fipucode
      0x122F8F10  97070    0x0     0x0
10 eipucode
      0x12310A80  53330   0x60A1  0x60A1
11 hipucode
      0x1231DB14  35528    0x0     0x0
12 sipucode
      0x1232661C  54040    0x0     0x0
13 sp_q160-1
      0x1233974   42912    0x0     0x0
14 ahp4/sp160-3 [deleted]
      0x1233E154  55730    0x0     0x0
15 ahp4/sp160-3
      0x1234BB48  55808    0x0     0x0
[ 682680/4194304 bytes free/total]

```

Table 3-6 describes the **show flash all** display fields for the Cisco 3000 series and the Cisco 7000 series internal Flash memory.

**Table 3-6 Show Flash All Field Descriptions**

Field	Description
bytes of flash memory sized on embedded flash	Total amount of Flash memory present.
Chip	Identifies the ROM unit.
socket	Location of the ROM unit.
code	Vendor code identifying the vendor of the ROM unit.
bytes	Size of the ROM unit (in hex bytes).
name (in row beginning with Chip)	Vendor name and chip part number of the ROM unit.
security jumper, flash memory	Security jumper is/is not installed. Flash memory is programmable or read-only. If the security jumper is not installed, you will see the <b>show flash</b> display with a message indicating that the jumper is not installed.

Field	Description
File	Number of the system image file. If no filename is specified in the <b>boot system flash</b> command, the router boots the system image file with the lowest file number.
name/status	Filename and status of a system image file. The status [invalidated] appears when a file has been rewritten (recopied) into Flash memory. The first (now invalidated) copy of the file is still present within Flash memory, but it is rendered unusable in favor of the newest version. The [invalidated] status can also indicate an incomplete file that results from the user abnormally terminating the copy process, a network timeout, or a Flash memory overflow.
addr	Address of the file in Flash memory.
length	Size of the system image file (in bytes).
fcksum	Checksum recorded in Flash memory.
ccksum	Computer checksum.
[deleted]	Flag indicating that another file exists with the same name or that process has been abnormally terminated.
bytes free/total	Amount of Flash memory used/total amount of Flash memory.

In the following example, the security jumper is not installed and you cannot write to Flash memory until the security jumper is installed:

```
Router# show flash all

4096K bytes of flash memory on embedded flash (in RP1).
  security jumper(12V) is not installed,
  flash memory is read-only.

  file      offset length   name
 00xDCD0    1903892   gs7-k [deleted]
 10x1DEA24  1903912   gs7-k
  [329908/4194304 bytes free]
```

The following is sample output for the **show flash all** command on a Cisco 3000 that has Flash memory partitioned:

```
Router# show flash all

System flash partition information:
  Partition  Size      Used      Free      Bank-Size    State      Copy-Mode
            4096K     3459K     637K     4096K      Read Only   RXBOOT-FLH
            2         4096K     3224K     872K     4096K      Read/Write  Direct

System flash directory, partition 1:
  File  Length   Name/status
        addr      fcksum   ccksum
  1    3459720  master/igs-bfp.100-4.3
        0x40      0x3DE1   0x3DE1
  [3459784 bytes used, 734520 available, 4194304 total]
  4096K bytes of processor board System flash (Read ONLY)

  Chip   Bank   Code      Size      Name
  1      1       89A2     1024KB    INTEL 28F008SA
  2      1       89A2     1024KB    INTEL 28F008SA
  3      1       89A2     1024KB    INTEL 28F008SA
  4      1       89A2     1024KB    INTEL 28F008SA

  Executing current image from System flash [partition 1]
```

```

System flash directory, partition2:
File  Length  Name/status
      addr      fcksum  ccksum
1  3224008  igs-kf.100
      0x40      0xEE91  0xEE91
[ 3224072 bytes used, 970232 available, 4194304 total]
4096K bytes of processor board System flash (Read/Write)

