Doc. No. 78-2083-04

Flash Memory Card Installation Instructions

Product Numbers: MEM-RSP-FLC8M=, MEM-RSP-FLC16M=, MEM-RSP-FLC20M=, MEM-RP-FLC8M=, MEM-RP-FLC16M=

This publication describes installation and configuration procedures for the Flash memory card, which ships as a spare part and is used with the Route Switch Processor (RSP1 and RSP2), 7000 Series Route Switch Processor (RSP7000), and the Route Processor (RP). This card is an 8-, 16-, or 20-megabyte (MB), Intel Series 2+ Flash memory card, which conforms with the Personal Computer Memory Card International Association (PCMCIA) format. The RP, RSP7000, RSP1, and RSP2 Flash memory cards are identical except that the RP Flash memory card contains a metal sleeve. The RSP7000 requires Cisco IOS Release 10.3(9) or later.

Note To boot from the Flash memory card, a Cisco 7000 or Cisco 7010 router using an RP must be using Cisco IOS Release 11.0 or later boot ROMs. When the Flash memory card is shipped installed in an RSP-based system, the Flash memory card contains an image. When the card is shipped installed in an RP-based system, the card is shipped formatted. When the card is shipped as a spare, it is shipped unformatted. Flash memory cards formatted on RSP-based systems must be reformatted before they can be used in RP-based systems, and Flash memory cards formatted on RP-based systems must be reformatted before they can be used in RSP-based systems.

The Flash memory card is used to store and boot Cisco Internetwork Operating System (Cisco IOS) software images and interface processor microcode images, and can be used as a server to store software and microcode images for other systems. The spare Flash memory card is shipped blank; you *must* format it before using it. Procedures for formatting the card are included in this publication.

Flash memory card product numbers are router specific, as described in Table 1.

Table 1 Routers and Flash Memory Card Product Numbers

Routers	Processor Card	Flash Memory Card
Cisco 7505	RSP1	MEM-RSP-FLC8M= MEM-RSP-FLC16M= MEM-RSP-FLC20M=
Cisco 7507 and Cisco 7513	RSP2	MEM-RSP-FLC8M= MEM-RSP-FLC16M= MEM-RSP-FLC20M=
Cisco 7010	RP, RP64MB	MEM-RP-FLC8M=[1] MEM-RP-FLC16M=[1]
	RSP7000	MEM-RSP-FLC8M= MEM-RSP-FLC16M= MEM-RSP-FLC20M=
Cisco 7000	RP, RP64MB	MEM-RP-FLC8M=[1] MEM-RP-FLC16M=[1]
	RSP7000	MEM-RSP-FLC8M= MEM-RSP-FLC16M= MEM-RSP-FLC20M=

1. Requires installation of Cisco IOS Release 11.0 boot ROMs (SWR-G7-11.0.1=) and the metal sleeve. The sleeve is shipped with the card.

Note Once formatted, the Flash memory card can be used on another processor-compatible router. For details, see the section "Flash Memory Card Compatibility" on page 27.

The Flash memory card is sensitive to electrostatic discharge (ESD) damage. Observe appropriate ESD-preventive procedures when handling the card.

In this publication, the first sections follow a chronological order typical of many Flash memory card installations: insert the card, format the card, copy an image to the card, and make that image bootable. The rest of the sections contain information about typical operations:

Note For convenience, the RSP1, RSP2, and RSP7000 are referred to as the *RSP*. Differences will be specified. Also, the RP and RP64MB are referred to as the *RP*. Differences will be specified.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage, which can occur when electronic cards or components are improperly handled, results in complete or intermittent failures. A processor module comprises a printed circuit board that is fixed in a metal carrier. Electromagnetic interference (EMI) shielding, connectors, and a handle are integral components of the carrier. Although the metal carrier helps to protect the board from ESD, use a preventive antistatic strap whenever handling a processor module.

Following are guidelines for preventing ESD damage:

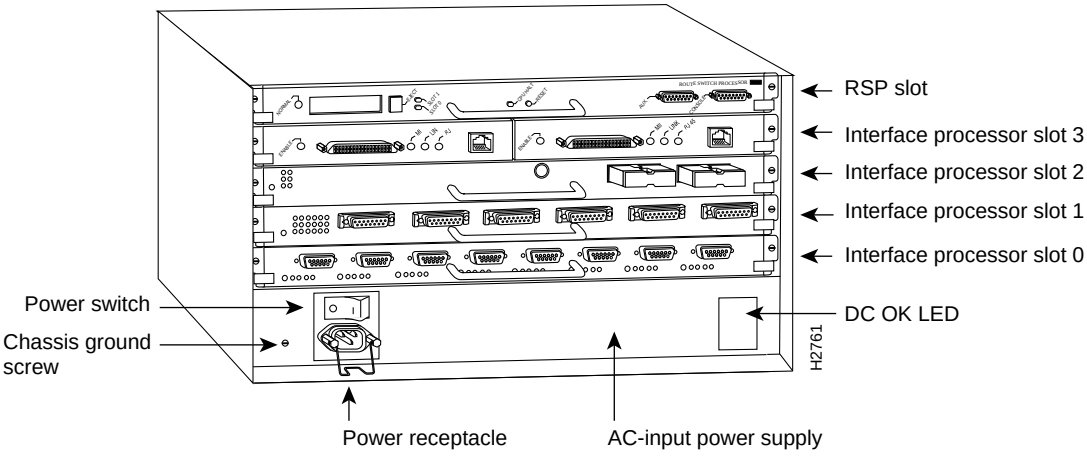
- Always use an ESD wrist or ankle strap and ensure that it makes good skin contact.
- Connect the equipment end of the strap to an unfinished chassis surface.
- Place a removed Flash memory card on an antistatic surface or in a static shielding bag. If the card will be returned to the factory, immediately place it in a static shielding bag.
- Avoid contact between the card and clothing. The wrist strap only protects the card from ESD voltages on the body; ESD voltages on clothing can still cause damage.

Caution For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 megohms.

Locating the RSP1, RSP2, RP, or RSP7000

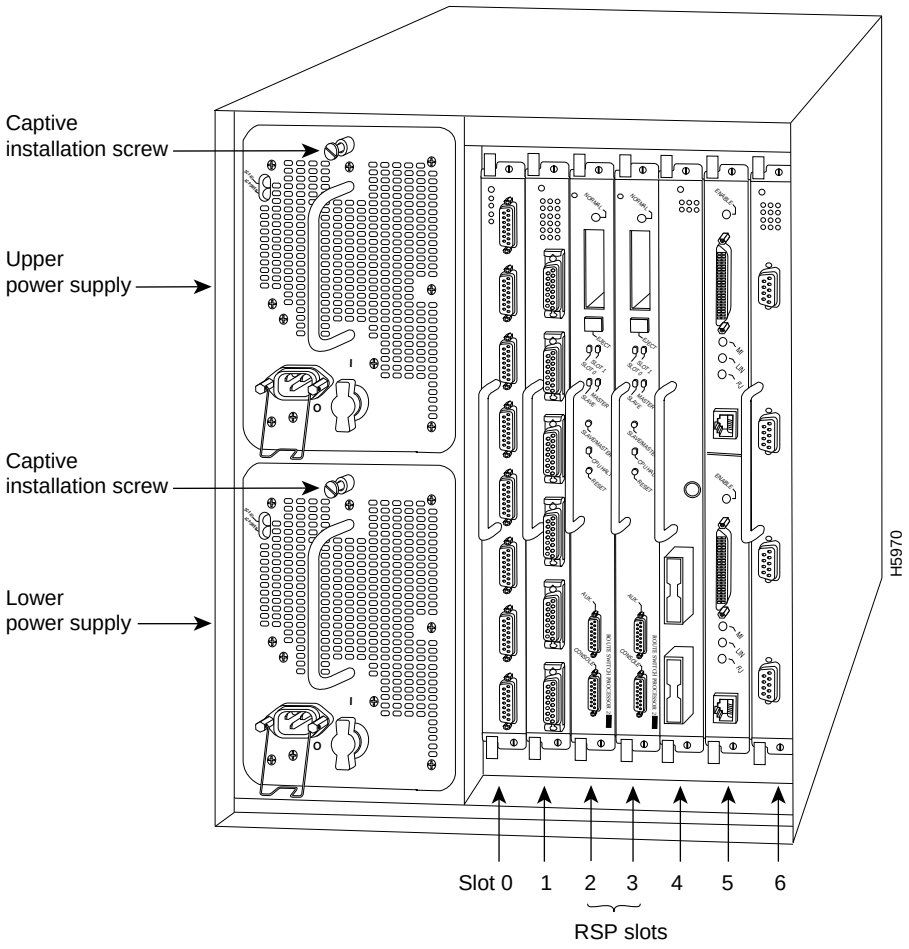
In the Cisco 7505, access to the RSP1, which contains the PCMCIA slots for the Flash memory card, is from the rear. The top processor slot, called the *RSP slot,* is reserved for the RSP1. (See Figure 1.)

