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Release Notes for Cisco IOS Release 11.2(11) Software Feature Packs for Cisco 1600 Series Routers

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These release notes describe the Cisco Internetwork Operating System (Cisco IOS) Release 11.2(11)P feature packs for Cisco 1600 series routers. This document contains the following sections:

Platforms Supported

Router Software Loader (RSL) Version 6.0 supports the following Cisco 1600 series routers:

- CiscoPro CPA1601, CPA1602, CPA1603, and CPA1604

- Cisco 1601, 1602, 1603, 1604, and 1605-R

What Is a Feature Pack?

The heart of a Cisco IOS software feature pack is a CD-ROM that contains a software image and the Router Software Loader (RSL), a Windows 95 application that loads the image onto the access router or server. Each Cisco IOS Release 11.2 feature pack CD contains one feature set. The CD booklet,

Getting Started with the Router Software Loader, explains how to use the RSL to install the router software. Users who cannot use the RSL can load images by following the instructions in the "Alternatives to the RSL" section of this document.

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

- CD-ROM with the following software:
  - Feature set software image that includes bundled modem firmware
  - The RSL program (a Windows 95 application)
  - A Trivial File Transfer Protocol (TFTP) server application (for Windows 95 only)
- Instruction booklet for using the RSL
- Release notes (this document), which includes alternatives to using the RSL for loading software images onto a router
- Software license—for using Cisco software in-object code form on a single access server or router
- Cisco Documentation CD-ROM, which contains all Cisco IOS software documentation

Before running the RSL, read the section, "Installation Tips" on page 13 . If you are loading software on a preconfigured router, you should save the router configuration file on your PC before beginning the download process, as described in the CD booklet *Getting Started with the Router Software Loader.*

Using Cisco Feature Packs

The tables in the following sections describe the Cisco feature packs. Use these tables to perform the following tasks before loading a software image onto a router:

1 Use Table 1 in the section "Product Numbers" to identify your software image.

2 Use Table 2 in the section "Cisco Feature Pack and Memory Descriptions" to identify your feature pack and the memory required for your feature set, based on the image you run.

3 Use Table 3 in the section "Cisco IOS Release 11.2(11)P Feature Sets" to identify which features are supported for a feature set on a specific platform.

4 Check the memory required for your feature set against Table 4 in the section "Upgrading Cisco 1600 Memory" to determine the factory-default memory on the router and the available memory upgrades.

Product Numbers

Table 1 lists the Cisco product numbers for the supported feature packs.

Table 1   **Feature Pack Product Numbers**

Product Number	Feature Pack Description
CD16-C-11.2=	Cisco 1600 IP Feature Pack
CD16-CP-11.2=	Cisco 1600 IP Plus Feature Pack
CD16-CW-11.2=	Cisco 1600 IP Plus 40 Feature Pack
CD16-CY-11.2=	Cisco 1600 IP Plus 56 Feature Pack
CD16-A/B/E-11.2=	Cisco 1600 IP/IPX, IP/AT, IP/IPX/AT & IP/IPX/IBM Feature Pack

Product Number	Feature Pack Description
CD16-BP/EP-11.2=	Cisco 1600 IP/IPX Plus & IP/AT Plus Feature Pack
CD16-BW/EW-11.2=	Cisco 1600 IP/IPX Plus 40, IP/AT Plus 40 & IP/Firewall Feature Pack
CD16-BY/EY-11.2=	Cisco 1600 IP/IPX Plus 56, IP/AT Plus 56 & IP/Firewall Feature Pack
CD16-AP-11.2=	Cisco 1600 IP/IPX/AT Plus & IP/IPX/IBM Plus Feature Pack
CD16-AW-11.2=	Cisco 1600 IP/IPX/AT Plus 40 & IP/IPX/IBM Plus 40 Feature Pack
CD16-AY-11.2=	Cisco 1600 IP/IPX/AT Plus 56 & IP/IPX/IBM Plus 56 Feature Pack
CD16-QHY-11.2=	Cisco 1600 IP/IPX/AT/IBM/Firewall Plus 56 Feature Pack
CD16-BHP-11.2=	Cisco 1600 IP/IPX/Firewall Plus Feature Pack

Note   The feature packs listed here contain Cisco IOS Release 11.2(9)P software images, a selection of earlier images, and Router Software Loader (RSL) Version 6.0.

Cisco Feature Pack and Memory Descriptions

Table 2 identifies each feature pack as specified on the router software CD-ROM label, describes the feature sets in each feature pack, and lists the following: UNIX and DOS filenames of the images, router platform on which each feature set runs, and memory requirements for each feature set.

Table 2   Cisco 1600 Series Feature Pack Image Filenames and Memory Requirements

Product Number	CD-ROM Title	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
CD16-C-11.2=	Cisco 1600 IP Feature Pack Release 11.2(11)P Router Software Loader Version 6.0	c1600-y-l.112-9.P	80153209	4MB	2MB	Cisco 1601-1604 IOS IP Feature Set 11.2(9)P
		c1600-y-mz.112-9.P	80218109	2MB	8MB	Cisco 1605-R IOS IP Feature Set 11.2(9)P
		c1600-y-l.112-11.P	80153211	4MB	2MB	Cisco 1601-1604 IOS IP Feature Set 11.2(11)P
		c1600-y-mz.112-11.P	80218111	2MB	8MB	Cisco 1605-R IOS IP Feature Set 11.2(11)P
CD16-CP-11.2=	Cisco 1600 IP Plus Feature Pack Release 11.2(11)P Router Software Loader Version 6.0	c1600-sy-l.112-9.P	80153309	6MB	4MB	Cisco 1601-1604 IOS IP Plus Feature Set 11.2(9)P
		c1600-sy-mz.112-9.P	80217809	4MB	8MB	Cisco 1605-R IOS IP Plus Feature Set 11.2(9)P
		c1600-sy-l.112-11.P	80153311	6MB	4MB	Cisco 1601-1604 IOS IP Plus Feature Set 11.2(11)P
		c1600-sy-mz.112-11.P	80217811	4MB	8MB	Cisco 1605-R IOS IP Plus Feature Set 11.2(11)P

