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Xmodem Console Download Procedure Using ROMmon

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Introduction

This document explains how to use the **xmodem** command at the console to download Cisco IOS® software using the ROM monitor (ROMmon).

Before You Begin

Conventions

For more information on document conventions, see the Cisco Technical Tips Conventions.

Prerequisites

There are no specific prerequisites for this document.

Components Used

The information in this document is based on the software and hardware versions below.

- Cisco 827, 1600, 1700, 2600, 3600, and 3700 Series Routers
- Cisco AS5200, AS5300, AS5350, and AS5400 Universal Access Servers

Note: Xmodem can also be used on certain Catalyst switches.

The information presented in this document was created from devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If you are working in a live network, ensure that you understand the potential impact of any command before using it.

Overview

Xmodem can be used on a group of routers (see Components Used) and is used in disaster recovery situations where the router has no valid Cisco IOS software or bootflash image to boot from and hence, only boots up in ROMmon. This procedure can also be used where there are no Trivial File Transfer Protocol (TFTP) servers or network connections, and a direct PC connection (or through a modem connection) to the router's console is the only viable option. Because this procedure relies on the console speed of the router and the serial port of the PC, it can take a long time to download an image. For example, downloading Cisco IOS Software Release 12.1(16) IP Plus image to a Cisco 1600 Series Router using a speed of 38400 bps takes approximately 25 minutes.

Usage

Here is the command syntax for **xmodem** as per the Command Reference Manual for Cisco IOS version 12.2.

```
xmodem [-c] [-y] [-e] [-f] [-r] [-x] [-s data-rate]
```

The following table describes the command syntax for the **xmodem** command.

syntax	Description
-c	(Optional) CRC-16 checksumming, which is more sophisticated and thorough than standard checksumming.
-y	(Optional) Uses the Ymodem protocol for higher throughput.
-e	(Optional) Erases the first partition in Flash memory before starting the download. This option is only valid for the Cisco 1600 series.
-f	(Optional) Erases all Flash memory before starting the download. This option is only valid for the Cisco 1600 series routers.
-r	(Optional) Downloads the file to DRAM. The default is Flash memory.
-x	(Optional) Does not execute the Cisco IOS software image on completion of the download.
-s ***data-rate***	(Optional) Sets the console port's data rate during file transfer. Values are 1200, 2400, 4800, 9600, 19200, 38400, and 115200 bps. The default rate is specified in the configuration register. This option is only valid for the Cisco 1600 series routers.
filename	(Optional) Filename to copy. This argument is ignored when the -r keyword is specified since only one file can be copied to DRAM. On the Cisco 1600 series routers, files are loaded to the ROMmon for execution.

Note: **xmodem** options **e**, **f**, and **s** are only supported on the Cisco 1600 Series Routers. To find out the

syntax and available options to use with the **xmodem** command, type **xmodem −?** at the ROMmon prompt.

Here's an example of the **xmodem** command issued on a Cisco 1603 router:

```
rommon 9 >xmodem −?
usage: xmodem [−cyrxefs]<destination filename>
−c  CRC−16
−y  ymodem−batch protocol
−r  copy image to dram for launch
−x  do not launch on download completion
−f  Perform full erase of flash
−e  Perform erase of first flash partition
−s<speed>Set speed of Download, where speed may be
1200|2400|4800|9600|19200|38400|115200
```

Here's an example of the **xmodem** command issued on a Cisco 2620 router:

```
rommon 1 >xmodem −?
xmodem: illegal option −− ?
usage: xmodem [−cyrx] <destination filename>
−c  CRC−16
−y  ymodem−batch protocol
−r  copy image to dram for launch
−x  do not launch on download completion
```

Examples

```
rommon 12 > xmodem −cfs115200 c1600−sy−mz.121−16.bin
rommon 2 > xmodem −c c2600−is−mz.122−10a.bin
```

Notes:

- The **xmodem** transfer only works on the console port. You can only download files to the router. You cannot use **xmodem** to get files from the router.
- It is also important to note that the −sdata−rate option is only available on the Cisco 1600 Series Routers and was implemented to overcome the console baud rate limitation of 9600 bps. By specifying −sdata−rate of 115200 bps for example, you can increase the download rate and hence, reduce download time. Other Cisco routers support console speeds up to 115200 bps. Therefore, the −sdata−rate option is not required.
- Ensure that the PC serial port is using a 16550 universal asynchronous transmitter/receiver (UART) if you're downloading a Cisco IOS software image through the router's console speed at 115200. If the PC serial port is not using a 16550 UART, it is recommended that you use a speed of 38,400 or lower.

