



# Release Notes for Cisco IOS Release 12.1(1)T Feature Packs for the Cisco 1700 Series

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**April 19, 2000**

These release notes describe the Cisco IOS Release 12.1(1)T feature packs for Cisco 1700 series routers and contain the following topics:

- Introduction, page 2
- System Requirements, page 3
- Installation Notes, page 16
- Related Documentation, page 21
- Obtaining Documentation, page 26
- Obtaining Technical Assistance, page 26



# Introduction

## List of Terms

The following terms are used throughout this document:

- **Feature**—Networking functionality that supports network technology and hardware. For example: Double Authentication, IP Multicast over Token Ring, Voice Over IP, PPP over ATM, and so forth.
- **Feature Set**—A group of features. For example: IP, IP Plus, Enterprise Plus, IP IPsec 56, and so forth.
- **Image**—Software code containing a Cisco IOS feature set. The image file nomenclature, such as *c800-y6-mw*, *c1000-bnsy40-mz*, and *c2500-g-1*, specifies a platform, feature set, and file compression method. For example, *c4500-is56i-mz* indicates:
  - Cisco 4500 platform: *c4500*.
  - IP Plus IPsec 56 feature set: *is56i*.
  - RAM compression method: *mz*.
- **Feature Pack**—A small box containing hardcopy documentation and CDs that contain software images, applications and electronic documentation. Feature packs provide software upgrades for many of the Cisco hardware platforms.

## How to Use These Release Notes

The tables in these release notes contain details about the Cisco feature packs. Use these tables to perform the following tasks before loading a software image onto a router:

1. Use Table 1, “Cisco 1700 Series Default Memory and Upgrade Options,” for the feature set memory requirements, factory-default memory, and available memory upgrades for your router.
2. Use Table 2, “Feature Pack Product Numbers Quick-Reference List,” to identify the software image you want to load.
3. Use Table 3, “Cisco 1700 Series Feature Packs,” and Table 4, “Additional Feature Packs for the Cisco 1750 Only,” to identify your feature pack and the memory required for your feature set, based on the image you load.
4. Use the tables in the “Feature Set Tables” section on page 12 to identify which features are supported in a feature set image.

## Feature Pack Components

A feature pack is a box that typically contains the following items:

- A CD-ROM with the following software:
  - Cisco IOS feature set software images that can include bundled modem firmware.
  - Router Software Loader (RSL) program (a Windows 95 application) that loads images onto your router.
  - Trivial File Transfer Protocol (TFTP) server application (for Windows 95 only).
- Getting Started with the Router Software Loader.



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**Note** If you cannot use RSL to load images, you can follow the instructions in the “Alternatives to RSL” section on page 17.

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- Release notes (this document).
- Other configuration or command references, if available.
- Software license for using Cisco software in object code form on a single access server or router.
- Documentation CD-ROM that contains all Cisco documentation.

## System Requirements

This section describes the following system requirements:

- Memory Defaults and Upgrade Options, page 4
- Hardware Supported, page 4
- Software Compatibility, page 6
- Determining the Software Release, page 6
- Upgrading Your Software Release, page 7
- Product Numbers Quick-Reference List, page 7
- Feature Pack Overview Tables, page 7
- Feature Set Tables, page 12

## Memory Defaults and Upgrade Options

*Table 1 Cisco 1700 Series Default Memory and Upgrade Options*

Memory Type	Cisco 1700 Series Defaults	Upgrade Options
Flash memory	4 MB	<ul style="list-style-type: none"> <li>4-MB to 8-MB upgrade (4 MB): MEM1700-4U8MFC=</li> <li>4-MB to 16-MB upgrade (12 MB): MEM1700-4U16MFC=</li> <li>8-MB to 16 -MB upgrade (8 MB): MEM1700-8U16MFC=</li> </ul>
DRAM	16 MB	<ul style="list-style-type: none"> <li>16-MB to 20-MB upgrade (4-MB): MEM1700-16U20D=</li> <li>16-MB to 24-MB upgrade (8-MB): MEM1700-16U24D=</li> <li>16-MB to 32-MB upgrade (16-MB): MEM1700-16U32D=</li> <li>16-MB to 48-MB upgrade (32-MB): MEM1700-16U48D=</li> </ul>

## Hardware Supported

The following hardware is supported:

- Cisco 1720—Runs data images only.
- Cisco 1750—Runs data and data-plus-voice images.

### Cisco 1720

The 1720 router provides Internet and intranet access and includes the following:

- Support for virtual private networking
- Modular architecture
- Network device integration

The Cisco 1720 router has the following hardware components:

- One autosensing 10/100 Fast Ethernet port
- Two WAN interface card slots
- One auxiliary (AUX) port (up to 115.2 kbps asynchronous serial)
- One console port
- RISC Processor for high performance encryption
- One internal expansion slot for support of future hardware-assisted services such as encryption (up to T1/E1) and compression
- DRAM memory: 16 MB default, expandable to 48 MB

- Flash memory: 4 MB default, expandable to 16 MB
- Desktop form factor

The Cisco 1720 router supports any combination of one or two of the following WAN interface cards, which are shared with the Cisco 1600, 2600, and 3600 routers:

- WIC-1T: One port high speed serial (sync/async)
- WIC-2T: Two port high speed serial (sync/async)
- WIC-2A/S: Two port low speed serial (sync/async) (up to 128 kbps)
- WIC-1B-S/T: One port ISDN BRI S/T
- WIC-1B-U: One port ISDN BRI U
- WIC-1DSU-56K4: One port integrated 56/64 kbps 4-wire DSU/CSU
- WIC-1DSU-T1: One port integrated T1 / Fractional T1 DSU/CSU

## Cisco 1750

The voice-and-data capable Cisco 1750 router provides global Internet and company intranet access and includes the following:

- Voice-over-IP (VoIP) voice-and-data functionality; the router can carry voice traffic (for example, telephone calls and faxes) over an IP network
- Support for virtual private networking
- Modular architecture
- Network device integration

The Cisco 1750 router has the following hardware components:

- One autosensing 10/100 Fast Ethernet port, which operates in full- or half-duplex mode (with manual override available)
- One Voice interface card slot—Supports a single voice interface card (Table 4) with two ports per card
- Two WAN interface card slots for either WAN interface cards (WICs) or voice interface cards (VICs)
- Synchronous serial interfaces on serial WAN interface cards
- Asynchronous serial interfaces on serial WAN interface cards
- ISDN WAN interface cards—ISDN dialup and ISDN leased line (IDSL) at 144 kbps; encapsulation over ISDN leased line: Frame Relay and PPP
- One auxiliary (AUX) port (up to 115.2 kbps asynchronous serial)
- One console port
- One internal expansion slot—Supports future hardware-assisted services such as encryption (up to T1/E1) and compression processor
- RISC Processor—Motorola MPC860T PowerQUICC at 48 MHz
- One security slot that supports Kensington or similar lockdown equipment
- DRAM memory: 16 MB default, expandable to 48 MB
- Flash memory: 4 MB default, expandable to 16 MB
- Desktop form factor

The Cisco 1750 router also supports any combination of one or two of the following WAN interface cards, which are shared with the Cisco 1600, 1720, 2600, and 3600 routers:

- WIC-1T: One port high speed serial (sync/async)(T1/E1)
- WIC-2T: Two port high speed serial (sync/async) (T1/E1)
- WIC-2A/S: Two port low speed serial (sync/async) (up to 128 kbps)
- WIC-1B-S/T: One port ISDN BRI S/T
- WIC-1B-U: One port ISDN BRI U with integrated NT1
- WIC-1DSU-56K4: One port integrated 56/64 kbps 4-wire DSU/CSU
- WIC-1DSU-T1: One port integrated T1 / Fractional T1 DSU/CSU

The Cisco 1750 router supports any combination of one or two of the following voice interface cards, which are shared with the Cisco 2600 and 3600 routers:

- VIC-2FXS: Two port Foreign Exchange Station (FXS) voice/fax interface card for voice/fax network module
- VIC-2FXO: Two port Foreign Exchange Office (FXO) voice/fax interface card for voice/fax network module
- VIC-2FXO-EU: Two port FXO voice/fax interface card for Europe
- VIC-2E/M: Two port Ear & Mouth (E&M) voice/fax interface card for voice/fax network module

## Software Compatibility

The feature packs described in these release notes contain Cisco IOS Release 12.1(1)T software images, some images from previous software releases, and RSL Version 7.9.

## Determining the Software Release

To determine the version of Cisco IOS software running on your 1700 series, log in to the router and enter the **show version** user EXEC command.

```
router> show version
Cisco Internetwork Operating System Software
IOS (tm) 1700 Software (C1700-y-mz), Version 12.1(1)T, RELEASE SOFTWARE
```

## Upgrading Your Software Release

For general information about upgrading to a new software release, see *Cisco IOS Upgrade Ordering Instructions* located at:

[http://www.cisco.com/warp/public/cc/cisco/mkt/ios/prodlit/957\\_pp.htm](http://www.cisco.com/warp/public/cc/cisco/mkt/ios/prodlit/957_pp.htm)

## Product Numbers Quick-Reference List

**Table 2** Feature Pack Product Numbers Quick-Reference List

Product Number	Feature Pack Description
CD17-C-12.1.1=	Cisco 1700 IOS IP Feature Pack
CD17-CP-12.1.1=	Cisco 1700 IOS IP Plus Feature Pack
CD17-CH-12.1.1=	Cisco 1700 IOS IP/FW Feature Pack
CD17-CL-12.1.1=	Cisco 1700 IOS IP Plus IPsec 56 Feature Pack
CD17-CK2-12.1.1=	Cisco 1700 IOS IP Plus IPsec 3DES Feature Pack
CD17-CHL-12.1.1=	Cisco 1700 IOS IP/FW Plus IPsec 56 Feature Pack
CD17-CHK2-12.1.1=	Cisco 1700 IOS IP/FW Plus IPsec 3DES Feature Pack
CD17-B-12.1.1=	Cisco 1700 IOS IP/IPX Feature Pack
CD17-BHP-12.1.1=	Cisco 1700 IOS IP/IPX/FW Plus Feature Pack
CD17-Q-12.1.1=	Cisco 1700 IOS IP/IPX/AT/IBM Feature Pack
CD17-QP-12.1.1=	Cisco 1700 IOS IP/IPX/AT/IBM Plus Feature Pack
CD17-CVP-12.1.1= <sup>1</sup>	Cisco 1750 IOS IP/Voice Plus Feature Pack
CD17-CHV-12.1.1= <sup>1</sup>	Cisco 1750 IOS IP/FW/Voice Plus Feature Pack
CD17-CVL-12.1.1= <sup>1</sup>	Cisco 1750 IOS IP/Voice Plus IPsec 56 Feature Pack
CD17-CVK2-12.1.1= <sup>1</sup>	Cisco 1750 IOS IP/Voice Plus IPsec 3DES Feature Pack
CD17-CHVL-12.1.1= <sup>1</sup>	Cisco 1750 IOS IP/FW/Voice Plus IPsec 56 Feature Pack
CD17-CHVK2-12.1.1= <sup>1</sup>	Cisco 1750 IOS IP/FW/Voice Plus IPsec 3DES Feature Pack
CD17-BHPV-12.1.1= <sup>1</sup>	Cisco 1750 IOS IP/IPX/FW/Voice Plus Feature Pack

1. This feature pack is only supported by the Cisco 1750 router when the router is configured to support voice applications by adding additional memory, a DSP module and a Voice Interface Card(VIC).

## Feature Pack Overview Tables

Table 3 lists feature pack information for the entire Cisco 1700 series.

Table 4 lists additional feature pack information supported by the Cisco 1750 router only.

