



Working with System Software Images

This chapter describes how to work with system software image files on the Catalyst 6000 family switches.



Note

For complete syntax and usage information for the commands used in this chapter, refer to the *Catalyst 6000 Family Command Reference* publication.

This chapter consists of these sections:

- Downloading System Software Images to the Switch Using TFTP, page 19-1
- Uploading System Software Images to a TFTP Server, page 19-8
- Downloading System Software Images Using rcp, page 19-9
- Uploading System Software Images to an rcp Server, page 19-14
- Downloading Software Images Over a Serial Connection on the Console Port, page 19-15
- Downloading a System Image Using Xmodem or Ymodem, page 19-21

Downloading System Software Images to the Switch Using TFTP

These sections describe how to download system software images to the switch supervisor engine and to intelligent modules:

- Understanding How TFTP Software Image Downloads Work, page 19-1
- Preparing to Download an Image Using TFTP, page 19-2
- Downloading Supervisor Engine Images Using TFTP, page 19-3
- Downloading Switching Module Images Using TFTP, page 19-4
- TFTP Download Procedures Example, page 19-4

Understanding How TFTP Software Image Downloads Work

You can download system software images to the switch using the Trivial File Transfer Protocol (TFTP). TFTP allows you to download system image files over the network from a TFTP server.

Some modules, such as ATM modules, have their own onboard Flash. When you download a software image file, the switch checks the header of the image file to determine the type of software image.

Depending on the type of software image you are downloading, one of the following occurs:

- Supervisor engine software image—The image file is downloaded to the supervisor engine Flash memory. You can store multiple image files on the Flash memory system devices (such as boot Flash and Flash PC cards).



Caution

Some supervisor engine software releases update the supervisor engine erasable programmable logic devices (EPLDs). The EPLDs can be updated only a limited number of times. You should avoid loading a new software release and then backing out unnecessarily. The supervisor engine software release notes indicate which software releases have code that updates the EPLDs.

- Intelligent module software images—If you specified a module number, the image file is downloaded to the specified module only (provided the image file is designed for the specified module type). If you do not specify a module number, the image file is downloaded to every module of the appropriate type. The file is relayed packet by packet to the appropriate modules using the Inter-Process Communications protocol internal to the system, with communication taking place across the switching bus. Downloading a software image to multiple modules significantly speeds up the process of updating the software on multiple modules of the same type.



Note

For more information on working with system software image files on the Flash file system, see Chapter 18, “Working With the Flash File System.”

Preparing to Download an Image Using TFTP

Before you begin downloading a software image using TFTP, make sure of the following:

- Ensure that the workstation acting as the TFTP server is configured properly. On a Sun workstation, make sure that the `/etc/inetd.conf` file contains the following line:

```
tftp dgram udp wait root /usr/etc/in.tftpd in.tftpd -p -s /tftpboot
```

Make sure that the `/etc/services` file contains this line:

```
tftp 69/udp
```



Note

You must restart the `inetd` daemon after modifying the `/etc/inetd.conf` and `/etc/services` files. To restart the daemon, either stop the `inetd` process and restart it, or enter a **fastboot** command (on the SunOS 4.x) or a **reboot** command (on Solaris 2.x or SunOS 5.x). Refer to the documentation for your workstation for more information on using the TFTP daemon.

- Ensure that the switch has a route to the TFTP server. The switch and the TFTP server must be in the same subnetwork if you do not have a router to route traffic between subnets. Check connectivity to the TFTP server using the **ping** command.
- Ensure that the software image to be downloaded is in the correct directory on the TFTP server (usually `/tftpboot` on a UNIX workstation).

- Ensure that the permissions on the file are set correctly. Permissions on the file should be world-read.
- A power interruption (or other problem) during the download procedure can corrupt the Flash code. If the Flash code is corrupted, you can connect to the switch through the console port and boot from an uncorrupted system image on a Flash PC card.

Downloading Supervisor Engine Images Using TFTP

**Note**

If you have a redundant supervisor engine, you cannot download a system image directly from a TFTP server to the Flash memory on the standby supervisor engine. When you download the image to the active supervisor engine, the standby supervisor engine synchronizes automatically with the new image. In addition, you cannot copy an image from the standby supervisor engine to the active supervisor engine.