      Chip    Bank    Code    Size    Name
      1       2       89A2   1024KB  INTEL 28F008SA
      2       2       89A2   1024KB  INTEL 28F008SA
      3       2       89A2   1024KB  INTEL 28F008SA
      4       2       89A2   1024KB  INTEL 28F008SA

```

Table 3-7 describes the additional fields in the display.

**Table 3-7 Show Flash All Fields for Partitioned Flash Memory**

Field	Description
Partition	Partition number in Flash memory.
Size	Size of partition in bytes.
Used	Number of bytes used in partition.
Free	Number of bytes free in partition.
Bank-Size	Size of bank in bytes.
State	State of the partition. It can be one of the following values: <ul style="list-style-type: none"> <li>• Read-Only indicates the partition that is being executed from.</li> <li>• Read/Write is a partition that can be copied to.</li> </ul>
Copy-Mode	Method by which the partition can be copied to: <ul style="list-style-type: none"> <li>• RXBOOT-FLH indicates copy via Flash load helper.</li> <li>• Direct indicates user can copy directly into Flash memory.</li> <li>• None indicates that it is not possible to copy into that partition.</li> </ul>
Chip	Chip number.
Bank	Bank number.
Code	Code number.
Size	Size of chip.
Name	Name of chip.

The following is sample output for the **show flash chips** command on a router that has Flash memory partitioned:

```

Router# show flash chips

System flash partition 1:
4096K bytes of processor board System flash (Read ONLY)

      Chip    Bank    Code    Size    Name
      1       1       89A2   1024KB  INTEL 28F008SA
      2       1       89A2   1024KB  INTEL 28F008SA
      3       1       89A2   1024KB  INTEL 28F008SA
      4       1       89A2   1024KB  INTEL 28F008SA
Executing current image from System flash [partition 1]

```

## show flash

---

```
System flash partition 2:  
4096K bytes of processor board System flash (Read/Write)
```

Chip	Bank	Code	Size	Name
1	2	89A2	1024KB	INTEL 28F008SA
2	2	89A2	1024KB	INTEL 28F008SA
3	2	89A2	1024KB	INTEL 28F008SA
4	2	89A2	1024KB	INTEL 28F008SA

The following is sample output for the **show flash detailed** command on a router that has Flash memory partitioned:

```
Router# show flash detailed

System flash directory, partition 1:  
File  Length  Name/status  
      addr      fcksum  ccksum  
  1  3224008  igs-kf.100  
      0x40      0xEE91  0xEE91  
[3224072 bytes used, 970232 available, 4194304 total]  
4096K bytes of processor board System flash (Read/Write)

System flash directory, partition 2:  
File  Length  Name/status  
      addr      fcksum  ccksum  
  1  3224008  igs-kf.100  
      0x40      0xEE91  0xEE91  
[3224072 bytes used, 970232 available, 4194304 total]  
4096K bytes of processor board System flash (Read/Write)
```

The following is sample output for the **show flash err** command on a Cisco 3000 that has Flash memory partitioned:

```
Router# show flash err

System flash directory, partition 1:  
File  Length  Name/status  
  1  37376  master/igs-bfp.100-4.3 [invalid checksum]  
[37440 bytes used, 4156864 available, 4194304 total]  
4096K bytes of processor board System flash (Read/Write)

      Chip    Bank    Code    Size    Name      erase  write  
  1       1       89A2   1024KB  INTEL 28F008SA    0      0  
  2       1       89A2   1024KB  INTEL 28F008SA    0      0  
  3       1       89A2   1024KB  INTEL 28F008SA    0      0  
  4       1       89A2   1024KB  INTEL 28F008SA    0      0  
Executing current image from System flash [partition 1]

System flash directory, partition 2:  
File  Length  Name/status  
  1  37376  master/igs-bfp.100-4.3 [invalid checksum]  
[37440 bytes used, 4156864 available, 4194304 total]  
4096K bytes of processor board System flash (Read/Write)

      Chip    Bank    Code    Size    Name      erase  write  
  1       2       89A2   1024KB  INTEL 28F008SA    0      0  
  2       2       89A2   1024KB  INTEL 28F008SA    0      0  
  3       2       89A2   1024KB  INTEL 28F008SA    0      0  
  4       2       89A2   1024KB  INTEL 28F008SA    0      0
```

The following is sample output for the **show flash summary** command on a router that has Flash memory partitioned. The partition that indicates a state of Read Only is the partition that is being executed from.

