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Release Notes for Cisco IOS Release 11.2(4) Software Feature Packs—Cisco AS5200 Access Servers

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These release notes identify the Cisco Internetwork Operating System (Cisco IOS) Release 11.2 feature packs for Cisco AS5200 access servers.

Product numbers for the supported feature packs are as follows:

- CD52-C-11.2= (Cisco AS5200 IP Feature Pack)
- CD52-CP-11.2= (Cisco AS5200 IP Plus Feature Pack)
- CD52-B-11.2= (Cisco AS5200 Desktop Feature Pack)
- CD52-BP-11.2= (Cisco AS5200 Desktop Plus Feature Pack)
- CD52-A-11.2= (Cisco AS5200 Enterprise Feature Pack)
- CD52-AP-11.2= (Cisco AS5200 Enterprise Plus Feature Pack)

What is a Feature Pack?

The heart of a Cisco Internetwork Operating System (Cisco IOS) software feature pack is a CD-ROM that contains software images and the Router Software Loader, a Windows 95 application, which loads the images onto the access server. Each Cisco IOS Release 11.2 feature pack CD contains two feature *sets* and one modem firmware image. For users without Windows 95, images can also be loaded with Windows 3.1 and a TFTP server application.

Each Cisco IOS Release 11.2 software feature pack box contains the following items:

- CD-ROM with the following software:
 - Access server software images
 - Modem software images
 - Software installer program (a Windows 95 application)

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- Instruction booklet for using the Router Software Loader program
- Release notes (this document), which include instructions for using a TFTP server application and Windows 3.1 as an alternative to Windows 95
- Software license—for using Cisco software in object code form on a single router
- Cisco Documentation CD-ROM, which contains all Cisco IOS software documentation

Note Before running the Router Software Loader, read the section “Installation Tips,” page 5.

These release notes contain the following sections:

- Cisco Feature Pack Descriptions, page 2
- Memory Requirements and Recommendations, page 4
- Installation Tips, page 5
- Cisco IOS Release 11.2 and 11.1 Feature Sets, page 6
- Installation Process for Router Software, page 14
- Installing the Software Using Microsoft Windows 3.1, page 13
- Additional Release Note Information, page 25
- About Cisco IOS Software Electronic Documentation, page 25
- Cisco Connection Online, page 28

Cisco Feature Pack Descriptions

This section describes the Cisco feature packs, listing the software feature sets comprising each feature pack. You can use this information to identify your feature pack set in conjunction with the corresponding information provided in the tables in the section “Cisco IOS Release 11.2 and 11.1 Feature Sets,” page 6. Tables in that section identify which features are supported for a feature set on a specific platform.

Software Feature Packs

Table 1 identifies each feature pack as specified on the label of the CD containing the router software. It also lists the feature sets comprising the feature pack, giving the DOS and UNIX filenames of the images. The table provides a brief description of each feature set and the router platform on which the feature set runs.

Note If your Cisco AS5200 contains an E1 interface, load a Cisco IOS Release 11.1(9)AA image that resides on your Cisco IOS Release 11.2 software feature pack CD. Cisco IOS Release 11.2(4)P does not support this interface.

Table 1 Cisco Feature Pack Feature Set Image Filenames

Feature Sets Included	DOS Filename	UNIX Filename	Description
Cisco AS5200 IP Feature Pack Release 11.2 and 11.1 (model number CD52-C-11.2=)			
IP for Cisco IOS 11.2(4)	80138004	c5200-i-1.112-4.P	IP feature set for Cisco AS5200 access servers
IP for Cisco IOS 11.1(9)AA	80111609	as5200-iz-1.111-9.AA	IP feature set for Cisco AS5200 access servers
Modem Firmware	80146101	mcom-modem-firmware.2.1.9.bin	Firmware images for Cisco AS5200 access servers
Cisco AS5200 IP Plus Feature Pack Release 11.2 and 11.1 (model number CD52-CP-11.2=)			
IP Plus for Cisco IOS 11.2(4)	80138104	c5200-is-1.112-4.P	IP Plus feature set for Cisco AS5200 access servers
IP Modem for Cisco IOS 11.1(9)AA	80111609	as5200-iz-1.111-9.AA	IP Plus feature set for Cisco AS5200 access servers
Modem Firmware	80146101	mcom-modem-firmware.2.1.9.bin	Firmware images for Cisco AS5200 access servers
Cisco AS5200 Desktop Feature Pack Release 11.2 and 11.1 (model number: CD52-B-11.2=)			
Desktop for Cisco IOS 11.2(4)	80137804	c5200-d-1.112-4.P	Desktop feature set for Cisco AS5200 access servers
Desktop for Cisco IOS 11.1(9)AA	80111509	as5200-dz-1.111-9.AA	Desktop feature set for Cisco AS5200 access servers
Modem Firmware	80146101	mcom-modem-firmware.2.1.9.bin	Firmware images for Cisco AS5200 access servers
Cisco AS5200 Desktop Plus Feature Pack Release 11.2 and 11.1 (model number CD52-BP-11.2.4.P=)			
Desktop Plus for Cisco IOS 11.2(4)	80137904	c5200-ds-1.112-4.P	Desktop Plus feature set for Cisco AS5200 access servers
Desktop Modem for Cisco IOS 11.1(9)AA	80111509	as5200-dz-1.111-9.AA	Desktop Plus feature set for Cisco AS5200 access servers
Modem Firmware	80146101	mcom-modem-firmware.2.1.9.bin	Firmware images for Cisco AS5200 access servers
Cisco AS5200 Enterprise Feature Pack Release 11.2 and 11.1 (model number CD52-A-11.2=)			
Enterprise for Cisco IOS 11.2(4)	80138204	c5200-j-1.112-4.P	Enterprise feature set for Cisco AS5200 access servers
Enterprise for Cisco IOS 11.1(9)AA	80111409	as5200-jmz-1.111-9.AA	Enterprise feature set for Cisco AS5200 access servers
Modem Firmware	80146101	mcom-modem-firmware.2.1.9.bin	Firmware images for Cisco AS5200 access servers
Cisco AS5200 Enterprise Plus Feature Pack Release 11.2 and 11.1 (model number CD52-AP-11.2=)			
Enterprise Plus for Cisco IOS 11.2(4)	80138304	c5200-js-1.112-4.P	Enterprise Plus feature set for Cisco AS5200 access servers
Enterprise for Cisco IOS 11.1(9)AA	80111409	as5200-jmz-1.111-9.AA	Enterprise Plus feature set for Cisco AS5200 access servers
Modem Firmware	80146101	mcom-modem-firmware.2.1.9.bin	Firmware images for Cisco AS5200 access servers

Note The Cisco Router Software Loader Version 4.1, contained on every Cisco IOS Release 11.2 and 11.1 software feature pack, supports both Ethernet and Token Ring interfaces.

Memory Requirements and Recommendations

This section includes two tables: Table 2 identifies the memory required to run each feature set on the Cisco AS5200 access server; Table 3 describes the memory delivered by default and the memory upgrades available.

You can use Table 2 to identify the memory required for your configuration based on the image you run. You can then check this against Table 3 to determine how much memory is available on the access server as the factory default and the upgrades that you can obtain to satisfy your requirements.