Use the following procedure to download a supervisor engine software image to the switch from a TFTP server:

-
- Step 1** Copy the software image file to the appropriate TFTP directory on the workstation.
- Step 2** Log into the switch through the console port or through a Telnet session. If you log in using Telnet, your Telnet session disconnects when you reset the switch to run the new software.
- Step 3** Use the **copy tftp flash** command. When prompted, enter the IP address or host name of the TFTP server and the name of the file to download. On those platforms that support the Flash file system, you are also prompted for the Flash device to which to copy the file and the destination filename.

The switch downloads the image file from the TFTP server to the specified Flash device.

**Note**

The switch remains operational while the image downloads.

- Step 4** Modify the BOOT environment variable using the **set boot system flash device:filename prepend** command, so that the new image boots when you reset the switch. Specify the Flash device (*device:*) and the filename of the downloaded image (*filename*).
- Step 5** Reset the switch using the **reset system** command. If you are connected to the switch through Telnet, your Telnet session disconnects.
- During startup, the Flash memory on the supervisor engine is reprogrammed with the new Flash code.
- Step 6** When the switch reboots, enter the **show version** command to check the version of the code on the switch.

**Note**

For examples that show complete TFTP download procedures for the various supervisor engine and switch types, see the “TFTP Download Procedures Example” section on page 19-4.

Downloading Switching Module Images Using TFTP

Use this procedure to download a software image to an intelligent module:

-
- Step 1** Copy the software image file to the appropriate TFTP directory on the workstation.
- Step 2** Log into the switch through the console port or a Telnet session. If you log in using Telnet, your Telnet session might disconnect when you reset modules to run the new software.
- Step 3** If there is only one module of the type appropriate for the image, or if there are multiple modules of the same type and you want to update the image on all of them, use the **copy tftp flash** command. When prompted, enter the IP address or host name of the TFTP server, the name of the file to download, the Flash device to which to copy the file, and the destination filename.
- Step 4** If there are multiple modules of the type appropriate for the image but you only want to update a single module, use the **copy tftp m/bootflash:** command, where *m* is the number of the module to which to download the software image.



Note If you do not specify a module number, the switch examines the header of the image file to determine to which modules the software is downloaded. The image is then downloaded to all the modules of that type.

The switch downloads the image file, erases the Flash memory on the appropriate modules, and reprograms the Flash memory with the downloaded Flash code.



Note All modules in the switch remain operational while the image downloads.

- Step 5** Reset the appropriate modules using the **reset mod_num** command. If you are connected through Telnet, your Telnet session disconnects if you reset the module through which your connection was made.
- Step 6** When the upgraded modules come online, enter the **show version [mod_num]** command to check the version of the code on the switch.
-



Note For examples that show complete procedures for TFTP downloads to intelligent modules, see the “Single Module Image TFTP Download Example” section on page 19-6 and the “Multiple Module Image TFTP Download Example” section on page 19-7.

TFTP Download Procedures Example

These sections show example TFTP download procedures:

- Supervisor Image TFTP Download Example, page 19-5
- Single Module Image TFTP Download Example, page 19-6
- Multiple Module Image TFTP Download Example, page 19-7


```

Cafe Daughter Present.

EOBC link up

Boot image: bootflash:cat6000-sup.5-2-1-CSX.bin
Flash Size = 0x1000000, num_flash_sectors = 64
readCafe2Version: 0x00000001
RIn Local Test Mode, Pinnacle Synch Retries: 2
Running System Diagnostics from this Supervisor (Module 1)
This may take up to 2 minutes...please wait

Cisco Systems Console

Enter password:
07/21/1998,13:52:51:SYS-5:Module 1 is online
07/21/1998,13:53:11:SYS-5:Module 4 is online
07/21/1998,13:53:11:SYS-5:Module 5 is online
07/21/1998,13:53:14:PAGP-5:Port 1/1 joined bridge port 1/1.
07/21/1998,13:53:14:PAGP-5:Port 1/2 joined bridge port 1/2.
07/21/1998,13:53:40:SYS-5:Module 2 is online
07/21/1998,13:53:45:SYS-5:Module 3 is online

Console>

```

Single Module Image TFTP Download Example



Note

For a step-by-step procedure for downloading software images to intelligent modules, see the “Downloading Switching Module Images Using TFTP” section on page 19-4.