```
Router# show flash summary

System flash partition information:
Partition  Size     Used     Free     Bank-Size  State      Copy-Mode
      1      4096K   2048K   2048K   2048K     Read Only   RXBOOT-FLH
      2      4096K   2048K   2048K   2048K     Read/Write  Direct
```

The following are possible values for Copy-Mode:

- RXBOOT-MANUAL—User can copy manually by reloading to the boot ROM image.
- RXBOOT-FLH—User can copy via Flash load helper.
- Direct—User can copy directly into Flash memory.
- None—Copy not allowed into that partition.

The following sample output shows the **show flash** command on a Cisco 7000 series PCMCIA slot or a Cisco 7500 series:

```
Gouda#cd slot1:
Gouda#show flash
-#- ED --type-- --crc-- -seek-- nlen -length- -----date/time----- name
1   .. 1        46A11866 2036C   4     746      May 16 1995 16:24:37 test
```

If you do not use the **cd** command to change the present working device to slot 1, you can display the same sample output with the following command:

```
Gouda#show flash slot1:
-#- ED --type-- --crc-- -seek-- nlen -length- -----date/time----- name
1   .. 1        46A11866 2036C   4     746      May 16 1995 16:24:37 test
```

The following is sample output for the **show flash filesystems** command on a Cisco 7000 series PCMCIA slot or a Cisco 7500 series router:

```
Cyclops# show flash filesystems slot1:
----- F I L E      S Y S T E M      S T A T U S -----
Device Number = 1
DEVICE INFO BLOCK: test
  Magic Number      = 6887635  File System Vers = 10000      (1.0)
  Length            = 800000   Sector Size      = 20000
  Programming Algorithm = 4   Erased State      = FFFFFFFF
  File System Offset = 20000   Length          = 7A0000
  MONLIB Offset     = 100      Length          = A140
  Bad Sector Map Offset = 1FFF8 Length          = 8
  Squeeze Log Offset = 7C0000 Length          = 20000
  Squeeze Buffer Offset = 7E0000 Length          = 20000
  Num Spare Sectors = 0
  Spares:
STATUS INFO:
  Writable
  NO File Open for Write
  Complete Stats
  No Unrecovered Errors
  Squeeze in progress
```

```
USAGE INFO:
  Bytes Used      = 36C      Bytes Available = 79FC94
  Bad Sectors     = 0        Spared Sectors  = 0
  OK Files        = 1        Bytes = 2EC
  Deleted Files   = 0        Bytes = 0
  Files w/Errors  = 0        Bytes = 0
```

The following is sample output for the **show flash chips bootflash:** command on a Cisco 7500 series:

```
Gouda#show flash chips bootflash:
***** RSP Internal Flash Bank -- Intel Chips *****
Flash SIMM Reg: 401
  Flash SIMM PRESENT
  2 Banks
  Bank Size = 4M
  HW Rev = 1

Flash Status Registers: Bank 0
  Intelligent ID Code : 89898989 A2A2A2A2
  Status Reg: 80808080

Flash Status Registers: Bank 1
  Intelligent ID Code : 89898989 A2A2A2A2
  Status Reg: 80808080

Gouda#
```

In the following example, the present working device is bootflash on a Cisco 7500 series. The sample output displays the **show flash all** output.

```
Gouda#cd bootflash:
Gouda#show flash all
-#- ED --type-- --crc-- -seek-- nlen -length- -----date/time----- name
1  .. FFFFFFFF 49B403EE 3D0510 21 3736719 May 30 1995 17:47:54 dirt/yanke/m

3865328 bytes available (3736848 bytes used)

----- F I L E      S Y S T E M      S T A T U S -----
Device Number = 2
DEVICE INFO BLOCK: test
  Magic Number      = 6887635  File System Vers = 10000      (1.0)
  Length            = 800000   Sector Size      = 40000
  Programming Algorithm = 5   Erased State     = FFFFFFFF
  File System Offset = 40000   Length          = 740000
  MONLIB Offset     = 100      Length          = A270
  Bad Sector Map Offset = 3FFFC  Length          = 4
  Squeeze Log Offset = 780000  Length          = 40000
  Squeeze Buffer Offset = 7C0000  Length          = 40000
  Num Spare Sectors = 0

  Spares:
STATUS INFO:
  Writable
  NO File Open for Write
  Complete Stats
  No Unrecovered Errors
  Squeeze in progress

USAGE INFO:
  Bytes Used      = 390510  Bytes Available = 3AFAF0
  Bad Sectors     = 0        Spared Sectors  = 0
  OK Files        = 1        Bytes = 390490
  Deleted Files   = 0        Bytes = 0
  Files w/Errors  = 0        Bytes = 0
```

```
***** RSP Internal Flash Bank -- Intel Chips *****
Flash SIMM Reg: 401
  Flash SIMM PRESENT
  2 Banks
  Bank Size = 4M
  HW Rev = 1

Flash Status Registers: Bank 0
  Intelligent ID Code : 89898989 A2A2A2A2
  Status Reg: 80808080

Flash Status Registers: Bank 1
  Intelligent ID Code : 89898989 A2A2A2A2
  Status Reg: 80808080