Xmodem Procedure for Downloading a Cisco IOS Software Image onto a Cisco 1603 Router

Use the following xmodem procedure to download a Cisco IOS software image onto a Cisco 1603 router.

1. Launch a terminal emulator program.

   In the following example, configure Windows HyperTerminal for 8−N−1 at 9600 bps and connect your PC's serial port to the console port of the router. Once connected, you need to get into the ROMmon prompt (rommon 1>). Typically, if the router's Cisco IOS software image and bootflash image are both corrupt, the router only comes up in ROMmon mode. If the former is not true and you

need to get into the ROMmon prompt, you need to change the configuration register (typically 0x2102 as given by **show version**) to 0x0 as follows:

```
1600#configure term
Enter configuration commands, one per line.  End with CNTL/Z.
1600(config)#configure
1600(config)#config-register 0x0
1600(config)#^Z
1600#
00:22:06: %SYS-5-CONFIG_I: Configured from console by console
1600#reload
System configuration has been modified. Save? [yes/no]: n
Proceed with reload? [confirm]
00:22:16: %SYS-5-RELOAD: Reload requested
System Bootstrap, Version 12.0(3)T, RELEASE SOFTWARE (fc1)
Copyright (c) 1999 by cisco Systems, Inc.

Simm with parity detected, ignoring onboard DRAM
C1600 platform with 16384 Kbytes of main memory
rommon 1 >
```

2. From the ROMmon prompt, issue the **xmodem** command. However, before issuing the **xmodem** command, ensure that you have the new Cisco IOS software image on your PC.

   In this example, all Flash memory is erased before downloading using the f option (only on the Cisco 1600 Series). Perform a CRC−16 checksum using the c option and using a download speed of 115200 bps (only on the Cisco 1600 Series) by specifying −s115200:

   ```
   rommon 12 >xmodem -cfs115200 c1600-sy-mz.121-16.bin
   Do not start the sending program yet...
   ```

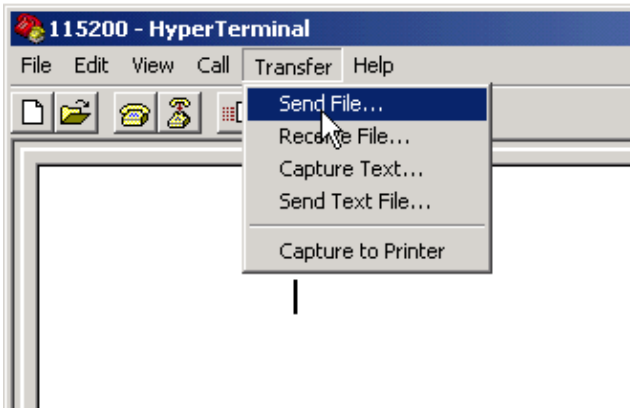
   Note: If the console port is attached to a modem, both the console port and the modem must be operating at the same baud rate.

   ```
   Use console speed 115200 bps for download [confirm]
   File size Checksum File name
   1957444 bytes (0x1dde44) 0xe345 c1600-y-mz.113-9.T

   Erasing flash at 0x83f0000 no partition 2 on device: PCMCIA slot 1

   Ready to receive file c1600-sy-mz.121-16.bin ...
   Download will be performed at 115200.
   make sure your terminal emulator is set to
   this speed before sending file.
   ```

