



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

April 6, 2000

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

- Introduction, page 1
- System Requirements, page 3
- Installation Notes, page 14
- Related Documentation, page 19
- Obtaining Documentation, page 27
- Obtaining Technical Assistance, page 28

Introduction

List of Terms

The following terms are used throughout this document:

- **Feature**—Networking functionality command(s) that support networking technology and hardware. For example: Double Authentication, IP Multicast over Token Ring, Voice Over IP, and PPP over ATM.
- **Feature pack**—A small box containing software images, applications and documentation on CD-ROMs, and hardcopy documentation. Feature packs provide software upgrades for many of the Cisco hardware platforms.



Corporate Headquarters: Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

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- Feature set—A group of features. For example: IP, IP Plus, Enterprise Plus, and IP Sec 56
- Image—Software code containing a Cisco IOS feature set. The image file naming 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:
 - Platform: (c4500) 4500 platform.
 - Feature set: (is56i) IP Plus IP Sec 56.
 - Compression method: (mz) RAM, zip compressed.

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, “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 Routers Data-Only Feature Packs,” and Table 4, “Cisco 1750 Routers Data and Voice Feature Packs,” 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 10 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.



Note If you cannot use RSL to load images, follow the instructions in the “Alternatives to the RSL” section on page 15.

- 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 topics:

- Memory Defaults and Upgrade Options, page 3
- Hardware Supported, page 3
- Software Compatibility, page 3
- Determining Your Software Release, page 4
- Updating Your Software Release, page 4
- Product Numbers Quick-Reference List, page 4
- Feature Pack Overview Table, page 6
- Feature Set Tables, page 10

Memory Defaults and Upgrade Options

Table 1 lists the memory delivered by default and the available memory upgrade options for Cisco 1700 routers for Release 12.1(1)XC.

Table 1 *Default Memory and Upgrade Options*

Memory Type	Cisco 1700 Defaults	Upgrade Options
Flash memory card	4 MB	4-MB to 8 MB upgrade (4 MB): MEM1700-4U8MFC= 4-MB to 16 MB upgrade (12 MB): MEM1700-4U16MFC= 8-MB to 16 MB upgrade (8 MB): MEM1700-8U16MFC=
DRAM	16 MB	16MB to 20MB upgrade (4-MB): MEM1700-16U20D= 16MB to 24MB upgrade (8-MB): MEM1700-16U24D= 16MB to 32MB upgrade (16-MB): MEM1700-16U32D= 16MB to 48MB upgrade (32-MB): MEM1700-16U48D= 24MB to 32MB upgrade (8 MB): MEM1700-24U32D= 24MB to 48MB upgrade (24 MB): MEM1700-24U48D=

Hardware Supported

Router Software Loader (RSL) Version 7.9 supports Cisco 1720 and Cisco 1750 routers.

Software Compatibility

The feature packs described in these release notes contain Cisco IOS Release 12.1(1)XC software images, some earlier images, and RSL Version 7.9. Before running RSL, read the “Installing Software Images Using RSL” section on page 14.

Determining Your Software Release

To determine the version of Cisco IOS software currently running on your Cisco 1700 series router, log in to the router and enter the **show version EXEC** command. The following sample output from the **show version** command indicates the version number on the second output line:

```
router> show version
Cisco Internetwork Operating System Software
IOS (tm) c1700 Software (c1700-y-mz.121-1), Version 12.1(1)XC, RELEASE SOFTWARE
```

Additional command output lines include more information, such as processor revision numbers, memory amounts, hardware IDs, and partition information.

Updating Your Software Release

For information about upgrading to a new software release, refer to the *Cisco IOS Upgrade Ordering Instructions* product bulletin located at the following URL:

http://www.cisco.com/warp/public/cc/cisco/mkt/ios/prodlit/957_pp.htm.

Alternatively, the Cisco IOS Software page on CCO has a variety of information, including upgrade information, organized by release. If you have a CCO account and log in, you can go directly to:

<http://www.cisco.com/kobayashi/sw-center/sw-ios.shtml>.

If you have a CCO account and log in, you can reach the Cisco IOS Software page by going to www.cisco.com and following this path: **Service & Support: Software Center: Cisco IOS Software: Cisco IOS 12.1: Ordering Procedures and Hardware Platform Support: Cisco IOS Upgrade Ordering Instructions**.

You can also reach the **IOS Upgrade Planner**, which allows you more flexibility to browse for your preferred software, by going to www.cisco.com and following this path: **Service & Support: Software Center: IOS Upgrade Planner**.