Table 3 Cisco 1700 Series Feature Packs

Product Number/ CD-ROM Title	Feature Set	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
CD17-C-12.1.1=	Cisco 1700 IP Feature Pack Release 12.1(1) and 12.1(1)T RSL_Version_7.9	c1700-y-mz.121-1	aaa1372	4 MB	16 MB	Cisco 1700 IOS IP Feature Set 12.1(1)
		c1700-y-mz.121-1.T	aaa1373	4 MB	16 MB	Cisco 1700 IOS IP Feature Set 12.1(1)T
CD17-CP-12.1.1=	Cisco 1700 IP Plus Feature Pack Release 12.1(1) and 12.1(1)T RSL_Version_7.9	c1700-sy-mz.121-1	aaa1374	4 MB	20 MB	Cisco 1700 IOS IP Plus Feature Set 12.1(1)
		c1700-sy-mz.121-1.T	aaa1375	8 MB	24 MB	Cisco 1700 IOS IP Plus Feature Set 12.1(1)T
CD17-CH-12.1.1=	Cisco 1700 IP/FW Feature Pack Release 12.1(1) and 12.1(1)T RSL_Version_7.9	c1700-o3y-mz.121-1	aaa1376	4 MB	20 MB	Cisco 1700 IOS IP/FW Feature Set 12.1(1)
		c1700-o3y-mz.121-1.T	aaa1377	4 MB	20 MB	Cisco 1700 IOS IP/FW Feature Set 12.1(1)T
CD17-CL-12.1.1=	Cisco 1700 IP Plus IPSec 56 Feature Pack Release 12.1(1) and 12.1(1)XC RSL_Version_7.9	c1700-sy56i-mz.121-1	aaa1378	8 MB	20 MB	Cisco 1700 IOS IP Plus IPSec 56 Feature Set 12.1(1)
		c1700-sy56i-mz.121-1.XC	aaa1379	8 MB	32 MB	Cisco 1700 IOS IP Plus IPSec 56 Feature Set 12.1(1)XC
CD17-CK2-12.1.1=	Cisco 1700 IP Plus IPSec 3DES Feature Pack Release 12.1(1) and 12.1(1)XC RSL_Version_7.9	c1700-k2sy-mz.121-1	aaa1380	8 MB	24 MB	Cisco 1700 IOS IP Plus IPSec 3DES Feature Set 12.1(1)
		c1700-k2sy-mz.121-1.XC	aaa1381	8 MB	32 MB	Cisco 1700 IOS IP Plus IPSec 3DES Feature Set 12.1(1)XC



Table 3 Cisco 1700 Series Feature Packs (continued)

Product Number/ CD-ROM Title	Feature Set	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
CD17-CHL-12.1.1=	Cisco 1700 IP/FW Plus IPSec 56 Feature Pack Release 12.1(1) and 12.1(1)XC RSL_Version_7.9	c1700-o3sy56i-mz.121-1	aaa1382	8 MB	24 MB	Cisco 1700 IOS IP/FW Plus IPSec 56 Feature Set 12.1(1)
		c1700-o3sy56i-mz.121-1.XC	aaa1383	8 MB	32 MB	Cisco 1700 IOS IP/FW Plus IPSec 56 Feature Set 12.1(1)XC
CD17-CHK2-12.1.1=	Cisco 1700 IP/FW Plus IPSec 3DES Feature Pack Release 12.1(1) and 12.1(1)XC RSL_Version_7.9	c1700-k2o3sy-mz.121-1	aaa1384	8 MB	32 MB	Cisco 1700 IOS IP/FW Plus IPSec 3DES Feature Set 12.1(1)
		c1700-k2o3sy-mz.121-1.XC	aaa1385	8 MB	32 MB	Cisco 1700 IOS IP/FW Plus IPSec 3DES Feature Set 12.1(1)XC
CD17-B-12.1.1=	Cisco 1700 IP/IPX Feature Pack Release 12.1(1) and 12.1(1)T RSL_Version_7.9	c1700-ny-mz.121-1	aaa1386	4 MB	20 MB	Cisco 1700 IOS IP/IPX Feature Set 12.1(1)
		c1700-ny-mz.121-1.T	aaa1387	4 MB	20 MB	Cisco 1700 IOS IP/IPX Feature Set 12.1(1)T
CD17-BHP-12.1.1=	Cisco 1700 IP/IPX/FW Plus Feature Pack Release 12.1(1) and 12.1(1)T RSL_Version_7.9	c1700-no3sy-mz.121-1	aaa1388	8 MB	20 MB	Cisco 1700 IOS IP/IPX/FW Plus Feature Set 12.1(1)
		c1700-no3sy-mz.121-1.T	aaa1389	8 MB	24 MB	Cisco 1700 IOS IP/IPX/FW Plus Feature Set 12.1(1)T
CD17-Q-12.1.1=	Cisco 1700 IP/IPX/AT/IBM Feature Pack Release 12.1(1) and 12.1(1)T RSL_Version_7.9	c1700-bnr2y-mz.121-1	aaa1390	8 MB	24 MB	Cisco 1700 IOS IP/IPX/AT/IBM Feature Set 12.1(1)
		c1700-bnr2y-mz.121-1.T	aaa1391	8 MB	24 MB	Cisco 1700 IOS IP/IPX/AT/IBM Feature Set 12.1(1)T

Table 3 Cisco 1700 Series Feature Packs (continued)

Product Number/ CD-ROM Title	Feature Set	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
CD17-QP-12.1.1=	Cisco 1700 IP/IPX/AT/IBM Plus Feature Pack Release 12.1(1) and 12.1(1)T RSL_Version_7.9	c1700-bnr2sy-mz.121-1	aaa1392	8 MB	32 MB	Cisco 1700 IOS IP/IPX/AT/IBM Plus Feature Set 12.1(1)
		c1700-bnr2sy-mz.121-1.T	aaa1393	8 MB	32 MB	Cisco 1700 IOS IP/IPX/AT/IBM Plus Feature Set 12.1(1)T

Table 4 Additional Feature Packs for the Cisco 1750 Only

Product Number/ CD-ROM Title	Feature Set	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
CD17-CVP-12.1.1=	Cisco 1750 IP/Voice Plus Feature Pack Release 12.1(1) and 12.1(1)T RSL_Version_7.9	c1700-sv3y-mz.121-1	aaa1394	8 MB	24 MB	Cisco 1750 IOS IP/Voice Plus Feature Set 12.1(1)
		c1700-sv3y-mz.121-1.T	aaa1395	8 MB	32 MB	Cisco 1750 IOS IP/Voice Plus Feature Set 12.1(1)T
CD17-CHV-12.1.1=	Cisco 1750 IP/FW/Voice Plus Feature Pack Release 12.1(1) and 12.1(1)T RSL_Version_7.9	c1700-o3sv3y-mz.121-1.1	aaa1396	8 MB	24 MB	Cisco 1750 IOS IP/FW/Voice Plus Feature Set 12.1(1)
		c1700-o3sv3y-mz.121-1.T	aaa1397	8 MB	32 MB	Cisco 1750 IOS IP/FW/Voice Plus Feature Set 12.1(1)T
CD17-CVL-12.1.1=	Cisco 1750 IP/Voice Plus IPSec 56 Feature Pack Release 12.1(1) and 12.1(1)XC RSL_Version_7.9	c1700-sv3y56i-mz.121-1	aaa1398	8 MB	24 MB	Cisco 1750 IOS IP/Voice Plus IPSec 56 Feature Set 12.1(1)
		c1700-sv3y56i-mz.121-1.XC	aaa1399	8 MB	32 MB	Cisco 1750 IOS IP/Voice Plus IPSec 56 Feature Set 12.1(1)XC

