



Flash Memory Card Installation Instructions

Product Numbers: MEM-RP-FLC8M=, MEM-RP-FLC16M=, MEM-RSP-FLC8M=, MEM-RSP-FLC16M=, MEM-RSP-FLC20M=, MEM-RSP-FLC32M=, MEM-RSP4-FLC16M=, MEM-RSP4-FLC20M=, MEM-RSP4-FLC32M=, MEM-RSP8-FLC16M=, MEM-RSP8-FLC20M=, MEM-RSP8-FLC32M=

Customer Order Number: DOC-782083=

This publication describes installation and configuration procedures for Flash memory cards, which ship as spare parts (=), and are used with the following Route Switch Processors (RSPs):

- RSP1—Used in the Cisco 7505
- RSP2—Used in the Cisco 7505, Cisco 7507, Cisco 7513, and Cisco 7576
- RSP4—Used in the Cisco 7505, Cisco 7507, Cisco 7513, and Cisco 7576
- RSP8—Used in the Cisco 7505, Cisco 7507, Cisco 7507-MX, Cisco 7513, Cisco 7513-MX, and Cisco 7576



Note The RSP8 also uses Flash Disks. The RSP16 uses only Flash Disks and does not use memory cards. For information on Flash Disks, see the [Using the Flash Disk](#) document.

- 7000 Series Route Switch Processor (RSP7000)—Used in the Cisco 7000 and Cisco 7010
- Route Processor (RP) and 64-megabyte (MB) RP RP64MB—Used in the Cisco 7000 and Cisco 7010

The Flash memory card is an 8-, 16-, 20- or 32-MB, Flash memory card, which conforms with the PC Card format formally called Personal Computer Memory Card International Association (PCMCIA).

The RP, RSP7000, RSP1, RSP2, RSP4, and RSP8 Flash memory cards are identical except that the RP Flash memory card contains a metal sleeve. The Flash memory card is used to store and boot Cisco IOS software images and interface processor microcode images. It can also be used as a server to store software and microcode images for other systems.

Spare Flash memory cards are shipped blank; you *must* format them before using them. Procedures for formatting a Flash memory card are included in this publication.

For convenience, the RSP1, RSP2, RSP4, RSP8, and RSP7000 are referred to as the *RSP*; differences are specified. Also, the RP and the RP64MB are referred to as the *RP*; differences are specified.



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In this publication, the procedural 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. Further, section headings indicate the processor types discussed in the procedures within that section.



Note

Special compatibility issues must be considered *before* using Flash memory cards that were formatted on the RSP1, RSP2, and the RP, in the RSP4 or RSP8. (To review these compatibility issues, see the “Flash Memory Card Compatibility and Software Prerequisites” section on page 5.)

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Related Documentation

Your router and the Cisco IOS software running on it contain extensive features and functionality, which are documented in the following resources:

- Cisco IOS software:

For configuration information and support, refer to the modular configuration and modular command reference publications in the Cisco IOS software configuration documentation set that corresponds to the software release installed on your Cisco hardware.



Note

You can access Cisco IOS software configuration and hardware installation and maintenance documentation on the World Wide Web at <http://www.cisco.com>, <http://www-china.cisco.com>, or <http://www-europe.cisco.com>.

- [Cisco 7200 Series Routers Documentation Roadmap](#)
- [Cisco 7500 Series Routers Documentation Roadmap](#)
- [Cisco 7010 routers documentation](#)
- Cisco 7000 series routers: [Route Processor \(RP\) Installation and Configuration Guide](#).
- Cisco 7000 Series Route Switch Processor (RSP7000): [Route Switch Processor \(RSP7000\) Installation and Configuration in the Cisco 7000 Series Routers](#).
- To view Cisco documentation or obtain general information about the documentation, refer to the following sources:
 - [Cisco.com](#), page 28
 - [Documentation Feedback](#), page 29
 - [Obtaining Technical Assistance](#), page 29
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Preventing Electrostatic Discharge Damage

Following are guidelines for preventing electrostatic discharge (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.
- 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.
- 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.



Caution

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

Flash Memory Card Product Numbers

Flash memory card product numbers are router and processor specific, as described in [Table 1](#).


Note

The RSP8 also uses Flash Disks. The RSP16 uses only Flash Disks and does not use memory cards. For information on Flash Disks, see the [Using the Flash Disk](#) document.

Table 1 *Flash Memory Card Product Numbers*

Routers	Processor Card	Flash Memory Card
Cisco 7505 Cisco 7507 Cisco 7513 Cisco 7576	RSP2	MEM-RSP-FLC8M= MEM-RSP-FLC16M= MEM-RSP-FLC20M=
	RSP4	MEM-RSP4-FLC16M= MEM-RSP4-FLC20M= MEM-RSP4-FLC32M=
	RSP8	MEM-RSP8-FLC16M= MEM-RSP8-FLC20M= MEM-RSP8-FLC32M=
Cisco 7507-MX Cisco 7513-MX	RSP8	MEM-RSP8-FLC16M= MEM-RSP8-FLC20M= MEM-RSP8-FLC32M=
Cisco 7010	RP, RP64MB	MEM-RP-FLC8M= ¹ MEM-RP-FLC16M= ¹
	RSP7000	MEM-RSP-FLC8M= MEM-RSP-FLC16M= MEM-RSP-FLC20M= MEM-RSP-FLC32M=
Cisco 7000	RP, RP64MB	MEM-RP-FLC8M= ¹ MEM-RP-FLC16M= ¹
	RSP7000	MEM-RSP-FLC8M= MEM-RSP-FLC16M= MEM-RSP-FLC20M= MEM-RSP-FLC32M=

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

Flash Memory Card Compatibility and Software Prerequisites

This section includes information about basic Flash memory compatibility and Cisco IOS software requirements for Flash memory card functionality.

To use the Flash memory card, it must have been formatted on the same type of system. 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 RP requires Cisco IOS 11.0 or later, to boot from a Flash memory card. In addition, an RP-based router can only read up to 16 MB of Flash memory.

The RSP7000 requires Cisco IOS Release 10.3(9) or later.

The RSP1 and RSP2 are compatible with all Cisco IOS software releases that support these processors.

The RSP4 requires Cisco IOS Release 11.1(8)CA1 or later.

The RSP8 requires Cisco IOS Release 12.0(9)S or a later release of 12.0 S.



Note The RSP8 also uses Flash Disks. The RSP16 uses only Flash Disks and does not use memory cards. For information on Flash Disks, see the [Using the Flash Disk](#) document.