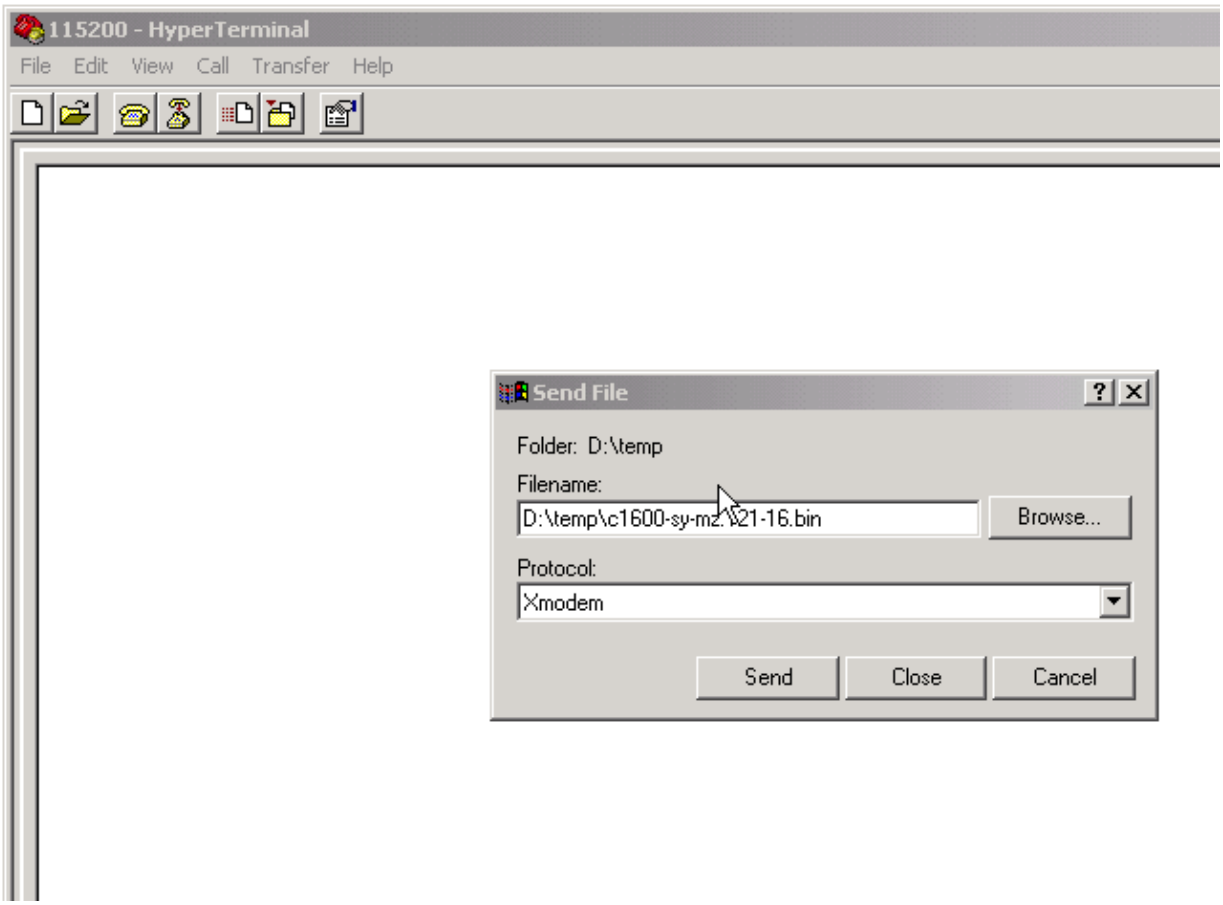
    **Warning:**

   ```
   All existing files in the partition displayed and files in any
   other partitions on this device will be lost! Continue ? press 'y'
   for yes, 'n' for no:y
   ```

