



Installing the Software

This chapter describes how to upgrade Cisco IOS images, use ROM Monitor, upgrade Field Programmable units, and the licensing packages supported on Cisco ISR 900 Series routers. This chapter includes the following sections:

- [ROM Monitor, page 5](#)
- [Upgrading ROMMON using Capsule Upgrade, page 10](#)
- [Upgrading the Cisco IOS Software, page 11](#)
- [Licensing, page 21](#)

ROM Monitor

The ROM monitor firmware runs when the router is powered up or reset. The firmware helps to initialize the processor hardware and boot the operating system software. You can use the ROM monitor to perform certain configuration tasks, such as recovering a lost password or downloading Cisco IOS software.

Before using the ROM monitor, you should understand the following concepts:

- [ROM Monitor Mode Command Prompt, page 5](#)
- [Why is the Router in ROM Monitor Mode?, page 5](#)
- [When do I use ROM Monitor?, page 6](#)
- [Tips for Using ROM Monitor Commands, page 6](#)

ROM Monitor Mode Command Prompt

The ROM monitor uses the `rommon x >` command prompt. The `x` variable begins at 1 and increments each time you press **Return** or **Enter** in ROM monitor mode.

Why is the Router in ROM Monitor Mode?

The router boots to ROM monitor mode when one of the following occurs:

- During power up or reload, the router did not find a valid system image.

- The last digit of the boot field in the configuration register is 0 (for example, 0x100 or 0x0).
- The **Ctrl+C** is entered during the first 60 seconds after reloading the router.

To exit ROM monitor mode, see the [“Exiting ROM Monitor Mode”](#) section on page 2-10.

When do I use ROM Monitor?

Use ROM monitor in the following situations:

- Manually loading a system image—You can load a system image without configuring the router to load that image in future system reloads or power-cycles. This can be useful for testing a new system image or for troubleshooting. See the [“Modifying the Configuration Register \(confreg\)”](#) section on page 2-8.
- Upgrading the system image when there are no TFTP servers or network connections, and a direct PC connection to the router console is the only viable option—See information about upgrading the system image in the configuration documentation for your router.
- During troubleshooting if the router crashes and hangs—See the [“Exiting ROM Monitor Mode”](#) section on page 2-10.
- Disaster recovery—Use the following method for recovering the system image or configuration file:
 - TFTP download (**tftpdnld**)—Use this method if you can connect a TFTP server directly to the fixed WAN port on your router. See the [“Exiting ROM Monitor Mode”](#) section on page 2-10.



Note

Recovering the system image is different from upgrading the system image. You need to recover the system image if it becomes corrupt or if it is deleted because of a disaster that affects the memory device severely enough to require deleting all data on the memory device in order to load a system image.

Tips for Using ROM Monitor Commands

- ROM monitor commands are case sensitive.
- You can halt any ROM monitor command by entering the **Ctrl+C** on the PC or terminal.
- To find out which commands are available on your router and to display command syntax options, see the [“Modifying the Configuration Register \(confreg\)”](#) section on page 2-8.

How to Use the ROM Monitor—Typical Tasks

This section provides the following procedures:

- [Entering ROM Monitor Mode, page 7](#)
- [Modifying the Configuration Register \(confreg\), page 8](#)
- [Obtaining Information on USB Flash Devices, page 9](#)
- [Exiting ROM Monitor Mode, page 10](#)

- If you use the Break key sequence to enter ROM monitor mode when the router would otherwise have booted the system image, you can exit ROM monitor mode by entering the **i** or **reset** command, which restarts the booting process and loads the system image.

Setting the Configuration Register to Boot to ROM Monitor Mode

This section describes how to enter ROM monitor mode by setting the configuration register to boot to ROM monitor mode at the next system reload or power-cycle.



Caution

Do not set the configuration register by using the **config-register 0x0** command after you have set the baud rate. To set the configuration register without affecting the baud rate, use the current configuration register setting by entering the **show ver | inc configuration** command, and then replacing the last (rightmost) number with a 0 in the configuration register command.

