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# Release Notes for Cisco IOS Release 11.2 Software Feature Packs for Cisco 1600 Series Routers

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**November 3, 1997**

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

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## Platforms Supported

Router Software Loader (RSL) Version 5.1 supports the following Cisco 1600 series routers:

- CiscoPro CPA1601, CPA1602, CPA1603, and CPA1604
- Cisco 1601, 1602, 1603, 1604, and 1605

## What Is a Feature Pack?

The heart of a Cisco IOS software feature pack is a CD-ROM that contains software images and the RSL, a Windows 95 application that loads software images onto the router. 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.

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

- CD-ROM with the following software:
  - Cisco IOS Release 11.2 feature set software images
  - The RSL program (a Windows 95 application)
  - A TFTP server application (for Windows 95 only)
- Instruction booklet for using the RSL (*Getting Started with the Router Software Loader*)
- 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 router
- Cisco Documentation CD-ROM, which contains all Cisco IOS software documentation

Before running the RSL, read the section, “Installation Tips,” page 11. 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 “Cisco IOS Release 11.2 Feature Sets” to identify which features are supported for a feature set on a specific platform.
- 2 Use Table 2 in the section “Product Numbers” to identify your software image.
- 3 Use Table 3 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.
- 4 Check the memory required for your feature set against Table 4 in the section “Cisco Feature Pack and Memory Descriptions” to determine the factory-default memory on the router and the available memory upgrades.

## Cisco IOS Release 11.2 Feature Sets

Table 1 lists the specific features supported within each Cisco IOS Release 11.2 feature set. The table uses the following conventions to identify features:

- Basic: offered in the basic feature set
- – : Not offered in the feature set
- Plus: offered only in the Plus feature sets, not in the basic feature set
- Encrypt: includes 40-bit (Plus 40) or 56-bit (Plus 56) data-encryption feature sets

Cisco IOS images with 40-bit Data Encryption Standard (DES) support can legally be distributed to any party eligible to receive Cisco IOS software. However, 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 might be denied or subject to delay due to U.S. government regulations. Contact your sales representative or distributor for more information, or send e-mail to [export@cisco.com](mailto:export@cisco.com).

Table 1 Cisco 1600 Series Routers Feature Sets

Features Contained in Feature Sets	Feature Sets				
	IP	IP/IPX	IP/AppleTalk	IP/IPX/AppleTalk	IP/IPX/IBM
<b>LAN Support</b>					
AppleTalk 1 and 2	—	—	Basic	Basic	—
Integrated routing and bridging (IRB) <sup>1</sup>	Basic	Basic	Basic	Basic	Basic
IP	Basic	Basic	Basic	Basic	Basic
Novell IPX	—	Basic	—	Basic	Basic
Transparent bridging	Basic	Basic	Basic	Basic	Basic
<b>WAN Services</b>					
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 <sup>2</sup>	Basic	Basic	Basic	Basic	Basic
PPP <sup>3</sup>	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
<b>WAN Optimization</b>					
Bandwidth-on-demand	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 <sup>4</sup>	Basic	Basic	Basic	Basic	Basic
Weighted fair queuing	Basic	Basic	Basic	Basic	Basic
IPX and SPX spoofing	—	Basic	—	Basic	Basic
<b>IP Routing</b>					
AppleTalk SMRP Multicast	—	—	Plus	Plus	—
Enhanced IGRP	Basic	Basic	Basic	Basic	Basic

Table 1 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
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
<b>Other Routing</b>					
IPX RIP	—	Basic	—	Basic	Basic
RTMP	—	—	Basic	Basic	—
NLSP	—	Plus	—	Plus	Plus
<b>Multimedia and Quality of Service</b>					
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
<b>Management</b>					
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
<b>Security</b>					
Access lists	Basic	Basic	Basic	Basic	Basic
Extended access lists	Basic	Basic	Basic	Basic	Basic
TACACS Plus	Basic	Basic	Basic	Basic	Basic
GRE tunneling	Basic	Basic	Basic	Basic	Basic
Lock and key	Basic	Basic	Basic	Basic	Basic
Network layer encryption, 40-bit (Plus 40) and 56-bit (Plus 56)	Encrypt	Encrypt	Encrypt	Encrypt	Encrypt

1. 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.
2. ISDN support includes calling line identification (CLI/ANI), ISDN subaddressing, and applicable WAN optimization features.
3. PPP includes support for LAN protocols supported by the feature set, address negotiation, PAP and CHAP authentication, and PPP compression.
4. Bandwidth-on-demand means two B channel calls to the same destination.