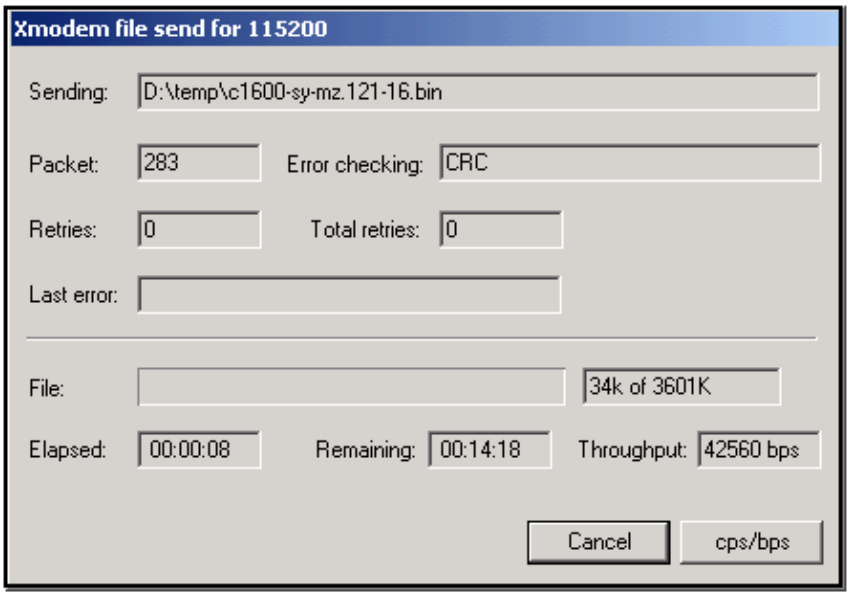
3. Configure the terminal emulator program for a data rate of 115200 bps to match the xmodem speed specified above. This is done by closing the previous terminal session of 9600 bps and opening a new one at 115200 with 8−N−1. The trick here is that the Cisco 1603 only supports a maximum baud rate of 9600 bps. Therefore, when connecting at 115200 bps, you won't be able to see the router prompt. This is an important point to remember. Once connected to the router at 115200 bps, select **Transfer** and **Send File** from the HyperTerminal menu bar.



4. Specify the image file name and location and enter **xmodem** as the protocol.



5. Click on Send to start the transfer.



The following message is received when the transfer is complete:

```
Download Complete!

Returning console speed to 9600

Please reset your terminal emulator to this speed...
```

6. Per the message above, you need to exit your 115200 bps HyperTerminal session and restart a new one at 9600 bps. Once connected, the router's ROMmon prompt appears. Verify that the download was successful by issuing a **dir flash**:.

```
rommon 9 >dir flash:
File size Checksum File name
3686656 bytes (0x384100) 0x1a5e c1600-sy-mz.121-16.bin
```

7. Change the config register back to 0x2102 and reset or power cycle the router so that the new Cisco IOS software image gets loaded.

```
rommon 10 >confreg 0x2102

You must reset or power cycle for new config to take effect.

rommon 11 >reset
System Bootstrap, Version 12.0(19981130:173850) [rameshs-120t_lava 114],
DEVELOPMENT SOFTWARE Copyright (c) 1994-1998 by cisco Systems, Inc.
Simm with parity detected, ignoring onboard DRAM
C1600 platform with 16384 Kbytes of main memory
program load complete, entry point: 0x4020060, size: 0x15568c
%SYS-6-BOOT_MESSAGES: Messages above this line are from the boot loader.
program load complete, entry point: 0x2005000, size: 0x3840e0

Self decompressing the image : ########################################
################


........

Cisco Internetwork Operating System Software
IOS (tm) 1600 Software (C1600-SY-M), Version 12.1(16),
RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2002 by cisco Systems, Inc.
```

```
Compiled Mon 08-Jul-02 17:09 by kellythw
Image text-base: 0x02005000, data-base: 0x0275BD48
.......
```

Xmodem Procedure for Downloading a Cisco IOS Software Image onto a Cisco 2620 Router

Use the following **xmodem** procedure to download a Cisco IOS software image onto a Cisco 2620 router.