This example shows a complete TFTP download procedure of an ATM software image to a single ATM module:

```

Console> (enable) show version 4
Mod Port Model      Serial #  Versions
-----
4   1   WS-X6101   003414855  Hw : 1.2
                               Fw : 1.3
                               Sw : 3.2(6)

Console> (enable) copy tftp 4/flash
IP address or name of remote host []? 172.20.52.3
Name of file to copy from []? cat6000-atm.3-2-7.bin
Download image tftp:cat6000-atm.3-2-7.bin to Module 4 FLASH (y/n) [n]? y
This command will reset Download Module(s) you selected.

Do you wish to continue download flash (y/n) [n]? y
-
Download done for module 4, please wait for it to come online

File has been copied successfully.
Console> (enable) 07/21/1998,13:13:54:SYS-5:Module 4 is online

```

```

Console> (enable) show version 4
Mod Port Model      Serial #  Versions
-----
4   1   WS-X6101   003414855 Hw : 1.2
                                     Fw : 1.3
                                     Sw : 3.2(7)

Console> (enable)

```

Multiple Module Image TFTP Download Example



Note

For a step-by-step procedure for downloading software images to intelligent modules, see the “Downloading Switching Module Images Using TFTP” section on page 19-4.

This example shows a complete TFTP download procedure of an ATM software image to multiple ATM modules:

```

Console> (enable) show version 4
Mod Port Model      Serial #  Versions
-----
4   1   WS-X6101   003414855 Hw : 1.2
                                     Fw : 1.3
                                     Sw : 3.2(6)

Console> (enable) show version 5
Mod Port Model      Serial #  Versions
-----
5   1   WS-X6101   003414463 Hw : 1.2
                                     Fw : 1.3
                                     Sw : 3.2(6)

Console> (enable) copy tftp flash
IP address or name of remote host []? 172.20.52.3
Name of file to copy from []? cat6000-atm.3-2-7.bin
Download image tftp:cat6000-atm.3-2-7.bin to Module 4 FLASH (y/n) [n]? y
Download image tftp:cat6000-atm.3-2-7.bin to Module 5 FLASH (y/n) [n]? y
This command will reset Download Module(s) you selected.

Do you wish to continue download flash (y/n) [n]? y
-
Download done for module 4, please wait for it to come online

Download done for module 5, please wait for it to come online

File has been copied successfully.
Console> (enable) 07/21/1998,12:25:10:SYS-5:Module 4 is online
07/21/1998,12:25:10:SYS-5:Module 5 is online

Console> (enable) show version 4
Mod Port Model      Serial #  Versions
-----
4   1   WS-X6101   003414855 Hw : 1.2
                                     Fw : 1.3
                                     Sw : 3.2(7)

Console> (enable) show version 5
Mod Port Model      Serial #  Versions
-----
5   1   WS-X6101   003414463 Hw : 1.2
                                     Fw : 1.3
                                     Sw : 3.2(7)

Console> (enable)

```

Uploading System Software Images to a TFTP Server

These sections describe how to upload system software images from a switch to a TFTP server:

- Preparing to Upload an Image to a TFTP Server, page 19-8
- Uploading Software Images to a TFTP Server, page 19-8



Note

For more information on working with system software image files on the Flash file system, see Chapter 18, “Working With the Flash File System.”

Preparing to Upload an Image to a TFTP Server

Before you attempt to upload a software image to a TFTP server, do the following:

- Ensure that the workstation acting as the TFTP server is configured properly. On a Sun workstation, make sure that the `/etc/inetd.conf` file contains this line:

```
tftp dgram udp wait root /usr/etc/in.tftpd in.tftpd -p -s /tftpboot
```

Make sure that the `/etc/services` file contains this line:

```
tftp 69/udp
```



Note

You must restart the `inetd` daemon after modifying the `/etc/inetd.conf` and `/etc/services` files. To restart the daemon, either stop the `inetd` process and restart it, or enter a **fastboot** command (on the SunOS 4.x) or a **reboot** command (on Solaris 2.x or SunOS 5.x). Refer to the documentation for your workstation for more information on using the TFTP daemon.

