

Working With System Software Images

This chapter describes how to how to work with system software image files.

Note For complete syntax and usage information for the commands used in this chapter, refer to the *Command Reference* for your switch.

This chapter consists of these sections:

- Downloading System Software Images to the Switch on page 19-1
- Uploading System Software Images to a TFTP Server on page 19-18

Downloading System Software Images to the Switch

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

- Understanding How Software Image Downloads Work on page 19-1
- Downloading Software Images Using TFTP on page 19-2
- Downloading Software Images Over a Serial Connection on the Console Port on page 19-13

Understanding How Software Image Downloads Work

You can download system software images to switch using one of two methods:

- Trivial File Transfer Protocol (TFTP)—You can use TFTP to perform a network download of files from a TFTP server
- Kermit—You can use Kermit, a popular file-transfer and terminal-emulation software program, to perform a serial transfer of files over the supervisor engine console port

Some modules, such as Catalyst 5000 series FDDI and 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. On the Catalyst 5000 series Supervisor Engine I or II and on the Catalyst 2926 series switches, you can store only a single image file at a time. On the Catalyst 5000 series Supervisor Engine III, III FSX, and III FLX, and on the Catalyst 4000, 2948G, and 2926G series switches, you can store multiple image files on the Flash memory system devices (such as boot Flash and, on the Supervisor Engine III, 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 (IPC) 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.

Downloading Software Images Using TFTP

The following sections describe how to download software images to the switch using TFTP:

- Preparing to Download an Image Using TFTP on page 19-2
- Downloading Supervisor Images Using TFTP on page 19-3
- Downloading Switching Module Images Using TFTP on page 19-4
- Example TFTP Download Procedures on page 19-6

Note For more information on working with system software image files on the Flash file system, refer to 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. At the `boot>` prompt, you can download the Flash code again through an enabled port in VLAN 1. By default, port 1/1 is enabled. You can use port 1/1 or enable another port.

Downloading Supervisor Images Using TFTP

Note Catalyst 5505, Catalyst 5509, and Catalyst 5500 only—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, the standby supervisor 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 command appropriate for your switch and supervisor engine to download the software image from the TFTP server:
- **Catalyst 5000 series Supervisor Engine I or II, and Catalyst 2926 series switches**—Use the **download** *host file* command, where *host* is the IP address or host name of the workstation acting as the TFTP server and *file* is the name of the file to download.
 - **Catalyst 5000 series Supervisor Engine III, III FSX, and III FLX, and Catalyst 4000, 2948G, and 2926G series switches**—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.

Note The Supervisor Engine III FSX and FLX models, and the Catalyst 4000 and 2948G series switches have only one Flash device (**bootflash:**).

The switch downloads the image file from the TFTP server:

- **Catalyst 5000 series Supervisor Engine I or II, and Catalyst 2926 series switches**—The Flash memory on the supervisor engine is erased and reprogrammed with the downloaded Flash code.
- **Catalyst 5000 series Supervisor Engine III, III FSX, and III FLX, and Catalyst 4000, 2948G, and 2926G series switches**—The image is copied to the specified Flash device.

Note The switch remains operational while the image downloads.

- Step 4** **Catalyst 5000 series Supervisor Engine III, III FSX, and III FLX, and Catalyst 4000, 2948G, and 2926G series switches**—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*).

Note This step is not necessary on the Catalyst 5000 series Supervisor Engine I or II, and on the Catalyst 2926 series switches.

- 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, on the Catalyst 5000 series Supervisor Engine III, III FSX, and III FLX, and on the Catalyst 4000, 2948G, and 2926G series switches, 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 “Example TFTP Download Procedures” section on page 19-6.

Downloading Switching Module Images Using TFTP

Use this procedure to download a software image to an intelligent module on a Catalyst 5000 series switch:

- 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 Use the command appropriate for your switch and supervisor engine to download the software image from the TFTP server:

- **Catalyst 5000 series Supervisor Engine I or II, and Catalyst 2926 series switches**

- 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 **download host file** command, where *host* is the IP address or host name of the TFTP server and *file* is the name of the file to download.
- If there are multiple modules of the type appropriate for the image but you only want to update a single module, use the **download host file mod_num** command, where *mod_num* is the slot in which the module is installed.

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.

- **Catalyst 5000 series Supervisor Engine III, III FSX, and III FLX, and Catalyst 4000, 2948G, and 2926G series switches**

- 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.
- 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.

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.

Note For examples that show complete procedures for TFTP downloads to intelligent modules, see the “Example Single Intelligent Module Image TFTP Download (Catalyst 5000 Series Supervisor I and II)” section on page 19-9, the “Example Multiple Module Image TFTP Download (Supervisor I and II)” section on page 19-11, the “Example Single Module Image TFTP Download (Supervisor III, III FSX, or III FLX)” section on page 19-10 and the “Example Multiple Module Image TFTP Download (Supervisor III, III FSX, or III FLX)” section on page 19-12.