Table 2   Cisco 1600 Series Feature Pack Image Filenames and Memory Requirements (Continued)

Product Number	CD-ROM Title	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
CD16-CW-11.2=	Cisco 1600 IP Plus 40 Feature Pack Release 11.2(11)P Router Software Loader Version 6.0	c1600-sy40-l.112-9.P	80153409	6MB	4MB	Cisco 1601-1604 IOS IP Plus 40 Feature Set 11.2(9)P
		c1600-sy40-mz.112-9.P	80217909	4MB	8MB	Cisco 1605-R IOS IP Plus 40 Feature Set 11.2(9)P
		c1600-sy40-l.112-11.P	80153311	6MB	4MB	Cisco 1601-1604 IOS IP Plus 40 Feature Set 11.2(11)P
		c1600-sy40-mz.112-11.P	80217911	4MB	8MB	Cisco 1605-R IOS IP Plus 40 Feature Set 11.2(11)P
CD16-CY-11.2=	Cisco 1600 IP Plus 56 Feature Pack Release 11.2(11)P Router Software Loader Version 6.0	c1600-sy56-l.112-9.P	80153509	6MB	4MB	Cisco 1601-1604 IOS IP Plus 56 Feature Set 11.2(9)P
		c1600-sy56-mz.112-9.P	80218009	4MB	8MB	Cisco 1605-R IOS IP Plus 56 Feature Set 11.2(9)P
		c1600-sy56-l.112-11.P	80153511	6MB	4MB	Cisco 1601-1604 IOS IP Plus 56 Feature Set 11.2(11)P
		c1600-sy56-mz.112-11.P	80218011	4MB	8MB	Cisco 1605-R IOS IP Plus 56 Feature Set 11.2(11)P
CD16-A/B/E-11.2=	Cisco 1600 IP/IPX, IP/AT, IP/IPX/AT & IP/IPX/IBM Feature Pack Release 11.2(11)P Router Software Loader Version 6.0	c1600-ny-l.112-9.P	80154009	4MB	4MB	Cisco 1601-1604 IOS IP/IPX Feature Set 11.2(9)P
		c1600-by-l.112-9.P	80153609	4MB	4MB	Cisco 1601-1604 IOS IP/Apple Talk Feature Set 11.2(9)P
		c1600-bny-l.112-9.P	80154409	6MB	4MB	Cisco 1601-1604 IOS IP/IPX/Apple Talk Feature Set 11.2(9)P
		c1600-nr2y-l.112-9.P	80211909	6MB	6MB	Cisco 1601-1604 IOS IP/IPX/IBM Feature Set 11.2(9)P
		c1600-ny-mz.112-9.P	80217709	2MB	8MB	Cisco 1605-R IOS IP/IPX Feature Set 11.2(9)P
		c1600-by-mz.112-9.P	80216909	2MB	8MB	Cisco 1605-R IOS IP/Apple Talk Feature Set 11.2(9)P
		c1600-bny-mz.112-9.P	80216509	4MB	8MB	Cisco 1605-R IOS IP/IPX/Apple Talk Feature Set 11.2(9)P

Table 2   Cisco 1600 Series Feature Pack Image Filenames and Memory Requirements (Continued)

Product Number	CD-ROM Title	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
		c1600-nr2y-mz.112-9.P	80217009	4MB	10MB	Cisco 1605-R IOS IP/IPX/IBM Feature Set 11.2(9)P
		c1600-ny-l.112-11.P	80154011	4MB	4MB	Cisco 1601-1604 IOS IP/IPX Feature Set 11.2(11)P
		c1600-by-l.112-11.P	80153611	4MB	4MB	Cisco 1601-1604 IOS IP/Apple Talk Feature Set 11.2(11)P
		c1600-bny-l.112-11.P	80154411	6MB	4MB	Cisco 1601-1604 IOS IP/IPX/Apple Talk Feature Set 11.2(11)P
		c1600-nr2y-l.112-11.P	80211911	6MB	6MB	Cisco 1601-1604 IOS IP/IPX/IBM Feature Set 11.2(11)P
		c1600-ny-mz.112-11.P	80217711	2MB	8MB	Cisco 1605-R IOS IP/IPX Feature Set 11.2(11)P
		c1600-by-mz.112-11.P	80216911	2MB	8MB	Cisco 1605-R IOS IP/Apple Talk Feature Set 11.2(11)P
		c1600-bny-mz.112-11.P	80216511	4MB	8MB	Cisco 1605-R IOS IP/IPX/Apple Talk Feature Set 11.2(11)P
		c1600-nr2y-mz.112-11.P	80217011	4MB	10MB	Cisco 1605-R IOS IP/IPX/IBM Feature Set 11.2(11)P
CD16-BP/EP-11.2=	Cisco 1600 IP/IPX Plus & IP/AT Plus Feature Pack Release 11.2(11)P Router Software Loader Version 6.0	c1600-nsy-l.112-9.P	80154109	6MB	4MB	Cisco 1601-1604 IOS IP/IPX Plus Feature Set 11.2(9)P
		c1600-bsy-l.112-9.P	80153709	6MB	4MB	Cisco 1601-1604 IOS IP/Apple Talk Plus Feature Set 11.2(9)P
		c1600-nsy-mz.112-9.P	80217409	4MB	8MB	Cisco 1605-R IOS IP/IPX Plus Feature Set 11.2(9)P
		c1600-bsy-mz.112-9.P	80216609	4MB	8MB	Cisco 1605-R IOS IP/Apple Talk Plus Feature Set 11.2(9)P
		c1600-nsy-l.112-11.P	80154111	6MB	4MB	Cisco 1601-1604 IOS IP/IPX Plus Feature Set 11.2(11)P
		c1600-bsy-l.112-11.P	80153711	6MB	4MB	Cisco 1601-1604 IOS IP/Apple Talk Plus Feature Set 11.2(11)P

Table 2   Cisco 1600 Series Feature Pack Image Filenames and Memory Requirements (Continued)