Table 2 Cisco AS5200 Feature Set Memory Requirements

Feature Set	Description	System Flash Memory Requirements	Bootflash Memory Requirements	DRAM Main Memory Requirements	Shared DRAM Memory Requirements
Cisco AS5200 IP Feature Pack Release 11.2					
IP	IP feature pack for Cisco AS5200 access servers	8 MB (default)	4 MB (default)	8 MB	4 MB (default)
Cisco AS5200 IP Plus Feature Pack Release 11.2					
IP Plus	IP Plus feature set for Cisco AS5200 access servers	8 MB (default)	4 MB (default)	8 MB	4 MB (default)
Cisco AS5200 Desktop Feature Pack Release 11.2					
Desktop	Desktop feature set for Cisco AS5200 access servers	8 MB (default)	4 MB (default)	8 MB	4 MB (default)
Cisco AS5200 Desktop Plus Feature Pack Release 11.2					
Desktop Plus	Desktop Plus feature set for Cisco AS5200 access servers	8 MB (default)	4 MB (default)	8 MB	4 MB (default)
Cisco AS5200 Enterprise Feature Pack Release 11.2					
Enterprise	Enterprise feature set for Cisco AS5200 access servers	8 MB (default)	4 MB (default)	8 MB	4 MB (default)
Cisco AS5200 Enterprise Plus Feature Pack Release 11.2					
Enterprise Plus	Enterprise Plus feature set for Cisco AS5200 access servers	8 MB (default)	4 MB (default)	8 MB	4 MB (default)

Table 3 Cisco AS5200 Memory Upgrade Options

	Default	Upgrade Options
Flash System	8 MB	16-MB upgrade: MEM-1X16-AS52=
Flash Bootflash	4 MB	8-MB upgrade: MEM-BF-52=
DRAM	8 MB	16-MB upgrade: MEM-16M-52=
Shared	4 MB	8-MB upgrade: MEM-8S-52=

Installation Tips

This section describes several solutions to problems you might encounter when using the Router Software Loader. These solutions are additions to the loader's online help.

Recovering From a Connection Error

This installation tip provides a possible recovery solution in the event that you are unable to connect to your router. You can skip this section unless you are experiencing a connection error.

In some cases, you might receive the following error message while connecting to the target router:

```
"Failed to configure the router to enable the Cisco IOS software image and configuration file upload and download operations. You may want to check the router to make sure that the selected interface exists."
```

If you encounter this message, try increasing the Short Timeout value in the Options Dialog box, especially if one of the following situations applies:

Note Increasing the Short Timeout value may increase the time it takes for the Router Software Loader to connect to the target router.

- You are connecting to a router that requires the Token Ring interface to be configured. It sometimes takes the Token Ring interface longer to come up than the default Short Timeout value of 15 seconds. Try increasing the Short Timeout to 25 seconds.
- You are connecting to a router that has a large configuration file. Large configuration files may take longer than the default Short Timeout value of 15 seconds to be written to nonvolatile random-access memory.
- You are connecting to a Cisco AS5200. A Cisco AS5200 requires up to 45 seconds to write a configuration to nonvolatile random-access memory, due to the amount of interfaces that must be checked during this process. Increase the Short Timeout value to 50 seconds.

Preserving the Router's Startup Configuration

As part of the connection procedure, the Router Software Loader writes the current running configuration of the router to the startup configuration in NVRAM. This operation overwrites the previous startup configuration file.



Caution If your router is running in ROM monitor mode or from the bootstrap image in ROM, and if the current startup configuration was created while running a full Cisco IOS system image, you should copy the startup configuration file to a network server before running the Router Software Loader. Otherwise, you might lose several configuration commands that are not supported by the bootstrap image, such as all routing and bridging configurations. As an option, if the router has a valid Cisco IOS image in Flash memory, you can reboot the router from the image in Flash before running the Router Software Loader. This way, your configuration commands will not be lost when the Router Software Loader writes the image to NVRAM. To do this, log into the router via the console port using Telnet or terminal emulation software. (If you use terminal emulation software, configure the software settings to 9600 baud, no parity, 8 data bits, and 1 stop bit.) Then follow steps 1 through 7 to reboot from flash:

Refer to the following steps to determine the operation mode of your particular router, and then how to reboot the router to run the image in Flash memory.

Step 1 After logging into the router, observe the command prompt.
If the prompt appears as a “rommon 1>” or “>,” the router is operating in ROM monitor mode.

Step 2 To boot the router from the image in Flash memory, enter the following command:

```
> b flash
```

The router will now load the Flash memory image. When the image is loaded, you can log out and start the Router Software Loader application.

If the prompt appears as “[router name](boot)>” or “[router name](boot)#,” the router is running the bootstrap image.

Step 3 Enter the **show version** command at the prompt and examine the Configuration Register value shown in the last line of the **show version** output.

Step 4 If your router shows the “[router name](boot)>” prompt, enter the **enable** command and supply the password if necessary.

Step 5 If the last digit of the Configuration Register is greater than 1, enter the **reload** command to reboot the router to run the image in Flash memory.

Step 6 If the last digit of the Configuration Register is less than 2, you must change the Configuration Register value before reloading, as follows:

```
router# configure terminal
```

Step 7 Enter the following configuration commands, one per line and end with **Ctrl-Z**:

```
router(config)# config-register 0x2102  
router(config)# exit  
router# reload
```

The router will now reboot and load the image in Flash memory. (If you were logged in via Telnet, you will be logged out automatically when the reboot operation begins.)

After the router reboots, you can log out and start the Router Software Loader application.

Cisco IOS Release 11.2 and 11.1 Feature Sets

This section identifies specific features, within a category of features, supported on a particular router platform. You can use the information given in the table provided in this section in conjunction with the information provided in the section “Cisco Feature Pack Descriptions,” page 2, to determine which features a particular feature set supports on a given platform.

Table 4 lists features for Cisco IOS Release 11.2, and Table 5 lists features for Cisco IOS Release 11.1.

The tables use these conventions to identify features:

- Yes: the feature is offered in the basic feature set
- – : the feature is not offered in the feature set
- Plus: the feature is offered only in the Plus feature sets, not in the basic feature set

Table 4 Cisco IOS Release 11.2 Feature Sets for Cisco AS5200 Access Servers

Features	IP Routing	Desktop (IP/IPX/AppleTalk/DEC)	Enterprise¹
LAN Support			
Apollo Domain	–	–	Yes
AppleTalk 1 and 2 ²	–	Yes	Yes
Banyan VINES	–	–	Yes
Concurrent routing and bridging (CRB)	Yes	Yes	Yes
DECnet IV	–	Yes	Yes
DECnet V	–	–	Yes
GRE	Yes	Yes	Yes
Integrated routing and bridging (IRB) ³	Yes	Yes	Yes
IP	Yes	Yes	Yes
LAN extension host	Yes	Yes	Yes
Multiring	Yes	Yes	Yes
Novell IPX ⁴	–	Yes	Yes
OSI	–	–	Yes
Source-route bridging (SRB)	–	–	Yes
Transparent and translational bridging	Yes	Yes	Yes
XNS	–	–	Yes
WAN Services			
ATM LAN emulation: Rate queues for SVC per subinterface	–	–	Yes
Combinet Packet Protocol (CPP)	Yes	Yes	Yes
Dialer profiles	Yes	Yes	Yes
Frame Relay	Yes	Yes	Yes
Frame Relay SVC Support (DTE)	–	–	Yes
Frame Relay traffic shaping	Yes	Yes	Yes
Half bridge/half router for CPP and PPP	Yes	Yes	Yes
HDLC	Yes	Yes	Yes
IPXWAN 2.0	–	Yes	Yes
ISDN ⁵	Yes	Yes	Yes
Multichassis Multilink PPP (MMP)	–	–	Yes
PPP ⁶	Yes	Yes	Yes
SMDS	Yes	Yes	Yes
Switched 56	Yes	Yes	Yes
Virtual Private Dial-up Network (VPDN)	–	Yes	Yes
X.25 ⁷	Yes	Yes	Yes