## Product Numbers

Table 2 lists the Cisco product numbers for the supported feature packs.

**Table 2 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/AppleTalk Feature Pack
CD16-BP/EP-11.2=	Cisco 1600 IP/IPX Plus & IP/AppleTalk Plus Feature Pack
CD16-BW/EW-11.2=	Cisco 1600 IP/IPX Plus 40 & IP/AppleTalk Plus 40 Feature Pack
CD16-BY/EY-11.2=	Cisco 1600 IP/IPX Plus 56 & IP/AppleTalk Plus 56 Feature Pack
CD16-AP-11.2=	Cisco 1600 IP/IPX/AppleTalk Plus Feature Pack
CD16-AW-11.2=	Cisco 1600 IP/IPX/AppleTalk Plus 40 Feature Pack
CD16-AY-11.2=	Cisco 1600 IP/IPX/AppleTalk Plus 56 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 5.1.

## Cisco Feature Pack and Memory Descriptions

Table 3 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 4 describes the memory delivered by default and the available memory upgrades.

**Table 3 Cisco 1600 Series Feature Packs**

Model 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 11.2.9P	c1600-y-l.112-9.P	80153209	4 MB	2 MB	Cisco 1600 IP feature set for Cisco 1601, 1602, 1603, 1604 11.2(9)P
		c1600-y-l.111-8.AA	80130508	4 MB	2 MB	Cisco 1600 IP feature set for 1601, 1602, 1603, 1604 11.1(8)AA
		c1600-y-l.112-4.xa	80153204	4 MB	2 MB	Cisco 1600 IP feature set for 1601, 1602, 1603, 1604 11.2(4)XA
		c1600-y-mz.112-9.P	80218109	2 MB	8 MB	Cisco 1600 IP feature set for 1605-R 11.2(9)P

## Using Cisco Feature Packs

Model Number	CD-ROM Title	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
CD16-CP-11.2=	Cisco 1600 IP Plus Feature Pack Release 11.2.9P	c1600-sy-l.112-9.P	80153309	6MB	4 MB	Cisco 1600 IP Plus feature set for 1601, 1602, 1603, 1604 11.2(9)P
		c1600-sy-l.111-8.AA	80130408	6 MB	4 MB	Cisco 1600 IP Plus feature set for 1601, 1602, 1603, 1604 11.1(8)AA
		c1600-sy-l.112-4.xa	80153304	6 MB	4 MB	Cisco 1600 IP Plus feature set for 1601, 1602, 1603, 1604 11.2(4)XA
		c1600-sy-mz.112-9.P	80217809	2 MB	8 MB	Cisco 1600 IP Plus feature set for 1605-R 11.2(9)P
CD16-CW-11.2=	Cisco 1600 IP Plus 40 Feature Pack Release 11.2.9P	c1600-sy40-l.112-9.P	80153409	6 MB	4 MB	Cisco 1600 IP Plus 40 feature set for 1601, 1602, 1603, 1604 11.2(9)P
		c1600-sy40-mz.112-9.P	80217909	4 MB	8 MB	Cisco 1600 IP Plus 40 feature set for 1605-R 11.2(9)P
		c1600-sy40-l.112-4.xa	80153404	6 MB	4 MB	Cisco 1600 IP Plus 40 feature set for 1601, 1602, 1603, 1604 11.2(4)XA
CD16-CY-11.2=	Cisco 1600 IP Plus 56 Feature Pack Release 11.2.9P	c1600-sy56-l.112-9.P	80153509	6 MB	4 MB	Cisco 1600 IP Plus 56 feature set for 1601, 1602, 1603, 1604 11.2(9)P
		c1600-sy56-mz.112-9.P	80218009	4 MB	8 MB	Cisco 1600 IP Plus 56 feature set for 1605-R 11.2(9)P
		c1600-sy56-l.112-4.xa	80153504	6 MB	4 MB	Cisco 1600 IP Plus 56 feature set for 1601, 1602, 1603, 1604 11.2(4)XA
CD16-A/B/E-11.2 =	Cisco 1600 IP/IPX/AppleTalk and IP/IPX/IBM Feature Pack Release 11.2.9P	c1600-ny-l.112-9.P	80154009	4 MB	4 MB	Cisco 1600 IP/ IPX feature set for 1601, 1602, 1603, 1604 11.2(9)P
		c1600-by-l.112-9.P	80153609	4 MB	4 MB	Cisco 1600 IP/ AppleTalk feature set for 1601, 1602, 1603, 1604 11.2(9)P
		c1600-bny-l.112-9.P	80154409	6 MB	4 MB	Cisco 1600 IP/ IPX/AppleTalk feature set for 1601, 1602, 1603, 1604 11.2(9)P
		c1600-ny-l.111-8.AA	80130308	4 MB	2 MB	Cisco 1600 IP/ IPX feature set for 1601, 1602, 1603, 1604 11.1(8)AA
		c1600-by-l.111-8.AA	80130108	4 MB	2 MB	Cisco 1600 IP/ AppleTalk feature set for 1601, 1602, 1603, 1604 11.1(8)AA