Figure 1 Cisco 7505 (Interface Processor End)



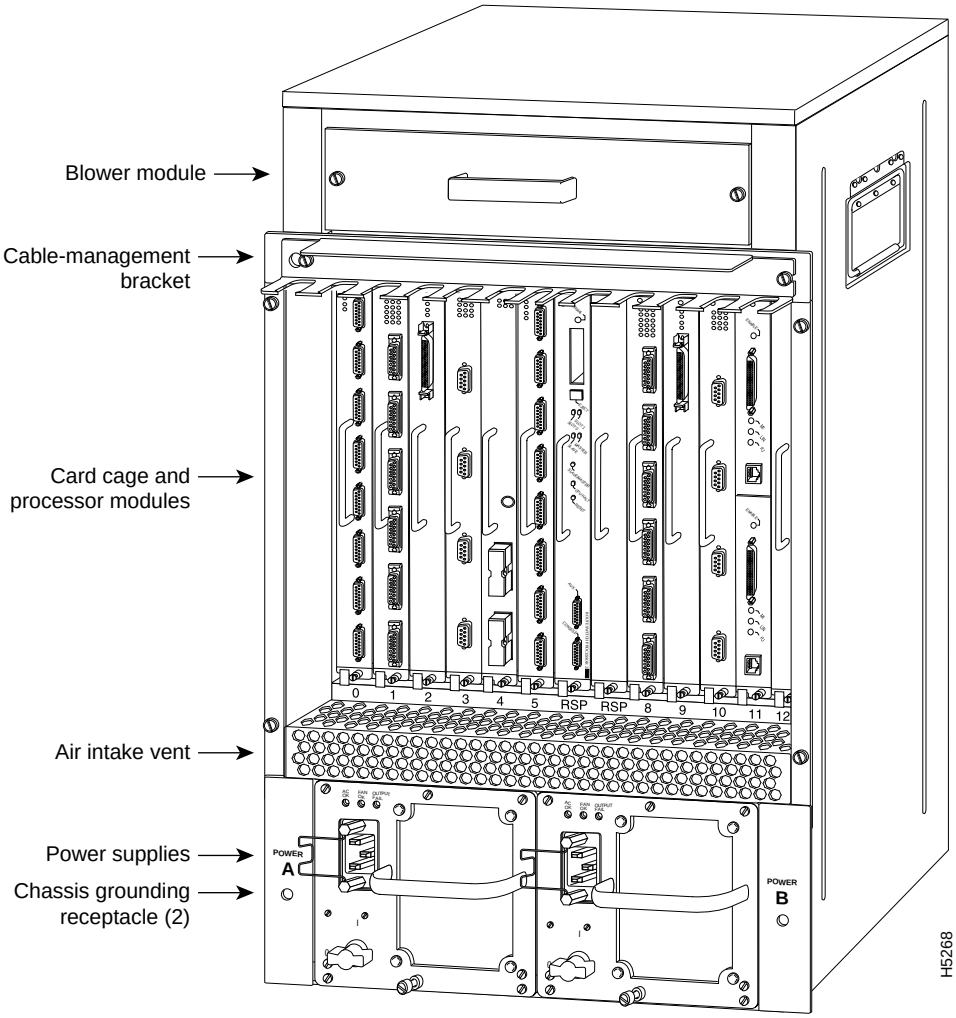
In the Cisco 7507, access to the RSP2, which contains the PCMCIA slots for the Flash memory card, is from the rear. Chassis slots 2 and 3, labeled *RSP slots*, are reserved for the RSP2. (See Figure 2.)

Figure 2 Cisco 7507, Interface Processor End



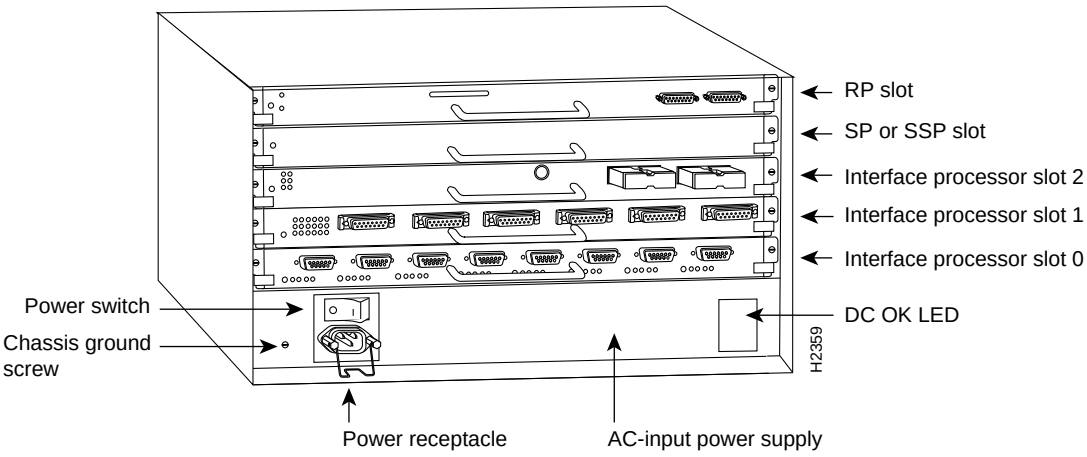
In the Cisco 7513, access to the RSP2, which contains the PCMCIA slots for the Flash memory card, is from the rear. (See Figure 3.) slot 6 or 7, labeled *RSP,* are reserved for the RSP2.

Figure 3 Cisco 7513 (Interface Processor End)



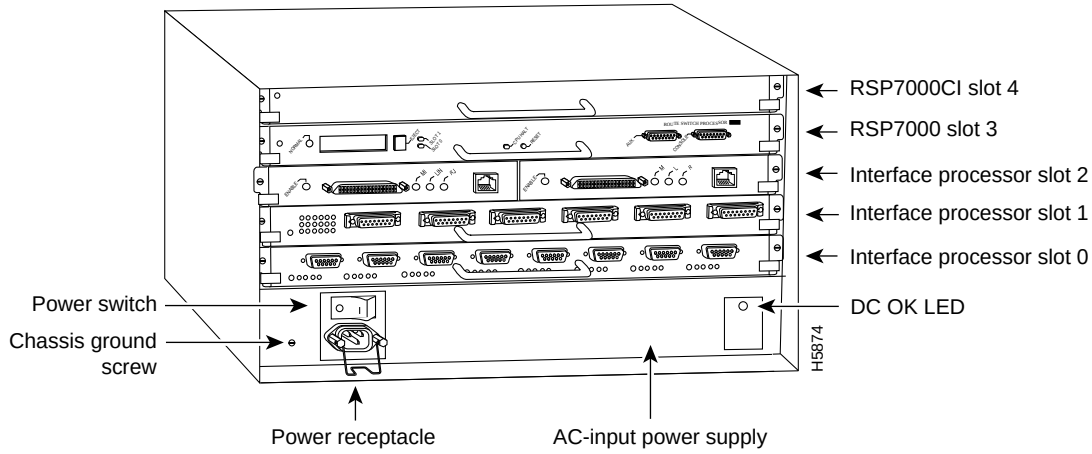
In the Cisco 7010, access to the RP, which contains the PCMCIA slot for the Flash memory card, is from the rear. The top processor slot is reserved for the RP. (See Figure 4.)