Table 4 Cisco IOS Release 11.2 Feature Sets for Cisco AS5200 Access Servers (Continued)

Features	IP Routing	Desktop (IP/IPX/AppleTalk/DEC)	Enterprise ¹
WAN Optimization			
Bandwidth-on-demand	Yes	Yes	Yes
Custom and priority queuing	Yes	Yes	Yes
Dial backup	Yes	Yes	Yes
Dial-on-demand	Yes	Yes	Yes
Header, ⁸ link and payload compression ⁹	Yes	Yes	Yes
Snapshot routing	Yes	Yes	Yes
Weighted fair queuing	Yes	Yes	Yes
IP Routing			
BGP	Yes	Yes	Yes
BGP4 ¹⁰	Yes	Yes	Yes
EGP	Yes	Yes	Yes
Enhanced IGRP	Yes	Yes	Yes
Enhanced IGRP Optimizations	Yes	Yes	Yes
ES-IS	–	–	Yes
IGRP	Yes	Yes	Yes
IS-IS	–	–	Yes
Named IP Access Control List	Yes	Yes	Yes
Network Address Translation (NAT)	Plus	Plus	Plus
NHRP	Yes	Yes	Yes
On Demand Routing (ODR)	Yes	Yes	Yes
OSPF	Yes	Yes	Yes
OSPF Not-So-Stubby-Areas (NSSA)	Yes	Yes	Yes
OSPF On Demand Circuit (RFC 1793)	Yes	Yes	Yes
PIM	Yes	Yes	Yes
Policy-based routing	Yes	Yes	Yes
RIP	Yes	Yes	Yes
RIP Version 2	Yes	Yes	Yes
Other Routing			
AURP	–	Yes	Yes
IPX RIP	–	Yes	Yes
NLSP	–	Yes	Yes
RTMP	–	Yes	Yes
SMRP	–	Yes	Yes
SRTP	–	–	Yes
Multimedia and Quality of Service			
Generic traffic shaping	Yes	Yes	Yes

Table 4 Cisco IOS Release 11.2 Feature Sets for Cisco AS5200 Access Servers (Continued)

Features	IP Routing	Desktop (IP/IPX/AppleTalk/DEC)	Enterprise¹
Random Early Detection (RED)	Yes	Yes	Yes
Resource Reservation Protocol (RSVP)	Yes	Yes	Yes
Management			
AutoInstall	Yes	Yes	Yes
Automatic modem configuration	Yes	Yes	Yes
HTTP Server	Yes	Yes	Yes
Modem Management	Plus	Plus	Plus
RMON events and alarms ¹¹	Yes	Yes	Yes
RMON full	Plus	Plus	Plus
SNMP	Yes	Yes	Yes
Telnet	Yes	Yes	Yes
Security			
Access lists	Yes	Yes	Yes
Access security	Yes	Yes	Yes
Extended access lists	Yes	Yes	Yes
Kerberized login	–	–	Yes
Kerberos V client support	–	–	Yes
Lock and key	Yes	Yes	Yes
MAC security for hubs	Yes	Yes	Yes
MD5 routing authentication	Yes	Yes	Yes
RADIUS	Yes	Yes	Yes
TACACS+ ¹²	Yes	Yes	Yes
IBM Support (Optional)			
APPN (optional)	–	–	–
BAN for SNA Frame Relay support	Plus	Plus	Yes
Bisync	Plus	Plus	Yes
Caching and filtering	Plus	Plus	Yes
DLSw+ ¹³	Plus	Plus	Yes
Downstream physical unit (DSPU) concentration	Plus	Plus	Yes
Frame Relay SNA support (RFC 1490)	Plus	Plus	Yes
Native Client Interface Architecture (NCIA) Server	Plus	Plus	Yes
NetView Native Service Point	Plus	Plus	Yes
QLLC	Plus	Plus	Yes
Response Time Reporter (RTR)	Plus	Plus	Yes
SDLC integration	Plus	Plus	Yes
DLSw (RFC 1795)	Plus	Plus	Yes

Table 4 Cisco IOS Release 11.2 Feature Sets for Cisco AS5200 Access Servers (Continued)

Features	IP Routing	Desktop (IP/IPX/AppleTalk/DEC)	Enterprise ¹
SDLC transport (STUN)	Plus	Plus	Yes
SDLC-to-LAN conversion (SDLLC)	Plus	Plus	Yes
SNA and NetBIOS WAN optimization via local acknowledgment	Plus	Plus	Yes
SRB/RSRB ¹⁴	Plus	Plus	Yes
SRT	Plus	Plus	Yes
TG/COS	–	–	Yes
TN3270	–	–	Yes
Protocol Translation			
LAT	–	–	Yes
Rlogin	–	–	Yes
Remote Node¹⁵			
ARAP 1.0/2.0	–	Yes	Yes
Asynchronous master interfaces	Yes	Yes	Yes
ATCP	–	Yes	Yes
CPPP	Yes	Yes	Yes
CSLIP	Yes	Yes	Yes
DHCP	Yes	Yes	Yes
IP pooling	Yes	Yes	Yes
IPX and ARAP on virtual async interfaces	–	–	Yes
IPXCP	–	Yes	Yes
MacIP	–	Yes	Yes
NASI	–	–	–
NetBEUI over PPP	–	–	–
SLIP	Yes	Yes	Yes
Terminal Services¹⁵			
LAT ¹⁶	–	–	Yes
Rlogin	Yes	Yes	Yes
Telnet	Yes	Yes	Yes
TN3270	–	–	Yes
X.25 PAD	Yes	Yes	Yes
Xremote	–	–	Yes

1. Enterprise is available with APPN in a separate feature set. APPN includes APPN Central Registration (CRR) and APPN over DLsw+.

2. Includes AppleTalk load balancing.

3. IRB supports IP, IPX, and AppleTalk; it is supported for transparent bridging, but not for SRB; it is supported on all media-type interfaces except X.25 and ISDN bridged interfaces; IRB and concurrent routing and bridging (CRB) cannot operate at the same time.

4. The Novell IPX feature includes display SAP by name, IPX Access Control List violation logging, and plain-English IPX access lists.

5. ISDN support includes calling line identification (ANI), X.25 over the B channel, ISDN subaddressing, and applicable WAN optimization features.