Cyclops#show flash chips bootflash:
***** RSP Internal Flash Bank -- Intel Chips *****
Flash SIMM Reg: 401
  Flash SIMM PRESENT
  2 Banks
  Bank Size = 4M
  HW Rev = 1

Flash Status Registers: Bank 0
  Intelligent ID Code : 89898989 A2A2A2A2
  Status Reg: 80808080

Flash Status Registers: Bank 1
  Intelligent ID Code : 89898989 A2A2A2A2
  Status Reg: 80808080
```

## show flh-log

To view the system console output generated during the Flash load helper operation, use the **show flh-log** privileged EXEC command.

**show flh-log**

### Syntax Description

This command has no arguments or keywords.

### Command Mode

Privileged EXEC

### Usage Guidelines

If you are a remote Telnet user performing the Flash upgrade without a console connection, this command allows you to retrieve console output when your Telnet connection has terminated due to the switch to the ROM image. The output indicates what happened during the download, and is particularly useful if the download fails.

### Sample Display

The following is sample output from the **show flh-log** command:

```
Router# show flh-log

%FLH: abc/igs-kf.914 from 131.108.1.111 to flash ...

System flash directory:
File  Length  Name/status
 1    2251320  abc/igs-kf.914

[ 2251384 bytes used, 1942920 available, 4194304 total]
Accessing file 'abc/igs-kf.914' on 131.108.1.111...
Loading from 131.108.13.111:

Erasing device... ... erased
Loading from 131.108.13.111:
- [OK -
2251320/4194304 bytes]

Verifying checksum... OK (0x97FA)
Flash copy took 79292 msec
%FLH: Re-booting system after download
Loading abc/igs-kf.914 at 0x3000040, size = 2251320 bytes [OK]

F3: 2183364+67924+259584 at 0x3000060
```

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

Cisco Internetwork Operating System Software  
Cisco IOS (tm) GS Software (GS7), Version 11.0  
Copyright (c) 1986-1995 by cisco Systems, Inc.  
Compiled Tue 06-Dec-94 14:01 by smith  
Image text-base: 0x00001000, data-base: 0x005A9C94

cisco 2500 (68030) processor (revision 0x00) with 4092K/2048K bytes of  
memory.

Processor board serial number 00000000  
DDN X.25 software, Version 2.0, NET2 and BFE compliant.  
ISDN software, Version 1.0.  
Bridging software.  
Enterprise software set supported. (0x0)  
1 Ethernet/IEEE 802.3 interface.  
2 Serial network interfaces.

--More--

1 ISDN Basic Rate interface.  
32K bytes of non-volatile configuration memory.

4096K bytes of processor board System flash (Read ONLY)

## show microcode

To show the microcode bundled into a 7000 series system, use the **show microcode** EXEC command.

**show microcode**

### Syntax Description

This command has no arguments or keywords.

### Command Mode

EXEC

### Sample Display

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

```
Router# show micro
Microcode bundled in system

  Card    Microcode      Target Hardware      Description
  Type    Version       Version
  ----  -----
  SP      2.3           11.x          SP version 2.3
  EIP     1.1           1.x           EIP version 1.1
  TRIP    1.2           1.x           TRIP version 1.2
  FIP     1.4           2.x           FIP version 1.4
  HIP     1.1           1.x           HIP version 1.1
  SIP     1.1           1.x           SIP version 1.1
  FSIP    1.1           1.x           FSIP version 1.1
```

## **show running-config**

To display the configuration information currently running on the terminal, use the **show running-config** EXEC command. This command replaces the **write terminal** command.

**show running-config**

### Syntax Description

This command has no arguments or keywords.

### Command Mode

EXEC

### Usage Guidelines

Use this command in conjunction with the **show startup-config** command to compare the information in running memory to the information stored in NVRAM or in a location specified by the CONFIG\_FILE environment variable. On the Cisco 7000 series or Cisco 7500 series, this variable specifies the configuration file used for initialization (startup). Use the **boot config** command in conjunction with the **copy running-config startup-config** command to set the CONFIG\_FILE environment variable.

### Example

The following example illustrates how to display the running configuration:

```
show running-config
Building configuration...
```

### Related Commands

**boot config**  
**configure**  
**copy running-config startup-config**  
**show startup-config**

## show startup-config

To display the contents of NVRAM (if present and valid) or to show the configuration file pointed to by the CONFIG\_FILE environment variable, use the **show startup-config** EXEC command. This command replaces **show configuration** command.

**show startup-config**

### Syntax Description

This command has no arguments or keywords.

### Command Mode

EXEC

### Usage Guidelines

NVRAM stores the configuration information on the network server in text form as configuration commands. For all platforms except the Cisco 7000 series and the Cisco 7500 series, the **show startup-config** command shows the version number of the software used when you last executed the **copy running-config startup-config** command.

For the Cisco 7000 series and the Cisco 7500 series, the **show startup-config** command shows the configuration file specified by the CONFIG\_FILE environment variable. The router informs you whether the displayed configuration is a complete configuration or a distilled version. A distilled configuration is one that does not contain access lists. If the CONFIG\_FILE environment variable does not exist or is not valid, the router displays the NVRAM configuration (if it is a valid, complete configuration).

### Sample Displays

The following is sample output from the **show startup-config** command. It shows the router displaying the contents of NVRAM.

```
Router# show startup-config
Using 5057 out of 32768 bytes
!
version 10.3
!
enable-password xxxx
service pad
!
boot system dross-system 131.108.13.111
boot system dross-system 131.108.1.111
!
exception dump 131.108.13.111
!
no ip ipname-lookup
!
decnet routing 13.1
decnet node-type area
decnet max-address 1023
!
```

```
interface Ethernet 0
ip address 131.108.1.1 255.255.255.0
ip helper-address 131.120.1.0
ip accounting
ip gdp
decnet cost 3
!
ip domain-name CISCO.COM
ip name-server 255.255.255.255
!
end
```

The following is partial sample output from the **show startup-config** command when the configuration file has been compressed:

```
Router# show startup-config
Using 21542 out of 65536 bytes, uncompressed size = 142085 bytes
!
version 9.22
service compress-config
!
hostname rose
!
boot system flash gs7-k.sthormod_clean
boot system rom
```

### Related Commands

**configure**  
**copy running-config startup-config**  
**description**  
**service compress-config**  
**show boot**  
**show running-config**

## show version

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

### show version

#### Syntax Description

This command has no arguments or keywords.

#### Command Mode

EXEC

#### Sample Display

The following is sample output from the **show version** command from a Cisco 7000 series:

```
Router> show version

GS Software (GS7), Version 10.0
Copyright (c) 1986-1993 by cisco Systems, Inc.
Compiled Mon 11-Jan-93 14:44

System Bootstrap, Version 4.6(1)

Current date and time is Fri 2-26-1993 2:18:52
Boot date and time is Fri 1-29-1993 11:42:38
Router uptime is 3 weeks, 6 days, 14 hours, 36 minutes
System restarted by power-on
Running default software
Network configuration file is "Router", booted via tftp from 131.108.2.333

RP1 (68040) processor with 16384K bytes of memory.
X.25 software.
Bridging software.
1 Switch Processor.
1 TRIP controller (4 Token Ring).
4 Token Ring/IEEE 802.5 interface.
1 AIP controller (1(ATM)
1 ATM network interface
4096K bytes of flash memory on embedded flash (in RP1).
Configuration register is 0x0
```

Table 3-8 describes significant fields shown in the display.

**Table 3-8 Show Version Field Descriptions**

Field	Description
GS Software, Version 10.0	Always specify the complete version number when reporting a possible software problem. In the example output, the version number is 10.0.
System Bootstrap, Version	Bootstrap version string.

---

Field	Description
Current date and time	Current date and time, the date and time the system was last booted, and <i>uptime</i> , or the amount of time the system has been up and running.
Boot date and time	
Router uptime is	
System restarted by power-on	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
Running default software	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.” In addition, the names and sources of the host and network configuration files are shown.
RP1....	The remaining output shows the hardware configuration and any nonstandard software options. The configuration register contents are 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.

## squeeze

To permanently delete Flash files, use the **squeeze** EXEC command.

**squeeze** *device*:

### Syntax Description

*device*:

Flash device from which to permanently delete files. The colon (:) is required. Valid devices are as follows:

- **bootflash**. This device is the internal Flash memory in the Cisco 7500 series.
- **slot0**. This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card.
- **slot1**. This device is the second PCMCIA slot on the Cisco 7500 series RSP card.

### Default

This command has no default.

### Command Mode

EXEC

### Usage Guidelines

Use this command with the Cisco 7000 series and the Cisco 7500 series.

---

**Note** With the Cisco 7000 series, you can use the **squeeze** command only on the Flash memory card inserted in the PCMCIA slot (**slot0:**) of the RP card. You cannot use this command on a Cisco 7000's internal Flash memory.

---

When Flash memory is full, you might need to rearrange the files so that the space used by the “deleted” files can be reclaimed. When you issue the **squeeze** command, the router copies all valid files to the beginning of Flash memory and erases all files marked “deleted.” At this point, you cannot recover “deleted” files and you can write to the reclaimed Flash memory space.

---

**Note** The squeeze operation might take as long as several minutes because it can involve erasing and rewriting almost an entire Flash memory space.

---

**Example**

The following example instructs the router to permanently erase the files marked “deleted” from the Flash memory card inserted in second slot of the RSP card:

```
squeeze slot1:
```

**Related Commands****delete****dir****undelete**

## tftp-server

To specify that the router operate as a TFTP server or to specify that a Flash device on a Cisco 7000 series or Cisco 7500 series operate as a TFTP server, use one of the following **tftp-server** global configuration commands. This command replaces the **tftp-server system** command. To remove a previously defined filename, use the **no tftp-server** command with the appropriate filename.

```
tftp-server flash [partition-number:]filename1 [alias filename2] [access-list-number]
tftp-server rom alias filename1 [access-list-number]
no tftp-server {flash [partition-number:]filename1 | rom alias filename2}
tftp-server flash device:filename (Cisco 7000 series and Cisco 7500 series only)
no tftp-server flash device:filename (Cisco 7000 series and Cisco 7500 series only)
```

### Syntax Description

<b>flash</b>	Specifies TFTP service of a file in Flash memory.
<b>rom</b>	Specifies TFTP service of a file in ROM.
<i>filename1</i>	Name of a file in Flash or in ROM that the TFTP server uses in answering TFTP Read Requests.
<b>alias</b>	Specifies an alternate name for the file that the TFTP server uses in answering TFTP Read Requests.
<i>filename2</i>	Alternate name of the file that the TFTP server uses in answering TFTP Read Requests. A client of the TFTP server can use this alternate name in its Read Requests.
<i>access-list-number</i>	(Optional) Basic IP access-list number. Valid values are 0 to 99.
<i>partition-number:</i>	(Optional) Specifies TFTP service of a file in the specified partition of Flash memory. If the partition number is not specified, the file in the first partition is used.
<i>device:</i>	Specifies TFTP service of a file on a Flash memory device in the Cisco 7000 series or Cisco 7500 series. The colon (:) is required. Valid devices are as follows: <ul style="list-style-type: none"> <li>• <b>flash</b>. This device is the internal Flash memory on the Cisco 7000 series.</li> <li>• <b>bootflash</b>. This device is the internal Flash memory in the Cisco 7500 series.</li> <li>• <b>slot0</b>. This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card.</li> <li>• <b>slot1</b>. This device is the second PCMCIA slot on the Cisco 7500 series RSP card.</li> </ul>
<i>filename</i>	Name of the file on a Flash memory device that the TFTP server uses in answering a TFTP Read Request. Use this argument only with the Cisco 7000 series or Cisco 7500 series.

**Default**

Disabled

**Command Mode**

Global configuration

**Usage Guidelines**

You can specify multiple filenames by repeating the **tftp-server** command. The system sends a copy of the system image contained in ROM or one of the system images contained in Flash memory to any client that issues a TFTP Read Request with this filename.

If the specified *filename1* or *filename2* exists in Flash memory, a copy of the Flash image is sent. On systems that contain a complete image in ROM, the system sends the ROM image if the specified *filename1* or *filename2* is not found in Flash memory.

Images that run from ROM cannot be loaded over the network. Therefore, it does not make sense to use TFTP to offer the ROMs on these images.

On the Cisco 7000 series and Cisco 7500 series, the system sends a copy of the file contained on one of the Flash memory devices to any client that issues a TFTP Read Request with its filename.

**Examples**

In the following example, the system uses TFTP to send a copy of the *version-10.3* file located in Flash memory in response to a TFTP Read Request for that file. The requesting host is checked against access list 22.

```
tftp-server flash version-10.3 22
```

In the following example, the system uses TFTP to send a copy of the ROM image *gs3-k.101* in response to a TFTP Read Request for the *gs3-k.101* file:

```
tftp-server rom alias gs3-k.101
```

In the following example, the system uses TFTP to send a copy of the *version-11.0* file in response to a TFTP Read Request for that file. The file is located on the Flash memory card inserted in slot 0 of the RP or RSP card.