This example shows how to set the configuration register to boot to ROM monitor mode:

```
Router>
Router> enable
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# config-register 0x0
Router(config)# exit
Router#
*Sep 14 08:56:31.265: %SYS-5-CONFIG_I: Configured from console by console
Router#write memory
Building configuration...
[OK] [OK]
Router#
*Sep 14 08:56:41.715: %SYS-2-PRIVCFG_ENCRYPT: Successfully encrypted private config file
Router#reload
Proceed with reload? [confirm]

*Sep 14 08:56:47.531: %SYS-5-RELOAD: Reload requested by console. Reload Reason: Reload
Command.
System Bootstrap, Version 15.8(3r)M0b, RELEASE SOFTWARE (fc1)
Copyright (c) 2018 by cisco Systems, Inc.
Compiled Mon 03-Sep-2018 9:01:14.57

C931-4P platform with 1048576 Kbytes of main memory

System Integrity Status: 0x00000000
Current image running: Upgrade
Last reset cause: Software initiated

Rom image verified correctly
```

What to Do Next

Proceed to the [“Modifying the Configuration Register \(confreg\)”](#) section on page 2-8.

Modifying the Configuration Register (confreg)

This section describes how to modify the configuration register by using the **confreg** ROM monitor command. You can also modify the configuration register setting from the Cisco IOS command-line interface (CLI) by using the **config-register** command in global configuration mode.

**Caution**

Do not set the configuration register by using the **config-register 0x0** command after setting the baud rate. To set the configuration register without affecting the baud rate, use the current configuration register setting by entering the **show ver | inc configuration** command and then replacing the last (rightmost) number with a 0 in the configuration register command.

**Note**

The modified configuration register value is automatically written into NVRAM, but the new value does not take effect until you reset or power-cycle the router.

In this example, the configuration register is set to boot the system image from flash memory:

```
rommon 3 > confreg 0x2102
```

In this example, no value is entered; therefore, the system prompts for each bit in the register:

```
rommon 3> confreg

Configuration Summary
(Virtual Configuration Register: 0x100)
enabled are:
[ 0 ] console baud: 9600
boot:..... the ROM Monitor
do you wish to change the configuration? y/n [n]: y
enable "diagnostic mode"? y/n [n]: n
enable "break/abort has effect"? y/n [n]: n
enable "ignore system config info"? y/n [n]: n
change console baud rate? y/n [n]: n
change the boot characteristics? y/n [n]: y
0 = the ROM Monitor
1-15 = boot system
enter boot option [0]: 3
```

Obtaining Information on USB Flash Devices

This example shows how to display the contents of the USB flash device, including directories, files, permissions, and sizes:

```
rommon 3 > dir usbflash0:
```

```
Size      Attributes Name
-----
8192      drw-      System Volume Information
60865852  -rw-      c900-ãuniversalk9_npe-mz.SPA.158-3.M0b
-----
```

This example shows the targeted USB flash devices that are inserted in the router and the valid device names that may or may not be currently inserted:

```
rommon 2 > dev

Devices in device table:
id name
tftp: network via tftp
```

```
flash: Internal flash drive
usbflash0: External USB drive 0
```

Exiting ROM Monitor Mode

This section describes how to exit ROM monitor mode and enter the Cisco IOS command-line interface (CLI). The method that you use to exit ROM monitor mode depends on how your router entered ROM monitor mode:

- If you reload the router and enter the Break key sequence to enter ROM monitor mode when the router would otherwise have booted the system image, you can exit ROM monitor mode by entering **i** command or the **reset** command, which restarts the booting process and loads the system image.
- If your router entered ROM monitor mode because it could not locate and load the system image, perform the steps in the following procedure.