[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 On	Installed In	Reformatting Required?
RSP1	RSP1 or RSP2	No ¹
RSP1	RSP4 or RSP8	Yes
RSP1	RP	Yes
RSP2	RSP1 or RSP2	No ¹
RSP2	RSP4 or RSP8	Yes
RSP2	RP	Yes
RSP4	All other RSPs	Yes ²
RSP4	RP	Yes
RSP8	All other RSPs	Yes ²
RSP8	RP	Yes
RSP7000	RSP1 or RSP2	No
RSP7000	RSP4 or RSP8	Yes

Table 2 *Flash Memory Card Compatibility (Continued)*

Formatted On	Installed In	Reformatting Required?
RSP7000	RP	Yes
RP	RSP1, RSP2, RSP4, RSP8, and RSP7000	Yes

1. Cisco IOS Release 10.3(572) and higher (for example Cisco IOS Release 10.3[6]) make the RSP1 and 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.
2. For specific RSP4 and RSP8 formatting requirements, refer to the section [“RSP4- and RSP8-Specific Flash Memory Card Compatibility Requirements and Examples.”](#)

**Note**

Flash memory cards formatted on RP-based systems can be used in other RP-based systems; however, these latter systems must be running Cisco IOS Release 11.0 or later to ensure basic Flash memory card functionality.

RSP4- and RSP8-Specific Flash Memory Card Compatibility Requirements and Examples

For a Flash memory card formatted on an RSP1, RSP2, or RSP7000 to be compatible with the RSP4 or RSP8 the Flash memory card must be reformatted with the new Cisco IOS software version that supports the RSP4 or RSP8. The RSP4 is supported by Cisco IOS Release 11.1(8)CA or later. The RSP8 is supported by Cisco IOS Release 12.0(9)S or a later release of 12.0 S.

**Note**

The RSP8 also uses Flash Disks. The RSP16 uses only Flash Disks and does not use memory cards. For information on Flash Disks, see the [Using the Flash Disk](#) document.

A new boot monitor library (boot monlib) image exists on the RSP4- and RSP8-supported Cisco IOS software release that implements the new format read across all RSPs, and which allows the files on the Flash memory card to be bootable on an RSP4 and RSP8.

**Note**

If the Cisco IOS software version is not an RSP4- or RSP8-supported version, but the boot image is an RSP4- or RSP8-supported Cisco IOS software image, then the Cisco IOS software uses the boot monlib image to format the Flash memory card; this applies to an RSP1, RSP2, RSP4, RSP8, or an RSP7000.

The following five examples show various scenarios that might occur with an RSP4 and Cisco IOS Release 11.1(8)CA1 (the initial Cisco IOS software release that supports the RSP4).

**Note**

Although not mentioned specifically, these examples also apply to the RSP8. However, pay close attention to IOS software image compatibility. The RSP8 is compatible with Cisco IOS Release 12.0(9)S or a later release of 12.0 S.

- Examples 1 and 2 show when a Flash memory card formatted on an RSP1, RSP2, or RSP7000 is not compatible with an RSP4.
- Examples 3 and 4 show how to make a Flash memory card formatted on an RSP1, RSP2, or RSP7000, compatible with an RSP4.
- Example 5 shows an RSP4-formatted Flash memory card that is compatible with all RSPs.

**Note**

A Flash memory card formatted on an RP-based system is always incompatible with the RSP4 and RSP8, and it must be reformatted.

Example 1

Example 1 shows Flash memory card incompatibility between an RSP4 and other RSPs.

Following are the conditions of Example 1:

- You have an RSP1, RSP2, or RSP7000
- You have Cisco IOS Release 10.3(12) in the Flash memory card in slot 0
- You formatted the Flash memory card in slot 0 with the Cisco IOS Release 10.0(13) boot monlib
- You have a Cisco IOS Release 10.3(12) boot image in bootflash
- You boot the system from Cisco IOS 10.3(12)

If you copy Cisco IOS Release 11.1(8)CA1 into the Flash memory card in slot 0, and move the Flash memory card from the RSP2 to an RSP4, the files are not bootable on the RSP4.

Example 2

Example 2 shows Flash memory card incompatibility between an RSP4 and other RSPs.

Following are the conditions of Example 2:

- You have an RSP1, RSP2, or RSP7000
- You have Cisco IOS Release 10.3(12) in the Flash memory card in slot 0
- You formatted the Flash memory card in slot 0 with the Cisco IOS Release 10.0(13) boot monlib
- You have a Cisco IOS Release 11.1(8)CA1 boot image in bootflash
- You boot the system from the Flash memory card in slot 0

If you copy Cisco IOS Release 11.1(8)CA1 into the Flash memory card in slot 0, and move the Flash memory card from the RSP2 to an RSP4, the files are not bootable on the RSP4.

Example 3

Example 3 shows how to make a Flash memory card compatible for use with an RSP4 and other RSPs.

Following are the conditions of Example 3:

- You have an RSP1, RSP2, or RSP7000
- You have a Cisco IOS Release 10.3(12) software image in the Flash memory card in slot 0
- You have a Cisco IOS Release 11.1(8)CA1 boot image in bootflash
- You boot the system from the Flash memory card in slot 0, or, from the boot image in bootflash

If you format the Flash memory card in slot 0, the system will use the boot monlib image to format the device.

If you then copy Cisco IOS Release 11.1(8)CA1 onto the Flash memory card in slot 0, and move the Flash memory card from the RSP2 to an RSP4, the files are bootable on the RSP4 (and all other RSPs).

Example 4

Example 4 shows how to make a Flash memory card compatible for use with other RSPs and an RSP4.

Following are the conditions of Example 4:

- You have an RSP1, RSP2, or RSP7000
- You have a Cisco IOS Release 11.1(8)CA1 software image in the Flash memory card in slot 0
- You have a Cisco IOS Release 11.1(8)CA1 boot image in bootflash
- You boot the system from the Flash memory card in slot 0

If you format the Flash memory card in slot 0, the system uses the Cisco IOS software monlib image to format the device.

If you then copy the Cisco IOS Release 11.1(8)CA1 software image onto the Flash memory card in slot 0, and move the Flash memory card from the RSP2 to an RSP4, the Cisco IOS Release 11.1(8)CA1 software image is bootable on the RSP4 (and all other RSPs).

Example 5

Example 5 shows how to make a Flash memory card compatible for use in an RSP4 and other RSPs.

Following are the conditions of Example 5:

- You have an RSP4
- You have Cisco IOS Release 11.1(8) software image in the Flash memory card in slot 0
- You have a Cisco IOS Release 11.1(8)CA1 boot image in bootflash
- You boot the system from the Flash memory card in slot 0 or from bootflash

If you format the Flash memory card in slot 0, the system uses the Cisco IOS software monlib image to format the device.