Table 4 Additional Feature Packs for the Cisco 1750 Only (continued)

Product Number/ CD-ROM Title	Feature Set	Image Name (UNIX)	Image Name (DOS)	Flash Memory Required	Main Memory Required	RSL Installer Description
CD17-CVK2-12.1.1=	Cisco 1750 IP/Voice Plus IPSec 3DES Feature Pack Release 12.1(1) and 12.1(1)XC RSL_Version_7.9	c1700-k2sv3y-mz.121-1	aaa1400	8 MB	24 MB	Cisco 1750 IOS IP/Voice Plus IPSec 3DES Feature Set 12.1(1)
		c1700-k2sv3y-mz.121-1.XC	aaa1401	8 MB	32 MB	Cisco 1750 IOS IP/Voice Plus IPSec 3DES Feature Set 12.1(1)XC
CD17-CHVL-12.1.1=	Cisco 1750 IP/FW/Voice Plus IPSec 56 Feature Pack Release 12.1(1) and 12.1(1)XC RSL_Version_7.9	c1700-o3sv3y56i-mz.121-1	aaa1402	8 MB	24 MB	Cisco 1750 IOS IP/FW/Voice Plus IPSec 56 Feature Set 12.1(1)
		c1700-o3sv3y56i-mz.121-1.XC	aaa1403	8 MB	32 MB	Cisco 1750 IOS IP/FW/Voice Plus IPSec 56 Feature Set 12.1(1)XC
CD17-CHVK2-12.1.1=	Cisco 1750 IP/FW/Voice Plus IPSec 3DES Feature Pack Release 12.1(1) and 12.1(1)XC RSL_Version_7.9	c1700-k2o3sv3y-mz.121-1	aaa1404	8 MB	24 MB	Cisco 1750 IOS IP/FW/Voice Plus IPSec 3DES Feature Set 12.1(1)
		c1700-k2o3sv3y-mz.121-1.XC	aaa1405	8 MB	32 MB	Cisco 1750 IOS IP/FW/Voice Plus IPSec 3DES Feature Set 12.1(1)XC
CD17-BHPV-12.1.1=	Cisco 1750 IP/IPX/FW/Voice Plus Feature Pack Release 12.1(1) and 12.1(1)T RSL_Version_7.9	c1700-no3sv3y-mz.121-1	aaa1406	8 MB	24 MB	Cisco 1750 IOS IP/IPX/FW/Voice Plus Feature Set 12.1(1)
		c1700-no3sv3y-mz.121-1.T	aaa1407	8 MB	32 MB	Cisco 1750 IOS IP/IPX/FW/Voice Plus Feature Set 12.1(1)T

## Feature Set Tables

The Cisco IOS software is packaged in feature sets consisting of software images—depending on the platform. Each feature set contains a specific set of Cisco IOS features.

For a summary of which feature sets are supported on the 1700 series, see the previous “Feature Pack Overview Tables” section on page 7.



### Caution

Cisco IOS images with strong encryption (including, but not limited to, 168-bit (3DES) data encryption feature sets) are subject to United States government export controls and have limited distribution. Strong encryption images to be installed outside the United States are likely to require an export license. Customer orders may be denied or subject to delay due to United States government regulations. When applicable, purchaser/user must obtain local import and use authorizations for all encryption strengths. Please contact your sales representative or distributor for more information, or send an e-mail to [export@cisco.com](mailto:export@cisco.com).

Cisco 1720 features and feature sets in Release 12.1(1)T are listed in Table 5 and Table 6.

Cisco 1750 features and feature sets in Release 12.1(1)T are listed in Table 7 and Table 8.

All tables use the following conventions:

- Yes—The feature is supported in the software image.
- No—The feature is not supported in the software image.



### Note

These feature set tables might contain only a selected list of features. These tables are not cumulative or complete in listing all the features in each image.

**Table 5** Feature List by Feature Set for the Cisco 1720 Router, Part 1

Features	Feature Set				
	IP	IP Plus	IP Plus IPSEC 56	IP/FW	IP/FW Plus IPSec 56
<b>Miscellaneous</b>					
Protocol-Independent Multicast Version 2	No	Yes	Yes	No	Yes
Vela-H.323 V2 Enhancements	No	No	No	No	No
X.25 Closed User Groups	Yes	Yes	Yes	Yes	Yes
<b>Security</b>					
SSH Version 1 Server Support	No	No	Yes	No	Yes

Table 6 Feature List by Feature Set for the Cisco 1720 Router, Part 2

Features	Feature Set						
	IP/FW Plus IPSec 56	IP/IPX	IP/IPX/AT/IBM	IP/IPX/AT/IBM Plus	IP/IPX/AT/IBM/ FW Plus IPSec 56	IP/IPX/AT/IBM/ FW Plus IPSec 3DES	IP/IPX/ FW Plus
<b>Miscellaneous</b>							
Protocol-Independent Multicast Version 2	Yes	No	No	Yes	Yes	Yes	Yes
Vela-H.323 V2 Enhancements	No	No	No	No	No	No	No
X.25 Closed User Groups	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Security</b>							
SSH Version 1 Server Support	Yes	No	No	No	Yes	Yes	No