	Command or Action	Purpose
Step 1	dir flash: <i>[directory]</i> Example: rommon > dir flash:	Displays a list of the files and directories in flash memory. <ul style="list-style-type: none"> • Locate the system image that you want the router to load. • If the system image is not in flash memory, use the second or third option in Step 2.
Step 2	boot flash: <i>[directory]</i> <i>[filename]</i> or boot <i>filename</i> <i>tftpserver</i> or boot <i>[filename]</i> Example: ROMMON > boot flash:myimage Example: ROMMON > boot someimage 172.16.30.40 Example: ROMMON > boot	In order, the examples here direct the router to: <ul style="list-style-type: none"> • Boot the first image or a specified image in flash memory. • Boot the specified image over the network from the specified TFTP server (hostname or IP address). • Boot from the boot helper image because it does not recognize the device ID. This form of the command is used to netboot a specified image. You can override the default boot helper image setting by setting the BOOTLDR Monitor environment variable to point to another image. Any system image can be used for this purpose. Note Options to the boot command are -x (load image but do not execute) and -v (verbose).

Upgrading ROMMON using Capsule Upgrade

You can upgrade ROMMON using capsule upgrade. This example shows how to upgrade ROMMON using Capsule Upgrade:

```
router# > upgrade rom-monitor file flash:c900-CapsuleUpdateFile.15.8-3rM0b
```



Note

Before you upgrade, make sure that you have the Capsule image 'c900-CapsuleUpdateFile.15.8-3rM0b' in the router flash.

Use the **showmon -v** command to verify the ROMMON version. This example shows the command output:

```
rommon 1 > showmon -v

System Bootstrap, Version 15.8(3r)M0b, RELEASE SOFTWARE (fc1)
Copyright (c) 2018 by cisco Systems, Inc.
Compiled Mon 03-Sep-2018 9:01:14.57
```

Upgrading the Cisco IOS Software

Your router comes pre-installed with the Cisco IOS image. However, you can install the new version in order to keep router features up to date. This section describes how to upgrade the Cisco Internet Operating System (IOS) software image on a Cisco 900 series ISR.

- [Information About Upgrading the System Image, page 11](#)
- [How to Upgrade the Cisco IOS Image, page 12](#)

Information About Upgrading the System Image

To upgrade the system image on your router, review the following sections:

- [Why Would I Upgrade the System Image?, page 11](#)
- [Which Cisco IOS Release Is Running on My Router Now?, page 11](#)
- [How Do I Choose the New Cisco IOS Release and Feature Set?, page 11](#)
- [Where Do I Download the System Image?, page 12](#)

Why Would I Upgrade the System Image?

System images contain the Cisco IOS software. Your router was shipped with an image installed. At some point, you may want to load a different image onto the router or the access point. For example, you may want to upgrade your IOS software to the latest release, or you may want to use the same Cisco IOS release for all the routers in a network. Each system image contains different sets of Cisco IOS features, therefore select an appropriate system image to suit your network requirements.

Which Cisco IOS Release Is Running on My Router Now?

To determine the Cisco IOS release that is currently running on your router, and the filename of the system image, enter the **show version** command in user EXEC or privileged EXEC mode.

How Do I Choose the New Cisco IOS Release and Feature Set?

To determine which Cisco IOS releases and feature are supported on your platform, go to Cisco Feature Navigator at <http://www.cisco.com/go/cfn>. You must have an account at Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

Where Do I Download the System Image?

To download a system image you must have an account at Cisco.com to gain access to the following websites. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box, and follow the instructions that appear.

If you know the Cisco IOS release and feature set you want to download, go directly to

<https://software.cisco.com/download/home>

For more information about [Loading and Managing System](#) images, go to

<https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/fundamentals/configuration/15mt/fundamentals-15-mt-book/cf-config-overview.html>

How to Upgrade the Cisco IOS Image

This section provides information about upgrading the Cisco IOS image on the router.