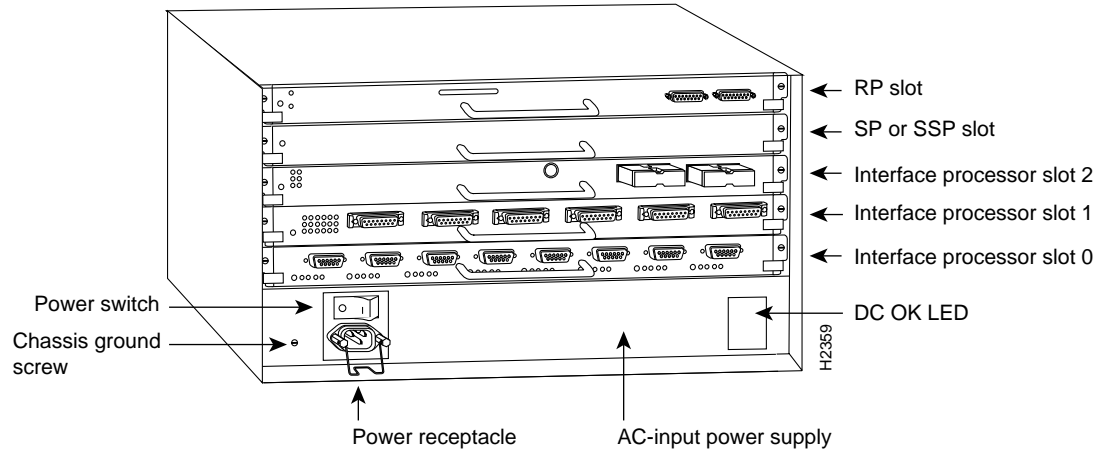
If you then move the Flash memory card in slot 0 from the RSP4 to an RSP1, RSP2, or RSP7000, the file is bootable on all RSPs.

Locating the RP, RSP7000, RSP1, RSP2, RSP4, or RSP8

This section provides directions for locating the RP, RSP7000, RSP1, RSP2, RSP4, or RSP8 in Cisco 7000 series routers and Cisco 7500 series routers. These processors contain the PC Card slots for Flash memory cards.

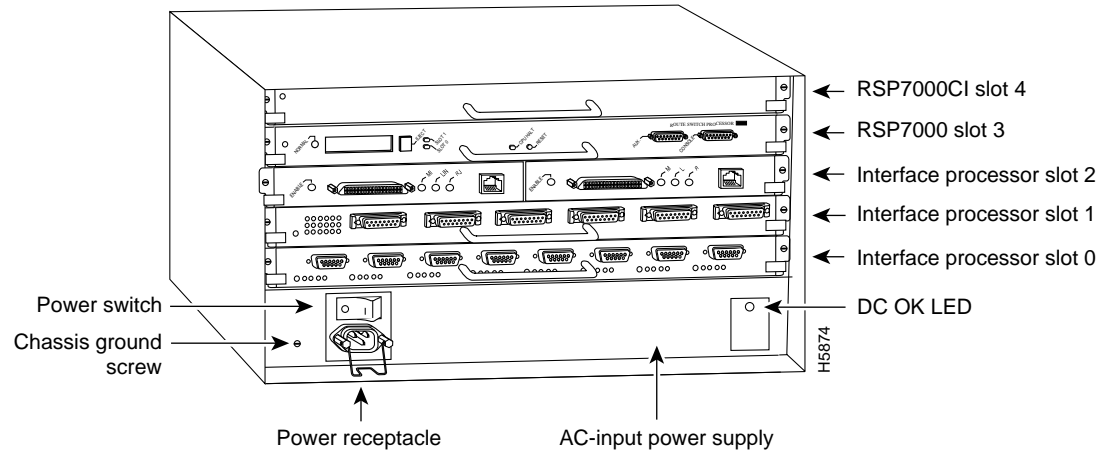
In a Cisco 7010 equipped with the RP, access to the RP is from the rear. The top processor slot, called the *RP* slot, is reserved for the RP card. (See [Figure 1](#).)

Figure 1 Cisco 7010 (Interface Processor End)



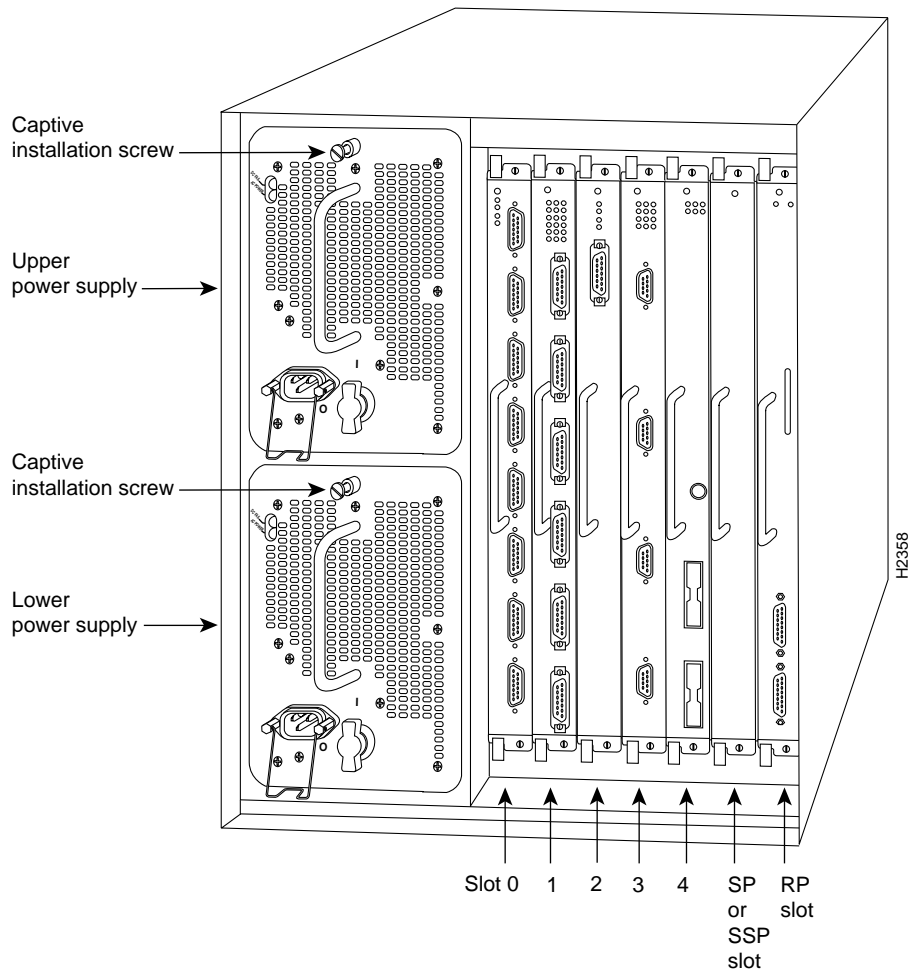
In a Cisco 7010 equipped with the RSP7000, access to the RSP7000 is from the rear. Slot 3, called the *RSP 7000* slot 3, is reserved for the RSP7000 card. (See [Figure 2](#).)