Product Numbers Quick-Reference List

Table 2 Feature Pack Product Numbers Quick-Reference List

Image Type	Product Number	Feature Pack Description
Data Only	c1700-y-mz.121-1	Cisco 1700 IOS IP Feature Set 12.1(1)
	c1700-y-mz.121-1.T	Cisco 1700 IOS IP Feature Set 12.1(1)T
	c1700-sy-mz.121-1	Cisco 1700 IOS IP Plus Feature Set 12.1(1)
	c1700-sy-mz.121-1.T	Cisco 1700 IOS IP Plus Feature Set 12.1(1)T
	c1700-o3y-mz.121-1	Cisco 1700 IOS IP/FW Feature Set 12.1(1)
	c1700-o3y-mz.121-1.T	Cisco 1700 IOS IP/FW Feature Set 12.1(1)T
	c1700-sy56i-mz.121-1	Cisco 1700 IOS IP Plus IPsec 56 Feature Set 12.1(1)
	c1700-sy56i-mz.121-1.XC	Cisco 1700 IOS IP Plus IPsec 56 Feature Set 12.1(1)XC
	c1700-k2sy-mz.121-1	Cisco 1700 IOS IP Plus IPsec 3DES Feature Set 12.1(1)
	c1700-k2sy-mz.121-1.XC	Cisco 1700 IOS IP Plus IPsec 3DES Feature Set 12.1(1)XC

Table 2 Feature Pack Product Numbers Quick-Reference List (continued)

Image Type	Product Number	Feature Pack Description	
Data Only (continued)	c1700-o3sy56i-mz.121-1	Cisco 1700 IOS IP/FW Plus IPSec 56 Feature Set 12.1(1)	
	c1700-o3sy56i-mz.121-1.XC	Cisco 1700 IOS IP/FW Plus IPSec 56 Feature Set 12.1(1)XC	
	c1700-k2o3sy-mz.121-1	Cisco 1700 IOS IP/FW Plus IPSec 3DES Feature Set 12.1(1)	
	c1700-k2o3sy-mz.121-1.XC	Cisco 1700 IOS IP/FW Plus IPSec 3DES Feature Set 12.1(1)XC	
	c1700-ny-mz.121-1	Cisco 1700 IOS IP/IPX Feature Set 12.1(1)	
	c1700-ny-mz.121-1.T	Cisco 1700 IOS IP/IPX Feature Set 12.1(1)T	
	c1700-no3sy-mz.121-1	Cisco 1700 IOS IP/IPX/ FW Plus Feature Set 12.1(1)	
	c1700-no3sy-mz.121-1.T	Cisco 1700 IOS IP/IPX/ FW Plus Feature Set 12.1(1)T	
	c1700-bnr2y-mz.121-1	Cisco 1700 IOS IP/IPX/ AT/IBM Feature Set 12.1(1)	
	c1700-bnr2y-mz.121-1.T	Cisco 1700 IOS IP/IPX/ AT/IBM Feature Set 12.1(1)T	
	c1700-bnr2sy-mz.121-1	Cisco 1700 IOS IP/IPX/ AT/IBM Plus Feature Set 12.1(1)	
	c1700-bnr2sy-mz.121-1.T	Cisco 1700 IOS IP/IPX/ AT/IBM Plus Feature Set 12.1(1)T	
	Data and Voice	c1700-sv3y-mz.121-1	Cisco 1750 IOS IP/Voice Plus Feature Set 12.1(1)
		c1700-sv3y-mz.121-1.T	Cisco 1750 IOS IP/Voice Plus Feature Set 12.1(1)T
		c1700-o3sv3y-mz.121-1.1	Cisco 1750 IOS IP/FW/ Voice Plus Feature Set 12.1(1)
		c1700-o3sv3y-mz.121-1.T	Cisco 1750 IOS IP/FW/ Voice Plus Feature Set 12.1(1)T
c1700-sv3y56i-mz.121-1		Cisco 1750 IOS IP/Voice Plus IPSec 56 Feature Set 12.1(1)	
c1700-sv3y56i-mz.121-1.XC		Cisco 1750 IOS IP/Voice Plus IPSec 56 Feature Set 12.1(1)XC	
c1700-k2sv3y-mz.121-1		Cisco 1750 IOS IP/Voice Plus IPSec 3DES Feature Set 12.1(1)	
c1700-k2sv3y-mz.121-1.XC		Cisco 1750 IOS IP/Voice Plus IPSec 3DES Feature Set 12.1(1)XC	
c1700-o3sv3y56i-mz.121-1		Cisco 1750 IOS IP/FW/ Voice Plus IPSec 56 Feature Set 12.1(1)	
c1700-o3sv3y56i-mz.121-1.XC		Cisco 1750 IOS IP/FW/ Voice Plus IPSec 56 Feature Set 12.1(1)XC	
c1700-k2o3sv3y-mz.121-1		Cisco 1750 IOS IP/FW/ Voice Plus IPSec 3DES Feature Set 12.1(1)	
c1700-k2o3sv3y-mz.121-1.XC		Cisco 1750 IOS IP/FW/ Voice Plus IPSec 3DES Feature Set 12.1(1)XC	
c1700-no3sv3y-mz.121-1		Cisco 1750 IOS IP/IPX/ FW/Voice Plus Feature Set 12.1(1)	
c1700-no3sv3y-mz.121-1.T		Cisco 1750 IOS IP/IPX/ FW/Voice Plus Feature Set 12.1(1)T	