- [Saving Backup Copies of Your Old System Image and Configuration, page 12](#)
- [Copying the System Image into Flash Memory, page 13](#)
- [Loading the New System Image, page 16](#)
- [Saving Backup Copies of Your New System Image and Configuration, page 19](#)

Saving Backup Copies of Your Old System Image and Configuration

To avoid unexpected downtime in the event you encounter serious problems using a new system image or startup configuration, we recommend that you save backup copies of your current startup configuration file and Cisco IOS software system image file on a server.

The following examples show how to copy a startup configuration to a TFTP server and how to copy from flash memory to an FTP server.

Copying the Startup Configuration to a TFTP Server: Example

The following example shows the startup configuration being copied to a TFTP server:

```
Router# copy nvram:startup-config tftp:
Remote host []? 192.0.0.1
Name of configuration file to write [rtr2-config]? rtr2-config-b4upgrade
Write file rtr2-config-b4upgrade on host 192.0.0.1?[confirm] <cr>
! [OK]
```

Copying from Flash Memory to a TFTP Server: Example

The following example uses the **dir flash:** command in privileged EXEC mode to learn the name of the system image file and the **copy flash: tftp:** command in privileged EXEC mode to copy the system image to a TFTP server. The router uses the default username and password.

```
Router# copy flash: tftp:
Source filename [running-config]?
Address or name of remote host []? 192.0.0.1
Destination filename [router-config]? running-config
983 bytes copied in 0.048 secs (20479 bytes/sec)
```

```

Router#
Router# dir flash:
Directory of flash:/

   1  -rw-     64383100  Sep 17 2018 05:58:14 +00:00  c900-universalk9-mz.SSA_09-10
   2  -rw-         1524  Sep 17 2018 05:55:30 +00:00  c900_startupconfig-backup
   3  -rw-          919  Sep 17 2018 05:58:44 +00:00  PSZ22241BW6_20180906052515287.zip

1936031744 bytes total (1871634432 bytes free)
Router#

```

Copying the System Image into Flash Memory

This section describes how to copy the system image into the flash memory card for your router.



Note

The router should have sufficient disk or flash memory to store the Cisco IOS. The router should also have sufficient memory (DRAM) to run the Cisco IOS. If the router does not have sufficient memory (DRAM), the router will have boot problems when it boots through the new Cisco IOS.

To copy the system image into the flash memory card for your router, choose one of the following methods:

- [Entering ROM Monitor Mode, page 7](#)
- [Using the ROM Monitor to Copy the System Image over a Network, page 14](#)
- [Loading the New System Image, page 16](#)

Using TFTP or Remote Copy Protocol to Copy the System Image into Flash Memory

This section describes how to use TFTP or Remote Copy Protocol (RCP) to upgrade the system image. This is the recommended and most common method of upgrading the system image.

Prerequisites

The following details the logistics of upgrading the system image.

- Install a TFTP server or an RCP server application on a TCP/IP-ready workstation or PC. Many third-party vendors provide free TFTP server software, which you can find by searching for “TFTP server” in a web search engine.

If you use TFTP:

- Configure the TFTP application to operate as a TFTP *server*, not a TFTP *client*.
- Specify the outbound file directory to which you will download and store the system image.
- Download the new Cisco IOS software image into the workstation or PC. See the [“Where Do I Download the System Image?” section on page 2-12](#).
- Establish a console session to the router. We recommend that you connect your PC directly to the router console port. See the hardware installation guide for your router.
- Verify that the TFTP or RCP server has IP connectivity to the router. If you cannot successfully ping between the TFTP or RCP server and the router, do one of the following:
 - Configure a default gateway on the router.
 - Make sure that the server and the router each have an IP address in the same network or subnet.

**Tip**

For more detailed information on how to perform the prerequisites, see the [Software Installation and Upgrade Procedure](#) tech note.