Figure 4 Cisco 7010 (Interface Processor End)



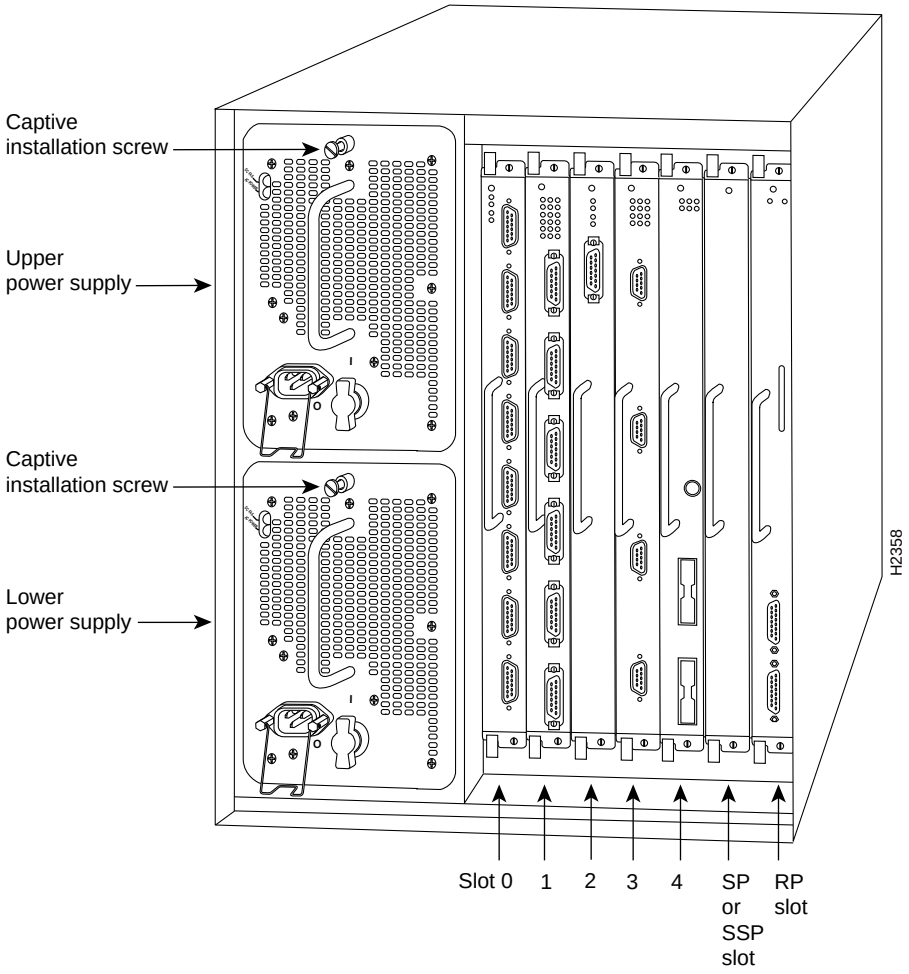
In the Cisco 7010 equipped with the RSP7000, the PCMCIA slots for the Flash memory card are located in the RSP7000, which is installed in slot 3 (labeled *7000 RSP*). (See Figure 5.)

Figure 5 Cisco 7010 with RSP7000 and RSP7000CI Installed



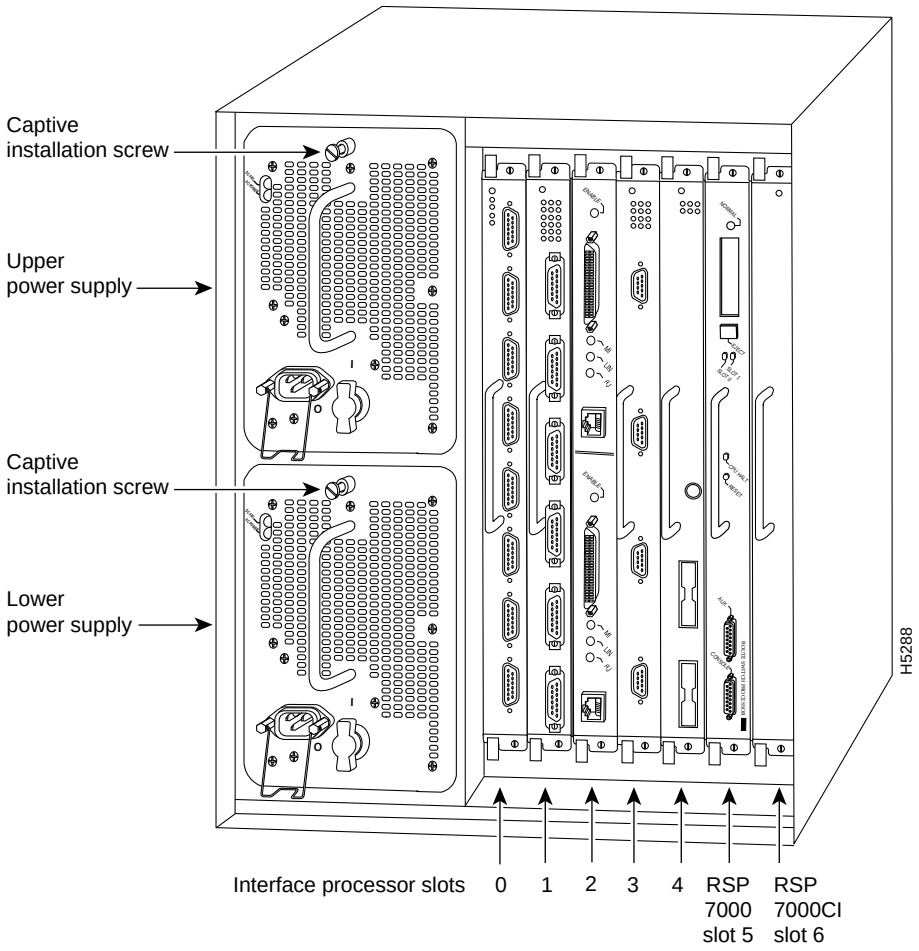
In the Cisco 7000, access to the RP, which contains the PCMCIA slot for the Flash memory card, is from the rear. (See Figure 6.) Slot 6, labeled *RP*, is reserved for the RP card.

Figure 6 Cisco 7000 (Interface Processor End)



In the Cisco 7000 equipped with the RSP7000, the PCMCIA slots for the Flash memory card are located in the RSP7000, which is installed in slot 5 (labeled *7000 RSP*). (See Figure 7.)

Figure 7 Cisco 7000 with RSP7000 and RSP7000CI Installed



Installing and Removing the Flash Memory Card in an RSP or RSP7000

The RSP and RSP 7000 have two PCMCIA slots—slot 0 and slot 1—into which you can install a Flash memory card. In the RSP1, slot 0 is on the bottom and slot 1 on the top (see Figure 8). In the RSP2, slot 0 is on the left and slot 1 is on the right (see Figure 9). Both slots can be used at the same time. The following procedure is a generic one and can be used for a Flash memory card in either slot position.

Note The Flash memory card can be inserted and removed with the power on. In the following procedure, the term *RSP* refers to the RSP1, RSP2, and RSP7000. Specific differences are noted.

Following is the procedure for installing and removing a Flash memory card:

Step 1 Face the front panel of the RSP, which should appear as shown in Figure 8a or Figure 9a, and hold the Flash memory card with the connector end of the card toward the slot. In an RSP1, the label should face up (in the direction of the arrow to the left of the PCMCIA slots) as shown in Figure 8. In an RSP2, the label should face right (in the direction of the arrow on the top of the PCMCIA slots) as shown in Figure 9.