Feature Pack Overview Table

Table 3 Cisco 1700 Series Routers Data-Only 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 Routers Data-Only 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-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.121-1XC	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 Routers Data-Only 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-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 Cisco 1750 Routers Data and Voice 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-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 Cisco 1750 Routers Data and Voice 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-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. Release 12.1(1)XC supports the same feature sets as Releases 12.1 and 12.1 T, but Release 12.1(1)XC can include new features supported by the Cisco 1700 series routers. Table 5 lists the feature sets supported by the Cisco 1700 series routers.

Table 5 Feature Sets Supported by the Cisco 1700 Series Routers

Image Name	Feature Set Matrix Terms	Software Image	Platform	In ¹
IP Plus IPsec 56 (DES)	IP Plus, IPsec 56	c1700-sy56i-mz	Cisco 1720 Cisco 1750	12.0(3)T
IP/FW Plus IPsec 56 (DES)	IP, FW, Plus, IPsec 56	c1700-o3sy56i-mz	Cisco 1720 Cisco 1750	
IP Plus IPsec 3DES	Plus, IPsec, 3DES ²	c1700-k2sy-mz	Cisco 1720 Cisco 1750	12.0(1)XA3
IP/FW Plus IPsec 3DES	IP, FW, Plus, IPsec, 3DES	c1700-k2o3sy-mz	Cisco 1720 Cisco 1750	
IP/IPX/AT/IBM/FW Plus IPsec 56 (DES)	IP, IPX, AT, IBM, FW, Plus, IPsec 56	c1700-bno3r2sy56i-mz	Cisco 1720 Cisco 1750	
IP/IPX/AT/IBM/FW Plus IPsec 3DES	IP, IPX, AT, IBM, FW, Plus, IPsec, 3DES	c1700-bk2no3r2sy-mz	Cisco 1720 Cisco 1750	
IP/Voice Plus IPsec 56 (DES)	IP, Voice, Plus, IPsec 56	c1700-sv3y56i-mz	Cisco 1750	
IP/FW/Voice Plus IPsec 56 (DES)	IP, FW, Voice, Plus, IPsec 56	c1700-o3sv3y56i-mz	Cisco 1720 Cisco 1750	
IP/Voice Plus IPsec 3DES	Plus, Voice, IPsec, 3DES	c1700-k2sv3y-mz	Cisco 1750	
IP/FW/Voice Plus IPsec 3DES	IP, FW, Voice, Plus, IPsec, 3DES	c1700-k2o3sv3y-mz	Cisco 1720 Cisco 1750	
IP/IPX/AT/IBM/FW/Voice Plus IPsec 56 (DES) ³	IP, IPX, AT, IBM, FW, Voice, Plus IPsec 56	c1700-bno3r2sv3y56i-mz	Cisco 1720 Cisco 1750	
IP/IPX/AT/IBM/FW/Voice Plus IPsec 3DES ³	IP, IPX, AT, IBM, FW, Voice, Plus IPsec, 3DES	c1700-bk2no3r2sv3y-mz	Cisco 1720 Cisco 1750	

1. The number in the “In” column indicates the Cisco IOS release in which the feature was introduced. For example, 12.0(3)T means a feature was introduced in Release 12.0(3)T. If a cell in this column is empty, the feature was included in the initial base release.
2. This set of features is provided in the Triple DES (3DES) Encryption data encryption feature sets.
3. This image is deferred in Releases 12.1(1), 12.1(1)T, and 12.1(1)XC.

**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 may require an export license. Customer orders may be denied or subject to delay due to United States government regulations. When applicable, the purchaser or the user must obtain local import and use authorizations for all encryption strengths. Contact your sales representative or distributor for more information, or send an e-mail to export@cisco.com.

Table 6 lists the features and feature sets supported by the Cisco 1700 series routers in Cisco IOS Release 12.1(1)XC. Table 7 lists the features and feature sets supported by the Cisco 1750 routers in Cisco IOS Release 12.1(1)XC. Both 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 only contain a selected list of features. These tables are not cumulative—nor do they list all the features in each image.