Table 7 Feature List by Feature Set for the Cisco 1750 Router, Part 1

Features	Feature Set						
	IP	IP Plus	IP Plus 40	IP Plus 56	IP Plus IPSEC 56	IP Plus IPSec 3DES	IP/FW
<b>Connectivity</b>							
Layer Two Tunneling Protocol (L2TP) Dial-Out	No	Yes	Yes	Yes	Yes	Yes	No
<b>IBM Support</b>							
Bridging Code Rework	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DSLw+ Ethernet Redundancy	No	No	No	No	No	No	No
<b>IP Routing</b>							
IP Type of Service and Precedence for Generic Routing Encapsulation (GRE) Tunnels	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OSPF Point to Multipoint	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Management</b>							
Cisco IOS File System	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Entity MIB	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Expression MIB	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Conditionally Triggered Debugging	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Process MIB	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Miscellaneous</b>							
Vela-H.323 V2 Enhancements	No	No	No	No	No	No	No

Table 7 Feature List by Feature Set for the Cisco 1750 Router, Part 1 (continued)

Features	Feature Set						
	IP	IP Plus	IP Plus 40	IP Plus 56	IP Plus IPSEC 56	IP Plus IPsec 3DES	IP/FW
<b>Multimedia</b>							
Protocol-Independent Multicasts Version 2	No	Yes	Yes	Yes	Yes	Yes	No
<b>Security</b>							
SSH Version 1 Server Support	No	No	No	No	Yes	Yes	No
<b>Switching</b>							
Web Cache Control Protocol Version 2 (WCCPv2)	No	Yes	Yes	Yes	Yes	Yes	No
<b>Voice Services</b>							
Voice over IP	No	No	No	No	No	No	No
<b>WAN Services</b>							
Always On/Direct ISDN	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dialer Watch	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data-link Switching Plus (DLSw+) Enhancements	No	No	No	No	No	No	No
Data-link Switching Plus (DLSw+) RSVP	No	No	No	No	No	No	No
MPPC-MS PPP Compression	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MS Callback	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VPDN MIB Feature	No	Yes	Yes	Yes	Yes	Yes	No

Table 8 Feature List by Feature Set for the Cisco 1750 Router, Part 2

Features	Feature Set							
	IP/IPX/ FW Plus	IP/FW Plus IPSec 56	IP/FW Plus IPSec 3DES	IP/IPX	IP/IPX/ AT/IBM	IP/IPX/ AT/IBM Plus	IP/IPX/ AT/IBM/ FW Plus IPSec 56	IP/IPX/ AT/IBM/ FW Plus IPSec 3DES
<b>Connectivity</b>								
Layer Two Tunneling Protocol (L2TP) Dial-Out	Yes	Yes	Yes	No	No	Yes	Yes	Yes
<b>IBM Support</b>								
Bridging Code Rework	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DSLw+ Ethernet Redundancy	No	No	No	No	Yes	Yes	Yes	Yes

Table 8 Feature List by Feature Set for the Cisco 1750 Router, Part 2 (continued)

Features	Feature Set							
	IP/IPX/ FW Plus	IP/FW Plus IPSec 56	IP/FW Plus IPSec 3DES	IP/IPX	IP/IPX/ AT/IBM	IP/IPX/ AT/IBM Plus	IP/IPX/ AT/IBM/ FW Plus IPSec 56	IP/IPX/ AT/IBM/ FW Plus IPSec 3DES
<b>IP Routing</b>								
IP Type of Service and Precedence for GRE Tunnels	Yes	Yes	Yes	No	No	Yes	Yes	Yes
OSPF Point to Multipoint	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Management</b>								
Cisco IOS File System	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Entity MIB	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Expression MIB	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Conditionally Triggered Debugging	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Process MIB	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Miscellaneous</b>								
Vela-H.323 V2 Enhancements	No	No	No	No	No	No	No	No
<b>Multimedia</b>								
Protocol-Independent Multicasts Version 2	Yes	Yes	Yes	No	No	Yes	Yes	Yes
<b>Security</b>								
SSH Version 1 Server Support	No	Yes	Yes	No	No	No	Yes	Yes
<b>Switching</b>								
Web Cache Control Protocol Version 2 (WCCPv2)	Yes	Yes	Yes	No	No	Yes	Yes	Yes
<b>Voice Services</b>								
Voice over IP	No	No	No	No	No	No	No	No
<b>WAN Services</b>								
Always On/Direct ISDN	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dialer Watch	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data-link Switching Plus (DLSw+) Enhancements	No	No	No	No	Yes	Yes	Yes	Yes
Data-link Switching Plus (DLSw+) RSVP	No	No	No	No	Yes	Yes	Yes	Yes
MPPC-MS PPP Compression	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 8 Feature List by Feature Set for the Cisco 1750 Router, Part 2 (continued)

Features	Feature Set							
	IP/IPX/ FW Plus	IP/FW Plus IPSec 56	IP/FW Plus IPSec 3DES	IP/IPX	IP/IPX/ AT/IBM	IP/IPX/ AT/IBM Plus	IP/IPX/ AT/IBM/ FW Plus IPSec 56	IP/IPX/ AT/IBM/ FW Plus IPSec 3DES
MS Callback	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VPDN MIB Feature	Yes	Yes	Yes	No	No	Yes	Yes	Yes

## Installation Notes

This section describes the following topics:

- Image Installation Tips and Troubleshooting When Using RSL, page 16
- Alternatives to RSL, page 17

## Image Installation Tips and Troubleshooting When Using RSL

### Image Installation Tips

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

- If you are loading software on a preconfigured router, save the router configuration file on your PC before running RSL.
- If you have added any static entries to the PC Address Resolution Protocol (ARP) table, one or more of them may be deleted by RSL. Manually re-enter any deleted entries in the PC ARP table.
- During a connection, if the router's running configuration is not the same as its startup configuration, the exact configuration is not restored. Any changes that you made since the last time you entered **copy running-config startup-config** or **write memory** commands are lost.
- RSL restores the router's 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**
  - **media-type aui**

### Recovering from a Connection Error

If any of the following elements apply to your installation, modify the Short Timeout value from the Options dialog box in RSL:

- You are connecting to a router or access server that has a large configuration file.
- You are connecting to a Cisco AS5200 access server.



- You see the following error message:

"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 are connecting to a Cisco AS5200, increase the Short Timeout value to 60 seconds. The Cisco AS5200 requires up to 45 seconds to write a configuration to nonvolatile random-access memory (NVRAM) due to the number of interfaces the it must check during this process.

If you are connecting to any other router or access server, increase the Short Timeout to a value over 25 seconds.