Note The Flash memory card is keyed and cannot be seated the wrong way. The eject button will not pop out if the card is not properly inserted.

Step 2 Insert the card into the appropriate slot until the card completely seats in the connector at the back of the slot and the eject button pops out toward you (see Figure 8b or Figure 9b). Note that the card does not insert all the way inside the RSP; a portion of the card remains outside of the slot. *Do not attempt to force the card past this point.*

Step 3 To eject the card, press the appropriate ejector button until the card is free of the connector at the back of the slot. (See Figure 8c or Figure 9c.)

Step 4 Remove the card from the slot and place it in an antistatic bag to protect it.

Figure 8 Installing and Removing a Flash Memory Card (RSP1 and RSP7000)

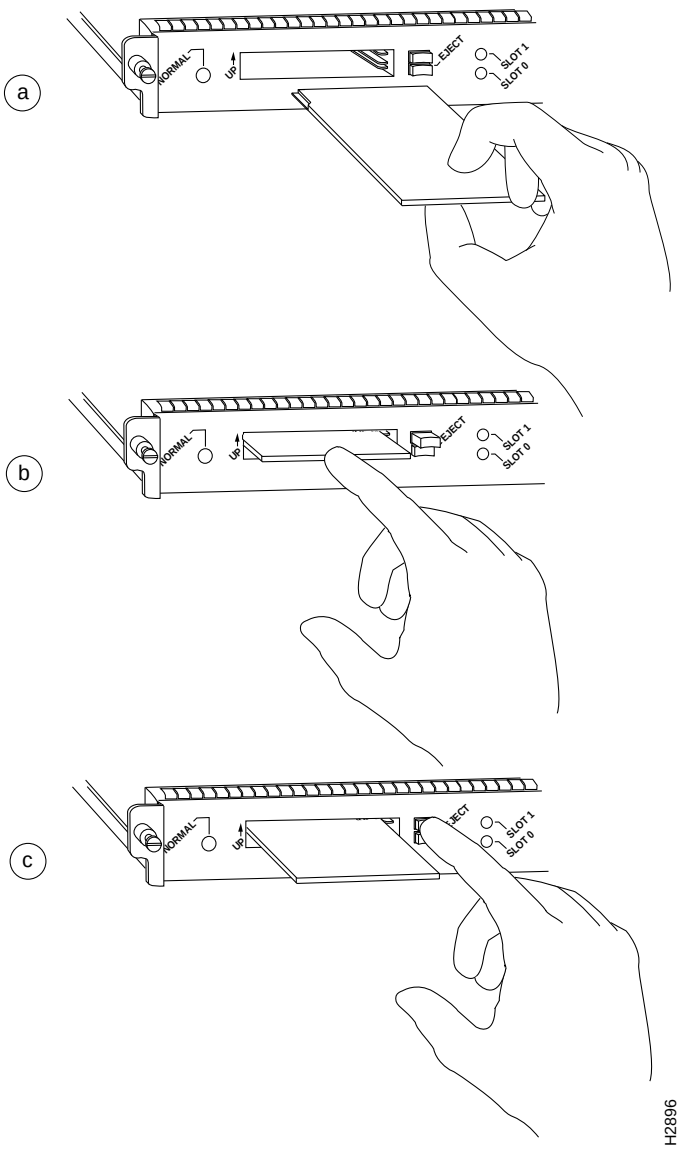
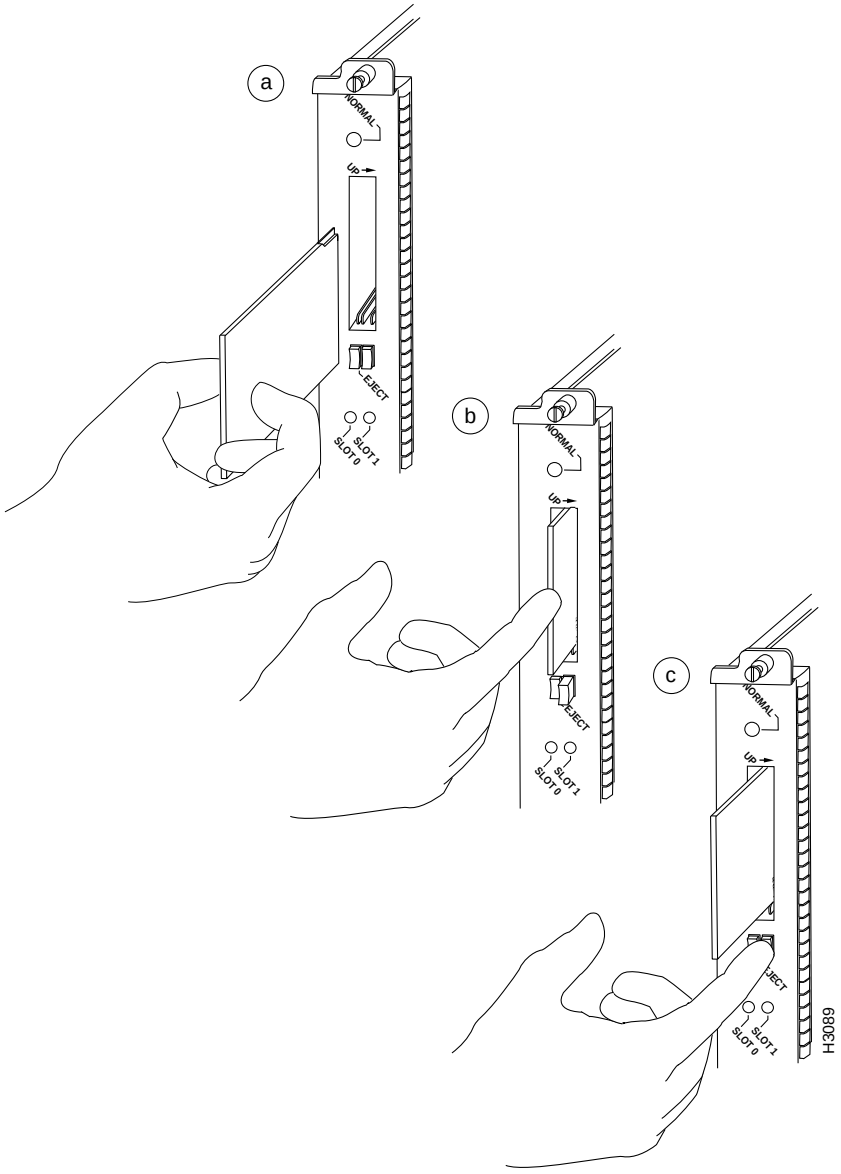


Figure 9 Installing and Removing a Flash Memory Card (RSP2 and RSP7000)



Installing and Removing the Flash Memory Card in an RP

The RP has one PCMCIA slot into which you can install a Flash memory card. (See Figure 11 or Figure 12.)

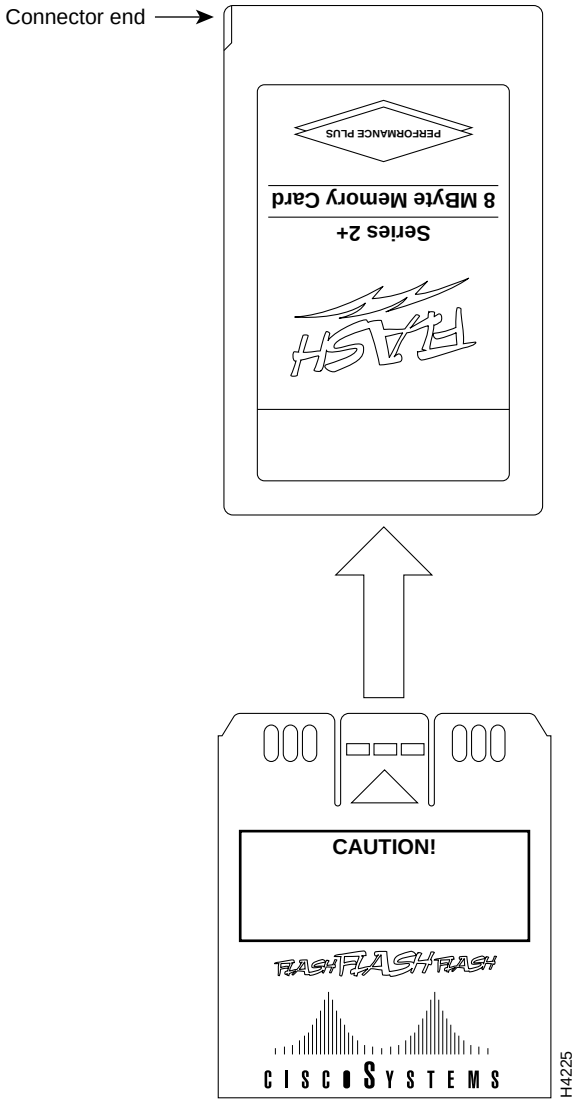
Note The Flash memory card can be inserted and removed with the power on.