6. PPP includes support for LAN protocols supported by the feature set, address negotiation, PAP and CHAP authentication, and PPP compression, and Multilink PPP.
7. X.25 includes X.25 switching.
8. IPX header compression (RFC 1553) is available in the feature sets that support IPX.
9. X.25 and Frame Relay payload compression are supported.
10. BGP4 includes soft configuration, multipath support, and prefix filtering with inbound route maps.
11. The RMON events and alarms groups are supported on all interfaces. Full RMON support is available with the Plus feature sets.
12. TACACS+ Single Connection and TACACS+ SENDAUTH enhancements are supported.
13. Cisco IOS Release 11.2 introduces several DLSw+ enhancements available in the Plus, Plus 40, and Plus 56 feature sets.
14. SRB/RSRB is fast switched. This enhancement is on by default but can be disabled.
15. Supported on access servers (with limited support on router auxiliary ports).
16. Use of LAT requires a terminal license (FR-L8-10.X= for an 8-user license or FR-L16-10.X= for a 16-user license).

Table 5 Cisco IOS Release 11.1 Feature Sets for Cisco AS5200 Access Servers

Feature	IP/Managed Modems	Desktop/Managed Modems	Enterprise/RMON/Managed Modems
SNMP	Yes	Yes	Yes
RMON ¹	–	–	Yes
Asynchronous support (SLIP)	Yes	Yes	Yes
CSLIP	Yes	Yes	Yes
ARA Protocol	–	Yes	Yes
Frame Relay	Yes	Yes	Yes
SMDS	Yes	Yes	Yes
X.25	Yes	Yes	Yes
ISDN	Yes	Yes	Yes
PPP	Yes	Yes	Yes
CPPP	Yes	Yes	Yes
HDLC	Yes	Yes	Yes
IP	Yes	Yes	Yes
RIP	Yes	Yes	Yes
RIPv2	Yes	Yes	Yes
IGRP	Yes	Yes	Yes
Enhanced IGRP	Yes	Yes	Yes
OSPF	Yes	Yes	Yes
BGP	Yes	Yes	Yes
EGP	Yes	Yes	Yes
PIM	Yes	Yes	Yes
NHRP	Yes	Yes	Yes
ES-IS	–	–	Yes
IS-IS	–	–	Yes

Table 5 Cisco IOS Release 11.1 Feature Sets for Cisco AS5200 Access Servers (Continued)

Feature	IP/Managed Modems	Desktop/Managed Modems	Enterprise/RMON/Managed Modems
Snapshot routing	Yes	Yes	Yes
NTP	Yes	Yes	Yes
Bridging (transparent and translational)	Yes	Yes	Yes
Multiring	Yes	Yes	Yes
LAN extension host	Yes	Yes	Yes
IPX	–	Yes	Yes
NLSP	–	Yes	Yes
IPXWAN 2.0	–	Yes	Yes
RTMP	–	Yes	Yes
SMRP	–	Yes	Yes
S RTP	–	–	Yes
AppleTalk Versions 1 and 2	–	Yes	Yes
AURP	–	Yes	Yes
DECnet IV	–	Yes	Yes
DECnet V	–	–	Yes
Apollo Domain	–	–	Yes
Banyan VINES	–	–	Yes
ISO CLNS	–	–	Yes
XNS	–	–	Yes
Lock-and-Key	Yes	Yes	Yes
MD5 routing authentication	Yes	Yes	Yes
Kerberized login	–	–	Yes
V.120	–	–	Yes
SRB	–	–	Yes
RSRB	–	–	Yes
APPN	–	–	–
FRAS BAN	–	–	Yes
DLSw (RFC 1795)	–	–	Yes
DLSw+	–	–	Yes
SDLC	–	–	Yes
SDLLC	–	–	Yes
STUN	–	–	Yes
TG/COS	–	–	Yes
QLLC	–	–	Yes
Bisync	–	–	Yes
DSPU	–	–	Yes

Table 5 Cisco IOS Release 11.1 Feature Sets for Cisco AS5200 Access Servers (Continued)

Feature	IP/Managed Modems	Desktop/Managed Modems	Enterprise/RMON/Managed Modems
NetView Native Service Point	–	–	Yes
Protocol translation	–	–	Yes
TN3270	–	–	Yes
LAT	–	–	Yes
SRT bridging	–	–	Yes
XRemote	–	–	Yes
Telnet	Yes	Yes	Yes
PAD	Yes	Yes	Yes
AutoInstall	Yes	Yes	Yes
Modem autoconfiguring	–	–	Yes
Router monitoring	Yes	Yes	Yes
DHCP	Yes	Yes	Yes
NASI	–	–	–
NetBEUI over PPP	–	–	–
RADIUS	Yes	Yes	Yes
Modem Management	Yes	Yes	Yes

1. All feature sets include RMON alarm and events groups. Full, nine-group RMON support is included in the feature sets indicated.

Installing the Modem Firmware Using the Router Software Loader

You can use the Windows 95 application, Router Software Loader, to install modem images. Use the instructions in the CD booklet, *Getting Started with the Router Software Loader*, to connect cables and begin the Router Software Loader application. In the dialog box, select the **Operations** menu, and then **Load Modem Image**. The Load Modem Image dialog box opens. Follow the instructions in the dialog box.

To quickly locate the path to your new Microcom firmware image, click the **Browse** button. After entering the target filename, click **OK**.

Note See Table 1 for a list of modem image filenames.

For instructions on installing modem firmware using Windows 3.1, see “Installation Process for Modem Software.”

Installing the Software Using Microsoft Windows 3.1

In addition to the router software feature sets, the CD-ROM also contains the Router Software Loader, which you can use to download the software to the router. The Router Software Loader is designed to work with a PC running Microsoft Windows 95. The booklet included with the

CD-ROM explains how to perform this simple process. However, you cannot use the Cisco Router Software Loader on a system running Microsoft Windows 3.1. You need to use the following procedures instead.

This section describes an alternative method you can use to install the router software from the CD-ROM onto the router using a PC running Microsoft Windows 3.1. The process requires that you first obtain a Trivial File Transfer Protocol (TFTP) application or a remote copy protocol (rcp) application, which you can use to set up your PC as a TFTP server or an rcp server. You can use either the **copy tftp flash** or **copy rcp flash** command to download the router software; or you can use the **copy tftp modem** command to download the modem software to the router.

Note If you do not already have a TFTP or rcp application, you can choose from a number of TFTP server applications or rcp applications available from independent software vendors. In addition, a number of TFTP programs are available as shareware from public sources on the World Wide Web.

Installation Process for Router Software

This section describes how to install the router software using a Microsoft Windows 3.1 PC with a TFTP server application.

To install the software using an rcp application, follow the same procedure and substitute rcp for TFTP in the instructions. You must also substitute the **copy rcp flash** command for the **copy tftp flash** command.

- Step 1** Install any TFTP server application on the PC. (Not provided by Cisco.)
- Step 2** Launch the TFTP server application on the PC. You commonly do this by double-clicking the application icon or its filename.
- Step 3** Set up the PC as a TFTP server using the TFTP server application setup or configuration facility.

The user interface of most TFTP server applications includes a setup facility that allows you to specify the PC as a server. For example, from the TFTP menu of one application, you can select **Settings** to display a panel that includes a checkbox beside the word Server. To configure the local PC as a server, click in this checkbox.



Caution Be sure you set up your local PC as a TFTP server. If you overlook this step, you will not be able to perform the copy procedure. This reminder also applies if you are using rcp on your system instead of TFTP.

- Step 4** Establish a console session from your local PC (which is now configured as a TFTP server), to the Cisco router.

You can do this in two ways:

- Connect the PC's COM port to the router's console port.

This is the recommended method. If you use this method, when you reload the router with the new image in Step 11, you will remain connected to the router. (If you use Telnet, you will lose connection to the router.)