Table 6 Feature List by Feature Set for the Cisco 1700 Series Routers

Features	Feature Sets					
	IP Plus IPSec 56 (DES)	IP/FW Plus IPSec 56 (DES)	IP Plus IPSec 3DES	IP/FW Plus IPSec 3DES	IP/IPX/AT/ IBM/ FW Plus IPSec 56 (DES)	IP/IPX/ AT/IBM/ FW Plus IPSec 3DES
Connectivity						
L2TP Dial-Out	Yes	Yes	Yes	Yes	Yes	Yes
IBM Support						
Bridging Code Rework	No	No	No	No	Yes	Yes
DSLw+ Ethernet Redundancy	No	No	No	No	Yes	Yes
IP Routing						
IP Type of Service and Precedence for GRE Tunnels	Yes	Yes	Yes	Yes	Yes	Yes
OSPF Point to Multipoint	Yes	Yes	Yes	Yes	Yes	Yes
Management						
Cisco IOS File System	Yes	Yes	Yes	Yes	Yes	Yes
Entity MIB	Yes	Yes	Yes	Yes	Yes	Yes
Expression MIB	Yes	Yes	Yes	Yes	Yes	Yes
Conditionally Triggered Debugging	Yes	Yes	Yes	Yes	Yes	Yes
Process MIB	Yes	Yes	Yes	Yes	Yes	Yes

Table 6 Feature List by Feature Set for the Cisco 1700 Series Routers

Features	Feature Sets					
	IP Plus IPSec 56 (DES)	IP/FW Plus IPSec 56 (DES)	IP Plus IPSec 3DES	IP/FW Plus IPSec 3DES	IP/IPX/AT/ IBM/ FW Plus IPSec 56 (DES)	IP/IPX/ AT/IBM/ FW Plus IPSec 3DES
Miscellaneous						
Multicast Source Discovery Protocol	Yes	Yes	Yes	Yes	Yes	Yes
X.25 Closed User Groups	Yes	Yes	Yes	Yes	Yes	Yes
X.25 Switch Local Acknowledgment	Yes	Yes	Yes	Yes	Yes	Yes
VPN Tunnel Management	Yes	Yes	Yes	Yes	Yes	Yes
Multimedia						
Protocol-Independent Multicasts Version 2	Yes	Yes	Yes	Yes	Yes	Yes
Switching						
Web Cache Control Protocol Version 2 (WCCPv2)	Yes	Yes	Yes	Yes	Yes	Yes
WAN Services						
Always On/Direct ISDN	Yes	Yes	Yes	Yes	Yes	Yes
Dialer Watch	Yes	Yes	Yes	Yes	Yes	Yes
DLSw+ Enhancements	No	No	No	No	Yes	Yes
DLSw+ RSVP	No	No	No	No	Yes	Yes
MPPC-MS PPP Compression	Yes	Yes	Yes	Yes	Yes	Yes
MS Callback	Yes	Yes	Yes	Yes	Yes	Yes
VPDN MIB Feature	Yes	Yes	Yes	Yes	Yes	Yes

Table 7 Feature List by Feature Set for the Cisco 1750 Series Routers

Features	Feature Sets					
	IP/Voice Plus IPSec 56 (DES)	IP/FW/Voice Plus IPSec 56 (DES)	IP/Voice Plus IPSec 3DES	IP/FW/Voice Plus IPSec 3DES	IP/IPX/AT/ IBM/FW/ Voice Plus IPSec 56 (DES) ¹	IP/IPX/ AT/IBM/ FW/Voice Plus IPSec 3DES ¹
Connectivity						
L2TP Dial-Out	Yes	Yes	Yes	Yes	Yes	Yes
IBM Support						
Bridging Code Rework	No	No	No	No	Yes	Yes
DSLw+ Ethernet Redundancy	No	No	No	No	Yes	Yes