Following is the procedure for installing and removing a Flash memory card:

Step 1 Verify that the metal sleeve is correctly installed on the Flash memory card. (The sleeve must be installed with the connector end exposed, as shown in Figure 10.)

Note A metal sleeve is shipped with all MEM-RP-FLC8M= and MEM-RP-FLC16M= (RP-specific) Flash memory cards. Should a replacement metal sleeve be required, consult Customer Engineering through the Technical Assistance Center (TAC) as described on the last page of this document.

Figure 10 Installing the Metal Sleeve



Step 2 Face the RP and hold the Flash memory card with the connector end of the card toward the slot. The product label should face to the right in a Cisco 7000 or up in a Cisco 7010. Figure 11 shows the orientation for a Cisco 7000, and Figure 12 shows the orientation for a Cisco 7010.

Note The Flash memory card is keyed and cannot be seated the wrong way.

Step 3 Insert the card into the PCMCIA slot until the card completely seats in the connector at the back of the slot. Note that the card does not insert all the way inside the RP; a portion of the card and sleeve remains outside of the slot. *Do not attempt to force the card past this point.*

Step 4 To remove the card, grasp the card near the slot and squeeze the sleeve together to release it from the slot. Then pull the card free from the connector at the back of the slot. (See Figure 11c or Figure 12c.)

Step 5 Place the removed Flash memory card on an antistatic surface or in a static shielding bag.

Figure 11 Installing and Removing a Flash Memory Card (RP in a Cisco 7000)

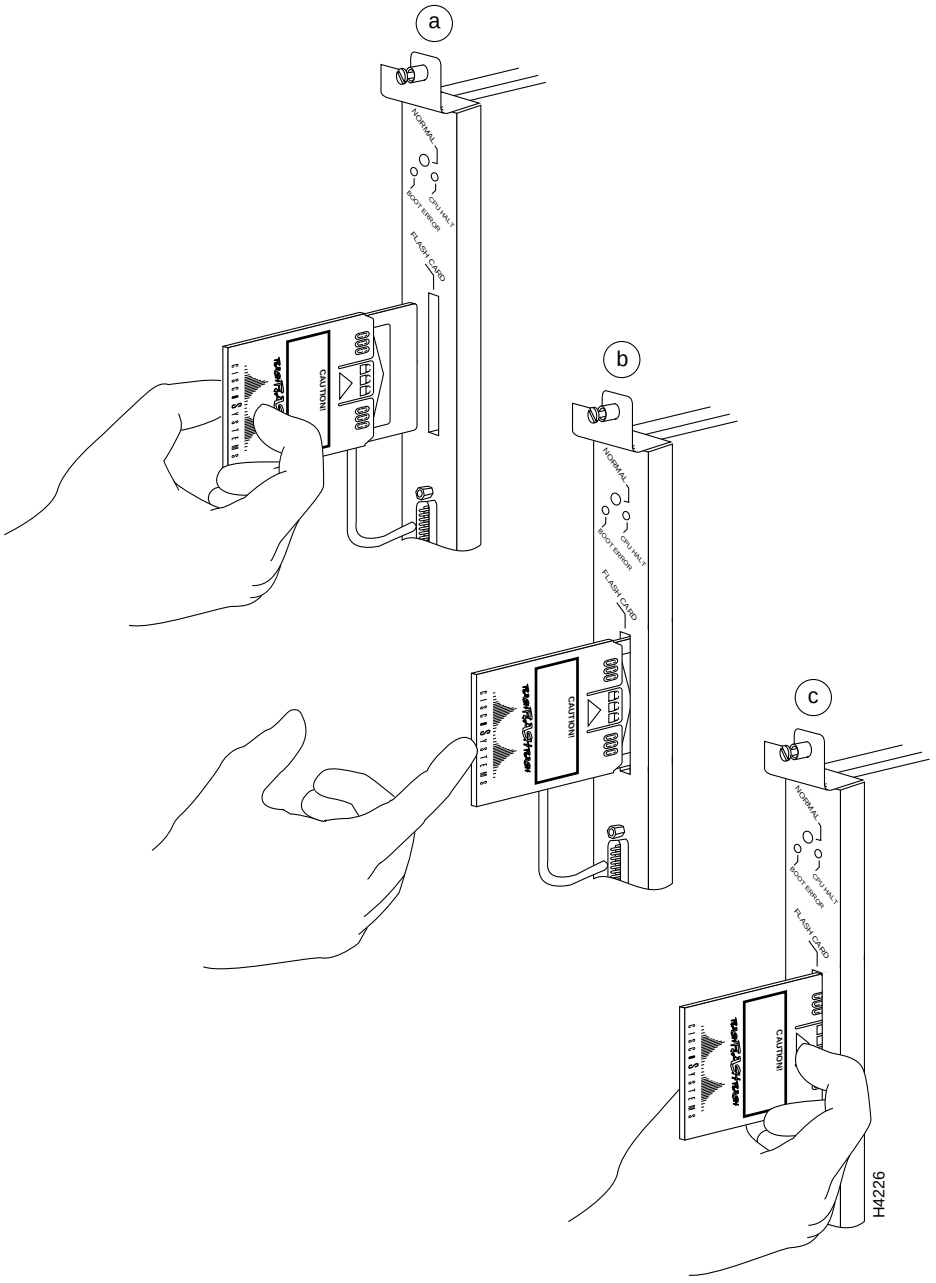
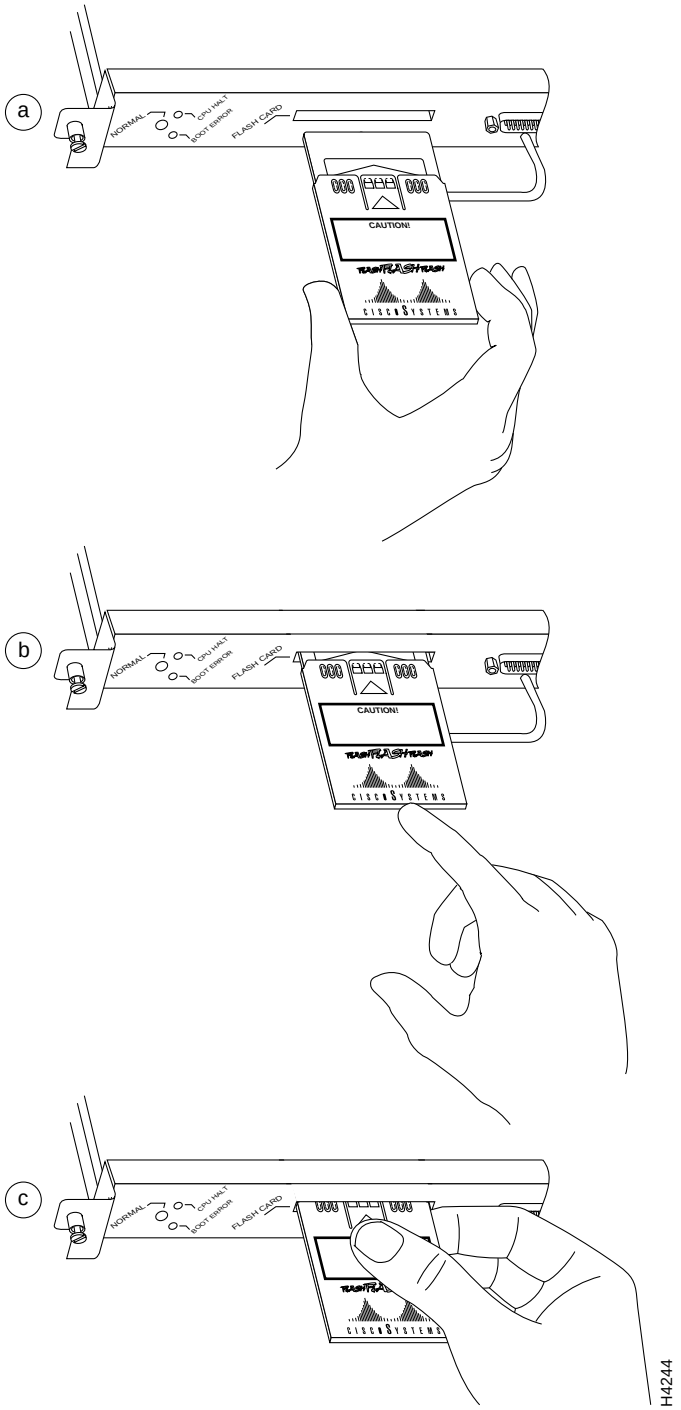