- Ensure that the switch has a route to the TFTP server. The switch and the TFTP server must be in the same subnetwork if you do not have a router to route traffic between subnets. Check connectivity to the TFTP server using the **ping** command.
- You might need to create an empty file on the TFTP server before uploading the image. To create an empty file, enter the **touch filename** command, where *filename* is the name of the file you will use when uploading the image to the server.
- If you are overwriting an existing file (including an empty file, if you had to create one), ensure that the permissions on the file are set correctly. Permissions on the file should be world-write.

Uploading Software Images to a TFTP Server

Use this procedure to upload a software image on a switch to a TFTP server for storage:

-
- Step 1** Log into the switch through the console port or a Telnet session.
 - Step 2** Upload the software image to the TFTP server with the **copy flash tftp** command. When prompted, specify the TFTP server address and destination filename. On platforms that support the Flash file systems, you are first prompted for the Flash device and source filename. If desired, you can use the **copy file-id tftp** command on these platforms.

Downloading Supervisor Engine Images Using rcp

Use this procedure to download a supervisor engine software image to the switch from an rcp server:

-
- Step 1** Copy the software image file to the appropriate rcp directory on the workstation.
 - Step 2** Log into the switch through the console port or through a Telnet session. If you log in using Telnet, your Telnet session disconnects when you reset the switch to run the new software.
 - Step 3** Download the software image from the rcp server by entering the **copy rcp flash** command. When prompted, enter the IP address or host name of the rcp server and the name of the file to download. On those platforms that support the Flash file system, you are also prompted for the Flash device to which to copy the file and the destination filename.

The switch downloads the image file from the rcp server.



Note The switch remains operational while the image downloads.

- Step 4** Modify the BOOT environment variable using the **set boot system flash device:filename prepend** command, so that the new image boots when you reset the switch. Specify the Flash device (*device:*) and the filename of the downloaded image (*filename*).
 - Step 5** Reset the switch using the **reset system** command. If you are connected to the switch through Telnet, your Telnet session disconnects.

During startup, the Flash memory on the supervisor engine is reprogrammed with the new Flash code.
 - Step 6** When the switch reboots, enter the **show version** command to check the version of the code on the switch.
-

Downloading Switching Module Images Using rcp

Use this procedure to download a software image to an intelligent module on a Catalyst 6000 family switch:

-
- Step 1** Copy the software image file to the appropriate rcp directory on the workstation.
 - Step 2** Log into the switch through the console port or a Telnet session. If you log in using Telnet, your Telnet session might disconnect when you reset modules to run the new software.
 - Step 3** Use the command appropriate for your switch and supervisor engine to download the software image from the rcp server:
 - If there is only one module of the type appropriate for the image, or if there are multiple modules of the same type and you want to update the image on all of them, use the **copy rcp flash** command. When prompted, enter the IP address or host name of the rcp server, the name of the file to download, the Flash device to which to copy the file, and the destination filename.
 - If there are multiple modules of the type appropriate for the image but you only want to update a single module, use the **copy rcp | m/bootflash:** command, where *m* is the number of the module to which to download the software image. If you do not specify the module, all modules of the same type will be updated.



Note If you do not specify a module number, the switch examines the header of the image file to determine to which modules the software is downloaded. The image is then downloaded to all the modules of that type.

The switch downloads the image file, erases the Flash memory on the appropriate modules, and reprograms the Flash memory with the downloaded Flash code.



Note All modules in the switch remain operational while the image downloads.

- Step 4** Reset the appropriate modules using the **reset mod_num** command. If you are connected through Telnet, your Telnet session disconnects if you reset the module through which your connection was made.
- Step 5** When the upgraded modules come online, enter the **show version [mod_num]** command to check the version of the code on the switch.

Example rcp Download Procedures

These sections show example rcp download procedures.

Supervisor Image rcp Download Example



Note For a step-by-step procedure for downloading a supervisor engine software image from an rcp server, see the “Downloading Supervisor Engine Images Using rcp” section on page 19-10.

This example shows a complete rcp download procedure of a supervisor engine software image to a Catalyst 6000 family switch:

```

Console> (enable) copy rcp flash
IP address or name of remote host []? 172.20.52.3
Name of file to copy from []? cat6000-sup.5-2-1-csx.bin
Flash device [bootflash]?
Name of file to copy to [cat6000-sup.5-2-1-csx.bin]?

4369664 bytes available on device bootflash, proceed (y/n) [n]? y
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCCCCCCCC
File has been copied successfully.
Console> (enable) set boot system flash bootflash:cat6000-sup.5-2-1-csx.bin prepend
BOOT variable = bootflash:cat6000-sup.5-2-1-csx.bin,1;bootflash:cat6000-sup.5-2-
1-csx.bin,1;

```


Single Module Image rcp Download Example



Note

For a step-by-step procedure for downloading software images to intelligent modules, see the “Downloading Switching Module Images Using rcp” section on page 19-10.