- Establish a Telnet session from the PC to the router.

- Step 5** Connect your PC's Ethernet port to the router's Ethernet port using the 10BaseT crossover cable provided.

Note Use straight-through cables if you are connecting via a 10BaseT hub.

- Step 6** From the console, enter the **copy tftp flash** command.

- Step 7** When prompted, enter the PC's IP address.

- Step 8** When prompted, enter the full pathname of the Cisco IOS Release 11.2 image to be copied to the router as in the following example:

```
Source file name? d:\cpswinst\images\80138004.bin
```

This example specifies the IP feature set for Cisco AS5200 access servers.

- Step 9** In response to the prompt, enter the destination filename and press **Enter** to indicate that you want to copy the image.

This is the name you select for the image file on the router, not the full pathname of the image on the CD-ROM attached to the PC. In this example, the UNIX filename is used:

```
Destination file name [d:\cpswinst\images\80138004.bin]? c5200-i-1.112-4.P
```

During the transfer process, the software displays messages indicating that it has accessed the file you have specified and is loading it.

- Step 10** Enter **yes** or **no** in response to the prompt asking if you want to erase the existing image copy resident in the router's Flash memory before copying the new one:

```
Erase flash device before writing? [confirm] yes
```

When copying to internal Flash memory, the system provides an option to erase existing internal Flash memory before writing onto it. The entire copying process takes several minutes and differs from network to network.

The exclamation point (!) indicates that the copy process is taking place. Each exclamation point (!) indicates that ten packets have been transferred successfully. A series of "V" characters indicates that a checksum verification of the image is occurring after the image is written to Flash memory.

- Step 11** Enter the **reload** command to reload the router:

```
# reload
```

Installation Process for Modem Software

This section provides steps that describe how to install the modem software using a Microsoft Windows 3.1 PC and a TFTP server application.

To install the software using an rcp application, follow the same procedure and substitute rcp for TFTP in the instructions. You must also substitute the **copy rcp flash** command for the **copy tftp flash** command.

- Step 1** Install any TFTP server application on the PC. (Not provided by Cisco.)

- Step 2** Launch the TFTP server application on the PC. You commonly do this by double-clicking the application icon or its filename.

Step 3 Set up the PC as a TFTP server using the TFTP server application setup or configuration facility.

The user interface of most TFTP server applications includes a setup facility that allows you to specify the PC as a server. For example, from the TFTP menu of one application, you can select **Settings** to display a panel that includes a checkbox beside the word Server. To configure the local PC as a server, you click in this checkbox.



Caution Be sure you set up your local PC as a TFTP server. If you overlook this step, you will not be able to perform the copy procedure. This reminder also applies if you are using rcp on your system instead of TFTP.

Step 4 Establish a console session from your local PC (which is now configured as a TFTP server), to the Cisco router.

You can do this in two ways:

- Connect the PC's COM port to the router's console port.
- Establish a Telnet session from the PC to the router.

Step 5 Connect your PC's Ethernet port to the router's Ethernet port using the 10BaseT crossover cable provided.

Note Use straight-through cables if you are connecting via a 10BaseT hub.

Step 6 From the console, enter the following command at the router prompt to copy the new Microcom firmware image from the CD-ROM drive of the PC to the router:

```
router# copy tftp modem
```

Step 7 When prompted, enter the keyword **all** to upgrade the firmware for all modems in the router.

```
Modem Numbers (<slot>/<port> | group <number> | all)? all
```

Step 8 When prompted, enter the IP address of your local Microsoft Windows 3.1 based PC as in the following example:

```
Address or name of remote host [255.255.255.255]? 131.108.1.1
```

Step 9 When prompted, enter the full pathname of the Microcom firmware image to be copied to the router as in the following example:

```
Source file name? d:\Modem\823567.bin
```

During the transfer process, messages indicate that the software has accessed the specified file and is loading it. An exclamation point (!) indicates that the copy process is taking place. Each exclamation point indicates that ten packets have been transferred successfully.

Command Reference Pages for TFTP and rcp

This section includes reference pages providing detailed information about the **copy rcp flash**, **copy tftp flash**, and **copy modem** commands. This information supplements the information provided in the steps described earlier in the section “Installing the Software Using Microsoft Windows 3.1,” page 13.

copy rcp flash

To copy a file from a network server to the router or to another destination using rcp, use the **copy rcp flash EXEC** command.

copy rcp flash

Syntax Description

flash Specifies internal Flash memory as the destination of the copy operation.

Command Mode

EXEC

Usage Guidelines

The rcp protocol requires that a client send the remote username of an rcp request to the server. When you issue the **copy rcp flash** command, by default the Cisco IOS software sends the username associated with the current teletype (TTY), if that name is valid. For example, if the user is connected to the router through Telnet and the user was authenticated through the **username** command, then the software sends that username as the remote username.

Note For Cisco, TTY lines are commonly used for access services. The concept of TTY originated with UNIX. For UNIX systems, each physical device is represented in the file system. Terminals are called TTY devices, which stands for *teletype*, the original UNIX terminal.

If the TTY username is invalid, the software uses the host name as the both the remote and local usernames. To specify a different remote username to be sent to the rcp server, use the **ip rcmd remote-username** command. You can also specify the path of an existing directory along with the remote username.



Caution The remote username must be associated with an account on the destination server. If you do not use the **ip rcmd remote-username** command to specify the name of a remote user associated with an account on the server, then the remote username associated with the current TTY process must be associated with an account on the server. If there is no username for the current TTY process, then the host name must be associated with an account on the server. If the network administrator of the destination server did not establish accounts for the remote username used, this command will not execute successfully when a default remote username is used.

If you copy a system image from a personal computer used as a file server, the remote host computer must support the remote shell (rsh) protocol.

Use the **copy rcp flash** to copy a system image from a network server to the router's internal Flash memory using rcp. The Cisco IOS software prompts for the address of the rcp server and rcp filename. When you issue this command, the system provides an option to erase existing Flash memory before writing onto it. The entire copying process takes several minutes and differs from network to network.

Before booting from Flash memory, verify that the checksum of the image in internal Flash memory matches the checksum listed in the README file distributed with the system software image. The checksum of the image in Flash memory is displayed at the bottom of the screen when you issue the **copy rcp flash** command. The README file was copied to the rcp server automatically when you installed the system software image.



Caution If the checksum value does not match the value in the README file, do not reboot the router. Reissue the **copy rcp flash** command and compare the checksums again. If the checksum is repeatedly wrong, copy the original system software image back into Flash memory *before* you reboot the router from Flash memory. If you have a corrupted image in Flash memory and try to boot from Flash memory, the router starts the system image contained in ROM (assuming booting from a network server is not configured). If ROM does not contain a fully functional system image, the router cannot function and must be reconfigured through a direct console port connection.