1. Launch a terminal emulator program.

   This example Windows HyperTerminal is configured for 8−N−1 at 9600 bps. Connect your PC's serial port to the console port of the router. Once connected, get into the ROMmon prompt (rommon 1>). Typically, if the router's Cisco IOS software image and bootflash image are both corrupt, the router only comes up in ROMmon mode. If the former is not true and you need to get into the ROMmon prompt, then you will need to change the configuration register (typically 0x2102 as given by **show version**) to 0x0 as follows:

   ```
   2620#configure terminal
   Enter configuration commands, one per line.  End with CNTL/Z.
   2620(config)#con
   2620(config)#conf
   2620(config)#config-register 0x0
   2620(config)#^Z
   2620#
   5d03h: %SYS-5-CONFIG_I: Configured from console by console
   2620#
   2620#reload

   System configuration has been modified. Save? [yes/no]: n
   Proceed with reload? [confirm]

   5d03h: %SYS-5-RELOAD: Reload requested
   System Bootstrap, Version 11.3(2)XA4, RELEASE SOFTWARE (fc1)
   Copyright (c) 1999 by cisco Systems, Inc.
   TAC:Home:SW:IOS:Specials for info
   C2600 platform with 65536 Kbytes of main memory

   rommon 1 >
   ```

2. Once in ROMmon, change the console baud rate from 9600 bps to 115200 bps to speed up the download time. Use the **confreg** command and follow the instructions presented on the screen.

   ```
   rommon 1 >confreg
   Configuration Summary
   enabled are:
   break/abort has effect
   console baud: 9600
   boot: the ROM Monitor

   do you wish to change the configuration? y/n [n]: y
   enable "diagnostic mode"? y/n [n]:
   enable "use net in IP bcast address"? y/n [n]:
   enable "load rom after netboot fails"? y/n [n]:
   enable "use all zero broadcast"? y/n [n]:
   disable "break/abort has effect"? y/n [n]:
   enable "ignore system config info"? y/n [n]:
   change console baud rate? y/n [n]: y
   enter rate: 0 = 9600, 1 = 4800, 2 = 1200, 3 = 2400
   4 = 19200, 5 = 38400, 6 = 57600, 7 = 115200 [0]: 7
   ```

```
change the boot characteristics? y/n [n]:

Configuration Summary
enabled are:
break/abort has effect
console baud: 115200
boot: the ROM Monitor

do you wish to change the configuration? y/n [n]:

You must reset or power cycle for new config to take effect.

rommon 2 >
```