This example shows a complete rcp download procedure of an ATM software image to a single ATM module:

```

Console> (enable) show version 4
Mod Port Model      Serial # Versions
-----
4   1   WS-X6101   003414855 Hw : 1.2
                               Fw : 1.3
                               Sw : 3.2(6)

Console> (enable) copy rcp 4/flash
IP address or name of remote host []? 172.20.52.3
Name of file to copy from []? cat6000-atm.3-2-7.bin
Download image rcp:cat6000-atm.3-2-7.bin to Module 4 FLASH (y/n) [n]? y
This command will reset Download Module(s) you selected.

Do you wish to continue download flash (y/n) [n]? y

Download done for module 4, please wait for it to come online

File has been copied successfully.
Console> (enable) 09/2/1999,13:13:54:SYS-5:Module 4 is online

Console> (enable) show version 4
Mod Port Model      Serial # Versions
-----
4   1   WS-X6101   003414855 Hw : 1.2
                               Fw : 1.3
                               Sw : 3.2(7)

Console> (enable)

```

Multiple Module Image rcp Download Example



Note

For a step-by-step procedure for downloading software images to intelligent modules, see the “Downloading Switching Module Images Using rcp” section on page 19-10.

This example shows a complete rcp download procedure of an ATM software image to multiple ATM modules:

```

Console> (enable) show version 4
Mod Port Model      Serial # Versions
-----
4   1   WS-X6101   003414855 Hw : 1.2
                               Fw : 1.3
                               Sw : 3.2(6)

Console> (enable) show version 5
Mod Port Model      Serial # Versions
-----
5   1   WS-X6101   003414463 Hw : 1.2
                               Fw : 1.3
                               Sw : 3.2(6)

```

```

Console> (enable) copy rcp flash
IP address or name of remote host []? 172.20.52.3
Name of file to copy from []? cat6000-atm.3-2-7.bin
Download image rcp:cat6000-atm.3-2-7.bin to Module 4 FLASH (y/n) [n]? y
Download image rcp:cat6000-atm.3-2-7.bin to Module 5 FLASH (y/n) [n]? y
This command will reset Download Module(s) you selected.

Do you wish to continue download flash (y/n) [n]? y
-
Download done for module 4, please wait for it to come online
Download done for module 5, please wait for it to come online

File has been copied successfully.
Console> (enable) 09/2/1999,12:25:10:SYS-5:Module 4 is online
09/2/1999,12:25:10:SYS-5:Module 5 is online

Console> (enable) show version 4
Mod Port Model      Serial #  Versions
-----
4   1   WS-X6101   003414855  Hw : 1.2
                                   Fw : 1.3
                                   Sw : 3.2(7)

Console> (enable) show version 5
Mod Port Model      Serial #  Versions
-----
5   1   WS-X6101   003414463  Hw : 1.2
                                   Fw : 1.3
                                   Sw : 3.2(7)

Console> (enable)

```

Uploading System Software Images to an rcp Server

These sections describe how to upload system software images from a switch to an rcp server:

- Preparing to Upload an Image to an rcp Server, page 19-14
- Uploading Software Images to an rcp Server, page 19-15



Note

For more information on working with system software image files on the Flash file system, see Chapter 18, “Working With the Flash File System.”

Preparing to Upload an Image to an rcp Server

Before you attempt to upload a software image to an rcp server, do the following:

- Ensure that the workstation acting as the rcp server is configured properly.
- Ensure that the switch has a route to the rcp server. The switch and the rcp server must be in the same subnetwork if you do not have a router to route traffic between subnets. Check connectivity to the rcp server using the **ping** command.
- If you are overwriting an existing file (including an empty file, if you had to create one), ensure that the permissions on the file are set correctly. Permissions on the file should be write for the specific username.

- Ensure that the Kermit software is installed on your PC or workstation.
- Ensure that the line speed settings are the same on the PC or workstation and on the switch:
 - On the switch, you can change the console port speed by entering the **set system baud rate** command. The default baud rate is 9600 baud.
 - On the PC or workstation, you can change the baud rate of the serial port by entering the **set speed rate** command at the Kermit> prompt.