To copy the system image into the flash memory card for your router, follow these steps:

Step 1 enable

Use this command to enter privileged EXEC mode. Enter your password if prompted:

```
Router> enable
Password: <password>
Router#
```

Step 2 copy tftp: flash:

or

copy rcp flash

Use one of these commands to copy a file from a server to flash memory:

```
Router# copy tftp: flash:
```

Step 3 When prompted, enter the IP address of the TFTP or RCP server:

```
Address or name of remote host []? 10.10.10.2
```

Step 4 When prompted, enter the filename of the Cisco IOS software image to be installed:

```
Source filename []? c900-universalk9-mz.bin
```



Note The filename is case sensitive.

Step 5 When prompted, enter the filename as you want it to appear on the router. Typically, the same filename is entered as was used in [Step 4](#):

```
Destination filename []? c900-universalk9-mz.bin
```

Step 6 If an error message appears that says, “Not enough space on device”, delete files from flash and try again. To delete files from flash, use the **delete flash: filename** command.**Step 7** If the error message does not appear, enter **no** when prompted to erase the flash memory before copying:

```
Accessing tftp://10.10.10.2/c900-universalk9-mz.bin...
Erase flash: before copying? [confirm] no
```

What to Do Next

Proceed to the [“Loading the New System Image”](#) section on page 2-16.

Using the ROM Monitor to Copy the System Image over a Network

This section describes how to download a Cisco IOS software image from a remote TFTP server to the router flash memory by using the **tftpdnld** ROM monitor command.

Before you can enter the **tftpdnld** ROM monitor command, you must set the ROM monitor environment variables.

Prerequisites

Connect the TFTP server to a fixed network port on your router.



Note

You can use the **tftpdnld** command only to download files to the router. You cannot use **tftpdnld** to get files from the router.

To download a Cisco IOS software image from a remote TFTP server to the router flash memory by using the **tftpdnld** ROM monitor command, follow these steps:

-
- Step 1** Enter ROM monitor mode.
- Step 2** Set the IP address of the router. For example:
- ```
rommon > IP_ADDRESS=172.16.23.32
```
- Step 3** Set the IP subnet mask. For example:
- ```
rommon > IP_SUBNET_MASK=255.255.255.224
```
- Step 4** Set the default gateway address. For example:
- ```
rommon > DEFAULT_GATEWAY=172.16.23.40
```
- Step 5** Set the TFTP server IP address, which is the location from which the software will be downloaded:
- ```
rommon > TFTP_SERVER=172.16.23.33
```
- Step 6** Set the name and directory location to which the image file will be downloaded onto the router. For example:
- ```
rommon > TFTP_FILE=archive/rel22/<image name>
```
- Step 7** (Optional) Set the input port to use a Gigabit Ethernet port. Usage is `GE_PORT=[0 | 1 | 2]`. For example:
- ```
rommon > GE_PORT=0
```
- Step 8** Use the **set** command to display the ROM monitor environment variables to verify that you have configured them correctly. For example:
- ```
rommon > set
```
- Step 9** Download the system image, as specified by the ROM monitor environmental variables, using the **tftpdnld [-r]** command. Without the **-r** option, the command downloads the specified image and saves it in flash memory. Using the **-r** option downloads and boots the new software but does not save the software to flash memory.
- ```
rommon 5 > tftpdnld -r
Attempting to boot from [tftp:]
```
-

What to Do Next

Proceed to the [“Loading the New System Image”](#) section on page 2-16.

Loading the New System Image

This section describes how to load the new system image that you copied into flash memory. First, determine whether you are in ROM monitor mode or in the Cisco IOS CLI, then choose one of the following methods of loading the new system image:

- [Loading the New System Image from the Cisco IOS Software, page 16](#)
- [Loading the New System Image from ROM Monitor Mode, page 18](#)

Loading the New System Image from the Cisco IOS Software

To load the new system image from the Cisco IOS software, follow these steps.