Figure 2 Cisco 7010 with RSP7000 and RSP7000CI Installed (Interface Processor End)



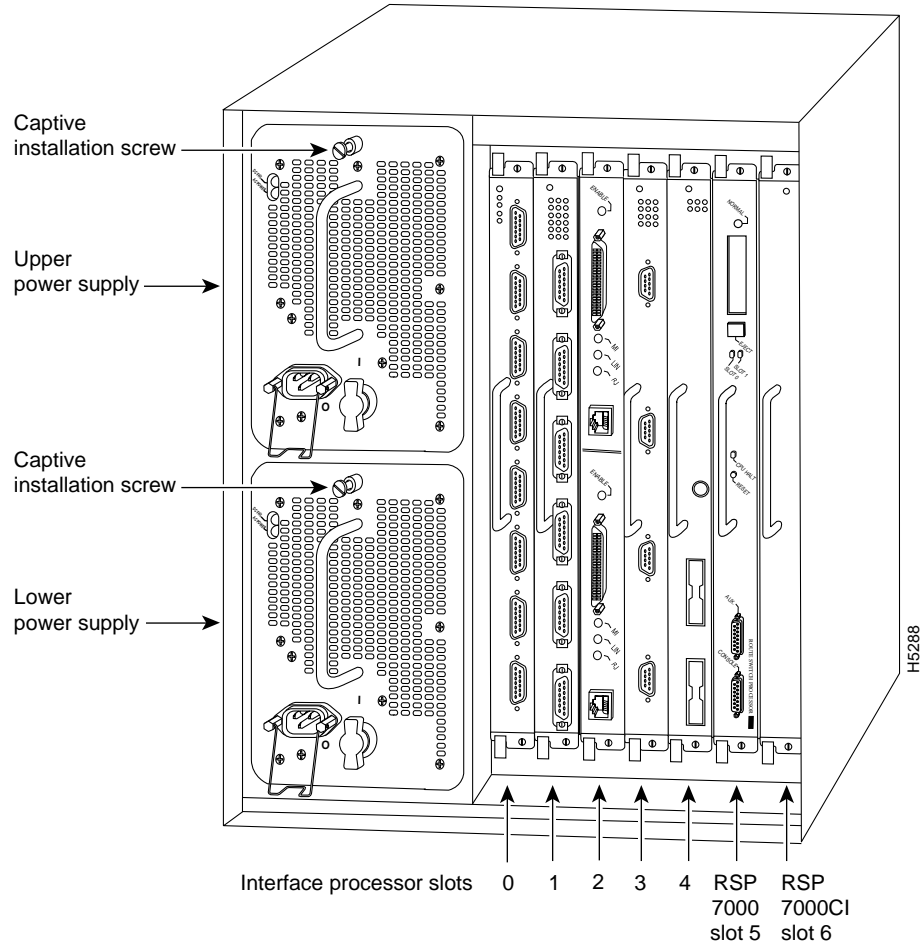
In a Cisco 7000 equipped with the RP, access to the RP is from the rear. (See [Figure 3](#).) Slot 6, called the *RP* slot, is reserved for the RP card.

Figure 3 Cisco 7000 (Interface Processor End)



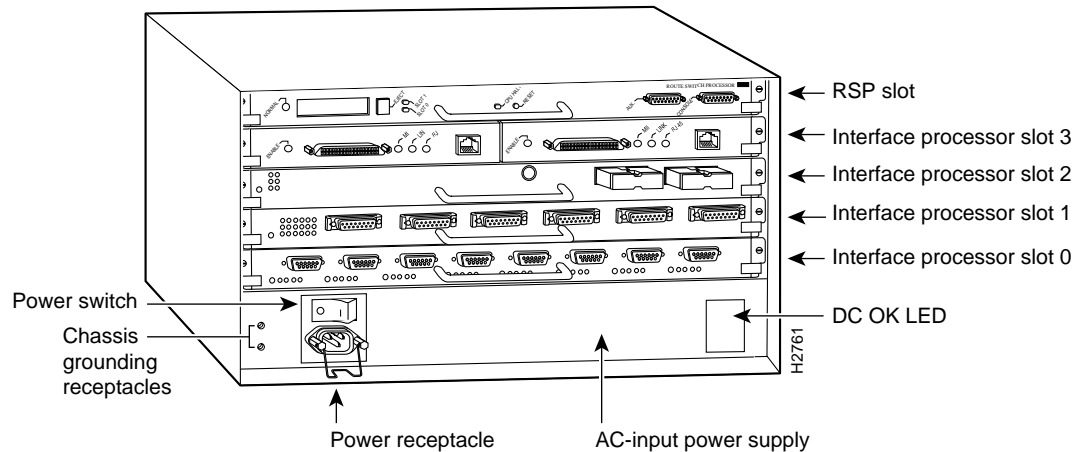
In a Cisco 7000 equipped with the RSP7000, access to the RSP7000 is from the rear. Slot 5, called the RSP 7000 slot 5, is reserved for the RSP7000 card. (See [Figure 4](#).)

Figure 4 Cisco 7000 with RSP7000 and RSP7000CI Installed (Interface Processor End)



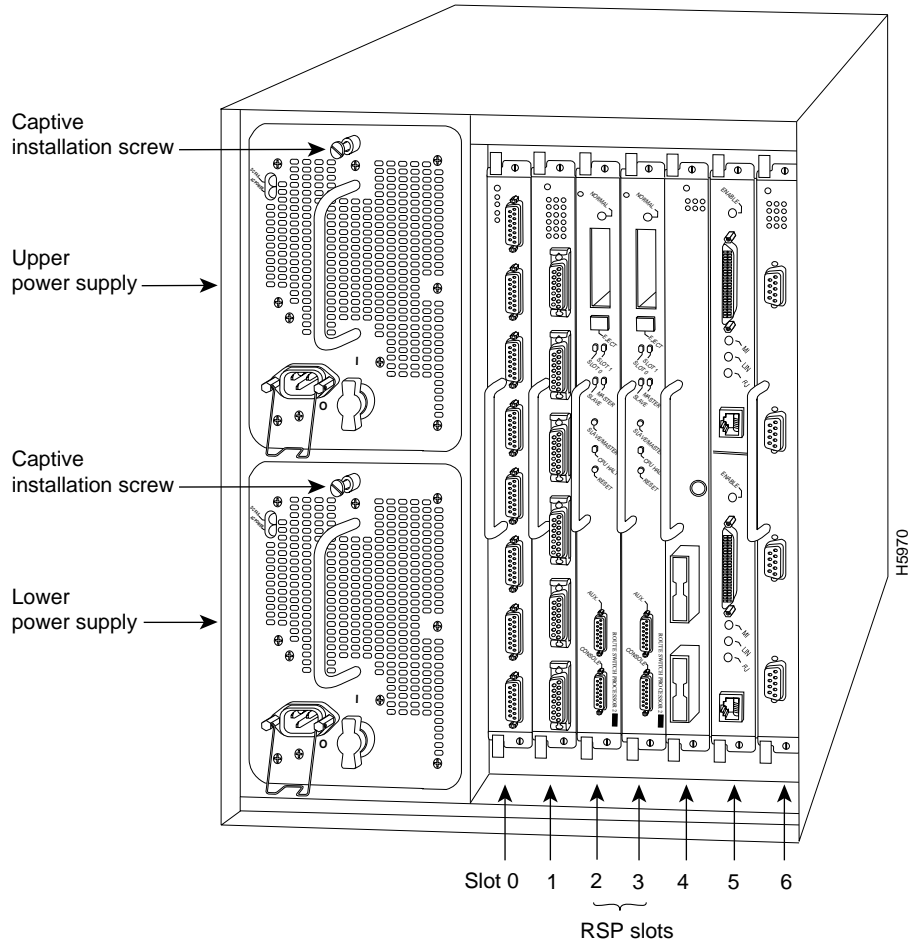
In a Cisco 7505, access to the RSP2 (or RSP1, RSP4, or RSP8) is from the rear. The top processor slot, called the *RSP slot*, is reserved for the RSP2 (or RSP1, RSP4, or RSP8) card. (See [Figure 5](#).)