Model Number	CD-ROM Title	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
		c1600-bny-l.111-8.AA	80129908	6 MB	4 MB	Cisco 1600 IP/ IPX/AppleTalk feature set for 1601, 1602, 1603, 1604 11.1(8)AA
		c1600-ny-l.112-4.xa	80154004	4 MB	2 MB	Cisco 1600 IP/ IPX feature set for 1601, 1602, 1603, 1604 11.2(4)XA
		c1600-by-l.112-4.xa	80153604	4 MB	2 MB	Cisco 1600 IP/ AppleTalk feature set for 1601, 1602, 1603, 1604 11.2(4)XA
		c1600-bny-l.112-4.xa	80154404	6 MB	4 MB	Cisco 1600 IP/ IPX/AppleTalk feature set for 1601, 1602, 1603, 1604 11.2(4)XA
		c1600-ny-mz.112-9.P	80217709	2 MB	8 MB	Cisco 1600 IP/ IPX feature set for 1605-R 11.2(9)P
		c1600-by-mz.112-9.P	80216909	2 MB	8 MB	Cisco 1600 IP/ AppleTalk feature set for 1605-R 11.2(9)P
		c1600-bny-mz.112-9.P	80216509	2 MB	8 MB	Cisco 1600 IP/ IPX/AppleTalk feature set for 1605-R 11.2(9)P
		c1600-nr2y-mz.112-9.P	80217009	4 MB	10 MB	Cisco 1600 IP/IPX/IBM feature set for 1605-R 11.2(9)P
		c1600-nr2y-l.112-9.P	80211909	6 MB	6 MB	Cisco 1600 IP/IPX/IBM feature set for 1601, 1602, 1603, 1604 11.2(9)P
CD16-BP/EP-11.2=	Cisco 1600 IP/IPX Plus & IP/AppleTalk Plus Feature Pack Release 11.2.9P	c1600-nsy-l.112-9.P	80154109	6 MB	4 MB	Cisco 1600 IP/ IPX Plus feature set for 1601, 1602, 1603, 1604 11.2(9)P
		c1600-bsy-l.112-9.P	80153709	6 MB	4 MB	Cisco 1600 IP/ AppleTalk Plus feature set for 1601, 1602, 1603, 1604 11.2(9)P
		c1600-nsy-l.111-8.AA	80130208	6 MB	4 MB	Cisco 1600 IP/ IPX Plus feature set for 1601, 1602, 1603, 1604 11.1(8)AA
		c1600-bsy-l.111-8.AA	80130008	6 MB	4 MB	Cisco 1600 IP/ AppleTalk Plus feature set for 1601, 1602, 1603, 1604 11.1(8)AA
		c1600-nsy-l.112-4.xa	80154104	6 MB	4 MB	Cisco 1600 IP/ IPX Plus feature set for 1601, 1602, 1603, 1604 11.2(4)XA