**Note**

If you change the timeout value, you must do so before connecting to the router, or the new value will not be used. Also, increasing the Short Timeout value can increase the time it takes for RSL to connect to the target router.

## Restoring the Startup Configuration

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

- Step 1 Ensure that all cables are properly attached to both the router and the PC.
- Step 2 Restart 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.
- Step 7 Exit RSL.


**Note**

In the steps above, the router configuration register (**config-register 0xnnnn**) is not restored.


**Note**

If you press **Ctrl-Alt-Delete** to quit RSL, the router configuration and the configuration register are not restored. However, the configuration file is not deleted from the PC. To restore the configuration file, follow the steps above, beginning with Step 2.

## Alternatives to RSL

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:

- Installing the Router Software by Using the Console or Auxiliary Port
- Installing the Router Software by Using a TFTP Server Application

**Note**

The sample prompts and output shown in the following sections may not be identical to the prompts displayed on the router console.

## Installing the Router Software by 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 where you enter the command. If you download the software by using 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. We recommend using the auxiliary port for this type of software download, because the auxiliary port has hardware flow control and full modem control. In addition, the transfer does not occupy the system console, so it is free for other uses.

The following example shows how to use the **copy xmodem flash** command on a Cisco 1700 series router:

```
Router# copy xmodem flash
**** WARNING ****
x/modem 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] yes
Use crc block checksumming? [confirm] yes
Max Retry Count [10]:
Perform image validation checks? [confirm] yes
Xmodem download using crc checksumming with image validation
Continue? [confirm] yes
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? c1700-y-mz.121-1
Erase flash device before writing? [confirm] yes
Flash contains files. Are you sure you want to erase? [confirm] yes

Copy '' from server
  as 'c1700-i-mz.121-1' into Flash WITH erase? [yes/no] yes
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 by Using a TFTP Server Application

Use this TFTP server application method as an alternative method to install the router software from the CD-ROM. You can perform this procedure by 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. If you are using a PC running Windows 95, you can use RSL or the TFTP server included on the feature pack CD-ROM to install the router software. For other operating systems, a number of TFTP or rcp applications are available from independent software vendors or as shareware on the World Wide Web.



### Note

To use an rcp application, follow the same procedure below, but substitute “rcp” for “TFTP” and 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** Start the TFTP server application on the PC 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, select **Settings** to display a panel. To configure the local PC as a server, select the Server checkbox.

Select a root directory where 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 do not, you cannot perform the copy procedure. This caution applies to both TFTP and rcp.

- 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 10, you remain connected to the router.
  - Establish a Telnet session from the PC to the router. If you choose to use Telnet, your connection to the router will be lost when it is reloaded.



### Caution

Make sure that your PC is set up to communicate with the connected device through its network port.

- Step 5** Connect your PC's LAN port to the corresponding LAN port on the router. If you are making a direct connection to the router via Ethernet or Fast Ethernet, use an Ethernet crossover cable. If connecting to the router via an Ethernet or Fast Ethernet hub or Token Ring MAU (hub), use straight-through cable.




---

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

---

**Step 6** At the prompt, enter the IP address of your PC, as shown 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 7** At the prompt, enter the filename of the Cisco IOS Release 12.1 image to be copied to the router, as shown in the following example:

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

This example specifies the DOS image name of the IP feature set for Cisco 1700 series routers (as shown in Table 3 and Table 4 in the “Feature Pack Overview Tables” section on page 7).

**Step 8** At 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 and Table 4 in the “Feature Pack Overview Tables” section on page 7 for the UNIX image filename.

```
Destination file name [80153209.bin]? c1700-y-mz
```

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

**Step 9** At the prompt, enter **yes** 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.




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**Caution** If you upgraded a CiscoPro CPA1700 router, do not save the configuration when prompted.

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**Step 10** Enter the **reload** command to reload the router:

```
Router# reload
```

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

## Related Documentation

The following sections describe the documentation available for the 1700 series. These documents consist of hardware and software installation guides, Cisco IOS configuration and command references, system error messages, and other documents.

Documentation is available as printed manuals or electronic documents.

Use these release notes with these documents:

- Release-Specific Documents, page 21
- Platform-Specific Documents, page 22
- Cisco IOS Documentation Set, page 23

## Release-Specific Documents

The following documents are specific to Cisco IOS Release 12.1. They are located on CCO and the Documentation CD-ROM:

- *Cross-Platform Release Notes for Cisco IOS Release 12.1*

On CCO at:

**Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.0: Release Notes: Cross-Platform Release Notes for Cisco IOS Release 12.1**

On the Documentation CD-ROM at:

**Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.0: Release Notes: Cross-Platform Release Notes for Cisco IOS Release 12.1**

- Product bulletins, field notices, and other release-specific documents on CCO at:

**Technical Documents**

- *Caveats for Cisco IOS Release 12.1*

For caveat details, see the *Caveats for Cisco IOS Release 12.1* document, which contains caveats applicable to all platforms for all maintenance releases of Release 12.1.

On CCO at:

**Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.1: Release Notes: Caveats: Caveats for Cisco IOS Release 12.1**

On the Documentation CD-ROM at:

**Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.1: Release Notes: Caveats: Caveats for Cisco IOS Release 12.1**




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**Note** If you have an account with CCO, you can use Bug Navigator II to find caveats of any severity for any release. To reach Bug Navigator II, go to CCO and press **Login**. Then go to **Software Center: Cisco IOS Software: Cisco Bugtool Navigator II**. Another option is to go to <http://www.cisco.com/support/bugtools>.

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## Platform-Specific Documents

### Cisco 1720 Router

These individual and groups of documents are available for the Cisco 1720 router on CCO and the Documentation CD-ROM:

- *Installing Your Cisco 1720*
- *Cisco 1720 Router Hardware Installation Guide*
- *Cisco 1700 Router Software Configuration Guide*
- *Regulatory Compliance and Safety Information*
- Configuration notes
- Release notes for the Cisco 1720 router
- *WAN Interface Cards Hardware Installation Guide*

On CCO at:

**Technical Documents: Documentation Home Page: Cisco Product Documentation: Access Servers and Access Routers: Modular Access Routers: Cisco 1720 Router**

On the Documentation CD-ROM at:

**Cisco Product Documentation: Access Servers and Access Routers: Modular Access Routers: Cisco 1720 Router**

### Cisco 1750 Router

These individual and groups of documents are available for the Cisco 1750 router on CCO and the Documentation CD-ROM:

- *Cisco 1750 Router Hardware Installation Guide*
- *Voice-over-IP Quick Start Guide*
- Cisco 1750 software configuration guides
- *Cisco WAN Interface Cards Hardware Installation Guide*
- *Installing and Removing Packet Voice DSP Modules Configuration Note*
- Release notes for the Cisco 1750 router
- Safety information for Cisco 1600 and 1700 routers

On CCO at:

**Technical Documents: Documentation Home Page: Cisco Product Documentation: Access Servers and Access Routers: Modular Access Routers: Cisco 1750 Router**

On the Documentation CD-ROM at:

**Cisco Product Documentation: Access Servers and Access Routers: Modular Access Routers: Cisco 1750 Router**

## Cisco IOS Documentation Set

The Cisco IOS software documentation set consists of the Cisco IOS configuration guides, Cisco IOS command references, and several other supporting documents, which are shipped with your order in electronic form on the Documentation CD-ROM—unless you specifically ordered the printed versions.

### Documentation Modules

Each module in the Cisco IOS documentation set consists of two books: a configuration guide and a corresponding command reference. Chapters in a configuration guide describe protocols, configuration tasks, Cisco IOS software functionality, and contain comprehensive configuration examples. Chapters in a command reference provide complete command syntax information. Use each configuration guide with its corresponding command reference.

On CCO and the Documentation CD-ROM, two master hot-linked documents provide information for the Cisco IOS software documentation set.

On CCO at:

**Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.1: Configuration Guides and Command References**

On the Documentation CD-ROM at:

**Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.1: Configuration Guides and Command References**

### Cisco IOS Release 12.1 Documentation Set

Table 9 describes the contents of the Cisco IOS Release 12.1 software documentation set, which is available in electronic form and in printed form ordered.



#### Note

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You can find the most current Cisco IOS documentation on CCO and the Documentation CD-ROM. These electronic documents may contain updates and modifications made after the hard-copy documents were printed.

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On CCO at:

**Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.1**

On the Documentation CD-ROM at:

**Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.1**

**Table 9 Cisco IOS Software Release 12.1 Documentation Set**

Books	Major Topics
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Configuration Fundamentals Configuration Guide</i></li> <li>• <i>Cisco IOS Configuration Fundamentals Command Reference</i></li> </ul>	Cisco IOS User Interfaces Cisco IOS File Management Cisco IOS System Management
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Bridging and IBM Networking Configuration Guide</i></li> <li>• <i>Cisco IOS Bridging and IBM Networking Command Reference, Volume I</i></li> <li>• <i>Cisco IOS Bridging and IBM Networking Command Reference, Volume II</i></li> </ul>	Using Cisco IOS Software Overview of SNA Internetworking Bridging IBM Networking
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Dial Services Configuration Guide: Terminal Services</i></li> <li>• <i>Cisco IOS Dial Services Configuration Guide: Network Services</i></li> <li>• <i>Cisco IOS Dial Services Command Reference</i></li> </ul>	Preparing for Dial Access Modem Configuration and Management ISDN and Signalling Configuration PPP Configuration Dial-on-Demand Routing Configuration Dial-Backup Configuration Terminal Service Configuration Large-Scale Dial Solutions Cost-Control Solutions Virtual Private Networks X.25 on ISDN Solutions Telco Solutions Dial-Related Addressing Services Interworking Dial Access Scenarios
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Interface Configuration Guide</i></li> <li>• <i>Cisco IOS Interface Command Reference</i></li> </ul>	Interface Configuration Overview Configuring LAN Interfaces Configuring Serial Interfaces Configuring Logical Interfaces
<ul style="list-style-type: none"> <li>• <i>Cisco IOS IP and IP Routing Configuration Guide</i></li> <li>• <i>Cisco IOS IP and IP Routing Command Reference</i></li> </ul>	IP Addressing and Services IP Routing Protocols IP Multicast
<ul style="list-style-type: none"> <li>• <i>Cisco IOS AppleTalk and Novell IPX Configuration Guide</i></li> <li>• <i>Cisco IOS AppleTalk and Novell IPX Command Reference</i></li> </ul>	AppleTalk and Novell IPX Overview Configuring AppleTalk Configuring Novell IPX
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Configuration Guide</i></li> <li>• <i>Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Command Reference</i></li> </ul>	Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Overview Configuring Apollo Domain Configuring Banyan VINES Configuring DECnet Configuring ISO CLNS Configuring XNS
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Multiservice Applications Configuration Guide</i></li> <li>• <i>Cisco IOS Multiservice Applications Command Reference</i></li> </ul>	Multiservice Applications Overview Voice Video Broadband



Table 9 Cisco IOS Software Release 12.1 Documentation Set (continued)

Books	Major Topics
