Updating Software

This appendix includes procedures to update software on the Catalyst 1200 series switch. New software to implement enhancements and maintenance releases is provided periodically. You can use one of the following two methods to update the software:

- The first method to update software is to initiate the network download from the switch through a Trivial File Transfer Protocol (TFTP) download server. This is the fastest and easiest method.

- The second method uses Kermit (a popular file-transfer and terminal-emulation program) to network download the software from a PC or workstation attached to the switch using the admin. port. This public domain software UNIX program is supplied on the software update disk.

Two versions of Catalyst Switch flashcode are needed: Data Movement Processor (DMP) and Network Management Processor (NMP) Flash code. You can update these Flash code versions at the same time or individually. The procedure used to update the Flash code software is identical for both DMP and NMP Flash code. The following examples discuss updating the NMP Flash code with the version number shows as *xx*.

Note Software updates are distributed on Sun- and PC-compatible 3.5-inch disks. Use the procedures in this appendix to copy the software from the disks and download the software from the workstation to the switch. For more information on switch-related commands, refer to the appendix "Command Reference."

Network Download Initiated from the Switch

The workstation acting as the download server must have the TFTP daemon.

To perform a network download to the switch, perform the following steps:

Step 1   On Sun workstations, make sure 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 the following line:

```
tftp 69/udp
```

Note   You must restart the inet daemon after modifying the */etc/inetd.conf* and */etc/services* files. To restart the daemon, either kill the inetd process and restart it, or do a **fastboot** (on the SunOS 4.x) or **reboot** (on Solaris 2.x [or SunOS 5.x]). Refer to your workstation manual for use of TFTP daemons.

Step 2   Copy the new software from the floppy to the home directory specified for the TFTP daemon on the workstation (usually */tftpboot*). If this directory does not exist, you must create it before continuing. The file you copy is *nmpxx.bin*, where *xx* is the software revision number.

Step 3   Log in to the admin. interface on the switch.

Step 4   Use the **download** *host file* [**nmp** | **dmp**] command and specify the IP address or host name of the workstation acting as the download server, the file to download, and the processor software you require. (*nmp* is the network management processor, and *dmp* is the data movement processor.) Following is an example:

```
Console> (enable) download 190.180.122.40 nmpxx.bin nmp
```

During the download, the status LED on the switch flashes, and the network remains operational. When the download is complete, the switch restarts automatically, causing it to momentarily disconnect from the ring. When the switch is up, use the **show system** command to check the version number of the software that the system is running.

To troubleshoot a failed network download from the switch, perform the following steps:

Step 1 Make certain that the switch has a route to the TFTP server; use the **ping** command to test this connectivity.

Step 2 Make certain that the software image to be downloaded is in the correct directory.

The network portion of the switch IP address must be the same as the network portion of the TFTP server address. If the network download fails because the power was interrupted during download, or for some other reason, the Flash code can become corrupted and the boot> prompt appears on the admin. port. Network download can then be used to download the Flash code again, but only via the SUM port. Network download from the boot> prompt does not work via the FDDI or Ethernet LAN ports. The Kermit serial download can also be used to download the Flash code.

Local File Transfer with Kermit

There are multiple versions of Kermit you can use to download the software to the switch. The following two sections describe:

- Copying the Software Using a PC

- Copying the Software Using a Sun Workstation

Refer to the section that most closely matches your installation configuration.

Copying the Software Using a PC

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

Step 1 Connect a PC serial port to the switch admin. port as described in the chapter "Connecting to the Network." Make sure you know the baud rate of the switch so you can set the line speed on the workstation accordingly.

Step 2 Insert the 3.5-inch software update disk into the floppy drive on the PC.

Step 3 Enter the following commands, where *x* is the disk drive containing the floppy:

```
C:\ copy x:*.*
C:\> dir *mpxx.bin
```

The **dir** command displays the filename of the new software in the format *conxx.rom*, where *xx* is the software revision number.

Set Kermit Parameters

To set the Kermit file transfer parameters, perform the following steps:

Step 1 Start Kermit on the PC.

Step 2 At the Kermit> prompt, specify the serial port using the following command, where *x* is the serial port number (1 through 8) that you connected to the switch:

```
Kermit> set port comx
```

Step 3 At the Kermit> prompt, enter the following command to set the baud rate for the serial port, where *n* is the port speed of the switch:

```
Kermit> set speed n
```

The default port speed for the switch is 9,600 baud.