## Using Cisco Feature Packs

Model Number	CD-ROM Title	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
		c1600-bsy-l.112-4.xa	80153704	6 MB	4 MB	Cisco 1600 IP/ AppleTalk Plus feature set for 1601, 1602, 1603, 1604 11.2(4)XA
		c1600-nsy-mz.112-9.P	80217409	4 MB	8 MB	Cisco 1600 IP/ IPX Plus feature set for 1605-R 11.2(9)P
		c1600-bsy-mz.112-9.P	80216609	4 MB	8 MB	Cisco 1600 IP/ AppleTalk Plus feature set for 1605-R 11.2(9)P
CD16-BW/EW-11.2=	Cisco 1600 IP/IPX Plus 40 & IP/AT Plus 40 Feature Pack Release 11.2.9P	c1600-nsy40-l.112-9.P	80154209	6 MB	4 MB	Cisco 1600 IP/ IPX Plus 40 feature set for 1601, 1602, 1603, 1604 11.2(9)P
		c1600-bsy40-l.112-9.P	80153809	6 MB	4 MB	Cisco 1600 IP/ AppleTalk Plus 40 feature set for 1601, 1602, 1603, 1604 11.2(9)P
		c1600-nsy40-mz.112-9.P	80217509	4 MB	8 MB	Cisco 1600 IP/ IPX Plus 40 feature set for 1605-R 11.2(9)P
		c1600-bsy40-mz.112-9.P	80216709	4 MB	8 MB	Cisco 1600 IP/ AppleTalk Plus 40 feature set for 1605-R 11.2(9)P
		c1600-nsy40-l.112-4.xa	80154204	6 MB	4 MB	Cisco 1600 IP/ IPX Plus 40 feature set for 1601, 1602, 1603, 1604 11.2(4)XA
		c1600-bsy40-l.112-4.xa	80153804	6 MB	4 MB	Cisco 1600 IP/ AppleTalk Plus 40 feature set for 1601, 1602, 1603, 1604 11.2(4)XA
CD16-BY/EY-11.2=		Cisco 1600 IP/IPX Plus 56 & IP/AT Plus 56 Feature Pack Release 11.2.9P	c1600-nsy56-l.112-9.P	80154309	6 MB	4 MB
	c1600-bsy56-l.112-9.P		80153909	6 MB	4 MB	Cisco 1600 IP/ AppleTalk Plus 56 feature set for 1601, 1602, 1603, 1604 11.2(9)P
	c1600-nsy56-mz.112-9.P		80217609	4 MB	8 MB	Cisco 1600 IP/ IPX Plus 56 feature set for 1605-R 11.2(9)P
	c1600-bsy56-mz.112-9.P		80216809	4 MB	8 MB	Cisco 1600 IP/ AppleTalk Plus 56 feature set for 1605-R 11.2(9)P