Product Number	CD-ROM Title	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
		c1600-nsy-mz.112-11.P	80217411	4MB	8MB	Cisco 1605-R IOS IP/IPX Plus Feature Set 11.2(11)P
		c1600-bsy-mz.112-11.P	80216611	4MB	8MB	Cisco 1605-R IOS IP/Apple Talk Plus Feature Set 11.2(11)P
CD16-BW/EW-11.2=	Cisco 1600 IP/IPX Plus 40, IP/AT Plus 40 & IP/Firewall Feature Pack Release 11.2(11)P Router Software Loader Version 6.0	c1600-nsy40-l.112-9.P	80154209	6MB	4MB	Cisco 1601-1604 IOS IP/IPX Plus 40 Feature Set 11.2(9)P
		c1600-bsy40-l.112-9.P	80153809	6MB	4MB	Cisco 1601-1604 IOS IP/Apple Talk Plus 40 Feature Set 11.2(9)P
		c1600-nsy40-mz.112-9.P	80217509	4MB	10MB	Cisco 1605-R IOS IP/IPX Plus 40 Feature Set 11.2(9)P
		c1600-bsy40-mz.112-9.P	80216709	4MB	10MB	Cisco 1605-R IOS IP/Apple Talk Plus 40 Feature Set 11.2(9)P
		c1600-nsy40-l.112-11.P	80154211	6MB	4MB	Cisco 1601-1604 IOS IP/IPX Plus 40 Feature Set 11.2(11)P
		c1600-bsy40-l.112-11.P	80153811	6MB	4MB	Cisco 1601-1604 IOS IP/Apple Talk Plus 40 Feature Set 11.2(11)P
		c1600-oy-I. 112-11.P	80246901	4MB	8MB	Cisco 1601-1604 IOS IP/Firewall Feature Set 11.2(11)P
		c1600-nsy40-mz.112-11.P	80217511	4MB	10MB	Cisco 1605-R IOS IP/IPX Plus 40 Feature Set 11.2(11)P
		c1600-bsy40-mz.112-11.P	80216711	4MB	10MB	Cisco 1605-R IOS IP/Apple Talk Plus 40 Feature Set 11.2(11)P
		c1600-oy-mz. 112-11.P	80246601	4MB	8MB	Cisco 1605-R IOS IP/Firewall Feature Set 11.2(11)P
CD16-BY/EY-11.2=	Cisco 1600 IP/IPX Plus 56, IP/AT Plus 56 & IP/Firewall Feature Pack Release 11.2(11)P Router Software Loader Version 6.0	c1600-nsy56-l.112-9.P	80154309	6MB	4MB	Cisco 1601-1604 IOS IP/IPX Plus 56 Feature Set 11.2(9)P
		c1600-bsy56-l.112-9.P	80153909	6MB	4MB	Cisco 1601-1604 IOS IP/Apple Talk Plus 56 Feature Set 11.2(9)P
		c1600-nsy56-mz.112-9.P	80217609	4MB	10MB	Cisco 1605-R IOS IP/IPX Plus 56 Feature Set 11.2(9)P

Table 2　Cisco 1600 Series Feature Pack Image Filenames and Memory Requirements (Continued)

Product Number	CD-ROM Title	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
		c1600-bsy56-mz.112-9.P	80216809	4MB	10MB	Cisco 1605-R IOS IP/Apple Talk Plus 56 Feature Set 11.2(9)P
		c1600-nsy56-l.112-11.P	80154311	6MB	4MB	Cisco 1601-1604 IOS IP/IPX Plus 56 Feature Set 11.2(11)P
		c1600-bsy56-l.112-11.P	80153911	6MB	4MB	Cisco 1601-1604 IOS IP/Apple Talk Plus 56 Feature Set 11.2(11)P
		c1600-oy-I. 112-11.P	80246901	4MB	8MB	Cisco 1601-1604 IOS IP/Firewall Feature Set 11.2(11)P
		c1600-nsy56-mz.112-11.P	80217611	4MB	10MB	Cisco 1605-R IOS IP/IPX Plus 56 Feature Set 11.2(11)P
		c1600-bsy56-mz.112-11.P	80216811	4MB	10MB	Cisco 1605-R IOS IP/Apple Talk Plus 56 Feature Set 11.2(11)P
		c1600-oy-mz. 112-11.P	80246601	4MB	8MB	Cisco 1605-R IOS IP/Firewall Feature Set 11.2(11)P
CD16-AP-11.2=	Cisco 1600 IP/IPX/AT Plus & IP/IPX/IBM Plus Feature Pack Release 11.2(11)P Router Software Loader Version 6.0	c1600-bnsy-l.112-9.P	80154509	6MB	4MB	Cisco 1601-1604 IOS IP/IPX/Apple Talk Plus Feature Set 11.2(9)P
		c1600-nr2sy-l.112-9.P	80212009	8MB	6MB	Cisco 1601-1604 IOS IP/IPX/IBM Plus Feature Set 11.2(9)P
		c1600-bnsy-mz.112-9.P	80216209	4MB	10MB	Cisco 1605-R IOS IP/IPX/Apple Talk Plus Feature Set 11.2(9)P
		c1600-nr2sy-mz.112-9.P	80217109	4MB	12MB	Cisco 1605-R IOS IP/IPX/IBM Plus Feature Set 11.2(9)P
		c1600-bnsy-l.112-11.P	80154511	6MB	4MB	Cisco 1601-1604 IOS IP/IPX/Apple Talk Plus Feature Set 11.2(11)P
		c1600-nr2sy-l.112-11.P	80212011	8MB	6MB	Cisco 1601-1604 IOS IP/IPX/IBM Plus Feature Set 11.2(11)P
		c1600-bnsy-mz.112-11.P	80216211	4MB	10MB	Cisco 1605-R IOS IP/IPX/Apple Talk Plus Feature Set 11.2(11)P

Table 2   Cisco 1600 Series Feature Pack Image Filenames and Memory Requirements (Continued)