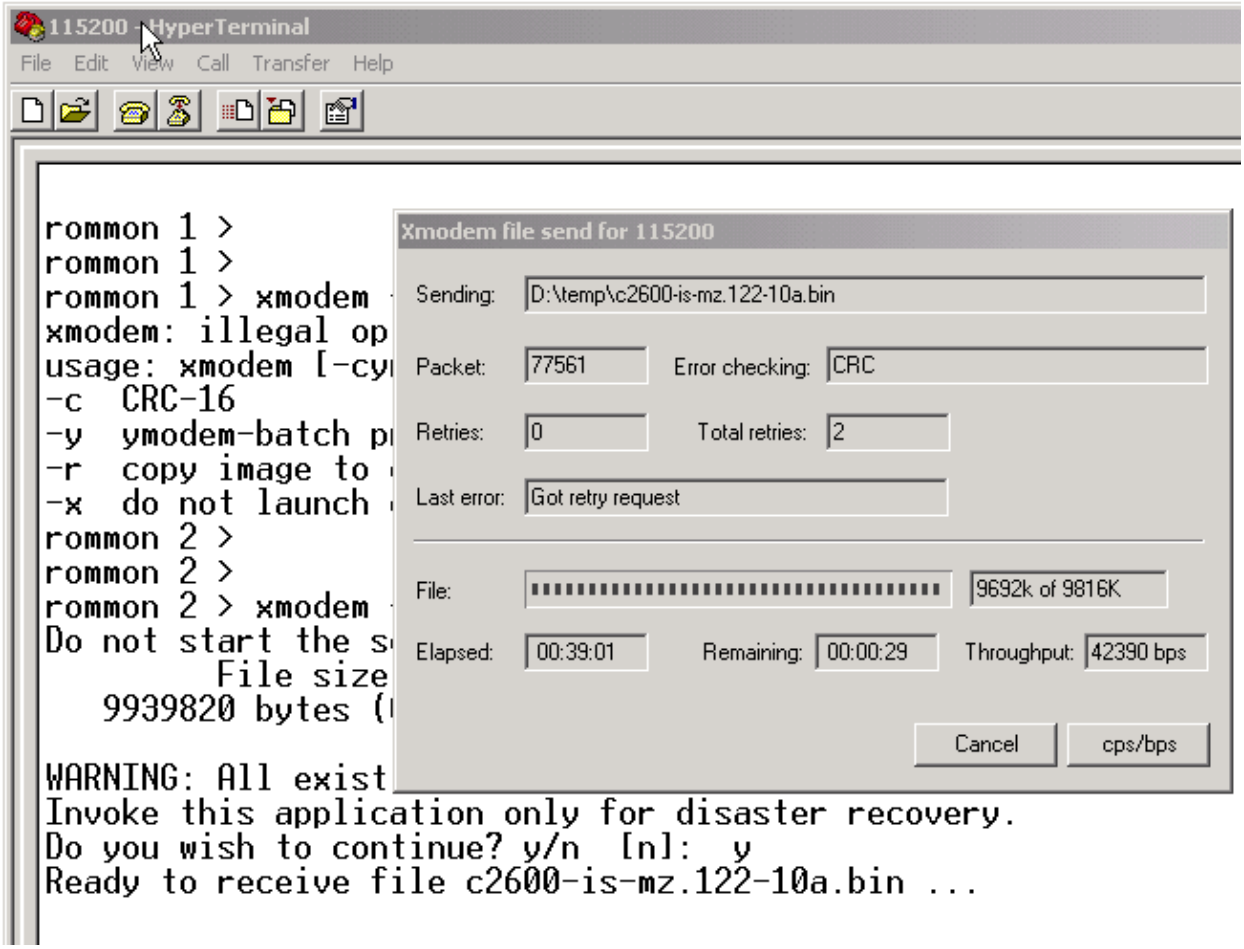
3. Once the router boots up in ROMmon, the HyperTerminal sessions start to display illegible characters. You need to exit the current terminal session and start a new one at a data rate of 115200 bps to match the console rate as in step 2 above.
4. You are now ready to issue the **xmodem** command. However, before issuing the **xmodem** command, ensure that you have the new Cisco IOS software image on your PC.

```
rommon 1 >
rommon 1 >xmodem -?
xmodem: illegal option -- ?
usage: xmodem [-cyrx] <destination filename>
-c  CRC-16
-y  ymodem-batch protocol
-r  copy image to dram for launch
-x  do not launch on download completion
rommon 2 >
rommon 2 >
rommon 2 > xmodem -c c2600-is-mz.122-10a.bin

!--- Note that [-s datarate] is not available here since you are set for 115200 bps.

Do not start the sending program yet...
       File size           Checksum  File name
9939820 bytes (0x97ab6c)   0x4991    c2600-is-mz.122-7a.bin
```

Warning:

```
All existing data in bootflash will be lost!
Invoke this application only for disaster recovery. Do you wish to continue?
y/n [n]: y Ready to receive file c2600-is-mz.122-10a.bin ...
```

5. From the HyperTerminal menu bar select **Transfer** > **Send** and specify the image name/location and **xmodem** protocol as in steps 3 and 4 above and start the transfer.



6. Once the transfer is complete, the following messages appears:

```
Erasing flash at 0x60fc0000
program flash location 0x60990000

Download Complete!
```

Notice how the Flash gets erased towards the end automatically compared to Cisco C1600. Hence, the reason why the f option is not required here. Finally, ensure that you reset the console speed back to 9600 and change the boot sequence back to default by changing the configuration register back to 0x2102 as follows:

```
rommon 12 > confreg 0x2102

You must reset or power cycle for new config to take effect
rommon 2 >reset

System Bootstrap, Version 11.3(2)XA4, RELEASE SOFTWARE (fc1)
Copyright (c) 1999 by cisco Systems, Inc.
TAC:Home:SW:IOS:Specials for info
C2600 platform with 65536 Kbytes of main memory

program load complete, entry point: 0x80008000, size: 0x995ec8
Self decompressing the image : ################################
########################################################################
########################################################################
########################    [OK]

.............................
```

```
Cisco Internetwork Operating System Software
IOS (tm) C2600 Software (C2600−IS−M), Version 12.2(10a), RELEASE SOFTWARE (fc1)
Copyright (c) 1986−2002 by cisco Systems, Inc.
Compiled Tue 21−May−02 14:16 by pwade
Image text−base: 0x80008088, data−base: 0x810ABB08

cisco 2620 (MPC860) processor (revision 0x100) with 61440K/4096K bytes of memory.
Processor board ID JAB03110MUB (3691217154)
M860 processor: part number 0, mask 49
Bridging software.
X.25 software, Version 3.0.0.
1 FastEthernet/IEEE 802.3 interface(s)
2 Voice FXS interface(s)
32K bytes of non−volatile configuration memory.
16384K bytes of processor board System flash (Read/Write)

Press RETURN to get started!

.........................
```