Model Number	CD-ROM Title	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
		c1600-nsy56-l.112-4.xa	80154304	6 MB	4 MB	Cisco 1600 IP/ IPX Plus 56 feature set for 1601, 1602, 1603, 1604 11.2(4)XA
		c1600-bsy56-l.112-4.xa	80153904	6 MB	4 MB	Cisco 1600 IP/ AppleTalk Plus 56 feature set for 1601, 1602, 1603, 1604 11.2(4)XA
CD16-AP-11.2=	Cisco 1600 IP/IPX/AppleTalk Plus and IP/IPX/IBM Plus Feature Pack Release 11.2.9P	c1600-bnsy-l.112-9.P	80154509	6 MB	4 MB	Cisco 1600 IP/ IPX/AppleTalk Plus feature set for 1601, 1602, 1603, 1604 11.2(9)P
		c1600-bnsy-l.111-8.AA	80129808	6 MB	4 MB	Cisco 1600 IP/ IPX/AppleTalk Plus feature set for 1601, 1602, 1603, 1604 11.1(8)AA
		c1600-bnsy-l.112-4.xa	80154504	6 MB	4 MB	Cisco 1600 IP/ IPX/AppleTalk Plus feature set for 1601, 1602, 1603, 1604 11.2(4)XA
		c1600-bnsy-mz.112-9.P	80216209	4 MB	10 MB	Cisco 1600 IP/ IPX/AppleTalk Plus feature set for 1605-R 11.2(9)P
		c1600-nr2sy-mz.112-9.P	80217109	4 MB	12 MB	Cisco 1600 IP/IPX/IBM Plus feature set for 1605-R 11.2(9)P
		c1600-nr2sy-l.112-9.P	80212009	8 MB	6 MB	Cisco 1600 IP/IPX/IBM Plus feature set for 1601, 1602, 1603, 1604 11.2(9)P
CD16-AW-11.2=	Cisco 1600 IP/IPX/AppleTalk Plus 40 and IP/IPX/IBM Plus 40 Feature Pack Release 11.2.9P	c1600-bnsy40-l.112-9.P	80154609	6 MB	4 MB	Cisco 1600 IP/ IPX/AppleTalk Plus 40 feature set for 1601, 1602, 1603, 1604 11.2(9)P
		c1600-bnsy40-mz.112-9.P	80216309	4 MB	10 MB	Cisco 1600 IP/ IPX/AppleTalk Plus 40 feature set for 1605-R 11.2(9)P
		c1600-bnsy40-l.112-4.xa	80154604	6 MB	4 MB	Cisco 1600 IP/ IPX/AppleTalk Plus 40 feature set for 1601, 1602, 1603, 1604 11.2(4)XA
		c1600-nr2sy40-mz.112-9.P	80217209	4 MB	12 MB	Cisco 1600 IP/IPX/IBM Plus 40 feature set for 1605-R 11.2(9)P

Model Number	CD-ROM Title	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
		c1600-nr2sy40-l.112-9.P	80212109	8 MB	6 MB	Cisco 1600 IP/IPX/IBM Plus 40 feature set for 1601, 1602, 1603, 1604 11.2(9)P
CD16-AY-11.2=	Cisco 1600 IP/IPX/AppleTalk Plus 56 and IP/IPX/IBM Plus 56 Feature Pack Release 11.2.9P	c1600-bnsy56-l.112-9.P	80154709	6 MB	4 MB	Cisco 1600 IP/IPX/AppleTalk Plus 56 feature set for 1601, 1602, 1603, 1604 11.2(9)P
		c1600-bnsy56-mz.112-9.P	80216409	4 MB	10 MB	Cisco 1600 IP/IPX/AppleTalk Plus 56 feature set for 1605-R 11.2(9)P
		c1600-bnsy56-l.112-4.xa	80154704	6 MB	4 MB	Cisco 1600 IP/IPX/AppleTalk Plus 56 feature set for 1601, 1602, 1603, 1604 11.2(4)XA
		c1600-nr2sy56-mz.112-9.P	80217309	4 MB	12 MB	Cisco 1600 IP/IPX/IBM Plus 56 feature set for 1605-R 11.2(9)P
		c1600-nr2sy56-l.112-9.P	80212209	8 MB	6 MB	Cisco 1600 IP/IPX/IBM Plus 56 feature set for 1601, 1602, 1603, 1604 11.2(9)P

**Table 4 Cisco 1600 Series Default Memory and Upgrade Options**

Memory Type	Cisco 1601-1604 Defaults	Cisco 1605 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.

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**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](mailto:cs-rep@cisco.com).

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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-1.112-3.P`.

## 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.

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

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## 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.

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**Note** In the previous situation, the router configuration register is not restored.

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**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.

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## 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. 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 auxiliary
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... eeeeeeeeeeeeeeeeeee ...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.

### Installation Process

This section describes how to use TFTP to install the router software.