Table 7 Feature List by Feature Set for the Cisco 1750 Series Routers

Features	Feature Sets					
	IP/Voice Plus IPSec 56 (DES)	IP/FW/Voice Plus IPSec 56 (DES)	IP/Voice Plus IPSec 3DES	IP/FW/Voice Plus IPSec 3DES	IP/IPX/AT/ IBM/FW/ Voice Plus IPSec 56 (DES) ¹	IP/IPX/ AT/IBM/ FW/Voice Plus IPSec 3DES ¹
IP Routing						
IP Type of Service and Precedence for GRE Tunnels	Yes	Yes	Yes	Yes	Yes	Yes
OSPF Point to Multipoint	Yes	Yes	Yes	Yes	Yes	Yes
Management						
Cisco IOS File System	Yes	Yes	Yes	Yes	Yes	Yes
Entity MIB	Yes	Yes	Yes	Yes	Yes	Yes
Expression MIB	Yes	Yes	Yes	Yes	Yes	Yes
Conditionally Triggered Debugging	Yes	Yes	Yes	Yes	Yes	Yes
Process MIB	Yes	Yes	Yes	Yes	Yes	Yes
Miscellaneous						
Multicast Source Discovery Protocol	Yes	Yes	Yes	Yes	Yes	Yes
X.25 Closed User Groups	Yes	Yes	Yes	Yes	Yes	Yes
X.25 Switch Local Acknowledgment	Yes	Yes	Yes	Yes	Yes	Yes
VPN Tunnel Management	Yes	Yes	Yes	Yes	Yes	Yes
Multimedia						
Protocol-Independent Multicasts Version 2	Yes	Yes	Yes	Yes	Yes	Yes
Switching						
Web Cache Control Protocol Version 2 (WCCPv2)	Yes	Yes	Yes	Yes	Yes	Yes
Voice Services						
Voice over IP	Yes	Yes	Yes	Yes	Yes	Yes
WAN Services						
Always On/Direct ISDN	Yes	Yes	Yes	Yes	Yes	Yes
Dialer Watch	Yes	Yes	Yes	Yes	Yes	Yes
DLSw+ Enhancements	No	No	No	No	Yes	Yes
DLSw+ RSVP	No	No	No	No	Yes	Yes
MPPC-MS PPP Compression	Yes	Yes	Yes	Yes	Yes	Yes
MS Callback	Yes	Yes	Yes	Yes	Yes	Yes
VPDN MIB Feature	Yes	Yes	Yes	Yes	Yes	Yes

1. This image is deferred in Releases 12.1(1), 12.1(1)T, and 12.1(1)XC.

Installation Notes

This section describes the following topics:

- Installing Software Images Using RSL, page 14
- Alternatives to the RSL, page 15

Installing Software Images Using RSL

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

Recovering From a Connection Error

This installation tip provides a possible recovery solution if you are unable to connect to your access server or router. You can skip this section unless you are experiencing a connection error.

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

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

If you encounter this message, especially if one of the following situations applies, try increasing the Short Timeout value higher than 25 seconds in the Options dialog box:

- You are connecting to an access server that has a large configuration file.
- You are connecting to a Cisco AS5200 access server. A Cisco AS5200 requires up to 45 seconds to write a configuration to nonvolatile random-access memory (NVRAM), due to the amount of interfaces that must be checked during this process. Increase the Short Timeout value to 60 seconds.



Note

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

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.

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



Note

If you press **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, beginning with Step 2.

Installation Tips

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 or more of them might be deleted by the RSL. You need to manually re-enter any deleted entries in the PC ARP table.
- If the router's 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'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**, and **media-type aui**.

Alternatives to the RSL

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

- Using the console or auxiliary port
- Using 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.

The transfer takes place only on the port at which you enter 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 so it is free for other uses.

The following example shows how to use the **copy xmodem flash** command on a Cisco 1700 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]y

Copy '' from server
  as 'c1700-y-mz.121-1' into Flash WITH erase? [yes/no] yes
Erasing device... eeeeeeeeeeeeeeeee ..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 a rcp server. Only use the RSL or the TFTP server included on the feature pack CD-ROM to install the router software if you are using a PC running Windows 95. For other operating systems, a number of TFTP or rcp applications are available from independent software vendors or available as shareware from public sources on the World Wide Web.



Note

To use an rcp application, follow the same procedure below, substituting “rcp” for “TFTP” and using 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, and configure the local PC as a server by selecting the Server 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 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 16, you remain connected to the router. (If you use Telnet, you lose connection to the router.)
 - Establish a Telnet session from the PC to the router.



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

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



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

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

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

- Step 7** When asked whether the system configuration has been modified, enter **yes**:

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

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

```
Password: <password>
```

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

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

- Step 10** At the router prompt, enter the following command to copy the new software image from the PC CD-ROM drive to the router:

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

In the next series of steps, you download the Cisco IOS Release 12.1(1)XC images that you want installed on your router.

- Step 11** 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 12** When prompted, enter the filename of the Cisco IOS Release 12.1(1)XC image to be copied to the router, as in the following example:

```
Source file name? aaa1372.bin
```

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

- Step 13** 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 and Table 4 in the section, “Feature Pack Overview Table” for the UNIX image filename.

```
Destination file name [aaa1372.bin]? c1700-y-mz.121-1
```

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

- Step 14** 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 15** Enter the following commands to reset the configuration register to 0x2102.