Product Number	CD-ROM Title	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
		c1600-nr2sy-mz.112-11.P	80217111	4MB	12MB	Cisco 1605-R IOS IP/IPX/IBM Plus Feature Set 11.2(11)P
CD16-AW-11.2=	Cisco 1600 IP/IPX/AT Plus 40 & IP/IPX/IBM Plus 40 Feature Pack Release 11.2(11)P Router Software Loader Version 6.0	c1600-bnsy40-l.112-9.P	80154609	6MB	4MB	Cisco 1601-1604 IOS IP/IPX/Apple Talk Plus 40 Feature Set 11.2(9)P
		c1600-nr2sy40-l.112-9.P	80212109	8MB	6MB	Cisco 1601-1604 IOS IP/IPX/IBM Plus 40 Feature Set 11.2(9)P
		c1600-bnsy40-mz.112-9.P	80216309	4MB	10MB	Cisco 1605-R IOS IP/IPX/Apple Talk Plus 40 Feature Set 11.2(9)P
		c1600-nr2sy40-mz.112-9.P	80217209	4MB	12MB	Cisco 1605-R IOS IP/IPX/IBM Plus 40 Feature Set 11.2(9)P
		c1600-bnsy40-l.112-11.P	80154611	6MB	4MB	Cisco 1601-1604 IOS IP/IPX/Apple Talk Plus 40 Feature Set 11.2(11)P
		c1600-nr2sy40-l.112-11.P	80212111	8MB	6MB	Cisco 1601-1604 IOS IP/IPX/IBM Plus 40 Feature Set 11.2(11)P
		c1600-bnsy40-mz.112-11.P	80216311	4MB	10MB	Cisco 1605-R IOS IP/IPX/Apple Talk Plus 40 Feature Set 11.2(11)P
		c1600-nr2sy40-mz.112-11.P	80217211	4MB	12MB	Cisco 1605-R IOS IP/IPX/IBM Plus 40 Feature Set 11.2(11)P
CD16-AY-11.2=	Cisco 1600 IP/IPX/AT Plus 56 & IP/IPX/IBM Plus 56 Feature Pack Release 11.2(11)P Router Software Loader Version 6.0	c1600-bnsy56-l.112-9.P	80154709	6MB	4MB	Cisco 1601-1604 IOS IP/IPX/Apple Talk Plus 56 Feature Set 11.2(9)P
		c1600-nr2sy56-l.112-9.P	80212209	8MB	6MB	Cisco 1601-1604 IOS IP/IPX/IBM Plus 56 Feature Set 11.2(9)P
		c1600-bnsy56-mz.112-9.P	80216409	4MB	10MB	Cisco 1605-R IOS IP/IPX/Apple Talk Plus 56 Feature Set 11.2(9)P
		c1600-nr2sy56-mz.112-9.P	80217309	4MB	12MB	Cisco 1605-R IOS IP/IPX/IBM Plus 56 Feature Set 11.2(9)P

Table 2   Cisco 1600 Series Feature Pack Image Filenames and Memory Requirements (Continued)

Product Number	CD-ROM Title	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
		c1600-bnsy56-l.112-11.P	80154711	6MB	4MB	Cisco 1601-1604 IOS IP/IPX/Apple Talk Plus 56 Feature Set 11.2(11)P
		c1600-nr2sy56-l.112-11.P	80212211	8MB	6MB	Cisco 1601-1604 IOS IP/IPX/IBM Plus 56 Feature Set 11.2(11)P
		c1600-bnsy56-mz.112-11.P	80216411	4MB	10MB	Cisco 1605-R IOS IP/IPX/Apple Talk Plus 56 Feature Set 11.2(11)P
		c1600-nr2sy56-mz.112-11.P	80212211	4MB	12MB	Cisco 1605-R IOS IP/IPX/IBM Plus 56 Feature Set 11.2(11)P
CD16-QHY-11.2=	Cisco 1600 IP/IPX/AT/IBM/Firewall Plus 56 Feature Pack Release 11.2(11)P Router Software Loader Version 6.0	c1600-bnor2sy56-I. 112-11.P	80246701	8MB	16MB	Cisco 1601-1604 IOS IP/IPX/Apple Talk/IBM/Firewall Plus 56 Feature Set 11.2(11)P
		c1600-bnor2sy56-mz. 112-11.P	80246401	4MB	16MB	Cisco 1605-R IOS IP/IPX/Apple Talk/IBM/Firewall Plus 56 Feature Set 11.2(11)P
CD16-BHP-11.2=	Cisco 1600 IP/IPX/Firewall Plus Feature Pack Release 11.2(11)P Router Software Loader Version 6.0	c1600-nosy-I. 112-11.P	80246801	8MB	8MB	Cisco 1601-1604 IOS IP/IPX/Firewall Plus Feature Set 11.2(11)P
		c1600-nosy-mz. 112-11.P	80246501	4MB	8MB	Cisco 1605-R IOS IP/IPX/Firewall Plus Feature Set 11.2(11)P

Cisco IOS Release 11.2(11)P Feature Sets

Table 3 lists Cisco IOS software feature sets available in Cisco IOS Release 11.2(11)P. These features are available in specific features sets on specific platforms.

Table 3 uses these feature set matrix symbols to identify features:

Feature Set Matrix Symbol	Description
Basic	This feature is offered in the basic feature set.
—	This feature is not offered in the feature set.
Plus	This feature is offered in the Plus feature set, not in the basic feature set.
Encrypt	This feature is offered in the encryption feature sets, which consist of 40-bit (Plus 40) or 56-bit (Plus 56) data encryption feature sets.

Cisco IOS images with 40-bit Data Encryption Standard (DES) support may legally be distributed to any party eligible to receive Cisco IOS software. The 40-bit DES is not a cryptographically strong solution and should not be used to protect sensitive data.