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Quality of Service Solutions Configuration Guide</i></li> <li>• <i>Cisco IOS Quality of Service Solutions Command Reference</i></li> </ul>	Quality of Service Overview Classification Congestion Management Congestion Avoidance Policing and Shaping Signalling Link Efficiency Mechanisms Quality of Service Solutions
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Security Configuration Guide</i></li> <li>• <i>Cisco IOS Security Command Reference</i></li> </ul>	Security Overview Authentication, Authorization, and Accounting (AAA) Security Server Protocols Traffic Filtering and Firewalls IP Security and Encryption Other Security Features
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Switching Services Configuration Guide</i></li> <li>• <i>Cisco IOS Switching Services Command Reference</i></li> </ul>	Cisco IOS Switching Services Overview Cisco IOS Switching Paths Cisco Express Forwarding NetFlow Switching MPLS Switching Multilayer Switching Multicast Distributed Switching Virtual LANs LAN Emulation
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Wide-Area Networking Configuration Guide</i></li> <li>• <i>Cisco IOS Wide-Area Networking Command Reference</i></li> </ul>	Wide-Area Networking Overview Configuring ATM Configuring Frame Relay Configuring Frame Relay-ATM Interworking Configuring SMDS Configuring X.25 and LAPB
<ul style="list-style-type: none"> <li>• <i>New Features in 12.1-Based Limited Lifetime Releases</i></li> <li>• <i>New Features in Release 12.1 T</i></li> <li>• Release Notes (Release note and caveat documentation for 12.1-based releases and various platforms)</li> <li>• <i>Cisco IOS Debug Command Reference</i></li> <li>• <i>Cisco IOS Dial Services Quick Configuration Guide</i></li> </ul>	

**Note**

*Cisco Management Information Base (MIB) User Quick Reference* is no longer published. If you have an account with CCO, you can find the current list of MIBs supported by Cisco. To reach the *Cisco Network Management Toolkit*, go to CCO, press **Login**, and click to **Software Center: Network Mgmt Products: Cisco Network Management Toolkit: Cisco MIB**.

# Obtaining Documentation

## World Wide Web

You can access the most current Cisco documentation on the World Wide Web at <http://www.cisco.com>, <http://www-china.cisco.com>, or <http://www-europe.cisco.com>.

## Documentation CD-ROM

Cisco documentation and additional literature are available in a CD-ROM package, which ships with your product. The Documentation CD-ROM is updated monthly. Therefore, it is probably more current than printed documentation. The CD-ROM package is available as a single unit or as an annual subscription.

## Ordering Documentation

Registered CCO users can order the Documentation CD-ROM and other Cisco Product documentation through our online Subscription Services at <http://www.cisco.com/cgi-bin/subcat/kaojump.cgi>.

Nonregistered CCO users can order documentation through a local account representative by calling Cisco's corporate headquarters (California, USA) at 408 526-4000 or, in North America, call 800 553-NETS (6387).

# Obtaining Technical Assistance

Cisco provides Cisco Connection Online (CCO) as a starting point for all technical assistance. Warranty or maintenance contract customers can use the Technical Assistance Center. All customers can submit technical feedback on Cisco documentation using the web, e-mail, a self-addressed stamped response card included in many printed documents, or by sending mail to Cisco.

## Cisco Connection Online

Cisco continues to revolutionize how business is done on the Internet. Cisco Connection Online is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information and resources at anytime, from anywhere in the world. This highly integrated Internet application is a powerful, easy-to-use tool for doing business with Cisco.

CCO's broad range of features and services helps customers and partners to streamline business processes and improve productivity. Through CCO, you will find information about Cisco and our networking solutions, services, and programs. In addition, you can resolve technical issues with online support services, download and test software packages, and order Cisco learning materials and merchandise. Valuable online skill assessment, training, and certification programs are also available.

Customers and partners can self-register on CCO to obtain additional personalized information and services. Registered users may order products, check on the status of an order and view benefits specific to their relationships with Cisco.

You can access CCO in the following ways:

- WWW: [www.cisco.com](http://www.cisco.com)
- Telnet: [cco.cisco.com](http://cco.cisco.com)
- Modem using standard connection rates and the following terminal settings: VT100 emulation; 8 data bits; no parity; and 1 stop bit.
  - From North America, call 408 526-8070
  - From Europe, call 33 1 64 46 40 82

You can e-mail questions about using CCO to [cco-team@cisco.com](mailto:cco-team@cisco.com).

## Technical Assistance Center

The Cisco Technical Assistance Center (TAC) is available to warranty or maintenance contract customers who need technical assistance with a Cisco product that is under warranty or covered by a maintenance contract.

To display the TAC web site that includes links to technical support information and software upgrades and for requesting TAC support, use [www.cisco.com/techsupport](http://www.cisco.com/techsupport).

To contact by e-mail, use one of the following:

Language	E-mail Address
English	<a href="mailto:tac@cisco.com">tac@cisco.com</a>
Hanzi (Chinese)	<a href="mailto:chinese-tac@cisco.com">chinese-tac@cisco.com</a>
Kanji (Japanese)	<a href="mailto:japan-tac@cisco.com">japan-tac@cisco.com</a>
Hangul (Korean)	<a href="mailto:korea-tac@cisco.com">korea-tac@cisco.com</a>
Spanish	<a href="mailto:tac@cisco.com">tac@cisco.com</a>
Thai	<a href="mailto:thai-tac@cisco.com">thai-tac@cisco.com</a>

In North America, TAC can be reached at 800 553-2447 or 408 526-7209. For other telephone numbers and TAC e-mail addresses worldwide, consult the following web site:  
<http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>.

## Software Configuration Tips on the Cisco Technical Assistance Center Home Page

If you have a CCO log-in account, you can access the following URL, which contains links and tips on configuring your Cisco products:

[http://www.cisco.com/kobayashi/technotes/serv\\_tips.shtml](http://www.cisco.com/kobayashi/technotes/serv_tips.shtml)

This URL is subject to change without notice. If it changes, point your Web browser to CCO, press **Login**, and click on this path: **Technical Assistance Center: Technical Tips**.

The following sections are provided from the Technical Tips page:

- Access Dial Cookbook—Contains common configurations or recipes for configuring various access routes and dial technologies.

- **Field Notices**—Notifies you of any critical issues regarding Cisco products and includes problem descriptions, safety or security issues, and hardware defects.
- **Frequently Asked Questions**—Describes the most frequently asked technical questions about Cisco hardware and software.
- **Hardware**—Provides technical tips related to specific hardware platforms.
- **Hot Tips**—Describes popular tips and hints gathered from the Cisco Technical Assistance Center (TAC). Most of these documents are available from the TAC Fax-on-demand service. To reach Fax-on-demand and receive documents at your fax machine from the United States, call 888 50-CISCO (888 502-4726). From other areas, call 650 596-4408.
- **Internetworking Features**—Lists tips on using Cisco IOS software features and services.
- **Sample Configurations**—Provides actual configuration examples that are complete with topology and annotations.

## Documentation Feedback

If you are reading Cisco product documentation on the World Wide Web, you can submit technical comments electronically. Click **Feedback** in the toolbar and select **Documentation**. After you complete the form, click **Submit** to send it to Cisco.

You can e-mail your comments to [bug-doc@cisco.com](mailto:bug-doc@cisco.com).

To submit your comments by mail, for your convenience many documents contain a response card behind the front cover. Otherwise, you can mail your comments to the following address:

Cisco Systems, Inc.  
 Document Resource Connection  
 170 West Tasman Drive  
 San Jose, CA 95134-9883

We appreciate and value your comments.

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This document is to be used in conjunction with the documents listed in the “Related Documentation” section on page 21.

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