Figure 5 Cisco 7505 (Interface Processor End)



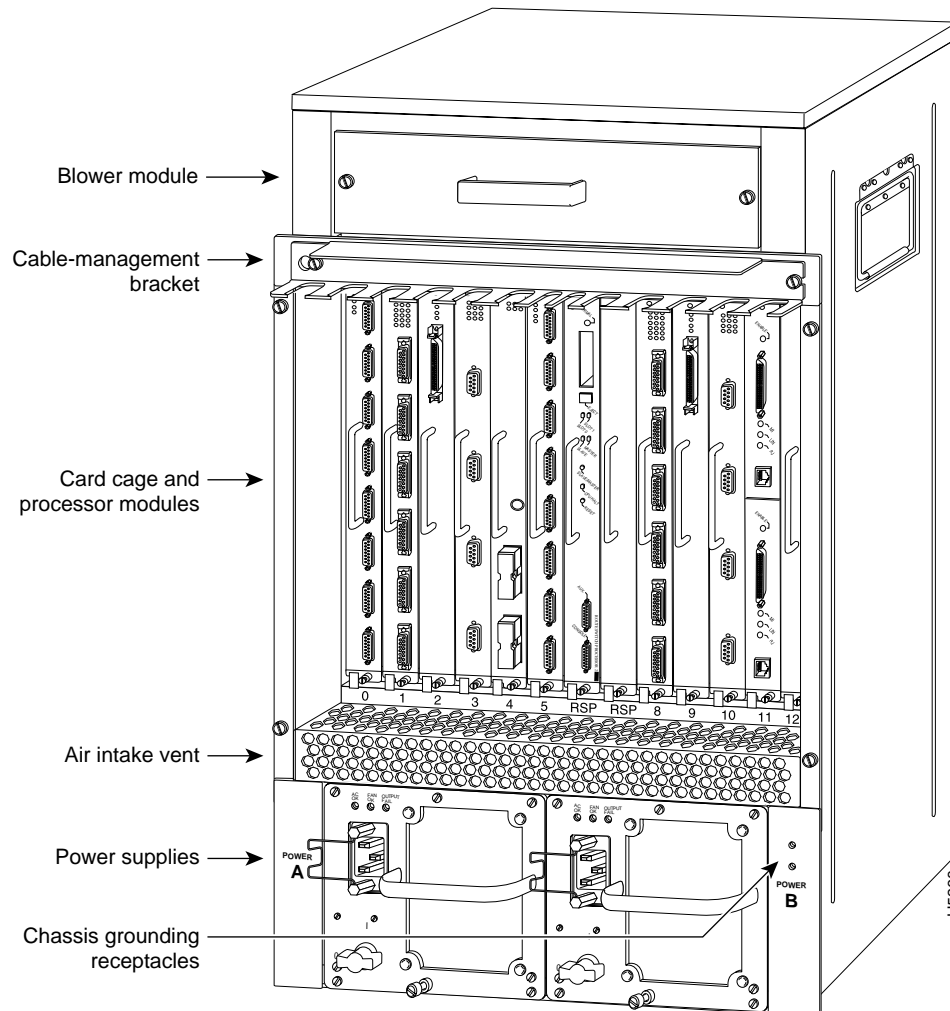
In a Cisco 7507 and Cisco 7507-MX, access to the RSP2, RSP4, or RSP8 is from the rear. Slots 2 and 3, called the *RSP* slots, are reserved for the RSP2, RSP4, or RSP8 cards. (See [Figure 6](#).)

Figure 6 Cisco 7507 and Cisco 7507-MX (Interface Processor End)



In a Cisco 7513, Cisco 7513-MX, and Cisco 7576, access to the RSP2, RSP4, or RSP8 is from the rear. (See [Figure 7](#).) Slots 6 and 7, called the *RSP* slots, are reserved for the RSP2, RSP4, or RSP8 cards.

Figure 7 Cisco 7513, Cisco 7513-MX, and Cisco 7576 (Interface Processor End)



Installing and Removing a Flash Memory Card (RSP and RSP7000 Only)

The RSP has two PC Card slots—slot 0 and slot 1—into which you can install a Flash memory card. (In the following procedure, the term *RSP* refers to the RSP1, RSP2, RSP4, RSP8, and RSP7000. Specific differences are noted.)

In the Cisco 7010 and Cisco 7505, the orientation of the RSP is horizontal. PC Card slot 0 is on the bottom, and PC Card slot 1 is on the top (see [Figure 8](#)).

In the Cisco 7000, Cisco 7507, Cisco 7507-MX, Cisco 7513, Cisco 7513-MX, or Cisco 7576, the orientation of the RSP is vertical. PC Card slot 0 is on the left, and PC Card slot 1 is on the right (see [Figure 9](#)).

In all RSPs, both PC Card slots can be used at the same time.



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

Use the following procedure to install and remove a Flash memory card in an RSP or RSP7000. The procedure is generic and can be used for a Flash memory card in either PC Card slot position.

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 PC Card slots) as shown in [Figure 8](#). In an RSP2, RSP4, or RSP8, the label should face right (in the direction of the arrow on the top of the PC Card slots) as shown in [Figure 9](#).