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

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

```
Router# reload
```

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

Related Documentation

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

Documentation is available as printed manuals or electronic documents, except for feature modules, which are available online on CCO and the Documentation CD-ROM.

Use these release notes with the documents listed in the following sections:

- Release-Specific Documents
- Platform-Specific Documents
- Feature Modules
- Cisco IOS Software Documentation Set

Release-Specific Documents

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

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

To reach the *Cross-Platform Release Notes for Cisco IOS Release 12.1* from CCO, click on this path (under the heading **Service & Support**):

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

To reach the *Cross-Platform Release Notes for Cisco IOS Release 12.1* on the Documentation CD-ROM, click on this path:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.1: Release Notes: Cross-Platform Release Notes
 - *Release Notes for Cisco IOS Release 12.1(1)XC*

To reach the *Release Notes for Cisco IOS Release 12.1(1)XC* from CCO, click on this path (under the heading **Service & Support**):

Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.1: Release Notes: Cisco 1700 Series Routers: Cisco 1700 - Release Notes for Release 12.1(1)XC

To reach the *Cross-Platform Release Notes for Cisco IOS Release 12.1* on the Documentation CD-ROM, click on this path:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.1: Release Notes: Cisco 1700 Series Routers: Cisco 1700 - Release Notes for Release 12.1(1)XC
- Product bulletins, field notices, and other release-specific documents

To reach these documents from CCO, click on this path (under the heading **Service & Support**):

Technical Documents: Product Bulletins

- *Caveats*

For caveat information see the *Caveats for Cisco IOS Release 12.1* and *Caveats for Cisco IOS Release 12.1 T* documents, which contain caveats applicable to all platforms for all maintenance releases of Release 12.1.

- To reach the caveats document from CCO, click on this path (under the heading **Service & Support**):

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

- To reach the caveats document on the Documentation CD-ROM, click on this path:

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

**Note**

If you have an account with CCO, you can use Bug Navigator II to find caveats of any severity for any release. You can reach Bug Navigator II on CCO at **Software Center: Cisco IOS Software: BUG TOOLKIT: Cisco Bug Navigator II**, or at <http://www.cisco.com/support/bugtools/bugtool.shtml>.

Platform-Specific Documents

Cisco 1720

These 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: 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

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

- *Cisco 1750 Router Hardware Installation Guide*
- Safety Information for Cisco 1600 and 1700 Routers

- *Cisco 1750 Router Voice over IP Configuration Guide*
- *Voice-over-IP Quick Start Guide*
- Release Notes for the Cisco 1750 Router

On CCO at:

Technical Documents: Documentation Home Page: 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

Feature Modules

Feature modules describe new features supported by Release 12.1(1)XC and are updates to the Cisco IOS documentation set. A feature module consists of a brief overview of the feature, benefits, configuration tasks, and a command reference. As updates, the feature modules are available online only. Feature module information is incorporated in the next printing of the Cisco IOS documentation set.

The feature module document specific to Release 12.1(1)XC is *Installing the Virtual Private Network Module for Cisco 1700 Series Routers*. To reach all of the Release 12.1(1)XC feature modules:

- From CCO, click on this path (under the heading **Service & Support**):
Technical Documents: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.1: New Feature Documentation: New Features in 12.1-Based Limited Lifetime Releases: New Features in Release 12.1X: New Features in Release 12.1(1)X
- From the Documentation CD-ROM, click on this path:
Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.1: New Feature Documentation: New Features in 12.1-Based Limited Lifetime Releases: New Features in Release 12.1X: New Features in Release 12.1(1)X

Cisco IOS Software Documentation Set

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

Documentation Modules

Each module in the Cisco IOS documentation set consists of two types of 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.

The Cisco IOS software documentation set is available on CCO and on the Documentation CD-ROM.
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

Release 12.1 Documentation Set

Table 8 describes the contents of the Cisco IOS Release 12.1 software documentation set, which is available in both electronic and printed form.



Note

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.

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 8 Cisco IOS Software Release 12.1 Documentation Set

Books	Chapter Topics
<ul style="list-style-type: none"> <i>Cisco IOS Configuration Fundamentals Configuration Guide</i> <i>Cisco IOS Configuration Fundamentals Command Reference</i> 	<ul style="list-style-type: none"> Configuration Fundamentals Overview Using the Command-Line Interface (CLI) Using Configuration Tools Configuring Operating Characteristics Managing Connections, Menus, and System Banners Using the Cisco Web Browser Using the Cisco IOS File System Modifying, Downloading, & Maintaining Configuration Files Loading and Maintaining System Images Maintaining Router Memory Rebooting a Router Configuring Additional File Transfer Functions Monitoring the Router and Network Troubleshooting a Router Performing Basic System Management System Management Using System Controllers Web Scaling Using WCCP Managing Dial Shelves