**Caution**

To prevent communication problems, do not use a speed greater than 19,200 baud.

- Ensure that Kermit is using the proper serial port.
 - On a PC, specify the serial port using the **set port comx** command, where *x* is the PC serial port number (1 through 8) that you connected to the switch.
 - On a UNIX workstation, specify the serial port using the **set port /dev/ttyx** command, where *x* is the serial port (a or b) that you connected to the switch.

Downloading Software Images Using Kermit (PC Procedure)

**Note**

This procedure applies to PC serial downloads only. For information on performing a serial download on a UNIX workstation, see the “Downloading Software Images Using Kermit (UNIX Procedure)” section on page 19-17.

Use this procedure to perform a serial download of a software image over the supervisor engine console port:

Step 1 Copy the software image file to the directory where Kermit is loaded.

Step 2 Start Kermit on the PC.

**Note**

Before continuing, ensure that the line speed is correct and that you have selected the proper serial line, as described in the “Preparing to Download an Image Using Kermit” section on page 19-15.

Step 3 At the Kermit> prompt, enter the **connect** command to connect to the switch. If your line and speed are set correctly, the switch Console> prompt appears.

Step 4 Enter the **enable** command to enter privileged mode.

Step 5 Enter the **download serial** command. The file is downloaded to module 1 by default.

Step 6 When prompted, confirm the download.

Step 7 Enter the escape sequence **Ctrl-J-c** by holding down the **Ctrl** key while you press **J**, and then press **c**.

Step 8 At the Kermit> prompt, enter the **send filename** command to send the file to the switch.

The switch downloads the image file, erases the Flash memory on the supervisor engine or the appropriate module, and reprograms the Flash memory with the downloaded Flash code.



Note The switch remains operational while the image downloads.

Step 9 When the Kermit> prompt reappears, enter the **connect** command to return to the switch Console> prompt. You will see status information as the switch erases and reprograms the Flash memory.



Note If you enter the **connect** command more than two minutes after the Kermit> prompt reappears, you might see only a Console> prompt instead of the status information about erasing and programming Flash code.

Step 10 Reset the switch using the **reset system** command.

Step 11 When the switch reboots, enter the **show version** [*mod_num*] command to check the version of the code on the switch.



Note For an example that shows a complete serial download procedure using Kermit on a PC, see the “PC Serial Download Procedure Example” section on page 19-19.

Downloading Software Images Using Kermit (UNIX Procedure)



Note This procedure applies to UNIX serial downloads only. For information on performing a serial download on a PC, see the “Downloading Software Images Using Kermit (PC Procedure)” section on page 19-16.

Use this procedure to perform a serial download of a software image over the supervisor engine console port.

To copy the software to the workstation, log in as root, and perform these steps:

Step 1 Copy the software image file to your home directory.

Step 2 At the UNIX command prompt, start Kermit by entering the **kermit** command (make sure the directory where Kermit is installed is included in the \$PATH environment variable on the workstation).



Note Before continuing, ensure that the line speed is correct and that you have selected the proper serial line, as described in the “Preparing to Download an Image Using Kermit” section on page 19-15.

Step 3 At the C-Kermit> prompt, enter the **connect** command to connect to the switch. If your line and speed are set correctly, the switch Console> prompt appears.

Step 4 Enter the **enable** command to enter privileged mode.

Step 5 Enter the **download serial** command. The file downloads to module 1 by default.

Step 6 When prompted, confirm the download.

Step 7 Enter the escape sequence **Ctrl-^c** by holding down the **Ctrl** key while you press **^**, and then press **c**.

Step 8 At the Kermit> prompt, enter the **send filename** command to send the file to the switch.

You can monitor the progress of the download by pressing the **a** key at any time during the Kermit download. A dot appears onscreen for every four packets transferred. If there is a problem transferring the file, one or more of the following letter codes appear:

- T—Kermit timed out.
- N—Kermit is not acknowledging the switch download process.
- E—Kermit detected an error in the progress of the transaction.

The switch downloads the image file, erases the Flash memory on the supervisor engine or the appropriate module, and reprograms the Flash memory with the downloaded Flash code.