Step 1 **dir flash:**

Use this command to display a list of all files and directories in flash memory:

```
Router# dir flash:

Directory of flash:/

   1  -rw-     64383100  Sep 17 2018 05:58:14 +00:00  c900-universalk9-mz.SSA_09-10
   2  -rw-         1524  Sep 17 2018 05:55:30 +00:00  c900_startupconfig-backup
   3  -rw-          919  Sep 17 2018 05:58:44 +00:00  PSZ22241BW6_20180906052515287.zip

1936031744 bytes total (1871634432 bytes free)
Router#
```



Note Determine whether the new system image is the first file or the only file listed in the **dir flash:** command output (is not required if it is the first file or only file listed).

Step 2 **configure terminal**

Use this command to enter global configuration mode:

```
Router# configure terminal

Router(config)#
```

Step 3 **no boot system**

Use this command to delete all entries in the bootable image list, which specifies the order in which the router attempts to load the system images at the next system reload or power cycle:

```
Router(config)# no boot system
```

Step 4 If the new system image is the first file or the only file displayed in the **dir flash:** command output, you do not need to perform the following step.

boot system flash:*system-image-filename*

Use this command to load the new system image after the next system reload or power cycle. For example:

```
Router(config)# boot system flash:c900-universalk9-mz.bin
```

Step 5 (Optional) Repeat to specify the order in which the router should attempt to load any backup system images.

Step 6 **exit**

Use this command to exit global configuration mode:

```
Router(config)# exit  
Router#
```

Step 7 show version

Use this command to display the configuration register setting:

```
Router# show version  
  
Cisco Internetwork Operating System Software  
.  
.  
.  
Configuration register is 0x0  
  
Router#
```

Step 8 If the last digit in the configuration register is 0 or 1, proceed to [Step 9](#). However, if the last digit in the configuration register is between 2 and F, proceed to [Step 12](#).

Step 9 configure terminal

Use this command to enter global configuration mode:

```
Router# configure terminal  
  
Router(config)#
```

Step 10 config-register 0x2102

Use this command to set the configuration register so that, after the next system reload or power cycle, the router loads a system image from the **boot system** commands in the startup configuration file:

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

Step 11 exit

Use this command to exit global configuration mode:

```
Router(config)# exit  
Router#
```

Step 12 copy run start

Use this command to copy the running configuration to the startup configuration:

```
Router# copy run start
```

Step 13 reload

Use this command to reload the operating system:

```
Router# reload
```

Step 14 When prompted to save the system configuration, enter **no**:

```
System configuration has been modified. Save? [yes/no]: no
```

Step 15 When prompted to confirm the reload, enter **y**:

```
Proceed with reload? [confirm] y
```

Step 16 show version

Use this command to verify that the router loaded the proper system image:

```
Router# show version
```

```

00:22:25: %SYS-5-CONFIG_I: Configured from console by console
Cisco Internetwork Operating System Software
.
.
.
System returned to ROM by reload
System image file is "flash:c900-universalk9-mz.bin"

```

What to Do Next

Proceed to the [“Saving Backup Copies of Your New System Image and Configuration”](#) section on page 2-19.

Loading the New System Image from ROM Monitor Mode

To load the new system image from ROM monitor mode, follow these steps:

Step 1 **dir flash:[partition-number:]**

Use this command to list files in flash memory:

```

rommon > dir flash:

program load complete, entry point: 0x4000000, size: 0x18fa0
Directory of flash:

 2      48296872  -rw-      c900-universalk9-mz.SPA

```

Note whether the new system image is the first file or the only file listed in the **dir flash:** command output.

Step 2 **confreg 0x2102**

Use this command to set the configuration register so that, after the next system reload or power cycle, the router loads a system image from the **boot system** commands in the startup configuration file:

```
rommon > confreg 0x2102
```

Step 3 **boot flash:[partition-number:]filename**

Use this command to force the router to load the new system image:

```
rommon > boot flash:c900-universalk9-mz.bin
```

Step 4 After the system loads the new system image, press **Return** a few times to display the Cisco IOS CLI prompt.