Cisco IOS images with 56-bit DES are subject to International Traffic in Arms Regulations (ITAR) controls and have a limited distribution. Images to be installed outside the U.S. require an export license. Customer orders may be denied or subject to delay because of United States government regulations. Contact your sales representative or distributor for more information, or send e-mail to export@cisco.com

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Table 3   Cisco 1600 Series Routers Feature Sets

Features Contained in Feature Sets	Feature Sets					
	IP	IP/IPX	IP/ AppleTalk	IP/IPX/ AppleTalk	IP/IPX/ IBM	Firewall[1]
LAN Support						—
AppleTalk 1 and 2[2]	—	—	Basic	Basic	—	—
Integrated routing and bridging (IRB)[3]	Basic	Basic	Basic	Basic	Basic	—
IP	Basic	Basic	Basic	Basic	Basic	—
Novell IPX[4]	—	Basic	—	Basic	Basic	—
Transparent bridging	Basic	Basic	Basic	Basic	Basic	—
WAN Services						—
Asynchronous	Basic	Basic	Basic	Basic	Basic	—
Frame Relay	Basic	Basic	Basic	Basic	Basic	—
Frame Relay SVC support (DTE)	Plus	Plus	Plus	Plus	Plus	—
Frame Relay traffic shaping	Basic	Basic	Basic	Basic	Basic	—
HDLC	Basic	Basic	Basic	Basic	Basic	—
ISDN [5]	Basic	Basic	Basic	Basic	Basic	—
PPP[6]	Basic	Basic	Basic	Basic	Basic	—
SMDS	Basic	Basic	Basic	Basic	Basic	—
Switched 56	Basic	Basic	Basic	Basic	Basic	—
X.25	Basic	Basic	Basic	Basic	Basic	—
SLIP asynchronous only	Basic	Basic	Basic	Basic	Basic	—
WAN Optimization						—
Bandwidth-on-demand[7]	Basic	Basic	Basic	Basic	Basic	—
Custom and priority queuing	Basic	Basic	Basic	Basic	Basic	—
Dial backup	Basic	Basic	Basic	Basic	Basic	—
Dial-on-demand	Basic	Basic	Basic	Basic	Basic	—
Header, link, and payload compression	Basic	Basic	Basic	Basic	Basic	—
Header and link compression	Basic	Basic	Basic	Basic	Basic	—
Snapshot routing	Basic	Basic	Basic	Basic	Basic	—
Weighted fair queuing	Basic	Basic	Basic	Basic	Basic	—
IPX and SPX spoofing	—	Basic	—	Basic	Basic	—

Table 3   Cisco 1600 Series Routers Feature Sets (Continued)

Features Contained in Feature Sets	Feature Sets					
	IP	IP/IPX	IP/ AppleTalk	IP/IPX/ AppleTalk	IP/IPX/ IBM	Firewall[1]
IP Routing						—
AppleTalk SMRP Multicast	—	—	Plus	Plus	—	—
Enhanced IGRP	Basic	Basic	Basic	Basic	Basic	—
IGRP	Basic	Basic	Basic	Basic	Basic	—
IP Multicast (PIM)	Plus	Plus	Plus	Plus	Plus	—
Network Address Translation (NAT)	Plus	Plus	Plus	Plus	Plus	—
On Demand Routing (ODR)	Basic	Basic	Basic	Basic	Basic	—
OSPF	Plus	Plus	Plus	Plus	Plus	—
OSPF On Demand Circuit (RFC 1793)	Plus	Plus	Plus	Plus	Plus	—
PIM	Plus	Plus	Plus	Plus	Plus	—
RIP	Basic	Basic	Basic	Basic	Basic	—
RIP Version 2	Basic	Basic	Basic	Basic	Basic	—
Other Routing						—
IPX RIP	—	Basic	—	Basic	Basic	—
RTMP	—	—	Basic	Basic	—	—
NLSP	—	Plus	—	Plus	Plus	—
Multimedia and Quality of Service						—
Generic traffic shaping	Plus	Plus	Plus	Plus	Plus	—
Random Early Detection (RED)	Plus	Plus	Plus	Plus	Plus	—
Resource Reservation Protocol (RSVP)	Plus	Plus	Plus	Plus	Plus	—
Management						—
SNMP	Basic	Basic	Basic	Basic	Basic	—
Telnet	Basic	Basic	Basic	Basic	Basic	—
Console port	Basic	Basic	Basic	Basic	Basic	—
Networking Timing Protocol (NTP)	Plus	Plus	Plus	Plus	Plus	—
Simple Networking Timing Protocol (SNTP)	Basic	Basic	Basic	Basic	Basic	—
Security						—
Access lists	Basic	Basic	Basic	Basic	Basic	—
Cisco IOS Firewall: Context-Based Access Control	—	—	—	—	—	Encrypt
Extended access lists	Basic	Basic	Basic	Basic	Basic	—
TACACS Plus	Basic	Basic	Basic	Basic	Basic	—
RADIUS	Plus	Plus	Plus	Plus	Plus	—
GRE tunneling	Basic	Basic	Basic	Basic	Basic	—
Lock and key	Basic	Basic	Basic	Basic	Basic	—

Table 3   Cisco 1600 Series Routers Feature Sets (Continued)

Features Contained in Feature Sets	Feature Sets					
	IP	IP/IPX	IP/ AppleTalk	IP/IPX/ AppleTalk	IP/IPX/ IBM	Firewall[1]
Network layer encryption, 40-bit (Plus 40) and 56-bit (Plus 56)	Encrypt	Encrypt	Encrypt	Encrypt	Encrypt	—
Virtual Private Dialup Network	Plus	Plus	Plus	Plus	Plus	—

1. Includes Firewall, IP/Firewall, IP/IPX/Firewall Plus, and IP/IPX/AT/IBM/Firewall Plus 56 feature sets. Available only in Cisco IOS Release 11.2(11)P and later releases.
2. AppleTalk load balancing is available in Cisco IOS Release 11.2.
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; and IRB and concurrent routing and bridging (CRB) cannot operate at the same time.
4. In Cisco IOS Release 11.2, 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 (CLI/ANI), 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. Multilink PPP is included with Cisco IOS Release 11.0(4) and later releases.
7. Bandwidth-on-demand means two B-channel calls to the same destination.