Examples

The following example shows how to use the **copy rcp flash** command on a Cisco AS5200 access server. The interface might differ slightly on other systems. This example copies a system image named file1 from the netadmin1 directory on the remote server named *SERVER1.CISCO.COM* with an IP address of 131.108.101.101 to Flash memory. To ensure that enough Flash memory is available to accommodate the system image to be copied, the Cisco IOS software allows you to erase the contents of Flash memory first.

```
Router1# configure terminal

Router1(config)# rcmd remote-username netadmin1
Router(config)# Ctrl-Z
Router# copy rcp flash

System flash directory, partition 2:
File Length Name/status
  1  984   file1 [deleted]
  2  984   file1
[2096 bytes used, 8386512 available, 8388608 total]
Address or name of remote host [255.255.255.255]? 131.108.101.101
Source file name? file1
Destination file name [file1]?
Accessing file 'file1' on 131.108.101.101...
Loading dirt/ssangiah/file1 .from 131.108.101.101 (via Ethernet0): ! [OK]

Erase flash device before writing? [confirm]
Flash contains files. Are you sure you want to erase? [confirm]

Copy 'file1' from server
  as 'file1' into Flash WITH erase? [yes/no] yes
Erasing device... eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee ...erased
Loading file1 from 131.108.101.101 (via Ethernet0): !
[OK - 984/8388608 bytes]
```

```
Verifying checksum... OK (0x14B3)
Flash copy took 0:00:01 [hh:mm:ss]
```

The following example shows sample output resulting from copying a system image into a partition of Flash memory. The system prompts only if there are two or more read/write partitions or one read-only and one read/write partition and dual Flash memory bank support in boot ROMs. If the partition entered is not valid, the process terminates. You have the option to enter a partition number, a question mark (?) for a directory display of all partitions, or a question mark and a number (?*number*) for a directory display of a particular partition. The default is the first read/write partition.

```
Router# copy rcp flash

System flash partition information:
Partition  Size  Used  Free  Bank-Size  State  Copy-Mode
    1       4096K  2048K  2048K   2048K     Read Only  RXBOOT-FLH
    2       4096K  2048K  2048K   2048K     Read/Write  Direct

[Type ?<no> for partition directory; ? for full directory; q to abort]
Which partition? [default = 2]
```

If the partition is read-only and has dual Flash memory bank support in boot ROMs, the session continues as follows:

```
**** NOTICE ****

Flash load helper v1.0
This process will accept the copy options and then terminate
the current system image to use the ROM based image for the copy.
Routing functionality will not be available during that time.
If you are logged in via telnet, this connection will terminate.
Users with console access can see the results of the copy operation.
----- ***** -----

Proceed? [confirm]
System flash directory, partition 1:
File Length Name/status
  1  3459720 master/c5200-is-I.112-4.P
[3459784 bytes used, 734520 available, 4194304 total]
Address or name of remote host [255.255.255.255]? 131.108.1.1
Source file name? master/c5200-is-I.112-4.P
Destination file name [default = source name]?
```

The file will be copied into the partition given earlier by the user:

```
Loading master/c5200-is-I.112-4.P from 131.108.1.111: !
Erase flash device before writing? [confirm]
Flash contains files. Are you sure? [confirm]
Copy 'master/c5200-is-I.112-4.P' from TFTP server
as 'master/c5200-is-I.112-4.P' into Flash WITH erase? [yes/no] yes
```

If the partition is read/write, the session continues as follows:

```
System flash directory, partition 2:
File Length Name/status
  1  3459720 master/c5200-is-I.112-4.P
[3459784 bytes used, 734520 available, 4194304 total]
Address or name of remote host [255.255.255.255]? 131.108.1.1
Source file name? master/c5200-is-I.112-4.P
Destination file name [default = source name]?
```

The file will be copied into the partition given earlier by the user:

```
Accessing file 'master/c5200-is-I.112-4.P' on ABC.CISCO.COM...
Loading master/c5200-is-I.112-4.P from 131.108.1.111: !
Erase flash device before writing? [confirm]
Flash contains files. Are you sure? [confirm]
```

```
Copy 'master/c5200-is-I.112-4.P' from TFTP server
as 'master/c5200-is-I.112-4.P' into Flash WITH erase? [yes/no] yes
```

Related Commands

boot config
boot system flash
cd
copy flash rep
ip rcmd remote-username
verify flash

copy tftp flash

To copy a file from a TFTP server to the router or to another destination, use the **copy tftp flash EXEC** command.

copy tftp flash

Syntax Description

flash Specifies internal Flash memory as the destination of the copy operation.

Command Mode

EXEC

Usage Guidelines

The system prompts for the address of the TFTP server and TFTP filename if you do not provide them at the command line. When copying to internal Flash memory, the system provides an option to erase existing internal Flash memory before writing onto it. The entire copying process takes several minutes and differs from network to network.

Before booting from Flash memory, verify that the checksum of the image in Flash memory matches the checksum listed in the README file distributed with the system software image. The checksum of the image in Flash memory is displayed at the bottom of the screen when you issue the **copy tftp flash** command. The README file was copied to the TFTP server automatically when you installed the system software image.



Caution If the checksum value is not correct according to the value in the README file, do not reboot the router. Issue the **copy tftp flash** command and compare the checksums again. If the checksum is repeatedly wrong, copy the original system software image back into Flash memory *before* you reboot the router from Flash memory. If you have a corrupted image in Flash memory and try to boot from Flash memory, the router starts the system image contained in ROM (assuming booting from a network server is not configured). If ROM does not contain a fully functional system image, the router cannot function and must be reconfigured through a direct console port connection.

Examples

The following example shows sample output of copying a system image named file1 into Flash memory:

```
Router# copy tftp flash

System flash directory, partition 2:
File Length Name/status
  1  984   file1 [deleted]
  2  984   file1
[2096 bytes used, 8386512 available, 8388608 total]
Address or name of remote host [255.255.255.255]? 223.255.254.254
Source file name? file1
Destination file name [file1]?
Accessing file 'file1' on 223.255.254.254...
Loading dirt/ssangiah/file1 .from 223.255.254.254 (via Ethernet0): - [OK]

Erase flash device before writing? [confirm]
Flash contains files. Are you sure you want to erase? [confirm]

Copy 'file1' from server
  as 'file1' into Flash WITH erase? [yes/no] yes
Erasing device... eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee ...erased
Loading file1 from 223.255.254.254 (via Ethernet0): !!!!!...
[OK - 984/8388608 bytes]

Verifying checksum... OK (0x14B3)
Flash copy took 0:00:01 [hh:mm:ss]
```

The exclamation point (!) indicates that the copy process is taking place. Each exclamation point (!) indicates that ten packets have been transferred successfully. A series of “V” characters indicates that a checksum verification of the image is occurring after the image is written to Flash memory.