Table 8 Cisco IOS Software Release 12.1 Documentation Set (continued)

Books	Chapter Topics
<ul style="list-style-type: none"> • <i>Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Configuration Guide</i> • <i>Cisco IOS Apollo Domain, Banyan VINES, DECnet, ISO CLNS, and XNS Command Reference</i> 	<ul style="list-style-type: none"> Overview of Apollo Domain, Banyan VINES, DECNET, ISO CLNS, and XNS Configuring Apollo Domain Configuring Banyan VINES Configuring DECnet Configuring IOS CLNS Configuring XNS
<ul style="list-style-type: none"> • <i>Cisco IOS AppleTalk and Novell IPX Configuration Guide</i> • <i>Cisco AppleTalk and Novell IPX Command Reference</i> 	<ul style="list-style-type: none"> AppleTalk and Novel IPX Overview Configuring AppleTalk Configuring Novell IPX
<ul style="list-style-type: none"> • <i>Cisco IOS Bridging and IBM Networking Configuration Guide</i> • <i>Cisco IOS Bridging and IBM Networking Command Reference, Volume I</i> • <i>Cisco Bridging and IBM Networking Command Reference, Volume II</i> 	<ul style="list-style-type: none"> Overview of SNA Internetworking Overview of Bridging Configuring Transparent Bridging Configuring Source-Route Bridging Configuring Token Ring Inter-Switch Link Configuring Token Ring Route Switch Module Overview of IBM Networking Configuring Remote Source-Route Bridging Configuring Data-Link Switching Plus+ Configuring Serial Tunnel and Block Serial Tunnel Configuring LLC2 and SDLC Parameters Configuring IBM Network Media Translation Configuring Frame Relay Access Support Configuring NCIA Server Configuring the Airline Product Set Configuring DSPU and SNA Service Point Support Configuring SNA Switching Services Configuring Cisco Transaction Connection Configuring Cisco Mainframe Channel Connection Adapters Configuring CLAW and TCP/IP Offload Support Configuring CMPC and CSNA Configuring CMPC+ Configuring the TN3270 Server Configuring IBM Network Media Translation Configuring Frame Relay Access Support Configuring NCIA Server Configuring the Airline Product Set Configuring DSPU and SNA Service Point Support Configuring SNA Switching Services Configuring Cisco Transaction Connection Configuring Cisco Mainframe Channel Connection Adapters Configuring CLAW and TCP/IP Offload Support Configuring CMPC and CSNA Configuring CMPC+ Configuring the TN3270 Server

Table 8 Cisco IOS Software Release 12.1 Documentation Set (continued)

Books	Chapter Topics
<ul style="list-style-type: none"> • <i>Cisco IOS Dial Services Configuration Guide: Terminal Services</i> • <i>Cisco IOS Dial Services Configuration Guide: Network Services</i> • <i>Cisco IOS Dial Services Command Reference</i> 	<ul style="list-style-type: none"> Large-Scale Dial Solutions Cost-Control Solutions Virtual Private Networks X.25 on ISDN Solutions Telco Solutions Dial-Related Addressing Services Internetworking Dial Access Scenarios 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
<ul style="list-style-type: none"> • <i>Cisco IOS Interface Configuration Guide</i> • <i>Cisco IOS Interface Command Guide</i> 	<ul style="list-style-type: none"> Interface Configuration Overview Configuring LAN Interfaces Configuring Serial Interfaces Configuring Logical Interfaces
<ul style="list-style-type: none"> • <i>Cisco IOS IP and IP Routing Configuration Guide</i> • <i>Cisco IOS IP and IP Routing Command Reference</i> 	<ul style="list-style-type: none"> IP Overview Configuring IP Addressing Configuring DHCP Configuring IP Services Configuring Mobile IP Configuring On-Demand Routing Configuring RIP Configuring IGRP Configuring OSPF Configuring IP Enhanced IGRP Configuring Integrated IS-IS Configuring BGP Configuring Multicast BGP (MBGP) Configuring IP Routing Protocol-Independent Features Configuring IP Multicast Routing Configuring Multicast Source Discovery Protocol Configuring PGM Router Assist Configuring Unidirectional Link Routing Using IP Multicast Tools
<ul style="list-style-type: none"> • <i>Cisco IOS Multiservice Applications Configuration Guide</i> • <i>Cisco IOS Multiservice Applications Command Reference</i> 	<ul style="list-style-type: none"> Multiservice Applications Overview Configuring Voice over IP Configuring Gatekeepers (Multimedia Conference Manager) Configuring Voice over Frame Relay Configuring Voice over ATM Configuring Voice over HDLC Configuring Voice-Related Support Features Configuring PBX Signaling