Figure 12 Installing and Removing a Flash Memory Card (RP in a Cisco 7010)



Formatting a Flash Memory Card in the RSP or RSP7000

Before you can use a new Flash memory card, you must format it.

If you plan to use a Flash memory card that was formatted on another type of system, see the section "Flash Memory Card Compatibility," on page 27, to determine if you need to reformat it first.

Note The following procedure assumes you have already booted your router.

Caution The formatting procedure erases all information on the Flash memory card. To prevent the loss of important data that might be stored on a Flash memory card, proceed carefully. If you want to save the data on a Flash memory card, copy the data to a server before you format the card.

A Flash memory card that is shipped as part of a Cisco 75XX (or a Cisco 7000 or Cisco 7010 with an RSP7000) system contains an image. A *spare* Flash memory card must be formatted before use.

Use the following procedure to format a new Flash memory card:

Step 1 Using the procedures in an earlier section, "Installing and Removing the Flash Memory Card in an RSP or RSP7000," insert the Flash memory card into slot 0. (If slot 0 is not available, use slot 1.)

Step 2 To format the Flash memory card, use the **format slot0:** (or **format slot1:**) command as follows. (Use only Intel Series 2+ Flash memory cards.)

```
Router# format slot0:
All sectors will be erased, proceed? [confirm]
Enter volume id (up to 30 characters): MyNewCard
Formatting sector 1
Format device slot0 completed
Router#
```

Note For this example, an 8-MB Flash memory card was used, and at the line "Formatting sector," the system counted the card's sectors backwards from 64 to 1 as it formatted them. For 16-MB Flash memory cards, the system counts backwards from 128 to 1, and for 20-MB Flash memory cards, the system counts backwards from 160 to 1.

The new Flash memory card is now formatted and ready to use.

Note For complete command descriptions and configuration information, refer to the appropriate configuration publications listed in the section "If You Need More Information" on page 28.

Formatting a Flash Memory Card in the RP

Before you can use a new Flash memory card, you must format it. Also, if you plan to boot from a Flash memory card that was formatted on an RSP-based system (Cisco 7500 series or a Cisco 7000 series router with an RSP7000), you must first reformat the card on your system.

Note A Flash memory card shipped with a spare RP or shipped with a system is already formatted.

Caution The formatting procedure erases all information on the Flash memory card. To prevent the loss of important data that might be stored on a Flash memory card, proceed carefully. If you want to save the data on a Flash memory card, upload the data to a server before you format the card.

Use the following procedure to format a new Flash memory card (the procedure assumes you have already booted your router):

Step 1 Using the procedures in the earlier section "Installing and Removing the Flash Memory Card in an RP," insert the Flash memory card into the PCMCIA slot.

Step 2 To format the Flash memory card, use the **format slot0:** command as follows. (Use only Intel Series 2+ Flash memory cards.)

```
Router# format slot0:
All sectors will be erased, proceed? [confirm]
Enter volume id (up to 30 characters): MyNewCard
Formatting sector 1
Format device slot0 completed
Router#
```

Note For this example, an 8-MB Flash memory card was used, and at the line "Formatting sector," the system counted the card's sectors backwards from 64 to 1 as it formatted them. For 16-MB Flash memory cards, the system counts backwards from 128 to 1.

The new Flash memory card is now formatted and ready to use.

Note For complete command descriptions and configuration information, refer to the appropriate configuration publications listed in the section "If You Need More Information" on page 28.

Copying an Image into a Flash Memory Card

With the Flash memory card formatted, you can now copy an image into it. The following procedure assume the following:

- You have an RSP (or RSP7000) or an RP with a good image in the onboard Flash so you can start the router.
- For RP-based systems, make sure you are running Cisco IOS Release 11.0 or later.
- The bootable image you want to copy to the Flash memory card exists on a TFTP server to which you have access (meaning you know its name and have connectivity to it), and at least one interface is available over which you can access this server.

Note To assure access to a TFTP sever, you will need to configure at least one interface. To configure an interface, you can use the **setup** command or use the configuration editor.For complete command descriptions and configuration information, refer to the appropriate configuration publications listed in the section "If You Need More Information" on page 28.

- You know the filename of the image you want to copy into the Flash memory card.

Following is the procedure for copying a file (called *new.image*) into the Flash memory card:

Step 1 Boot the router and allow it to initialize.

Step 2 If the Flash memory card is unformatted or has been formatted on another 7000 or 7500 series router, format it using the procedure in the section "Formatting a Flash Memory Card in the RSP or RSP7000" on page 17 or "Formatting a Flash Memory Card in the RP" on page 18.

Step 3 To copy the image *new.image* to the Flash memory card, use the following series of commands:

```
Router> en
Password:
Router# copy tftp:new.image slot0:new.image
20575008 bytes available on device slot0, proceed? [confirm]
Address or name of remote host [1.1.1.1]?
Loading new.image from 1.1.1.1 (via Ethernet1/0): !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
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!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 7799951/15599616 bytes]
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
Router#
```

Note In the preceding example, the exclamation points (!!!) appear as the file is downloaded, and the "C" characters signify calculation of the checksum, which is a verification that the file has been correctly downloaded to the Flash memory card.

Making the Flash Memory Card Image Bootable

Use the following series of commands to make the image (the file named *new.image*) bootable. Note that, since the configuration register must be set to 0x2102, the **config-register** command is part of the sequence.

```
Router# config terminal
Router(config)# no boot system
Router(config)# boot system flash slot0:new.image
Router(config)# config-register 0x2102
Crtl-z
Router# copy running-config startup-config
Router# reload
```

When the system reloads it will boot the image *new.image* from the Flash memory card in slot 0.

Note For more details about the **boot system flash** command, refer to "Enabling Booting from Flash Memory on an RSP or RSP7000" or "Enabling Booting from Flash Memory on an RP."

Copying Bootable Images between Flash Memory Cards (RSP and RSP7000 only)

As future releases of Cisco IOS images become available, you will receive these images either as a file booted from a network server, a file on floppy disk, or a file on a Flash memory card.

The following scenario describes how to use a newly released image on a Flash memory card in a system that has an older image on a Flash memory card in slot 0 and a default boot image in the onboard Flash SIMM.

For this scenario, the filenames are as follows:

- The new image on the new Flash memory card in slot 1 is *image.new.*
- The old image in the Flash memory card in slot 0 is *image.old*.
- The bootable image in onboard Flash memory is *image.boot*.

You will copy the new image from the new Flash memory card onto the Flash memory card that contains the old image.