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

Note To change the line speed for the file transfer, first use the **set baud** command on the switch, then escape back to Kermit to execute a **set speed** command.

Download the New Software to the Switch

To download the software from the PC, perform the following steps:

Step 1 At the Kermit> prompt, enter the following command to connect to the switch:

```
Kermit> connect
```

If your line and speed are set correctly, the console prompt appears.

Step 2 Enter **enable** to enter privileged mode.

```
Console> enable
Console> (enable)
```

Step 3 At the Kermit> prompt, enter the download command:

```
Kermit> (enable) download serial[nmp|dmp]
```

Step 4 After you press **Return**, the switch waits for the new software to arrive. The following message displays:

```
Cisco switch Boot ROM 1.00

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

Step 5 Enter the escape sequence **Esc-Crtl**-**]**-**c**

To enter this sequence correctly, press **Esc**, then hold down the **Control** key while you press **]** and then press **c**.

Step 6 At the Kermit> prompt, enter the following command to send the file to the switch (where *xx* is the software revision number):

```
Kermit> send nmpxx.bin
```

Note During the download, the 1/A and 2/B LEDs on the front panel of the switch alternately flash green. Also, the traffic meter LEDs increment in binary counter fashion for each packet received by the switch.

A screen similar to the following appears, displaying the send status information:

```
        File name: nmpxx.rom
 KBytes transferred:
Percent transferred:
          Sending:

  Number of Packets:
  NUmber of retries:
        Last error: None
      Last warning: None
```

Wait while the file is being transferred. The information changes in the display until the following information appears in the send status screen:

```
        File name: nmpxx.rom
 KBytes transferred: xxxx
Percent transferred: 100%
          Sending: Complete

  Number of Packets: xxxx
  NUmber of retries: None
        Last error: None
      Last warning: None
```

```
Kermit>
```

Step 7 When the `Kermit>` prompt reappears, enter **connect** to return to the console prompt.

```
Kermit> connect
```

If the file transfer was not successful, the following message displays and you must repeat the procedure:

```
Download Not OK
```

Note If you do not return Kermit to terminal emulation mode immediately after the download has completed, you may not see a Kermit message.

Step 8 Reboot the switch to initialize Flash memory.

If the file transfer was successful, the switch erases Flash memory and reprograms it with the new software. The following messages display during the process:

```
Initializing flash...Erasing Flash....Done
Programming Flash
Base....Code....Length....Time....Done
```

If the switch successfully reprograms Flash memory, the new software executes as follows:

```
Cisco Systems Console
Enter password:
Wed Oct 26, 1994, 17:35:08
Enter password:
```

This concludes the download procedure; the switch is now executing the new software. You can check the Sw field in the **show system** command display to verify that the new software is running.

Troubleshooting the PC Download Procedure

The most common problem with Kermit file transfers is an incorrect line setting. Make sure that the serial port on the PC connected to the switch matches the **set line** or **set port** command.

If you cannot communicate at all with the switch and you are sure that the **set line** command is correct, check the serial port baud rate. The default baud rate of the switch admin. port is 9,600. If the switch baud rate was changed to an unknown value, you may have to enter several **set speed** commands in Kermit before you can make a connection.

Caution Do not use a baud rate of 38,400 for download. This causes Kermit to time out.

The following list identifies the Kermit error codes:

- T—Kermit timed out.

- N—Kermit is not acknowledging (NAK) the switch download process.

- E—Kermit detected an error in the progress of the transaction.

Example of a Successful PC Download

The following screen shows an example of a complete download procedure:

```
C:\ copy A:\*.*
copying nmpxx.rom
C:\ kermit
Kermit, 4C(057) 31 Jul 85, 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 28).
Type the escape character followed by C to get back,
or followed by ? to see other options
Console> enable
Console> (enable) download serial [nmp|dmp]
Return to your Local Machine by typing its escape sequence
Issue Kermit send command from there [Send 'Filename']
WAITING FOR DOWNLOAD!!