Example TFTP Download Procedures

These sections show example TFTP download procedures:

- Example Supervisor Image TFTP Download (Catalyst 5000 Series Supervisor Engine I and II or Catalyst 2926 Series Switch) on page 19-6
- Example Supervisor Image TFTP Download (Catalyst 5000 Series Supervisor III, III FSX, III FLX, or Catalyst 4000, 2948G, or 2926G Series Switches) on page 19-8
- Example Single Intelligent Module Image TFTP Download (Catalyst 5000 Series Supervisor I and II) on page 19-9
- Example Single Module Image TFTP Download (Supervisor III, III FSX, or III FLX) on page 19-10
- Example Multiple Module Image TFTP Download (Supervisor I and II) on page 19-11
- Example Multiple Module Image TFTP Download (Supervisor III, III FSX, or III FLX) on page 19-12

Example Supervisor Image TFTP Download (Catalyst 5000 Series Supervisor Engine I and II or Catalyst 2926 Series Switch)

Note For a step-by-step procedure for downloading a supervisor engine software image from a TFTP server, see the “Downloading Supervisor Images Using TFTP” section on page 19-3.

This example shows a complete TFTP download procedure of a supervisor engine software image to a Catalyst 5000 series switch with a Supervisor Engine I or II module or to a Catalyst 2926 series switch:

```
Console> (enable) show version 1
Mod Port Model      Serial #  Versions
-----
1   2   WS-X5509  007486003  Hw : 2.3
                               Fw : 3.1(2)
                               Fw1: 3.1(1)
                               Sw  : 4.1(2)

Console> (enable) download 172.20.52.3 cat5000-sup.4-2-1.bin
Download image cat5000-sup.4-2-1.bin from 172.20.52.3 to module 1 FLASH (y/n)
[n]? y
/
Finished network single module download. (2748504 bytes)
FLASH on Catalyst:

Type          Address          Location
Intel 28F016  20000000        NMP (P3) 8MB SIM

Erasing flash sector...done.
Programming flash sector...done.
Erasing flash sector...done.
Programming flash sector...done.
Erasing flash sector...done.
Programming flash sector...done.
The system needs to be reset to run the new image.
Console> (enable) reset system
This command will reset the system.
Do you want to continue (y/n) [n]? y
Console> (enable) 07/21/1998,10:52:36:SYS-5:System reset from Console//
```

```
ATE0
ATS0=1
```

```
ROM Power Up Diagnostics of Feb 19 1998
```

```
Init NVRAM Log
LED Test ..... done
ROM Checksum ..... passed
Dual Port RAM r/w Test ..... passed
ID PROM ..... passed
System DRAM Size(mb) ..... 16
DRAM Data Bus Test ..... passed
DRAM Address Test ..... passed
DRAM Byte/Word Access Test .. passed
EARL Test ..... passed
```

```
BOOTROM Version 3.1(2), Dated Feb 19 1998 11:05:50
BOOT date: 07/21/98 BOOT time: 10:52:51
Uncompressing NMP image. This will take a minute...
Downloading epld sram device please wait ...
Programming successful for Altera 10K10 SRAM EPLD
Updating epld flash version from 0000 to 0400
```

```
Running System Diagnostics from this Supervisor (Module 1)
This may take up to 2 minutes....please wait
```

```
Cisco Systems Console
```

```
Enter password:
07/21/1998,10:53:39:SYS-5:Module 1 is online
07/21/1998,10:53:58:PAGP-5:Port 1/1 joined bridge port 1/1.
07/21/1998,10:54:15:SYS-5:Module 7 is online
07/21/1998,10:54:22:SYS-5:Module 2 is online
07/21/1998,10:54:39:SYS-5:Module 9 is online
07/21/1998,10:54:43:SYS-5:Module 5 is online
07/21/1998,10:54:56:SYS-5:Module 3 is online
07/21/1998,10:54:57:SYS-5:Module 6 is online
07/21/1998,10:54:58:DTP-5:Port 3/1-2 has become dot10 trunk
07/21/1998,10:55:36:SYS-5:Module 2 is online
```

```
Console> show version 1
```

```
Mod Port Model      Serial #  Versions
-----
1    2    WS-X5509    007486003  Hw : 2.3
                                     Fw : 3.1(2)
                                     Fw1: 3.1(1)
                                     Sw  : 4.2(1)
```

```
Console>
```



```

DPRAM Data 0xaa Test .....Passed
DPRAM Address Test .....Passed
Clearing DPRAM .....Done
System DRAM Memory Size .....32MB
DRAM Data 0x55 Test .....Passed
DRAM Data 0xaa Test .....Passed
DRAM Address Test .....Passed
Clearing DRAM .....Done
EARL++ .....Present
EARL RAM Test .....Passed
EARL Serial Prom Test .....Passed
Level2 Cache .....Present
Level2 Cache test.....Passed

Boot image: bootflash:cat5000-sup3.4-2-1.bin
Downloading epld sram device please wait ...
Programming successful for Altera 10K10 SRAM EPLD
Downloading epld sram device please wait ...
Programming successful for Altera 10K30 SRAM EPLD
Downloading epld sram device 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> **show version 1**

Mod	Port	Model	Serial #	Versions
1	2	WS-X5530	007451586	Hw : 1.3 Fw : 3.1.2 Fw1: 3.1(2) Sw : 4.2(1)

Console>

Example Single Intelligent Module Image TFTP Download (Catalyst 5000 Series Supervisor I and II)

Note For a step-by-step procedure for downloading software images to intelligent modules on a Catalyst 5000 series switch with a Supervisor Engine I or II, refer to the “Downloading Switching Module Images Using TFTP” section on page 19-4.

This example shows a complete TFTP download procedure of an FDDI software image to a single FDDI module in a Catalyst 5000 series switch with a Supervisor Engine I or II module:

```
Console> (enable) show version 3
Mod Port Model      Serial #  Versions
-----
3   2   WS-X5101   003489788 Hw : 1.0
                                     Fw : 1.1
                                     Fw1: 1.3
                                     Sw : 2.1(7)

Console> (enable) download 172.20.52.3 cat5000-fddi.3-1-1.bin 3
This command will reset module 3.
Download image cat5000-fddi.3-1-1.bin from 172.20.52.3 to Module 3 FLASH (y/n) [
n]? y
|
Finished network single module download. (1060456 bytes)
.....
.....
.....
.....
.....
.....
SCP download checksum ok
SCP download done.
Please wait until module 3 comes online before resetting.
(Approximately 5 minutes)
Console> (enable) Console> (enable) 07/21/1998,11:23:36:SYS-5:Module 3 FLASH pro
gramming complete
07/21/1998,11:24:59:SYS-5:Module 3 is online
07/21/1998,11:25:00:DTP-5:Port 3/1-2 has become dot10 trunk

Console> (enable) show version 3
Mod Port Model      Serial #  Versions
-----
3   2   WS-X5101   003489788 Hw : 1.0
                                     Fw : 1.1
                                     Fw1: 1.3
                                     Sw : 3.1(1)

Console> (enable)
```

Example Single Module Image TFTP Download (Supervisor III, III FSX, or III FLX)

Note For a step-by-step procedure for downloading software images to intelligent modules on a Catalyst 5000 series switch with a Supervisor Engine III, III FSX, or III FLX, refer to 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 in a Catalyst 5000 series switch with a Supervisor Engine III module:

```
Console> (enable) show version 4
Mod Port Model      Serial #  Versions
-----
4   1   WS-X5155   003414855 Hw : 1.2
                                     Fw : 1.3
                                     Fw1: 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 []? cat5000-atm.3-2-7.bin
```

```
Download image tftp:cat5000-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-X5155   003414855 Hw : 1.2
                                     Fw : 1.3
                                     Fw1: 1.3
                                     Sw : 3.2(7)
```

```
Console> (enable)
```

Example Multiple Module Image TFTP Download (Supervisor I and II)

Note For a step-by-step procedure for downloading software images to intelligent modules on a Catalyst 5000 series switch with a Supervisor Engine I or II, refer to 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 in a Catalyst 5000 series switch with a Supervisor Engine I or II module:

```
Console> (enable) show version 8
```

```
Mod Port Model      Serial #  Versions
```

```
-----
```

```
8   1   WS-X5155   003414855 Hw : 1.2
                                     Fw : 1.3
                                     Fw1: 1.3
                                     Sw : 3.2(4)
```

```
Console> (enable) show version 9
```

```
Mod Port Model      Serial #  Versions
```

```
-----
```

```
9   1   WS-X5155   003414463 Hw : 1.2
                                     Fw : 1.3
                                     Fw1: 1.3
                                     Sw : 3.2(6)
```

```
Console> (enable) download 172.20.52.3 cat5000-atm.3-2-7.bin
```

```
Download image cat5000-atm.3-2-7.bin from 172.20.52.3 to Module 8 FLASH (y/n) [n]
]? y
```

```
Download image cat5000-atm.3-2-7.bin from 172.20.52.3 to Module 9 FLASH (y/n) [n]
]? y
```

```
This command will reset download module(s) you selected.
```

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

```
-
```

```
Download done for module 8, please wait for it to come online
```

```
Download done for module 9, please wait for it to come online
```

```
Finished network multiple modules download. (2378316 bytes)
```

```
Please wait until module(s) come online before resetting.
```

```
Console> (enable) 07/21/1998,13:19:54:SYS-5:Module 8 is online
```

```
07/21/1998,13:19:54:SYS-5:Module 9 is online
```

```
Console> (enable) show version 8
Mod Port Model      Serial # Versions
-----
8   1   WS-X5155   003414855 Hw : 1.2
                               Fw : 1.3
                               Fw1: 1.3
                               Sw : 3.2(7)