The following example shows sample output resulting from copying a system image into a partition of Flash memory. The system will prompt only if there are two or more read/write partitions or one read-only and one read/write partition and dual Flash bank support in boot ROMs. If the partition entered is not valid, the process terminates. You can enter a partition number, a question mark (?) for a directory display of all partitions, or a question mark and a number (?number) for directory display of a particular partition. The default is the first read/write partition.

```
Router# copy tftp flash

System flash partition information:
Partition Size Used Free Bank-Size State Copy-Mode
  1      4096K 2048K 2048K 2048K Read Only RXBOOT-FLH
  2      4096K 2048K 2048K 2048K Read/Write Direct

[Type ?<no> for partition directory; ? for full directory; q to abort]
Which partition? [default = 2]
```

If the partition is read-only and has dual Flash bank support in boot ROMs, the session continues as follows:

```
**** NOTICE ****

Flash load helper v1.0
This process will accept the copy options and then terminate
the current system image to use the ROM based image for the copy.
Routing functionality will not be available during that time.
If you are logged in via telnet, this connection will terminate.
Users with console access can see the results of the copy operation.
-----

Proceed? [confirm]
System flash directory, partition 1:
File Length Name/status
  1 3459720 master/c5200-is-I.112-4.P
```

```
[3459784 bytes used, 734520 available, 4194304 total]
Address or name of remote host [255.255.255.255]? 131.108.1.1
Source file name? master/c5200-is-I.112-4.P
Destination file name [default = source name]?
```

The file will be copied into the partition given earlier by the user:

```
Loading master/c5200-is-I.112-4.P from 131.108.1.111: !
Erase flash device before writing? [confirm]
Flash contains files. Are you sure? [confirm]
Copy 'master/c5200-is-I.112-4.P' from TFTP server
as 'master/c5200-is-I.112-4.P' into Flash WITH erase? [yes/no] yes
```

If the partition is read/write, the session continues as follows:

```
System flash directory, partition 2:
File Length Name/status
  1 3459720 master/c5200-is-I.112-4.P
[3459784 bytes used, 734520 available, 4194304 total]
Address or name of remote host [255.255.255.255]? 131.108.1.1
Source file name? master/c5200-is-I.112-4.P
Destination file name [default = source name]?
```

The file will be copied into the partition given earlier by the user:

```
Accessing file 'master/c5200-is-I.112-4.P' on ABC.CISCO.COM...
Loading master/c5200-is-I.112-4.P from 131.108.1.111: !
Erase flash device before writing? [confirm]
Flash contains files. Are you sure? [confirm]
Copy 'master/c5200-is-I.112-4.P' from TFTP server
as 'master/c5200-is-I.112-4.P' into Flash WITH erase? [yes/no] yes
```

Related Commands

copy flash tftp
verify
verify flash

copy modem

To download firmware to modems in the Cisco AS5200 access server, use the **copy modem EXEC** command.

```
copy {flash | tftp | rcp} modem
```

Syntax Description

flash	Copies firmware from Flash memory to the modem.
tftp	Copies firmware from the TFTP server to the modem.
rcp	Downloads a remote copy of the firmware from a network server to the modem.

Default
Disabled

Command Mode

EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

After you enable this command, you are asked to provide the download destination (a *slot/modem-port* or **all**), the remote host name, and the path leading to the source modem firmware.

If a modem that you wish to upgrade is busy with a call when the **copy modem** command is enabled, the upgrade for that modem yields until the active call is dropped. All other idle modems in the upgrade range proceed with the downloading operation.

Examples

The following example shows how to copy the modem firmware file called *modem_upgrade* from the TFTP server called *Modem_Server* to modem 2/0, which is installed in the Cisco AS5200 access server:

```
AS5200# copy tftp modem
Modem Firmware Download Modem Numbers? 2/0
Address or name of remote host [UNKNOWN]? Modem_Server
Source file name? dirt/elem/modem_upgrade
Accessing file 'dirt/elem/modem_upgrade on Modem_Server...
Loading dirt/elem/modem_upgrade .from 223.255.254.254 (via Ethernet0): ! [OK]

Loading dirt/elem/modem_upgrade from 223.255.254.254 (via Ethernet0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 237503/278528 bytes]

AS5200#
%MODEM-5-DL_START: Modem (2/0) started firmware download
%MODEM-5-DL_GOOD: Modem (2/0) completed firmware download:
MNPCClass10V.34/V.FCModemRev1.0.23/85.23/85
```

As shown in this example, you might want to upgrade and test one modem's firmware before upgrading the firmware of all the modems on the access server, as shown in the next example.

This example shows how to download the same modem firmware file from the TFTP server to all the modems in the Cisco AS5200 access server:

```
AS5200# copy tftp modem
Modem Firmware Download Modem Numbers? all
Address or name of remote host [UNKNOWN]? Modem_Server
Source file name? dirt/elem/modem_upgrade
Accessing file 'dirt/elem/modem_upgrade on Modem_Server...
Loading dirt/elem/modem_upgrade .from 223.255.254.254 (via Ethernet0): ! [OK]

Loading dirt/elem/modem_upgrade from 223.255.254.254 (via Ethernet0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 237503/278528 bytes]

AS5200#
%MODEM-5-DL_START: Modem (2/0) started firmware download
%MODEM-5-DL_START: Modem (2/1) started firmware download
%MODEM-5-DL_START: Modem (2/2) started firmware download
%MODEM-5-DL_START: Modem (2/3) started firmware download
%MODEM-5-DL_START: Modem (2/4) started firmware download
%MODEM-5-DL_START: Modem (2/5) started firmware download
```

```
%MODEM-5-DL_START: Modem (2/6) started firmware download
%MODEM-5-DL_START: Modem (2/7) started firmware download
%MODEM-5-DL_START: Modem (2/8) started firmware download
%MODEM-5-DL_START: Modem (2/9) started firmware download
%MODEM-5-DL_START: Modem (2/10) started firmware download
%MODEM-5-DL_START: Modem (2/11) started firmware download
%MODEM-5-DL_START: Modem (2/12) started firmware download
%MODEM-5-DL_START: Modem (2/13) started firmware download
%MODEM-5-DL_START: Modem (2/14) started firmware download
%MODEM-5-DL_START: Modem (2/15) started firmware download
%MODEM-5-DL_START: Modem (2/16) started firmware download
%MODEM-5-DL_START: Modem (2/17) started firmware download
%MODEM-5-DL_START: Modem (2/18) started firmware download
%MODEM-5-DL_START: Modem (2/19) started firmware download
%MODEM-5-DL_START: Modem (2/20) started firmware download
%MODEM-5-DL_START: Modem (2/21) started firmware download
%MODEM-5-DL_START: Modem (2/22) started firmware download
%MODEM-5-DL_START: Modem (2/23) started firmware download
%MODEM-5-DL_GOOD: Modem (2/2) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/10) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/4) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/6) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/7) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/12) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/11) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/13) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/1) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/14) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/19) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/22) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/5) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/8) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/9) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/17) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/0) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/3) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/21) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/16) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/15) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/18) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/20) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
```



```
%MODEM-5-DL_GOOD: Modem (2/23) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
```

The following example shows how to copy the modem firmware file called STAR.M from Flash memory to the integrated modem 1/2:

```
AS5200# copy flash modem
Modem Numbers (<slot>/<port> | group <number> | all)? 1/2

System flash directory:
File Length Name/status
 1 3539820 as5200-i-m.allcookies
 2 239203 STAR.M
 3 23072 BOOT.105 [3802288 bytes used, 4586320 available, 8388608 total]
Source file name? STAR.M
AS5200#
%MODEM-5-DL_START: Modem (1/2) started firmware download
%MODEM-5-DL_GOOD: Modem (1/2) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
AS5200#
```

Additional Release Note Information

For detailed information about this software release, see the Cisco IOS release notes located on the Documentation CD-ROM. Information that pertains to this feature pack includes the following:

- New features
- Important notes
- Caveats

Note The release notes shipped with your router are designed as reference material. The feature pack release notes (this document) should be sufficient for installing your software.

About Cisco IOS Software Electronic Documentation

Cisco IOS software documentation is provided on the Documentation CD-ROM that is included with your feature pack. Documentation about Cisco IOS Release 11.2(4)P and 11.1(9)AA describes the software images included on this feature pack CD.