Step 5 **enable**

Use this command to enable privileged EXEC mode, and enter your password if prompted:

```

Router> enable
Password: <password>
Router#

```

Step 6 **configure terminal**

Use this command to enter global configuration mode:

```

Router# configure terminal
Router(config)#

```

Step 7 no boot system

Eliminate all entries in the bootable image list, which specifies the system image that the router loads at startup:

```
Router(config)# no boot system
```

Step 8 If the new system image is the first file or only the file displayed in the **dir flash:** command output, this step is not required.

boot system flash:*new-system-image-filename*

Use this command to load the new system image after the next system reload or power cycle:

```
Router(config)# boot system flash:c900-universalk9-mz.bin
```

Step 9 (Optional) Repeat to specify the order in which the router should attempt to load any backup system images.

Step 10 exit

Use this command to exit global configuration mode:

```
Router(config)# exit  
Router#
```

Step 11 copy run start

Use this command to copy the running configuration to the startup configuration:

```
Router# copy run start
```

What to Do Next

Proceed to the [“Saving Backup Copies of Your New System Image and Configuration”](#) section on page 2-19.

Saving Backup Copies of Your New System Image and Configuration

To aid file recovery and to minimize downtime in the event of file corruption, we recommend that you save backup copies of the startup configuration file and the Cisco IOS software system image file on a server.

**Tip**

Do not erase any existing backup copies of your configuration and system image that you saved before upgrading your system image. If you encounter serious problems using your new system image or startup configuration, you can quickly revert to the previous working configuration and system image.

For more detailed information, see the “Managing Configuration Files” chapter and the “Loading and Maintaining System Images” chapter of the *Cisco IOS Configuration Fundamentals Configuration Guide* at:

http://www.cisco.com/en/US/docs/ios/fundamentals/configuration/guide/12_4/cf_12_4_book.html.

To save backup copies of the startup configuration file and the system image file, complete the following steps.

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> Enter your password if prompted.
Step 2	copy nvram:startup-config {ftp: rcp: tftp:} Example: Router# copy nvram:startup-config ftp:	Copies the startup configuration file to a server. <ul style="list-style-type: none"> The configuration file copy serves as a backup copy. Enter the destination URL when prompted.
Step 3	dir flash: Example: Router# dir flash:	Displays the layout and contents of a flash memory file system. <ul style="list-style-type: none"> Write down the name of the system image file.
Step 4	copy flash: {ftp: rcp: tftp:} Example: Router# copy flash: ftp:	Copies a file from flash memory to a server. <ul style="list-style-type: none"> Copy the system image file to a server to serve as a backup copy. Enter the flash memory partition number if prompted. Enter the filename and destination URL when prompted.

Examples

Copying the Startup Configuration to a TFTP Server: Example

The following example shows the startup configuration being copied to a TFTP server:

```
Router# copy nvram:startup-config tftp:
Remote host[]? 172.16.101.101
Name of configuration file to write [rtr2-config]? <cr>
Write file rtr2-config on host 172.16.101.101?[confirm] <cr>
! [OK]
```

Copying from Flash Memory to a TFTP Server: Example

The following example uses the **dir flash:** privileged EXEC command to obtain the name of the system image file and the **copy flash: tftp:** privileged EXEC command to copy the system image to a TFTP server. The router uses the default username and password.

```
Router# dir flash:
System flash directory:
File Length Name/status
1 4137888 c920-mz
[4137952 bytes used, 12639264 available, 16777216 total]
16384K bytes of processor board System flash (Read/Write)\

Router# copy flash: tftp:
IP address of remote host [255.255.255.255]? 192.0.0.1
filename to write on tftp host? c920-universalk9-mz
writing c920-mz !!!!!...
successful ftp write.
```

Licensing

When you order a new router, it is shipped preinstalled with the software image and the corresponding licenses for the packages and features that you specified. You do not need to activate or register the software before use. You need a license if you are upgrading or installing a new Cisco IOS feature. For more information about the license type, technology package, and installation, see [Software Activation on Cisco Integrated Services Routers and Cisco Integrated Service Routers G2](#) guide.