Upgrading Cisco 1600 Memory

Table 4 describes the memory delivered by default and the available memory upgrades.

Table 4   Cisco 1600 Series Default Memory and Upgrade Options

Memory Type	Cisco 1601-1604 Defaults	Cisco 1605-R Defaults	Upgrade Options
Flash memory card	4 MB	2 MB	2-MB upgrade for Cisco 1605-R: MEM1600R-2FC= 4-MB upgrade: MEM1600-4FC= 6-MB upgrade: MEM1600-6FC= 8-MB upgrade: MEM1600-8FC= 12-MB upgrade: MEM1600-12FC=
DRAM	2 MB	8 MB	2-MB upgrade: MEM1600-2D= 4-MB upgrade: MEM1600-4D= 8-MB upgrade: MEM1600-8D= 16-MB upgrade: MEM1600-16D=

Loading Cisco IOS Release 11.2 Software on CiscoPro Routers

The RSL has an upgrade utility to permanently modify a CiscoPro router so that it accepts Cisco IOS Release 11.2 software images. The utility changes the router SysObjectID Simple Network Management Protocol (SNMP) MIB value (used for network management) to that of a Cisco router. The software banner also changes and no longer identifies the router as a CiscoPro product.

Note After this upgrade, CiscoVision cannot recognize your router. If you choose the permanent upgrade, CiscoWorks for Windows is a recommended replacement for network management purposes. To upgrade your CiscoVision software to CiscoWorks Windows 2.1, order one of the following: CPW-CVCW-U to Upgrade CiscoVision to CiscoWorks Windows (managing up to 50 nodes) or CPW-CVCW-ENT-U to Upgrade CiscoVision to CiscoWorks Windows (managing up to 500 nodes). For general information about Cisco Systems, Cisco products, or upgrades, contact 800 553-6387, 408 526-7208, or cs-rep@cisco.com.

If you select a Cisco IOS Release 11.2 image from the image list and are connected to a CiscoPro CPA1600 series router, a message box tells you that the router requires a permanent upgrade to load this image. You can either select **yes** to have the RSL upgrade the router and continue loading the selected image or cancel the load operation.

After you select **yes**, the RSL utility downloads, performs the upgrade, reboots the router, and issues a message to confirm the upgrade. Confirm this message. The RSL then downloads the selected image.

The upgrade utility must be located in the Images directory. If it is not, the upgrade utility informs you that the image is not present.

The Cisco 1600 series upgrade utility filename is cpa1600-upgrade-l.112-3.P. The upgrade utility is a special file, not a Cisco IOS runtime image. RSL only installs valid software releases on Cisco 1600 routers.

Installation Tips

This section describes some solutions to problems you might encounter when using the RSL. These solutions are additions to RSL online help.

Recovering From a Connection Error

Try increasing the Short Timeout value in the Options dialog box if you receive the following message when trying to connect to the 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."
```

This connection recovery method is particularly applicable when you are connecting to one of the following devices:

- A router that has a large configuration file.

- A Cisco AS5200. Note that a Cisco AS5200 requires up to 45 seconds to write a configuration to nonvolatile random-access memory (NVRAM) due to the number of interfaces that must be checked during this process. Increase the Short Timeout value to 60 seconds.

Note   Increasing the Short Timeout value might increase the time it takes for the RSL to connect to the target router.

Restoring the Startup Configuration

In some cases, the RSL is unable to restore the startup configuration. If this happens, take the following steps:

Step 1   Ensure that all cables are properly attached to both the router and the PC.

Step 2   Restart the RSL, and connect by using the **Preconfigured router** option.

Step 3   When asked if you want to overwrite the existing startup configuration file, choose **no**.

Step 4   When asked if you want to continue, choose **yes**.

Step 5   When the router is connected, select **Download Router Configuration** in the Router Software Loader dialog box.

Step 6   Select the appropriate file, and click the radio button beside **Copy configuration to the router nonvolatile memory**.

The router should now contain the startup configuration it had before the initial RSL connection. You can now exit the RSL.

Note   In the previous situation, the router configuration register (**config-register 0x***nnnn*) is not restored.

Note   If you enter **Ctrl-Alt-Delete** to terminate the RSL, the router configuration and configuration register are not restored. However, in this case the configuration file is not deleted from the PC, so you can restore it using the previous steps.

Helpful Hints

The following information about RSL operations can help you with the installation process:

- If you have added any static entries to the PC Address Resolution Protocol (ARP) table, one of them might be deleted by the RSL. You need to manually re-enter this entry into the PC ARP table.

- If the router running configuration at connection time is not the same as its startup configuration, the exact configuration is not restored. Any changes that you have made since the last time a **copy running-config startup-config** or **write memory** command was entered are lost.

- The RSL restores the router startup configuration, but some running configuration commands are not restored. To restore the exact running configuration, reboot the router. The following interface configuration commands are not restored to the running configuration: **no shutdown**, **no ringspeed**, and **media-type aui**.

Alternatives to the RSL

The RSL is designed to work with a PC running Microsoft Windows 95 and is the recommended method for downloading software to the router. The booklet included with the CD-ROM explains how to perform this simple install process. However, two alternatives are available for installing router software:

- Use the console or auxiliary port
- Use a TFTP server application

Installing the Router Software Using the Console or Auxiliary Port

This section explains how to use the **copy xmodem flash** command to install the router software from the CD-ROM onto the router.

Note   The transfer takes place only on the port at which you issue the command. If you download via the console, all console output is discarded for the duration of the transfer. You can only download files to the router; you cannot copy files from the router. Cisco recommends using the auxiliary port for this type of software download. The auxiliary port has hardware flow control and full modem control. In addition, the transfer does not occupy the system console.

The following example shows how to use the **copy xmodem flash** command on a Cisco 1600 series router.