```
tftp-server flash slot0:version-11.0
```

**Related Command**

A dagger (†) indicates that the command is documented in another chapter.

**access-list** †

## undelete

To recover a deleted file on a specified device, use the **undelete** EXEC command.

**undelete** *index [device:]*

### Syntax Description

<i>index</i>	Number that indexes the file in the <b>dir</b> command output.
<i>device:</i>	(Optional) Device to contain the recovered configuration file. The colon (:) is required. Valid devices are as follows:
	<ul style="list-style-type: none"><li>• <b>bootflash.</b> This device is the internal Flash memory in the Cisco 7500 series.</li><li>• <b>slot0.</b> This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card.</li><li>• <b>slot1.</b> This device is the second PCMCIA slot on the Cisco 7500 series RSP card.</li></ul>

### Default

The default device is the one specified by the **cd** command.

### Command Mode

EXEC

### Usage Guidelines

Use this command with the Cisco 7000 series and the Cisco 7500 series.

---

**Note** With the Cisco 7000 series, you can use the **undelete** command only on the Flash memory card inserted in the PCMCIA slot (**slot0:**) of the RP card. You cannot use this command on a Cisco 7000's internal Flash memory.

---

When you delete a file, the router simply marks the file as deleted, but does not erase the file. This command allows you to recover a “deleted” file on a specified Flash memory device. You must undelete a file by its index because you could have multiple deleted files with the same name. For example, the “deleted” list could contain multiple configuration files with the name *router-config*. You undelete by index to indicate which of the many *router-config* files from the list to undelete. Use the **dir** command to learn the index number of the file you want to undelete.

You cannot undelete a file if a valid (undeleted) one with the same name exists. Instead, you first delete the existing file and then undelete the file you want. For example, if you had an undeleted version of the *router-config* file and you wanted to use a previous, deleted version instead, you could not simply undelete the previous version by index. You would first delete the existing *router-config* file and then undelete the previous *router-config* file by index. You can delete and undelete a file up to 15 times.

If you try to recover the configuration file pointed to by the CONFIG\_FILE environment variable, the system prompts you to confirm recovery of the file. This prompt reminds you that the CONFIG\_FILE environment variable points to an undeleted file. To permanently delete all “deleted” files on a Flash memory device, use the **squeeze** command. If you try to recover a file that has the same name as an existing valid file, the system displays an error message.

### **Example**

The following example recovers the deleted file whose index number is 1 to the Flash memory card inserted in slot 0 of the RP or RSP card:

```
undelete 1 slot0:
```

### **Related Commands**

**delete**  
**dir**  
**squeeze**

## verify

On the Cisco 7000 series or the Cisco 7500 series, to verify the checksum of a file on a Flash device, use the **verify** EXEC command. This command replaces the **copy verify** and **copy verify flash** commands.

**verify** [*device:*] *filename*

### Syntax Description

*device:*

(Optional) Device containing the file whose checksum is being verified. The colon (:) is required. Valid devices are as follows:

- **flash**. This device is the internal Flash memory in the Cisco 7000 series.
- **bootflash**. This device is the internal Flash memory in the Cisco 7500 series.
- **slot0**. This device is the PCMCIA slot on the Cisco 7000 series RP card or the first PCMCIA slot on the Cisco 7500 series RSP card.
- **slot1**. This device is the second PCMCIA slot on the Cisco 7500 series RSP card.

When you omit this argument, the system verifies the checksum of the specified file on the current working device.

*filename*

Name of a file on the specified Flash device. The file can be of any type. The maximum filename length is 63 characters.

### Default

The current working device is the default device.

### Command Mode

EXEC

### Usage Guidelines

Use the **verify** command to verify the checksum of a file before using it. When you omit the *device:* argument, the system verifies the checksum of the specified file on the current working device.

---

**Note** On the Cisco 7000 series, the **verify** [*device:*]*filename* command differs from the **verify flash** command. The **verify** [*device:*]*filename* command verifies a specified file located in internal Flash or on the Flash memory card inserted in the PCMCIA slot. The **verify flash** command verifies internal Flash memory.

---

**Example**

The following example verifies the *gsxx* file on the Flash memory card inserted in slot 0 of a Cisco 7000's RP card or a Cisco 7500's RSP card:

```
verify slot0:gsxx
```

**Related Commands**

**cd**  
**copy flash**  
**pwd**  
**show flash**  
**ip rcmd remote-username**

## verify bootflash

To verify the checksum of a boot image in Flash memory on the Cisco 4500, use the **verify bootflash** EXEC command. This command replaces the **copy verify bootflash** command.

**verify bootflash**

### Syntax Description

This command has no arguments or keywords.

### Command Mode

EXEC

### Usage Guidelines

You can use this command only on routers that have two banks of Flash: one bank for the boot image and the second bank for the system image.

Each boot software image that is distributed on disk uses a single checksum for the entire image. This checksum is displayed only when the image is copied into Flash memory; it is not displayed when the image file is copied from one disk to another.

The README file, which is included with the image on the disk, lists the name, file size, and checksum of the image. Review the contents of the README file before loading or duplicating the new image so that you can verify the checksum when you copy it into Flash memory or onto a server.

To display the contents of Flash memory, use the **show flash** command. The Flash contents listing does not include the checksum of individual files. To recompute and verify the image checksum after the image has been copied into Flash memory, use the **verify bootflash** command. When you enter the command, the system prompts you for the filename to verify. By default, it prompts for the last file (most recent) in Flash. Press **Return** to recompute the default file checksum, or enter the name of a different file at the prompt.

### Example

The following example illustrates how to use this command:

```
Router# copy verify bootflash

Boot flash directory:
File  name/status
  1  c4500-xboot
[1387336 bytes used, 2806968 bytes available]

Name of file to verify? c4500-xboot
Verifying checksum for 'c4500-xboot' (file # 1)... [OK]
```

### Related Commands

**copy bootflash tftp**  
**copy mop bootflash**  
**copy tftp bootflash**  
**erase bootflash**  
**show bootflash**

## verify flash

To verify the checksum of Flash memory, use the **verify flash** EXEC command. This command replaces the **copy verify** and **copy verify flash** commands.

verify flash

## Syntax Description

This command has no arguments or keywords.

## Command Mode

EXEC

## Usage Guidelines

The **verify flash** command works on Cisco 3000 series, Cisco 4000 series, and Cisco 7000 series routers only. The Cisco 7500 series does not support this command.

On the Cisco 7000 series, this command works only on internal Flash memory. This command does not verify the checksums of files on the Flash memory card inserted in the PCMCIA slot. To verify the Flash memory card, use the **verify** command.

Each system software or microcode image that is distributed on disk uses a single checksum for the entire image. This checksum is displayed only when the image is copied into Flash memory; it is *not* displayed when the image file is copied from one disk to another.

The README file (which is included with the image on the disk) lists the name, file size, and checksum of the image. Review the contents of the README file before loading or duplicating the new image so that you can verify the checksum when you copy it into the Flash memory or onto a TFTP server.

To display the contents of Flash memory, use the **show flash** command. The Flash content listing does not include the checksum of individual files. To recompute and verify the image checksum after the image file is copied into Flash memory, use the **verify** command. When you enter the command, the screen prompts you for the filename to verify. By default, it prompts for the last file in Flash (most recent). Press **Return** to recompute the default file checksum, or enter the filename of a different file at the prompt.

## Examples

The following example illustrates how to use this command:

The following example illustrates how to use the **verify flash** command when more than one Flash memory partition exists:

```
Router# verify flash

System flash partition information:
Partition  Size     Used     Free     Bank-Size   State      Copy-Mode
      1      4096K   2048K   2048K   2048K      Read Only  RXBOOT-FLH
      2      4096K   2048K   2048K   2048K      Read/Write Direct

[Type ?<no> for partition directory; ? for full directory; q to abort]
```

The system will prompt only if there are two or more read/write partitions. If the partition entered is not valid, the process terminates. You can enter a partition number, a question mark (?) for a directory display of all partitions, or a question mark and a number (*?number*) for directory display of a particular partition. The default is the first partition.

```
File  Length  Name/status
      1  3459720  master/igs-bfpx.100-4.3
[3459784 bytes used, 734520 available, 4194304 total]

Name of file to verify? master/igs-bfpx.100-4.3
Verifying checksum for 'master/igs-bfpx.100-4.3' (file # 1)...  OK
```

### Related Commands

**show flash**  
**verify**

## write erase

The **erase startup-config** command replaces this command. Refer to the description of the **erase** command for more information on **erase startup-config**.

## **write memory**

The **copy running-config startup-config** command replaces this command. Refer to the description of the **copy running-config** command for more information on **copy running-config startup-config**.

## write network

The **copy running-config rcp** or **copy running-config tftp** command replaces this command. Refer to the description of the **copy running-config** command for more information on **copy running-config rcp** or **copy running-config tftp**.

## **write terminal**

The **show running-config** command replaces this command. Refer to the description of **show running-config** for more information.