Note The scenario assumes that the new image will fit on the Flash memory card in slot 0, alongside the old image. If there is not enough available space, use the **delete** command to delete files from the Flash memory card to make sufficient room for the new image; however, *do not* delete the *image.old* file. Then use the **squeeze** command to remove these deleted files from the Flash memory card. If, after you have deleted files and used the **squeeze** command, the two files cannot coexist on the Flash memory card in slot 0, remove this card (place it in an anti-static bag and store it in a safe place), then insert the new Flash memory card (with the file *image.new*) in slot 0. Proceed to Step 5 and use the command **boot system flash slot0:image.new** to designate the file *image.new* as the default boot image.

Step 1 Boot the router. By default, the file *image.boot* will be used.

Step 2 Enable the router as follows:

```
Router> en
Password:
Router#
```

Step 3 Insert the new Flash memory card in slot 1.

Step 4 Use the following command to copy the file *image.new* in slot 1, to the Flash memory card in slot 0, *only if* there is enough memory space for the two images to coexist.

```
Router# copy slot1:image.new slot0:image.new
```

Note The previous command can also be entered as **copy slot1:image.new slot0:**.

Step 5 Use the following series of commands to designate the file *image.new* (which is in the Flash memory card in slot 0) as the default boot image:

```
Router# config t
Router(config)# no boot system
Router(config)# boot system flash slot0:image.new
Crtl-z
Router# copy running-config startup-config
Router# reload
```

When the system reloads, it will boot the file *image.new* from the Flash memory card in slot 0.

Enabling Booting from Flash Memory on an RSP or RSP7000

To enable booting from Flash memory, set configuration register bits 3, 2, 1, and 0 to a value between 2 and 15 in conjunction with the **boot system flash** *[filename]* configuration command.

Following are definitions of the various Flash memory-related **boot** commands:

boot system flash—Boots the first file in onboard Flash memory

boot system flash flash:—Boots the first file in onboard Flash memory

boot system flash *herfile***—**Boots the file named "herfile" on onboard Flash memory

boot system flash slot0:—Boots the first file on Flash memory card in slot 0

boot system flash flash:*hisfile* **—**Boots the file named "hisfile" on onboard Flash memory

boot system flash slot0:*myfile* **—**Boots the file named "myfile" on the Flash memory card in slot 0

To enter configuration mode and specify a Flash memory filename in the PCMCIA slot from which to boot, enter the **configure terminal** command at the enable prompt, as follows:

```
Router# configure terminal
Enter configuration commands, one per line. End with CTRL-Z.
Router(config)# boot system flash slot0:myfile
```

To disable Break and enable the **boot system flash slot0:** command, enter the **config-register** command with the value shown in the following example:

```
Router(config)# config-reg 0x2102

To exit configuration mode, enter Cntl-Z as follows:
Crtl-z
Router#
```

To save the new configuration to memory, use the **copy running-config startup-config** command as follows:

```
Router# copy running-config startup-config
```

When you enter **boot** commands, pay attention to the use of the space bar, which influences the way the router interprets the command. For example, notice the difference in the following commands:

```
Router(config)# boot system flash slot0:myfile (correct command)
Router(config)# boot system flash slot0: myfile (incorrect command)
```

In the first case, the router boots the file specified (*myfile*). In the second case, the router finds the *filename* field blank and boots the first file on the Flash memory card.

Enabling Booting from Flash Memory on an RP

To enable booting from Flash memory, set configuration register bits 3, 2, 1, and 0 to a value between 2 and 15 in conjunction with the **boot system flash** *[filename]* configuration command.

Following are definitions of the various Flash memory-related **boot** commands:

boot system flash—Boots the first file in onboard Flash memory

boot system flash flash:—Boots the first file in onboard Flash memory

boot system flash *herfile***—**Boots the file named "herfile" on onboard Flash memory

boot system flash slot0:—Boots the first file on Flash memory card in the PCMCIA slot (slot 0)

boot system flash flash:*hisfile* **—**Boots the file named "hisfile" on onboard Flash memory

boot system flash slot0:*myfile* **—**Boots the file named "myfile" on the Flash memory card in the PCMCIA slot (slot 0)

To enter configuration mode and specify a Flash memory filename in the PCMCIA slot from which to boot, enter the **configure terminal** command at the enable prompt, as follows:

```
Router# configure terminal
Enter configuration commands, one per line. End with CTRL-Z.
Router(config)# boot system flash slot0:myfile
```

To disable Break and enable the **boot system flash slot0:** command, enter the **config-register** command with the value shown in the following example:

```
Router(config)# config-reg 0x2102

To exit configuration mode, enter Cntl-Z as follows:
Crtl-z
Router#
```

To save the new configuration to memory, use the **copy running-config startup-config** command as follows:

```
Router# copy running-config startup-config
```

When you enter **boot** commands, pay attention to the use of the Spacebar, which influences the way the router interprets the command. For example, notice the difference in the following commands:

```
Router(config)# boot system flash slot0:myfile (correct command)
Router(config)# boot system flash slot0: myfile (incorrect command)
```

In the first case, the router boots the file specified (*myfile*). In the second case, the router finds the *filename* field blank and boots the first file on the Flash memory card.

Copying to Flash Memory on an RSP or RSP7000

Copying a new image to Flash memory might be required whenever a new image or maintenance release becomes available.

Use the command **copy tftp:***filename* [**bootflash** | **slot0** | **slot1**]:*filename* for the copy procedure where **tftp:***filename* is the source of the file and [**bootflash** | **slot0** | **slot1**]:*filename* is the destination in onboard Flash memory or on either of the Flash memory cards.

An example of the **copy tftp:***filename* command follows:

```
Router# copy tftp:myfile1 slot0:myfile1
20575008 bytes available on device slot0, proceed? [confirm]
Address or name of remote host [1.1.1.1]?
Loading new.image from 1.1.1.1 (via Ethernet1/0): !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!![OK - 7799951/15599616 bytes]
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
Router#
```

Note In the preceding example, the exclamation points (!!!) appear as the file is downloaded, and the “C” characters signify calculation of the checksum, which is a verification that the file has been correctly downloaded to the Flash memory card.

Copying to Flash Memory on an RP

Copying a new image to Flash memory might be required whenever a new image or maintenance release becomes available.

Use the command **copy tftp:***filename* [**bootflash** | **slot0**]:*filename* for the copy procedure where **tftp:***filename* is the source of the file and [**bootflash** | **slot0**]:*filename* is the destination in onboard Flash memory or on either of the Flash memory cards.

An example of the **copy tftp:***filename* command follows:

```
Router# copy tftp:myfile1 slot0:myfile1
20575008 bytes available on device slot0, proceed? [confirm]
Address or name of remote host [1.1.1.1]?
Loading new.image from 1.1.1.1 (via Ethernet1/0): !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!![OK - 7799951/15599616 bytes]
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
Router#
```

Note In the preceding example, the exclamation points (!!!) appear as the file is downloaded, and the “C” characters signify calculation of the checksum, which is a verification that the file has been correctly downloaded to the Flash memory card.

RSP-Specific Flash Memory Commands

Following are additional commands related to the Flash memory in the single in-line memory module (SIMM) on the RSP or RSP7000 (called *bootflash*) and in PCMCIA cards. (The following example assumes you are currently in PCMCIA slot 0.) You can determine which PCMCIA slot you are accessing using the **pwd** command as follows:

```
Router# pwd
slot0
```

You can move between Flash memory media using the **cd** [**bootflash** | **slot0** | **slot1**] command as follows:

```
Router# cd slot0
slot0
Router# cd slot1
Router# pwd
slot1
```

You can list the directory of any Flash memory media using the **dir** [**bootflash** | **slot0** | **slot1**] command as follows:

```
Router# dir
-#- -length- -----date/time------ name
1   4601977  May 19 1994 09:42:19 myfile1
6   679      May 19 1994 05:43:56 todays–config
7   1        May 19 1994 09:54:53 fun1
```

You can delete a file from any Flash memory media using the **delete** command as follows:

```
Router# delete slot0:fun1
Router# dir
-#- -length- -----date/time------ name
1   4601977  May 19 1994 09:42:19 myfile1
6   679      May 19 1994 05:43:56 todays–config
```

To verify that the **delete** command was successful, use the **dir/all/long** command.