Note The Flash memory card is keyed and cannot be seated the wrong way. The ejector 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 ejector 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 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, RSP2, RSP4, or RSP8 in a Cisco 7505, or RSP7000 in a Cisco 7010)*

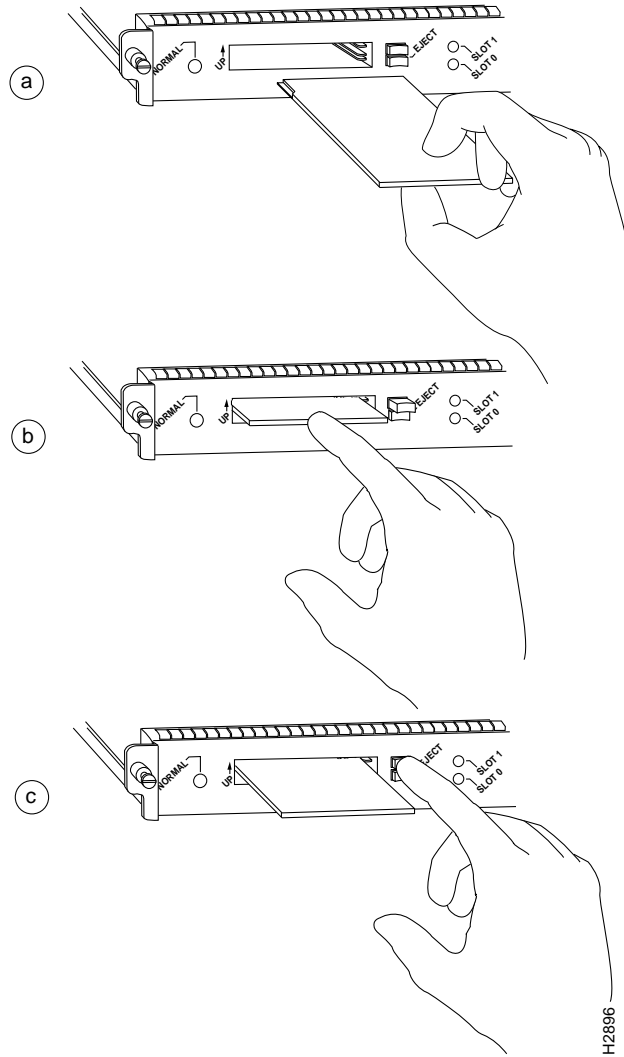
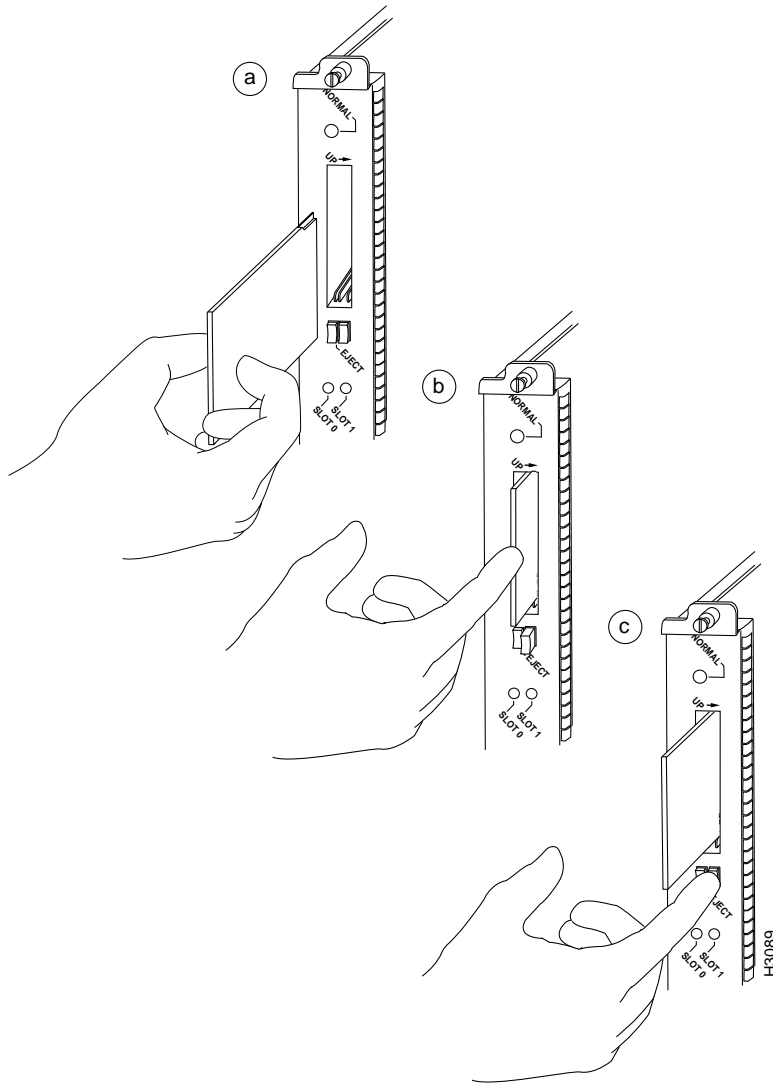


Figure 9 *Installing and Removing a Flash Memory Card (RSP2, RSP4, or RSP8 in a Cisco 7505, Cisco 7507, Cisco 7507-MX, Cisco 7513, Cisco 7513-MX, or Cisco 7576, or RSP7000 in a Cisco 7000)*



Formatting a Flash Memory Card (RSP and RSP7000 Only)

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 [“Flash Memory Card Compatibility and Software Prerequisites”](#) section on page 5, to determine if you need to reformat it first.



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 TFTP server or another Flash memory card *before* you format the card.

A Flash memory card that is shipped as part of a Cisco 7500 series system (or a Cisco 7000 or Cisco 7010 with an RSP7000) contains a Cisco IOS software image and does not require formatting to be used. A *spare* Flash memory card is shipped blank and must be formatted before use.



Note The RSP8 also uses Flash Disks. The RSP16 uses only Flash Disks and does not use memory cards. For information on Flash Disks, see the [Using the Flash Disk](#) document.

Use the following procedure to format a new Flash memory card in an RSP or RSP7000 (the procedure assumes you have already booted your router).

Step 1 Using the procedures in the “[Installing and Removing a Flash Memory Card \(RSP and RSP7000 Only\)](#),” section, insert the Flash memory card into slot 0. (If slot 0 is not available, use slot 1.)