Xmodem Procedure for Downloading a Cisco IOS Software Image onto a Cisco 3600 Router

Use the following **xmodem** procedure to download a Cisco IOS software image onto a Cisco 3600 Series Router.

The standard procedure uses the default console speed of 9600 bits per second. Xmodem is a slow transfer protocol, and the transfer of a file as large as a Cisco IOS software image could take an unacceptably long time. Increasing the console speed on the 3600 router helps decrease the time it takes to do the xmodem file transfer.

When in ROMMON mode, follow the procedure below using the ROMMON **confreg** utility.

1.
```
rommon 2 > confreg
do you wish to change the configuration? y/n [n]:  y
enable  "diagnostic mode"? y/n  [n]: n
enable  "use net in IP bcast address"? y/n  [n]: n
disable "load rom after netboot fails"? y/n  [n]: n
enable  "use all zero broadcast"? y/n  [n]: n
enable  "break/abort has effect"? y/n  [n]: n
enable  "ignore system config info"? y/n  [n]: n
change console baud rate? y/n  [n]:  y
enter rate: 0 = 9600,  1 = 4800,  2 = 1200,  3 = 2400
            4 = 19200, 5 = 38400, 6 = 57600, 7 = 115200  [7]:  7
change the boot characteristics? y/n  [n]:  y
enter to boot:
 0 = ROM Monitor
 1 = the boot helper image
 2−15 = boot system
    [0]:  0

    Configuration Summary

enabled are:
load rom after netboot fails
console baud: 115200
boot: the ROM Monitor
do you wish to change the configuration? y/n  [n]: n
You must reset or power cycle for new config to take effect
rommom 2 > reset
```

2. Open a new hyperterminal with settings as follows:

```
Bits per second − 115200
Data bits − 8
Parity − None
Stop bits − 1
Flow control − Hardware
```

3. After setting the hyperterminal, you get a rommon prompt. Enter the **xmodem** command. Before typing an **xmodem** command, there should be a software image residing in your terminal or your local hard drive.

```
rommon 2 > xmodem −c c3640−i−mz.121−7.bin

Do not start the sending program yet...
         File size           Checksum   File name

   4936800 bytes (0x4b5460)   0x2dd7    c3640−i−mz.121−7.bin (bad checksum: 0x13eb)

WARNING: All existing data in flash will be lost!

Invoke this application only for disaster recovery.

Do you wish to continue? y/n  [n]:  y

Ready to receive file c3640−i−mz.121−7.bin ...
```

4. After the above message appears, you have to download the file using **xmodem** and the following procedure:

    a. Go to Hyperterminal and click the Transfer menu
    b. Select Send File
    c. In the dialog box which appears, click on browse; look for the file name on your local hard drive
    d. Below the filename field is the Protocol drop−down box; select Xmodem
    e. Click Send to initiate the file transfer

5. After the transfer completes, the router will reload itself. When the reload completes, press the **return** key to be taken to a prompt and to reset the configuration register and the console line speed.

```
Router> enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#configure terminal
Router(config)#config−register 0x2102
Router(config)#line con 0
Router(config−line)# speed 9600
```

6. Upon changing the console speed, you will lose connectivity. Go to your terminal program, change the baud rate to 9600, and reconnect to the router console.

```
Router(config−line)#ctrl z
Router #write mem
Router #reload
```

Related Information

- **Technical Support − Cisco Systems**

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