Note Files that are deleted are simply marked as deleted, but still occupy space in Flash memory. To remove them, use the **squeeze** command.

The **squeeze** command permanently removes files, which are marked as deleted, and pushes all other undeleted files together to eliminate spaces between them.

Following is the syntax of the squeeze command:

```
Router# squeeze slot0:
All deleted files will be removed, proceed? [confirm]
Squeeze operation may take a while, proceed? [confirm]
ebESZ
```

To prevent loss of data due to sudden power loss, the “squeezed” data is temporarily saved to another location of Flash memory, which is specially used by the system.

In the preceding command display output, the character “e” means this special location has been erased (which must be performed before any write operation). The character “b” means that the data that is about to be written to this special location has been temporarily copied. The character “E” signifies that the sector which was temporarily occupied by the data has been erased. The character “S” signifies that the data was written to its permanent location in Flash memory.

The **squeeze** command operation keeps a log of which of these functions has been performed so upon sudden power failure, it can come back to the right place and continue with the process. The character "Z" means this log was erased after the successful **squeeze** command operation.

Recovering from Locked Blocks

A locked block of Flash memory occurs when power is lost or a Flash memory card is unplugged during a write or erase operation. When a block of Flash memory is locked, it cannot be written to or erased, and the operation will consistently fail at a particular block location. The only way to recover from locked blocks is by reformatting the Flash memory card with the **format** command.

Caution Formatting a Flash memory card to recover from locked blocks will cause existing data to be lost.

Note For complete command descriptions and configuration information, refer to the *Router Products Command Reference* publication and the *Router Products Configuration Guide*.

Flash Memory Card Compatibility

In order to use the Flash memory card, the card must have been formatted on the same type of system. Table 2 shows which systems support using a Flash memory card without reformatting and which systems require that you reformat the card before it can be used.

Table 2 Flash Memory Card Compatibility

Formatted In	Installed In	Usable Without Reformatting	Must Be Reformatted
RSP1	RSP1	X	
RSP1	RSP2	X[1]	
RSP7000	RSP1 or RSP2	X	
RSP7000	RP		X
RSP1	RP		X
RSP2	RSP1	X[1]	
RSP2	RSP2	X	
RSP2	RP		X
RP	RP	X	
RP	RSP1		X
RP	RSP2		X
RP	RSP7000		X

1. Cisco IOS Release 10.3(572) and higher (for example Cisco IOS 10.3[6]) make RSP1and RSP2 formats compatible. In Cisco IOS Release 10.3(5) and lower, RSP1 and RSP2 formats are not compatible and require you to reformat the card before it can be used.

Note An RSP-based router (Cisco 7505, Cisco 7507, Cisco 7513, or Cisco 7000 and Cisco 7010 with RSP7000) cannot read from or write to a Flash memory card formatted on an RP-based router (Cisco 70XX). Similarly, an RP-based router cannot read from or write to a Flash memory card formatted on an RSP-based router.

Any Intel Series 2+ Flash memory card can be used on an RSP- or RP-based router. However, an RP-based router requires installation of the card's metal sleeve and must contain Cisco IOS Release 11.0 boot ROMs (SWR-G7-11.0.0=) or later. (The RP board requires Cisco IOS 11.0 in order to boot from the Flash memory card.) In addition, an RP-based router can only read up to 16 MB.

If You Need More Information

The Cisco Internetwork Operating System (Cisco IOS) software running the router contains extensive features and functionality. The effective use of many of many of these features is easier if you have more information at hand.

To obtain general information about documentation, call Customer Service at 800 553-6387 or 408 526-7208. Customer Service hours are 5:00 a.m. to 6:00 p.m. Pacific time, Monday through Friday (excluding company holidays). You can also send e-mail to `cs-rep@cisco.com`. You can also refer to the *Cisco Information Packet* that shipped with your router.

For additional information on configuring the Cisco 7500 series routers and VIP2, the following documentation resources are available to you:

- UniverCD

  This publication and all other Cisco Systems publications are available on UniverCD, which is Cisco's online library of product information. UniverCD is updated and shipped monthly, so it might be more up to date than printed documentation. To order UniverCD, contact a Cisco Sales or Customer Service representative.

- For systems with Cisco IOS Release 10.0 (1) or later, refer to the following publications:
  - *Router Products Configuration Guide*
  - *Router Products Command Reference*
  - *Troubleshooting Internetworking Systems*

- For systems with Cisco IOS Release 11.1(1), a Cisco-approved 11.1 beta software version, or a later Cisco IOS release, refer to the following modular configuration and modular command reference publications, as appropriate for your configuration:
  - *Configuration Fundamentals Configuration Guide*
  - *Configuration Fundamentals Command Reference*
  - *Wide-Area Networking Configuration Guide*
  - *Wide-Area Networking Command Reference*
  - *Network Protocols Configuration Guide*
  - *Network Protocols Command Reference*
  - *Network Protocols Configuration Guide*
  - *Network Protocols Command Reference*
  - *Bridging and IBM Networking Configuration Guide*
  - *Bridging and IBM Networking Command Reference*
  - *Configuration Builder Getting Started Guide*
  - *Troubleshooting Internetworking Systems*
- For hardware installation and maintenance information on the Cisco 7000, Cisco 7010, Cisco 7505, Cisco 7507, and Cisco 7513 routers, refer to the following publications:
  - *Cisco 7000 Hardware Installation and Maintenance*
  - *Cisco 7010 Hardware Installation and Maintenance*
  - *Cisco 7505 Hardware Installation and Maintenance*
  - *Cisco 7507 Hardware Installation and Maintenance*
  - *Cisco 7513 Hardware Installation and Maintenance*

Cisco Connection Online

Cisco Connection Online (CCO), formerly Cisco Information Online (CIO), is Cisco Systems' primary, real-time support channel. Maintenance customers and partners can self-register on CCO to obtain additional content and services.

Available 24 hours a day, 7 days a week, CCO provides a wealth of standard and value-added services to Cisco's customers and business partners. CCO services include product information, software updates, release notes, technical tips, the Bug Navigator, configuration notes, brochures, descriptions of service offerings, and download access to public and authorized files.

CCO serves a wide variety of users through two interfaces that are updated and enhanced simultaneously—a character-based version and a multimedia version that resides on the World Wide Web (WWW). The character-based CCO supports Zmodem, Kermit, Xmodem, FTP, Internet e-mail, and fax download options, and is excellent for quick access to information over lower bandwidths. The WWW version of CCO provides richly formatted documents with photographs, figures, graphics, and video, as well as hyperlinks to related information.

You can access CCO in the following ways:

- WWW: `http://www.cisco.com`.
- Telnet: `cco.cisco.com`.
- Modem: From North America, 408 526-8070; from Europe, 33 1 64 46 40 82. Use the following terminal settings: VT100 emulation; databits: 8; parity: none; stop bits: 1; and baud rates up to 14.4 kbps.

For a copy of CCO's Frequently Asked Questions (FAQ), contact `cco-help@cisco.com`. For additional information, contact `cco-team@cisco.com`.

Note If you are a network administrator and need personal technical assistance with a Cisco product that is under warranty or covered by a maintenance contract, contact Cisco's Technical Assistance Center (TAC) at 800 553-2447, 408 526-7209, or `tac@cisco.com`. To obtain general information about Cisco Systems, Cisco products, or upgrades, contact 800 553-6387, 408 526-7208, or `cs-rep@cisco.com`.

This document is to be used in conjunction with the *Cisco 7505 Hardware Installation and Maintenance*,, the *Cisco 7507 Hardware Installation and Maintenance*, the *Cisco 7513 Hardware Installation and Maintenance*, the *Cisco 7010 Hardware Installation and Maintenance*, or the *Cisco 7000 Hardware Installation and Maintenance* publications. (2083flmc.fm)

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