Note The switch remains operational while the image downloads.

Step 9 Press **Return** to return to the C-Kermit> prompt. When the Kermit> prompt reappears, enter the **connect** command to return to the switch Console> prompt. You will see status information as the switch erases and reprograms the Flash memory.



Note If you enter the **connect** command more than two minutes after the Kermit> prompt reappears, you might see only a Console> prompt instead of the status information about erasing and programming Flash code.

Step 10 Reset the switch using the **reset system** command.

Step 11 When the switch reboots, enter the **show version [mod_num]** command to check the version of the code on the switch.



Note For an example that shows a complete serial download procedure using Kermit on a UNIX workstation, see the “UNIX Workstation Serial Download Procedure Example” section on page 19-20.

Example Serial Software Image Download Procedures

These sections show example serial download procedures over the supervisor engine console port using Kermit:

- PC Serial Download Procedure Example, page 19-19
- UNIX Workstation Serial Download Procedure Example, page 19-20

PC Serial Download Procedure Example

This screen output shows an example of a complete serial download procedure on a PC:

```
C:\ copy A:\*.*
copying c6509_xx.bin
C:\ kermit
Kermit, 4C(057) 06 Apr 98, 4.2 BSD
Type ? for help
Kermit> set port com1
Kermit> set speed 9600
Kermit> connect
Connecting to com1,speed 9600.
The escape character is ^] (ASCII 29).
Type the escape character followed by C to get back,
or followed by ? to see other options

Console> enable
Console> (enable) download serial
Download CBI image via console port (y/n) [n]? y

Waiting for DOWNLOAD!
Return to your local Machine by typing its escape sequence
Issue Kermit send command from there[ Send `Filename`]

<CONTROL-] c to return to Local Machine>

Kermit> send c6509_xx.bin

      File name: c6509_xx.bin
KBytes transferred: xxxx
Percent transferred: 100%
      Sending: Complete

      Number of Packets: xxxx
      Number of retries: None
      Last error: None
      Last warning: None
Kermit> connect

Finished network download. (1136844 bytes)
Flash erase in progress ... Erase done
Programming Flash: Flash Programming Complete
Flash erase in progress ... Erase done
Programming Flash: Flash Programming Complete
Flash erase in progress ... Erase done
Programming Flash: Flash Programming Complete
Flash erase in progress ... Erase done
Programming Flash: Flash Programming Complete
Flash erase in progress ... Erase done
Programming Flash: Flash Programming Complete
Flash erase in progress ... Erase done
Programming Flash: Flash Programming Complete
Flash erase in progress ... Erase done
Programming Flash: Flash Programming Complete
Flash erase in progress ... Erase done
Programming Flash: Flash Programming Complete
Flash erase in progress ... Erase done
Programming Flash: Flash Programming Complete
The system needs to be reset to run the new image.

Cisco Systems Console
Enter password:
Mon Apr 06, 1998, 14:35:08
Console>
```

UNIX Workstation Serial Download Procedure Example

This screen output shows an example of a complete serial download procedure on a UNIX workstation:

```
workstation% cd /tmp
workstation% tar -xvfp /dev/rfd0
c5009_xx.bin, 1156046 bytes, 2258 tape blocks
workstation% ls -la
total 1150
drwxrwsrwt  5 bin          512 Sep 28 04:15 .
drwxr-xr-x 18 root        1536 Sep 27 15:41 ..
-r--r--r--  1 60000      1156046 Jul 18 10:32 c5009_xx.bin
workstation% kermi
C-Kermit, 4E(072) 06 Apr 98, SUNOS 4.x
Type ? for help
C-Kermit> set line /dev/ttya
C-Kermit> set speed 9600
/dev/ttya: 9600 baud
C-Kermit> connect
Connecting thru /dev/ttya, speed 9600.
The escape character is CTRL-\ (28).
```