```
Router# copy xmodem flash
                          **** WARNING ****
       x/ymodem is a slow transfer protocol limited to the current speed
       settings of the auxiliary/console ports. The use of the auxilary
       port for this download is strongly recommended.
       During the course of the download no exec input/output will be
       available.
                          ---- ******* ----
       Proceed? [confirm]y
       Use crc block checksumming? [confirm]y
       Max Retry Count [10]:
       Perform image validation checks? [confirm]y
       Xmodem download using crc checksumming with image validation
       Continue? [confirm]y
       Partition    Size    Used      Free      Bank-Size  State         Copy Mode
         1         4096K    3259K      836K      4096K      Read/Write    Direct
         2         4096K      0K      4095K      4096K      Read/Write    Direct

       [Type ?<no> for partition directory; ? for full directory; q to abort]
       Which partition? [default = 1] 2

       System flash directory, partition 2:
       File  Length    Name/status
         1    68       TESTFILE
       [132 bytes used, 4194172 available, 4194304 total]
```

```
Destination file name? c3620-i-mz.0918
Erase flash device before writing? [confirm]y
Flash contains files. Are you sure you want to erase? [confirm]y

Copy '' from server
  as 'c3620-i-mz.0918' into Flash WITH erase? [yes/no]y
Erasing device... eeeeeeeeeeeeeeee ...erased
Ready to receive file...........C
Verifying checksum...  OK (0x5DE8)
Flash device copy took 00:12:06 [hh:mm:ss]
```

Installing the Router Software Using a TFTP Server Application

Use this TFTP server application method as an alternative to using the RSL to install the router software from the CD-ROM. You can perform this procedure using a PC (running Microsoft Windows 95 or Microsoft Windows 3.1), a Macintosh, or a UNIX system. You can use either the **copy tftp flash** or **copy rcp flash** command to download the router software to the router.

First obtain a TFTP application or a remote copy protocol (rcp) application to set up your computer as a TFTP server or an rcp server. Use the RSL or the TFTP server included on the feature pack CD-ROM to install the router software only if you are using a PC running Windows 95. For other operating systems, a number of TFTP or rcp applications are available from independent software vendors or available as shareware from public sources on the World Wide Web.

Note   To use an rcp application, follow the same procedure, and substitute rcp for TFTP in the instructions. Use the **copy rcp flash** command instead of the **copy tftp flash** command.

Step 1   Install any TFTP server application on the PC. (A PC application is included on the feature pack CD-ROM for Microsoft Windows 95 only.)

Step 2   Launch the TFTP server application on the PC, usually by double-clicking the application icon or its .exe filename.

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

Most TFTP server applications include 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 this checkbox.

The TFTP server also allows the selection of a "root" directory. You must select the directory in which the Cisco IOS files reside, for example, d:\cpswinst\images.

Caution   Make sure you set up your local PC as a TFTP server. If you overlook this step, you cannot perform the copy procedure. This reminder also applies if you are using rcp 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 by using one of these methods:

- Connect the PC com port to the router console port.

    This is the recommended method.When you reload the router with the new image in Step 25, you remain connected to the router. (If you use Telnet, you lose connection to the router.)

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

Caution   Make sure your PC is set up to communicate with the 10BaseT Ethernet port on the router.

Step 5   Connect your PC Ethernet port to the corresponding router LAN port. Use the 10BaseT crossover cable to connect to an Ethernet port. Use straight-through cables if you are connecting via a 10BaseT hub or a 100BaseT hub.

Note   We recommend that you back up the router configuration before upgrading the router software.

Step 6   Enter the following commands to set the configuration register to 0x2101 and reload to the bootstrap image:

```
Router# config terminal
Router(config)# config-reg 0x2101
Router(config)# end
Router# reload
```

Note   If you are upgrading a CiscoPro CPA1600 series router running from an image in Flash memory, the router reloads to ROM monitor mode because of an interaction between the Flash Load Helper and the cpa1600-upgrade-l.112-3.P image.

Step 7   Enter **yes** in response to the prompt asking if the system configuration has been modified:

```
# System configuration has been modified. Save? yes
```

Step 8   If the password prompt appears, enter the password.

```
Password:
```

Step 9   At the router prompt, enter **enable** and then the password:

```
Router(boot)> enable
Password:
```

Step 10   If you are *not* upgrading a CiscoPro CPA1600 router, skip to Step 19.

Step 11   At the router prompt, enter the following command to copy the router upgrade utility from the PC CD-ROM drive to the router:

```
Router(boot)# copy tftp flash
```

Note   If you are using rcp, enter **copy rcp flash** instead.

Step 12   When prompted, enter the IP address of your PC, as in the following example:

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

This is the IP address of your local PC, not the router. (Note that you can obtain your PC IP address from the DOS prompt in the windows directory by entering **winipcfg**, as follows: C:\WINDOWS> **winipcfg**.)

Step 13   When prompted, enter the filename of the image to be copied to the router as in the following example:

```
Source file name? cpa1600-upgrade-l.112-3.P
```

Note   The upgrade image file on the Feature Pack CD has a long filename (cpa1600-upgrade-l.112-3.P); note that DOS displays it in 8.3 format as cpa1600~1.P. The upgrade utility is a special file, not a Cisco IOS runtime image.

Step 14   In response to the following prompt, enter the destination filename, and press **Enter**.

```
Destination file name [cpa1600-upgrade-l.112-3.P]?
cpa1600-upgrade-l.112-3.P
```

(This is the name of the image file on the router, not the full pathname of the image on the PC CD-ROM.)

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

If the file is not found, check the following:

- The filename is correct.

- The TFTP server is enabled.

- The correct root directory is selected.

- There is IP connectivity between the router and TFTP server.

If the file is still not found, create a temporary directory called C:\temp and copy the CiscoPro upgrade file into the directory. Select the C:\temp directory as the root directory.

Step 15   Enter **yes** in response to the prompt asking if you want to erase the existing image in the router Flash memory before copying the new one:

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

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. If you see three or more periods (...), the transfer might fail. If the transfer fails, check IP connectivity between the router and TFTP server by using the **ping** command.

Step 16   Enter the **reload** command to reload the router:

```
Router(boot)# reload
```

Do not save the configuration.

After reload is complete, your CiscoPro router has been upgraded to a Cisco Enterprise router. Because the original Cisco IOS image that resided in Flash memory was erased during the upgrade process, the router should now be running in bootstrap mode.

Step 17   If the password prompt appears, enter the password.