---

**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 26, 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.
- Step 5** Connect your PC Ethernet port to the corresponding router LAN port. Use the 10BaseT crossover cable to connect to an Ethernet port.

---

**Note** Use straight-through cables if you are connecting via a 10BaseT hub or a 100BaseT hub.

---

For systems without a LAN interface, make sure that the router and the PC have IP connectivity through the available interface (that is, the router and PC can ping each other with IP traffic).

**Note** It is recommended that you backup the router configuration before upgrading the router software.

**Step 6** If you are *not* upgrading a CiscoPro CPA1600 router, skip to Step 20.

**Step 7** 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-1.112-3.P image.

Avoid ROM monitor mode by entering the following commands:

```
# config terminal
(config)# config-reg 0x2101
(config)# Ctrl-Z
# reload
```

The router reloads to the bootstrap image.

**Step 8** Enter **yes** in response to the prompt asking if the system configuration has been modified:

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

**Step 9** If the password prompt appears, enter the password.

```
Password:
```

**Step 10** At the router prompt, enter **enable** and then the password:

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

**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:

```
# 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-1.112-3.P
```

**Note** The upgrade image file on the Feature Pack CD has a long filename (cpa1600-upgrade-1.112-3.P); note that DOS displays it in 8.3 format as cpa1600~1.P.

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

```
Destination file name [cpa1600-upgrade-1.112-3.P]?  
cpa1600-upgrade-1.112-3.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
```

---

**Note** Ignore the warning message: "File not a recommended image for this system."

---

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 periods (...), the transfer failed. Check IP connectivity between the router and TFTP server by using the **ping** command.

**Step 16** Enter the following configuration commands:

```
# config terminal  
(config)# config-reg 0x2102  
(config)# Ctrl-Z
```

**Step 17** Enter the **reload** command to reload the router:

```
# 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 18** If the password prompt appears, enter the password.

```
Password:
```

**Step 19** At the router prompt, enter **enable** and then the password:

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



- Step 20** At the router prompt, enter the following command to copy the new software image from the PC CD-ROM drive to the router:

```
(boot)# 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 21** 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 22** 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 3 in the section, “Cisco Feature Pack and Memory Descriptions”).

- Step 23** 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 3 in the section, “Cisco Feature Pack and Memory Descriptions” for the UNIX image filename.

```
Destination file name [80153209.bin]? c1600-i-1
```

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

- Step 24** 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 25** If you upgraded a CiscoPro CPA1600 router, enter the following configuration commands from the console to reset the configuration register:

```
# config terminal
(config)# config-reg 0x2102
(config)# Ctrl-Z
```