Console> (enable) show version 9
Mod Port Model      Serial # Versions
-----
9   1   WS-X5155   003414463 Hw : 1.2
                               Fw : 1.3
                               Fw1: 1.3
                               Sw : 3.2(7)

Console> (enable)
```

Example Multiple Module Image TFTP Download (Supervisor III, III FSX, or III FLX)

Note For a step-by-step procedure for downloading software images to intelligent modules on a Catalyst 5000 series switch with a Supervisor Engine III, III FSX, or III FLX, refer to 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 in a Catalyst 5000 series switch with a Supervisor Engine III, III FSX, or III FLX module:

```
Console> (enable) show version 4
Mod Port Model      Serial # Versions
-----
4   1   WS-X5155   003414855 Hw : 1.2
                               Fw : 1.3
                               Fw1: 1.3
                               Sw : 3.2(6)

Console> (enable) show version 5
Mod Port Model      Serial # Versions
-----
5   1   WS-X5155   003414463 Hw : 1.2
                               Fw : 1.3
                               Fw1: 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 []? cat5000-atm.3-2-7.bin
Download image tftp:cat5000-atm.3-2-7.bin to Module 4 FLASH (y/n) [n]? y
Download image tftp:cat5000-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-X5155   003414855 Hw : 1.2
                                   Fw : 1.3
                                   Fw1: 1.3
                                   Sw : 3.2(7)

Console> (enable) show version 5
Mod Port Model      Serial #  Versions
-----
5   1   WS-X5155   003414463 Hw : 1.2
                                   Fw : 1.3
                                   Fw1: 1.3
                                   Sw : 3.2(7)

Console> (enable)

```

Downloading Software Images Over a Serial Connection on the Console Port

These sections describe how to perform a serial download of software images over the supervisor engine console port using Kermit:

- Preparing to Download an Image Using Kermit on page 19-13
- Downloading Software Images Using Kermit (PC Procedure) on page 19-14
- Downloading Software Images Using Kermit (UNIX Procedure) on page 19-15
- Example Serial Software Image Download Procedures on page 19-16

Preparing to Download an Image Using Kermit

Before you begin a serial download of a software image using Kermit, make sure of the following:

- On a UNIX workstation, make sure your shell window is local (not an **rlogin** window to a different workstation).
- Ensure that the supervisor engine console port is connected to a serial port on your PC or workstation with a serial cable.
- 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, refer to the “Downloading Software Images Using Kermit (UNIX Procedure)” section on page 19-15.

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 19-13.

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-]-c** by holding down the **Control** 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. 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 “Example PC Serial Download Procedure” section on page 19-16.

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, refer to the “Downloading Software Images Using Kermit (PC Procedure)” section on page 19-14.

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 19-13.

- 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 **Control** 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 “Example UNIX Workstation Serial Download Procedure” section on page 19-17.

Example Serial Software Image Download Procedures

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

- Example PC Serial Download Procedure on page 19-16
- Example UNIX Workstation Serial Download Procedure on page 19-17

Example PC Serial Download Procedure

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

```
C:\ copy A:\*.*
copying c5009_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 c5009_xx.bin

File name: c5009_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>
```

Example UNIX Workstation Serial Download Procedure

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% kermit
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!
```

Uploading System Software Images to a TFTP Server

```
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>
```

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 on page 19-18
- Uploading Software Images to a TFTP Server on page 19-19

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 using the command appropriate for your switch and supervisor engine:
- **Catalyst 5000 series Supervisor Engine I or II, and Catalyst 2926 series switches**—Use the **upload host filename [mod_num]** command. Specify the number of the module from which to upload the image in the *mod_num* argument. You do not need to specify the module number if you are uploading the supervisor engine software image.
 - **Catalyst 5000 series Supervisor Engine III, III FSX, and III FLX, and Catalyst 4000, 2948G, and 2926G series switches**—Use the **copy flash tftp** command. When prompted, specify the Flash device, source filename, TFTP server address, and destination filename. If desired, you can also use the **copy file-id tftp** command.

The software image is uploaded to the TFTP server.

This example shows how to upload the supervisor engine software image on a Catalyst 5000 series Supervisor Engine I or II, or a Catalyst 2926 series switch, to a TFTP server:

```
Console> (enable) upload 172.20.52.3 cat5000-sup.4-2-1.bin
Upload Module 1 image to cat5000-sup.4-2-1.bin on 172.20.52.3 (y/n) [n]y
-
Finished network upload. (3021332 bytes)
Console> (enable)
```