Step 2 Use the **format slot0:** (or **format slot1:**) command to format the Flash memory card, as follows. (The volume name MyNewCard is used as an example only.)

```
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, for 20-MB Flash memory cards, the system counts backwards from 160 to 1, and for 32-MB Flash memory cards, the system counts backwards from 256 to 1.

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



Note For additional command descriptions and configuration information, refer to the appropriate configuration publications listed in the “[Related Documentation](#)” section on page 3.

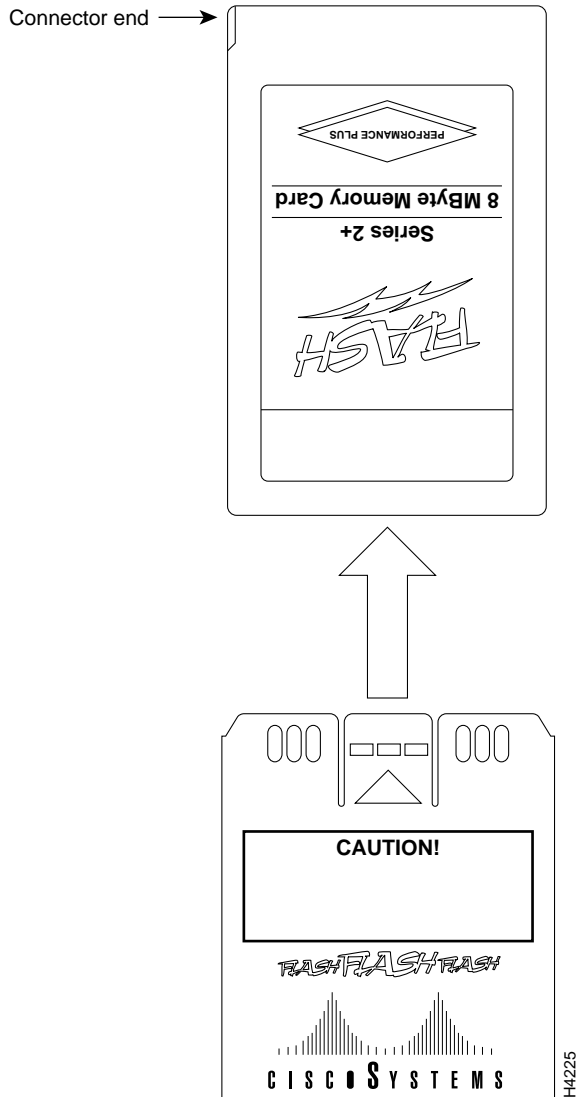
Installing and Removing a Flash Memory Card (RP Only)

The RP has one PC Card slot into which you can install a Flash memory card. (See [Figure 11](#) and [Figure 12](#).) The Flash memory card can be inserted and removed with the power on. All RP-specific cards must have a metal sleeve installed. This metal sleeve is shipped with all MEM-RP-FLC8M= and MEM-RP-FLC16M= (RP-specific) Flash memory cards. If you need a replacement metal sleeve, consult the Technical Assistance Center (TAC) as described on the last page of this document.

Use the following procedure to install and remove a Flash memory card in an RP:

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](#).)

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 PC Card 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 close to the processors faceplate 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-shielded bag.

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

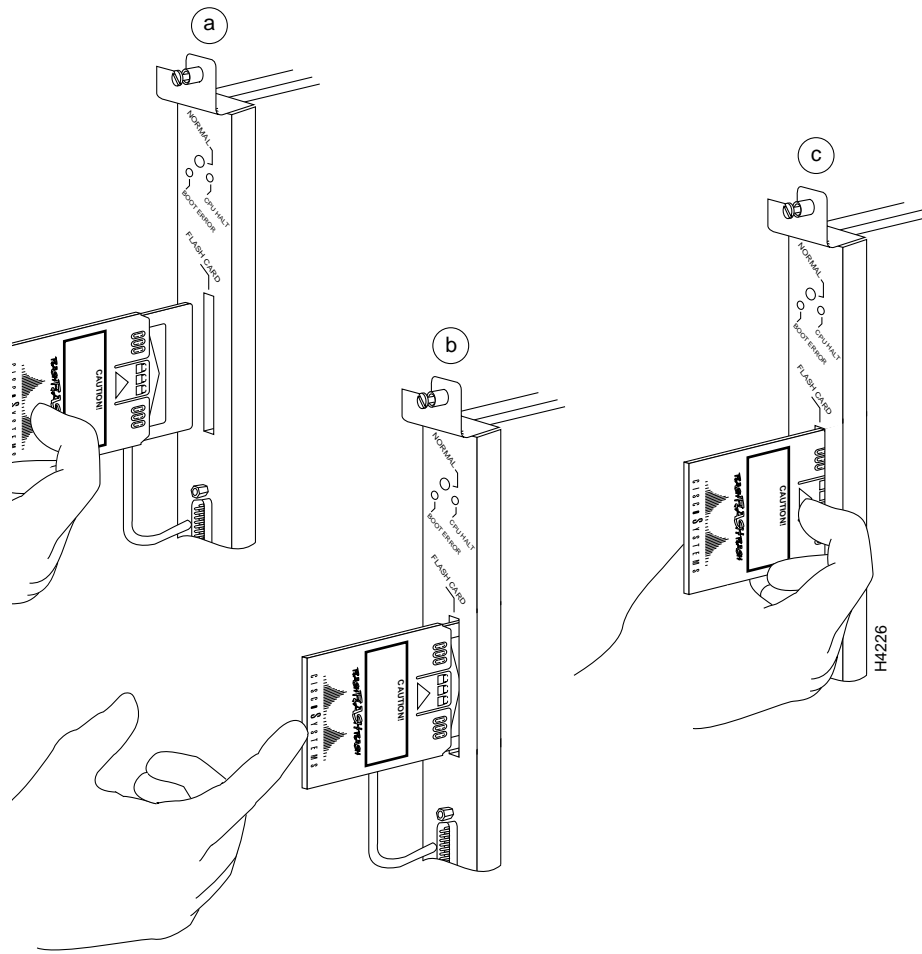
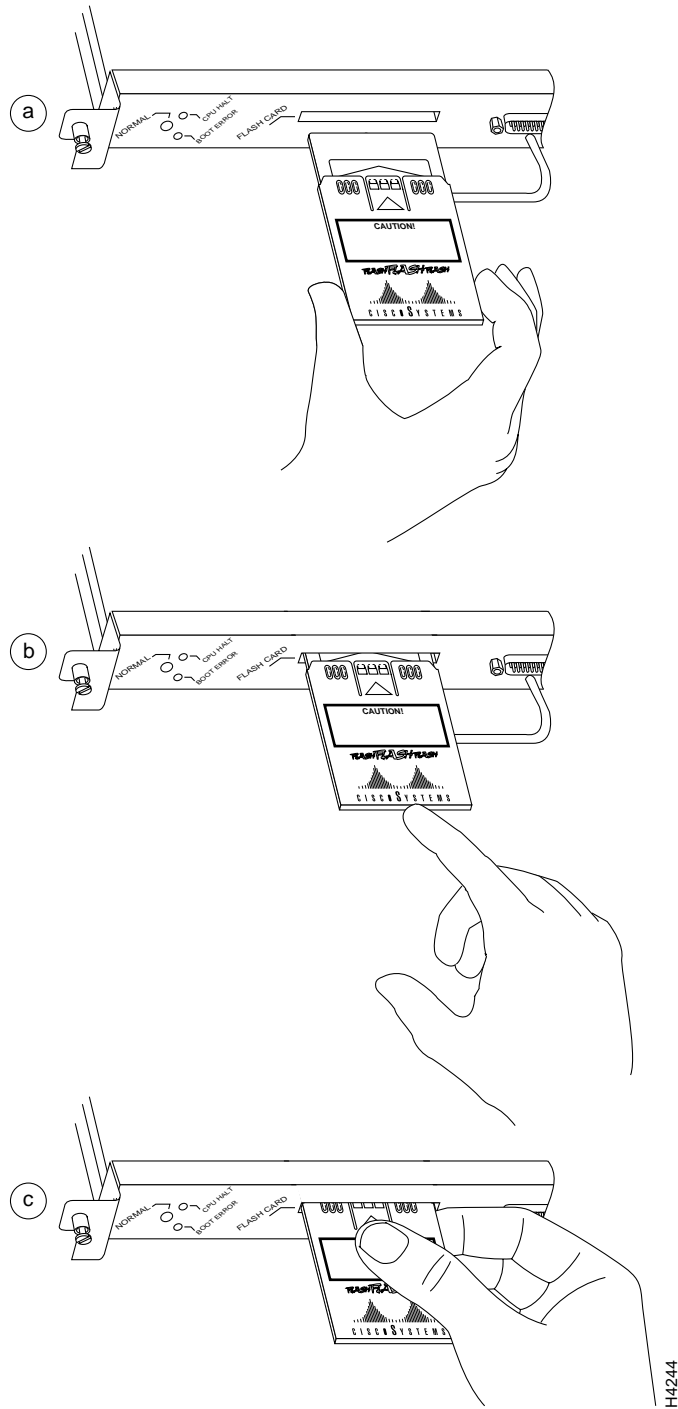


Figure 12 Installing and Removing a Flash Memory Card (RP in a Cisco 7010)



Formatting a Flash Memory Card (RP Only)

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 router 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 in an RP (the procedure assumes you have already booted your router).

Step 1 Using the procedures in the “[Installing and Removing a Flash Memory Card \(RP Only\)](#),” section, insert the Flash memory card into the PC Card slot.

Step 2 Use the **format slot0:** command to format the Flash memory card, as follows. (The volume name MyNewCard is used as an example only.)