- Step 26** Enter the **reload** command to reload the router:

```
(boot)# 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.

## About Cisco IOS Software Electronic Documentation

Cisco IOS software documentation is provided on the Documentation CD-ROM that is included with your feature pack. To locate the correct documentation, first determine the Cisco IOS release level of the image you loaded (see Table 3 in the section “Cisco Feature Pack and Memory Descriptions”).

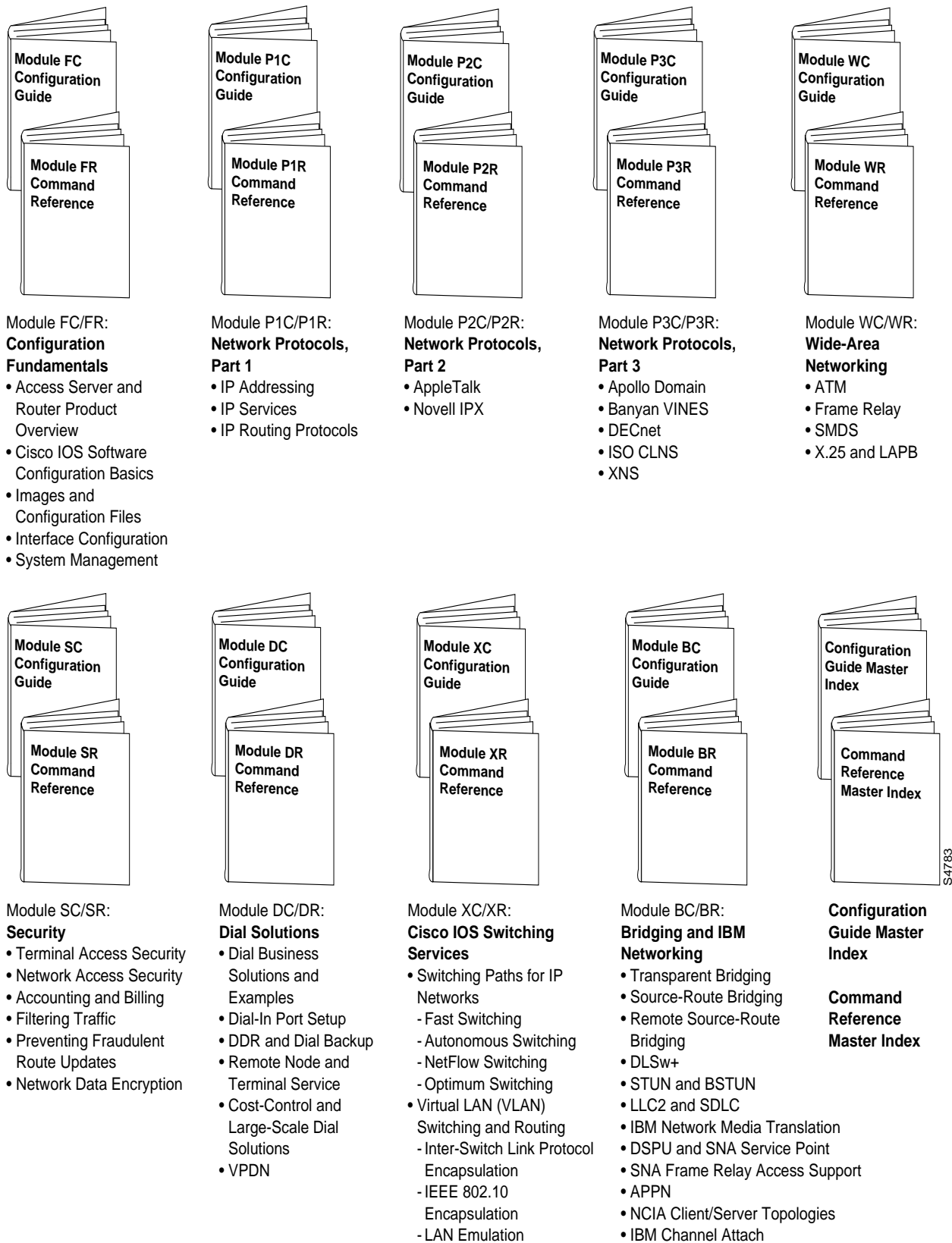
You can either use the Documentation CD or go to [www.cisco.com](http://www.cisco.com) (select **Products & Ordering, Documentation, Cisco Product Documentation, Cisco IOS Software Configuration**, then select the level of release). Typical documentation consists of the following:

- Release notes—Contains information such as new features, important notes, and caveats.
- Feature guides—Describes new features available in specific Cisco IOS releases.
- Documentation modules that comprise the configuration guides and command references. Figure 1 describes Cisco IOS Release 11.2 modules.
- *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.
- Caveats.

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.

Figure 1 Cisco IOS Configuration Guides and Command References



## Cisco Connection Online

Cisco Connection Online (CCO) is Cisco Systems' primary, real-time support channel. Maintenance customers and partners can self-register on CCO to obtain additional information and services.

Available 24 hours a day, 7 days a week, CCO provides a wealth of standard and value-added services to Cisco customers and business partners. CCO services include product information, product documentation, software updates, release notes, technical tips, the Bug Navigator, configuration notes, brochures, descriptions of service offerings, and download access to public and authorized files.

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](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 Frequently Asked Questions (FAQ), contact [cco-help@cisco.com](mailto:cco-help@cisco.com). For additional information, contact [cco-team@cisco.com](mailto:cco-team@cisco.com).

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**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](mailto: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](mailto:cs-rep@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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