Type the escape character followed by C to get back,
or followed by ? to see other options.

```
Console> enable
Console> (enable) download serial c5009_xx.bin
```

```
Download CBI image via console port (y/n) [n]? y
```

```
Waiting for DOWNLOAD!
Return to your local Machine by typing its escape sequence
Issue Kermit send command from there[ Send `Filename`]
[Back at Local System]
C-Kermit> send c5009_xx.bin
SF
c5009_xx.bin => c5009_xx.bin, Size: 1156046
```

```
CTRL-F to cancel file, CTRL-R to resend current packet
CTRL-B to cancel batch, CTRL-A for status report:
```

```
.....
*** Display Truncated ***
```

```
..... [OK]
ZB?
```

```
C-Kermit> connect
Connecting thru /dev/ttya, speed 9600.
The escape character is CTRL-\ (28).
Type the escape character followed by C to get back,
or followed by ? to see other options.
```

```
Download OK
Initializing Flash
Programming Flash
Base...Code...Length...Time...Done
```

```
Cisco Systems Console
Enter password:
Mon Apr 06, 1998, 17:35:08
Console>
```

Downloading a System Image Using Xmodem or Ymodem

When you need a system image on the switch, but the switch does not have network access and you do not have a software image on a Flash PC card, you can download an image from a local or remote computer (such as a PC, UNIX workstation, or Macintosh) through the console port using the Xmodem or Ymodem protocol.

Xmodem and Ymodem are common protocols used to transfer files and are included in applications such as Windows 3.1 (TERMINAL.EXE), Windows 95 (HyperTerminal), Windows NT 3.5x (TERMINAL.EXE), Windows NT 4.0 (HyperTerminal), and Linux UNIX freeware (minicom).

Xmodem and Ymodem downloads are slow: use them only when the switch does not have network access. You can speed up the transfer by setting the console port speed to 38400 bps.

Xmodem and Ymodem file transfers are performed from the ROM monitor with the following command:

```
xmodem [-y] [-c] [-s data-rate]
```

In the example, the **-y** option uses the Ymodem protocol; **-c** provides CRC-16 checksumming; and **-s** sets the console port data rate.

**Note**

See the “ROM Monitor Command-Line Interface” section in the “Command-Line Interfaces” chapter for more information about the ROM monitor.

The computer from which you transfer the supervisor engine software image must be running terminal emulation software that supports the Xmodem or Ymodem protocol.

The following procedure shows a file transfer using the Xmodem protocol. To use the Ymodem protocol, include the **-y** option with the **xmodem** command.

**Caution**

A modem connection from the telephone network to your console port introduces security issues that you should consider before enabling the connection. For example, remote users can dial into your modem and access the switch configuration settings.

**Caution**

If you have redundant supervisor engines **you must remove the second (redundant) supervisor engine prior to performing this procedure**. The image that is downloaded via xmodem is not saved to memory, therefore after the download if you have two supervisor engines installed and attempt to reboot the active supervisor engine with the downloaded image, the redundant supervisor engine will takeover and synchronize with the active; the downloaded image will not be booted.

- Step 1** Place a supervisor engine software image on the computer’s hard drive. You can download an image from Cisco Connection Online (see the “Preface” section for details).
- Step 2** To download from a local computer, connect the console port (port mode switch in the *in* position) to a serial port on the computer, using a null-modem cable. The console port speed must match the speed configured on the local computer.



Note If you are transferring from a local computer, you may need to configure the terminal emulation program to ignore RTS/DTR signals.

Step 3 To download from a remote computer:

- a. Connect a modem to the console port and to the telephone network.
- b. The modem and console port must communicate at the same speed, which can be from 1200 to 38400 bps, depending on the speed supported by your modem. Use the **confreg** ROM monitor command to configure the console port transmission speed.
- c. Connect a modem to the remote computer and to the telephone network and configure it for the same speed as the supervisor engine.
- d. Dial the number of the supervisor engine modem from the remote computer.

Step 4 Enter the **xmodem** command at the ROM monitor prompt in the terminal emulation window:

```
rommon > xmodem -s 38400 -c
```

Step 5 Start an Xmodem or Ymodem send operation with the computer's terminal emulation software. The computer downloads the system image to the supervisor engine. See your terminal emulation software application manual for instructions on how to execute a Xmodem or Ymodem file transfer.

Step 6 After the new image is completely downloaded, the ROM monitor boots it.



Note Downloading an image through the console port does not create an image file on any of the Flash devices. The downloaded image resides only in memory. The image in memory cannot be saved as a file.

Step 7 After the download, the console port returns to the default baud rate: 9600. If the download took place at other than 9600 baud, the remote computer's baud rate must be changed back to 9600 baud.



Note Establish network connectivity to the switch to copy an image file from a TFTP server to one of the Flash devices.