```
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 32-MB Flash memory cards, the system counts backwards from 256 to 1.

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



Note

For additional command descriptions and configuration information, refer to the appropriate configuration publications listed in the “[Related Documentation](#)” section on page 3.

Copying an Image to a Flash Memory Card (RP, RSP, and RSP7000)

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

- 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. To assure access to a TFTP server, 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 additional command descriptions and configuration information, refer to the appropriate configuration publications listed in the [“Related Documentation” section on page 3.](#))
- You know the filename of the image you want to copy into the Flash memory card.

Use the following procedure to copy a file (called *new.image*) to a 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 Cisco 7000 series or Cisco 7500 series router, format it using the procedure in the [“Formatting a Flash Memory Card \(RP Only\)” section on page 21,](#) or in the [“Formatting a Flash Memory Card \(RP Only\)” section on page 21,](#) as appropriate.
- 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]
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cccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
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 a Flash Memory Card Image Bootable (RP, RSP, and RSP7000)

After you copy an image to the Flash memory card, use the following series of commands to make the image (the file named *new.image*) bootable. Note that the **config-register** command is part of the sequence because the configuration register must be set to 0x2102 to enable loading an image from Flash memory.

```
Router# config terminal
Router(config)# no boot system
Router(config)# boot system flash slot0:new.image
Router(config)# config-register 0x2102
Ctrl-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 **boot** commands, refer to the “[Enabling Booting from Flash Memory \(RSP and RSP7000 only\)](#)” section on page 24, or the “[Enabling Booting from Flash Memory \(RP Only\)](#)” section on page 25.

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

Copy the new image from the new Flash memory card to 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 antistatic bag and store it in a safe place), and 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.

Use the following procedure to copy bootable images between Flash memory cards:

- Step 1** Boot the router. By default, the file *image.boot* is 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 now 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
Ctrl-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 (RSP and RSP7000 only)

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:—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 first 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

Enter configuration mode and specify a Flash memory filename in the PC Card slot from which to boot by using the **configure terminal** command, as follows:

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

Disable Break and enable the **boot system flash slot0:** command using the **config-register** command. Use the value shown in the following example:

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

To exit configuration mode, enter Ctrl-Z as follows:

```
Ctrl-z
Router#
```

Save the new configuration to memory using 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** key, which influences the way the router interprets the command. For example, notice the difference in the following commands: 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.

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



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

Enabling Booting from Flash Memory (RP Only)

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 PC Card slot (slot 0)

boot system flash flash:hisfile —Boots the first file named “hisfile” on onboard Flash memory

boot system flash slot0:myfile —Boots the file named “myfile” on the Flash memory card in the PC Card slot (slot 0)

To enter configuration mode and specify a Flash memory filename in the PC Card 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 Ctrl-Z as follows:
Ctrl-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** key, which influences the way the router interprets the command. For example, notice the difference in the following commands: 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.

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

Copying an Image to Flash Memory (RSP and RSP7000 Only)

You might need to copy an image to Flash memory whenever a new Cisco IOS software image or Cisco IOS software 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 two Flash memory cards in PC Card slot 0 or slot 1.

RSP-Specific Flash Memory Commands (RSP and RSP7000 Only)

This section provides additional commands related to the Flash memory in the single in-line memory module (SIMM) on the RSP or RSP7000 (called *bootflash*) and in PC Card cards. (The RP does not have an onboard bootflash device.) The following example assumes you have Flash memory cards in PC Card slots 0 and 1.

You can determine which PC Card 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 that 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 in case of a 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 (RP, RSP, and RSP7000)

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 consistently fails at a particular block location. The only way to recover from locked blocks is by reformatting the Flash memory card with the **format** command. (For additional command descriptions and configuration information, refer to the appropriate configuration publications listed in the “[Related Documentation](#)” section on page 3.)



Caution

Formatting a Flash memory card to recover from locked blocks causes existing data to be lost.

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation at this URL:

<http://www.cisco.com/univercd/home/home.htm>

You can access the Cisco website at this URL:

<http://www.cisco.com>

You can access international Cisco websites at this URL:

http://www.cisco.com/public/countries_languages.shtml

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You can find instructions for ordering documentation at this URL:

http://www.cisco.com/univercd/cc/td/doc/es_inpk/pdi.htm

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San Jose, CA 95134-9883

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<http://tools.cisco.com/RPF/register/register.do>

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool automatically provides recommended solutions. If your issue is not resolved using the recommended resources, your service request will be assigned to a Cisco TAC engineer. The TAC Service Request Tool is located at this URL:

<http://www.cisco.com/techsupport/servicerequest>

For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco TAC engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)

EMEA: +32 2 704 55 55

USA: 1 800 553 2447

For a complete list of Cisco TAC contacts, go to this URL:

<http://www.cisco.com/techsupport/contacts>

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—Your network is “down,” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

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<http://www.cisco.com/ipj>

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