<CONTROL-\ c to return to Local Machine>

Kermit> send nmpxx.rom


          File name: nmpxx.rom
 KBytes transferred: xxxx
Percent transferred: 100%
            Sending: Complete

  Number of Packets: xxxx
  NUmber of retries: None
         Last error: None
       Last warning: None
```

```
Kermit> connect


Cisco Systems Console
Enter password:
Wed Oct 26, 1994, 17:35:08
Console>
```

Copying the Software Using a Sun Workstation

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

Step 1 Connect a workstation serial port to the switch admin. port as described in the chapter "Connecting to the Network." Make sure you know the baud rate of the switch so you can set the line speed on the workstation accordingly.

Step 2 Insert the 3.5-inch software update disk into the floppy drive on the workstation.

Step 3 At the workstation prompt, change your working directory to */tmp* by entering the following command:

```
workstation% cd /tmp
```

Step 4 At the workstation prompt, use the **tar** command to copy the new boot rom file to the */tmp* directory. For example:

```
workstation% tar -xvfp /dev/rfd0
```

The following message displays while the files are being copied, where *xx* in the filename is the software revision number:

```
x nmpxx.rom, xxxxxxx bytes, xxxx tape blocks
x dmpxx.rom, xxxxxxx bytes, xxxx tape blocks
```

The number of bytes and tape blocks that display may be different.

Set Kermit Parameters

To set the Kermit file transfer parameters, perform the following steps:

Step 1 At the workstation prompt, start Kermit on the workstation:

```
workstation% kermit
```

The workstation prompt, changes to a Kermit> prompt similar to the following:

```
C-Kermit, 4E(072) 24 Jan 89, SUNOS 4.x
Type ? for help
Kermit>
```

Step 2 At the Kermit> prompt, specify the serial port connected to the switch by entering the following command, where *x* is port a or b:

```
Kermit> set line /dev/ttyx
```

Step 3 At the Kermit> prompt, enter the following command to set the baud rate for the serial port, where *n* is the port speed of the switch:

```
Kermit> set speed n
```

The default port speed for the switch is 9,600 baud.

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

Note   To change the line speed for the file transfer, first use the **set baud** command on the switch, then escape back to Kermit to execute a **set speed** command.

Download the New Software to the Switch

To download the software from the workstation, follow these steps:

Step 1 At the Kermit> prompt, enter the following command to connect to the switch:

```
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>
```

If your line and speed are set correctly, the console prompt appears.

Step 2 At the console prompt, enter **enable** to enter privileged mode:

```
Console> enable
Console> (enable)
```

Step 3 At the console prompt, enter the download command:

```
Console> (enable) download serial [nmp|dmp]
```

Note Entering this command takes the switch out of service and affects your network. Be sure the software is on a local workstation (connected directly to the switch) and not on a Network File System (NFS) mounted partition.

Step 4 After you press **Return**, the switch waits for the new software to arrive. The following message displays:

```
Cisco switch Boot ROM 1.00

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

Step 5 At this point you must enter the escape sequence **Crtl**-\-**c to return to the** Kermit> **prompt.**

To enter this sequence correctly, hold down the **Control** key while you press \ and then press **c**.

Step 6 At the Kermit> prompt, enter the following command to send the file to the switch (where *xx* is the software revision number):

```
[Back at Local System]
C-Kermit> send nmpxx.rom
SF
nmpxx.rom => nmpxx.ROM, 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?
```

Note During the download, the 1/A and 2/B LEDs on the front panel of the switch alternately flash green. Also, the traffic meter LEDs increment in binary counter fashion for each packet received by the switch.

A dot appears on the screen for every four packets transferred. Other letters appear if Kermit has trouble transferring the file. You can monitor the progress of the download by typing **a** at any time during the Kermit download.

When the file transfer is finished you hear a beep, and the following message appears:

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

Step 7 Press **Return** to return to the Kermit> prompt:

```
    Kermit>
```

If the file transfer is successful, the switch erases Flash memory and reprograms it with the new software. The following messages display during the process:

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

If the switch successfully reprograms Flash memory, the new software executes as follows:

```
BOOTROM Version 1.0, Dated Feb 15 1994 11:15:14
Booting on Feb 24 1994 12:10:56

NMP Diagnostics Version 4.X, Dated Feb 20 1994 10:12:39
Model C1201, Board Serial# 1234, H/W Rev 2.1

Model C1201, Board Serial# 1234, H/W Rev 2.1
Copyright (C) Cisco Systems Inc. 1993, 1994

DMP Diagnostics Version 4.X, Dated Feb 21 1994 12:14:26
Model C1201, Board Serial# 1234, H/W Rev 2.1
Copyright (C) Cisco Systems Inc. 1993, 1994
```

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

```
Cisco Systems Console
Enter password:
Wed Oct 26, 1994, 17:35:08
Console>
```

This concludes the download procedure; the switch is now executing the new software. You can check the Sw field in the **show system** command display to verify that the new software is running.