To locate this documentation, you can either use the Documentation CD or go to www.cisco.com, select **Products and Ordering, Documentation, Cisco IOS Software Configuration**, and **Cisco IOS Release 11.2**. The documentation for Cisco IOS Release 11.2 is organized as follows:

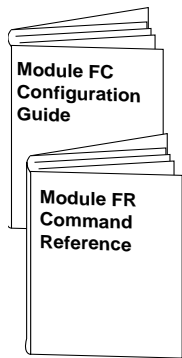
- Release Notes—use the *Cisco IOS Release 11.2(4)P Release Notes*.
- Feature Guides—use the *Cisco IOS Release 11.2(4)P Feature Guide*.
- Eight modules that comprise the configuration guides and command references, which are described in Figure 1.
- *Cisco IOS Software Command Summary*—summarizes the commands in the command reference publications. For each command, the summary provides complete syntax, the purpose of the command, and a description of each keyword and argument in the command syntax.
- *System Error Messages*—describes system error messages reported by Cisco IOS software.

- *Cisco Management Information Base (MIB) User Quick Reference*—describes the Cisco Systems private, or local, Management Information Base (MIB), which is provided with all Cisco software releases and with CiscoWorks router management software. A MIB file contains variables that can be set or read to provide information on network devices and interfaces. The Cisco MIB is a set of variables that are private extensions to the Internet standard MIB II.
- *Debug Command Reference*—provides information about using debug commands to troubleshoot your network. The *Debug Command Reference* is intended for network administrators who already know how to configure a router and are familiar with all relevant network equipment.
- *Access Services Quick Configuration Guide*—describes the tasks you perform to solve common business problems with access service technologies. It presents the most common access service tasks in a format that enables you to configure your access server quickly for the most common tasks. It does not describe every feature, but describes those tasks that you most likely need to do to configure your access server.
- Caveats

The documentation for Cisco IOS Release 11.1 is organized as follows:

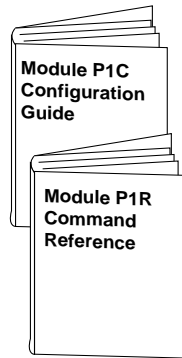
- Release Notes—use the *Release Note and Updates to Cisco IOS Release 11.1 AA*.
- Configuration guides and command references
- Cisco IOS Supporting Documentation
- Caveats

Figure 1 Cisco IOS Configuration Guides and Command References



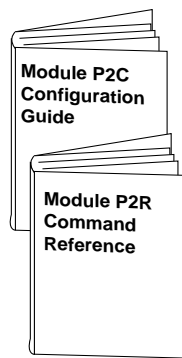
Module FC/FR:
Configuration Fundamentals

- Access Server and Router Product Overview
- Cisco IOS Software Configuration Basics
- Images and Configuration Files
- Interface Configuration
- System Management



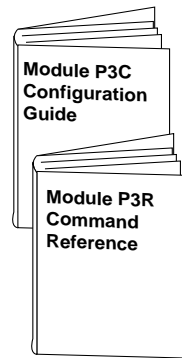
Module P1C/P1R:
Network Protocols, Part 1

- IP Addressing
- IP Services
- IP Routing Protocols



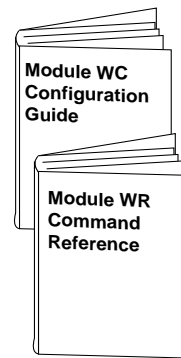
Module P2C/P2R:
Network Protocols, Part 2

- AppleTalk
- Novell IPX



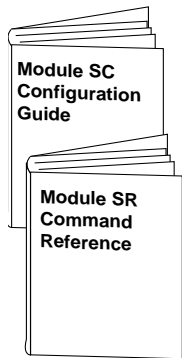
Module P3C/P3R:
Network Protocols, Part 3

- Apollo Domain
- Banyan VINES
- DECnet
- ISO CLNS
- XNS



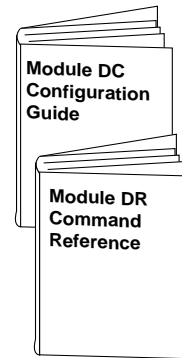
Module WC/WR:
Wide-Area Networking

- ATM
- Frame Relay
- SMDS
- X.25 and LAPB



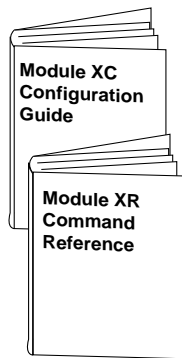
Module SC/SR:
Security

- Terminal Access Security
- Network Access Security
- Accounting and Billing
- Filtering Traffic
- Preventing Fraudulent Route Updates
- Network Data Encryption



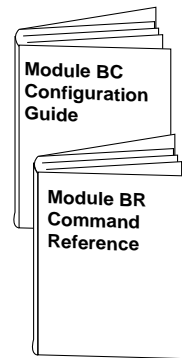
Module DC/DR:
Dial Solutions

- Dial Business Solutions and Examples
- Dial-In Port Setup
- DDR and Dial Backup
- Remote Node and Terminal Service
- Cost-Control and Large-Scale Dial Solutions
- VPDN



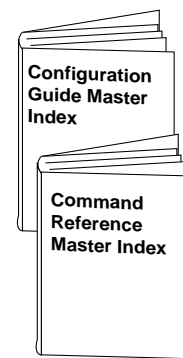
Module XC/XR:
Cisco IOS Switching Services

- Switching Paths for IP Networks
 - Fast Switching
 - Autonomous Switching
 - NetFlow Switching
 - Optimum Switching
- Virtual LAN (VLAN) Switching and Routing
 - Inter-Switch Link Protocol Encapsulation
 - IEEE 802.10 Encapsulation
 - LAN Emulation



Module BC/BR:
Bridging and IBM Networking

- Transparent Bridging
- Source-Route Bridging
- Remote Source-Route Bridging
- DLSw+
- STUN and BSTUN
- LLC2 and SDLC
- IBM Network Media Translation
- DSPU and SNA Service Point
- SNA Frame Relay Access Support
- APPN
- NCI Client/Server Topologies
- IBM Channel Attach



Configuration Guide Master Index

Command Reference Master Index

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Cisco IOS configuration guides describe system configuration and maintenance tasks and provide comprehensive configuration examples. The configuration guides do not include command syntax for every command, so you should use them in conjunction with the command references. The Cisco configuration guides give in-depth descriptions of configuration tasks.

Cisco IOS command references describe the commands necessary for configuring and maintaining your system. If you are new to Cisco software, you should use the Cisco command references in conjunction with the configuration guides to reference commands and detailed information pertaining to their use. If you are an experienced network administrator, you might want to use the Cisco command references as standalone manuals.

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- WWW: <http://www-europe.cisco.com>.
- WWW: <http://www-china.cisco.com>.
- Telnet: cco.cisco.com.
- Modem: From North America, 408 526-8070; from Europe, 33 1 64 46 40 82. Use the following terminal settings: VT100 emulation; databits: 8; parity: none; stop bits: 1; and baud rates up to 14.4 kbps.

For a copy of CCO's Frequently Asked Questions (FAQ), contact cco-help@cisco.com. For additional information, contact cco-team@cisco.com.

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This document is to be used in conjunction with the *Cisco IOS configuration guide* and *command reference* publications.

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