```
Password:
```

Step 18   At the router prompt, enter **enable** and then the password:

```
Router(boot)# enable
Password:
```

Step 19   At the router prompt, enter the following command to copy the new software image from the PC CD-ROM drive to the router:

```
Router(boot)(config)# copy tftp flash
```

In the next series of steps, you download the Cisco IOS Release 11.2 images that you want installed on your router.

Step 20   When prompted, enter the IP address of your PC, as in the following example:

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

This is the IP address of your local PC, not that of the router.

Step 21   When prompted, enter the filename of the Cisco IOS Release 11.2 image to be copied to the router, as in the following example:

```
Source file name? 80153209.bin
```

This example specifies the DOS image name of the IP feature set for Cisco 1600 series routers (as shown in Table 2 in the section, "Cisco Feature Pack and Memory Descriptions").

Step 22   In response to the prompt, enter the destination UNIX image filename, and press **Enter**.

This is the name of the image file on the router, not the full pathname of the image on the CD-ROM attached to the PC. Refer to Table 2 in the section, "Cisco Feature Pack and Memory Descriptions" for the UNIX image filename.

```
Destination file name [80153209.bin]? c1600-i-l
```

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

Step 23   Enter **yes** in response to the prompt asking if you want to erase the existing image copy resident in the router Flash memory before copying the new one.

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

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 checksum verification of the image occurs after the image is written to Flash memory.

Step 24   Enter the following commands to reset the configuration register to 0x2102.

```
Router(boot)(config)# config terminal
Router(boot)(config)# config-reg 0x2102
Router(boot)(config)# end
```

Step 25   Enter the **reload** command to reload the router:

```
Router# reload
```

⚠️ **Caution**   If you upgraded a CiscoPro CPA1600 router, do not save the configuration when prompted.

After reload is complete, the router should be running the required Cisco IOS image. Use the **show version** command to verify.

Related Documentation

For a list of documentation related to the Cisco 1600, refer to the *Release Notes for the 1600 Series for Cisco IOS Release 11.2P.* Release notes and other Cisco documentation are on the Cisco Documentation CD-ROM and at Cisco Connection Online (CCO) on the World Wide Web:

- On the Documentation CD-ROM, go to *Cisco Product Documentation*, select *Cisco IOS Software Configuration*, and then select *Cisco IOS Release 11.2*.

- On CCO, go to http://www.cisco.com/, click on *Software and Support*, and select *Documentation*. Next, select *Documentation*, go to *Cisco IOS Software Configuration,* and then click on *Cisco IOS Release 11.2.*

Online documentation for Release 11.2 includes:

- Release Notes
- Feature Guides including new features for Cisco IOS Release 11.2(10)P
- Configuration Guides and Command References
- Command Summary
- System Error Messages
- MIB User Quick Reference
- Debug Command Reference
- Caveats

For Cisco IOS Release 11.2, the Cisco IOS documentation set consists of eight documentation modules. Each documentation module has a configuration guide, a command reference, and five supporting documents.

The books and chapter topics are as follows:

Books	Chapter Topics
• *Configuration Fundamentals Configuration Guide* • *Configuration Fundamentals Command Reference*	Access Server and Router Product Overview User Interface System Images and Configuration Files Using ClickStart, AutoInstall, and Setup Interfaces System Management
• *Security Configuration Guide* • *Security Command Reference*	Network Access Security Terminal Access Security Accounting and Billing Traffic Filters Controlling Router Access Network Data Encryption with Router Authentication
• *Access Services Configuration Guide* • *Access Services Command Reference*	Terminal Lines and Modem Support Network Connections AppleTalk Remote Access SLIP and PPP XRemote LAT Telnet TN3270 Protocol Translation Configuring Modem Support and Chat Scripts X.3 PAD Regular Expressions
• *Wide-Area Networking Configuration Guide* • *Wide-Area Networking Command Reference*	ATM Dial-on-Demand Routing (DDR) Frame Relay ISDN LANE PPP for Wide-Area Networking SMDS X.25 and LAPB
• *Network Protocols Configuration Guide, Part 1* • *Network Protocols Command Reference, Part 1*	IP IP Routing
• *Network Protocols Configuration Guide, Part 2* • *Network Protocols Command Reference, Part 2*	AppleTalk Novell IPX

Books	Chapter Topics
• *Network Protocols Configuration Guide, Part 3* • *Network Protocols Command Reference, Part 3*	Apollo Domain Banyan VINES DECnet ISO CLNS XNS
• *Bridging and IBM Networking Configuration Guide* • *Bridging and IBM Networking Command Reference*	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 Support SNA Frame Relay Access Support APPN NCIA Client/Server Topologies IBM Channel Attach
• *Cisco IOS Software Command Summary* • *Access Services Quick Configuration Guide* • *System Error Messages* • *Debug Command Reference* • *Cisco Management Information Base (MIB) User Quick Reference*	

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CCO serves a wide variety of users through two interfaces that are updated and enhanced simultaneously: a character-based version and a multimedia version that resides on the World Wide Web (WWW). The character-based CCO supports Zmodem, Kermit, Xmodem, FTP, and Internet e-mail, and it is excellent for quick access to information over lower bandwidths. The WWW version of CCO provides richly formatted documents with photographs, figures, graphics, and video, as well as hyperlinks to related information.

You can access CCO in the following ways:

- WWW: http://www.cisco.com

- 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 connection rates up to 28.8 kbps.

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

Note   If you are a network administrator and need personal technical assistance with a Cisco product that is under warranty or covered by a maintenance contract, contact Cisco's Technical Assistance Center (TAC) at 800 553-2447, 408 526-7209, or tac@cisco.com. To obtain general information about Cisco Systems, Cisco products, or upgrades, contact 800 553-6387, 408 526-7208, or cs-rep@cisco.com.

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