Troubleshooting the Download Procedure

The most common problem with Kermit file transfers is an incorrect line setting. Make sure that the serial port on the Sun or PC connected to the switch matches the **set line** or **set port** command.

If you cannot communicate at all with the switch and you are sure that the **set line** command is correct, check the serial port baud rate. The default baud rate of the switch admin. port is 9,600. If the switch baud rate was changed to an unknown value, you may have to enter several **set speed** commands in Kermit before you can make a connection.

> ⚠️ **Caution**   Do not use a baud rate of 38,400 for download. This causes Kermit to time out.

On a Sun workstation, make sure that the shell window you are using is a local window (not an rlogin window to a different workstation).

During a successful file transfer, a dot appears on the screen for every four packets transferred. If Kermit has trouble transferring the file, other code letters may appear.

The following list identifies the Kermit error codes:

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

Example of a Successful Download

The following screen shows an example of a complete download procedure.

```
workstation% cd /tmp
workstation% tar -xvfp /dev/rfd0
x nmpxx.rom, 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 nmpxx.rom
workstation% kermit
C-Kermit, 4E(072) 24 Jan 89, 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 nmpxx

Switch Boot ROM (Ver 1.00)

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 nmpxx.rom
SF
nmpxx.rom => nmpxx.ROM, 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:
       Wed Oct 26, 1994, 17:35:08
Console>
```

Troubleshooting Download Errors

Use Table B-1 as a guide to troubleshoot problems when downloading software to the Catalyst 1200 series switch.

Table B-1   Download Errors

Error	Possible Cause	Possible Solution
File not found. tftp_req_file failed, val=-1	The command syntax is incorrect, or the file cannot be found on the TFTP server.	Enter **download help** for syntax information and retype the command. Make sure the file name is correct and that the file is located on the TFTP server.
No more processes. tftp_reqfile failed, val=-1	The Catalyst 1200 switch has no processes available (max. = 16)	Terminate unnecessary tasks, such as telnet sessions or pings. Then retry the download.
TFTP session in progress. Try again later.	There is already a download in progress.	Retry the download when the current download process is complete.
<LCP> not enough memory, use fragmented buffers. <LCP> use fragmented buffers for download.	The Catalyst 1200 switch did not find an unfragmented memory chunk, as required for the download process. The Catalyst 1200 allocates the fragmented buffers to a chained list and continues.	None required.

Error	Possible Cause	Possible Solution
<LCP> RMON task killed.[1]	If after allocating the fragmented buffer to a chained list, the Catalyst 1200 switch still does not have enough memory, it terminates the RMON task.	None required.
<LCP> Router RIP killed.[1.] <LCP> SNMPDM killed.[1.] <LCP> THREAD killed.[1.]	If after allocating the fragmented buffer to a chained list and terminating the RMON task, the Catalyst 1200 switch still does not have enough memory, it terminates the RIP, SNMPDM, and THREAD tasks.	None required.
No Response from host. tftp_req_file_failed, val=-1	The Catalyst 1200 attempted to connect to the TFTP server, but the connection failed.	Check the physical connectivity to the server. Then check that the IP address or alias for the TFTP server is correct and retry the download.
Can't allocate process state buffer.	The Catalyst 1200 switch does not have enough memory to start the TFTP process.	Other applications might be using too much memory. Retry the download when there is less traffic or terminate the unnecessary telnet sessions or pings.
TFTP failed. Too many retries.	The Catalyst 1200 was disconnected from the TFTP server while downloading the image file.	Check that the network is operational, then retry the download.
Downloaded NMP code length is bad. tftp_req_file failed, val=-1	The image was corrupted because of a TFTP problem.	Retry the download.
Downloaded NMP code checksum failed. tftp_req_file failed, val=-1	The image was corrupted because of a TFTP problem.	Retry the download.

Error	Possible Cause	Possible Solution
The NMP flash was damaged, must first download a valid image.	The user entered Ctrl-C while the Catalyst 1200 switch was clearing or erasing Flash memory.	Retry the download of the same Flash image. If this error occurs again, contact Cisco's Technical Assistance Center.

1. After the download successfully completes, the Catalyst 1200 switch automatically reboots and restarts terminated processes.