Table 8 Cisco IOS Software Release 12.1 Documentation Set (continued)

Books	Chapter Topics
(Continued) <ul style="list-style-type: none"> • <i>Cisco IOS Multiservice Applications Configuration Guide</i> • <i>Cisco IOS Multiservice Applications Command Reference</i> 	Configuring Subscriber-End Broadband Access Router Features Configuring Synchronized Clocking Configuring Store and Forward Fax Configuring Video Support Configuring Head-End Broadband Access Router Features
<ul style="list-style-type: none"> • <i>Cisco Quality of Service Solutions Configuration Guide</i> • <i>Cisco IOS Quality of Service Solutions Command Reference</i> 	Quality of Service Overview Classification Overview Configuring Policy-Based Routing Configuring QoS Policy Propagation via Border Gateway Protocol Configuring Committed Access Rate Congestion Management Overview Configured Weighted Fair Queueing Configuring Custom Queueing Configuring Priority Queueing Congestion Avoidance Overview Configuring Weighted Random Early Detection Policing and Shaping Overview Configuring Generic Traffic Shaping Configuring Frame Relay and Frame Relay Traffic Shaping Signalling Overview Configuring RSVP Configuring Subnetwork Bandwidth Manager Configuring RSVP-ATM Quality of Service Internetworking Link Efficiency Mechanisms Overview Configuring Link Fragmentation and Interleaving for Multilink PPP Configuring Compressed Real-Time Protocol IP to ATM CoS Overview Configuring IP to ATM CoS QoS Features for Voice Introduction
<ul style="list-style-type: none"> • <i>Cisco IOS Security Configuration Guide</i> • <i>Cisco IOS Security Command Reference</i> 	Security Overview AAA Overview Configuring Authentication Configuring Authorization Configuring Accounting Configuring RADIUS Configuring TACACS+ Configuring Kerberos Radius Commands TACACS+ Commands Access Control Lists: Overview and Guidelines Cisco Secure Integrated Software Firewall Overview Configuring Lock-and-Key Security (Dynamic Access Lists) Configuring IP Session Filtering (Reflexive Access Lists) Configuring TCP Intercept (Prevent Denial-of-Service Attacks) Configuring Context-Based Access Control

Table 8 Cisco IOS Software Release 12.1 Documentation Set (continued)

Books	Chapter Topics
(Continued)	Configuring Cisco Secure Integrated Software Intrusion Detection System
• <i>Cisco IOS Security Configuration Guide</i>	Configuring Authentication Proxy
• <i>Cisco IOS Security Command Reference</i>	Configuring Port to Application Mapping
	IP Security and Encryption Overview
	Configuring IPsec Network Security
	Configuring Certification Authority Interoperability
	Configuring Internet Key Exchange Security Protocol
	Configuring Passwords and Privileges
	Neighbor Router Authentication: Overview and Guidelines
	Configuring IP Security Options
• <i>Cisco IOS Switching Services Configuration Guide</i>	Cisco IOS Switching Services Overview
• <i>Cisco IOS Switching Services Command Reference</i>	Switching Paths Overview
	Configuring Switching Paths
	Cisco Express Forwarding Overview
	Configuring Cisco Express Forwarding
	NetFlow Switching Overview
	Configuring NetFlow Switching
	MPLS Overview
	Configuring MPLS
	Configuring IP Multilayer Switching
	Configuring IP Multicast Multilayer Switching
	Configuring IPX Multilayer Switching
	Configuring Multicast Distributed Switching
	Routing Between VLANs Overview
	Configuring Routing Between VLANs with ISL Encapsulation
	Configuring Routing Between VLANs with IEEE 802.10 Encapsulation
	Configuring Routing Between VLANs with IEEE 802.1Q Encapsulation
	LAN Emulation Overview
	Configuring LAN Emulation
	Configuring Token Ring LANE
	MPOA Overview
	Configuring the MPOA Client
	Configuring the MPOA Server
	Configuring Token Ring LANE for MPOA
• <i>Cisco IOS Wide-Area Networking Configuration Guide</i>	Wide-Area Networking Overview
• <i>Cisco IOS Wide-Area Networking Command Reference</i>	Configuring ATM
	Frame Relay
	Frame Relay-ATM Internetworking
	Configuring SMDS
	Configuring X.25 and LAPB

Table 8 Cisco IOS Software Release 12.1 Documentation Set (continued)

Books	Chapter Topics
<ul style="list-style-type: none"> • <i>Cisco IOS Configuration Guide Master Index</i> • <i>Cisco IOS Command Reference Master Index</i> • <i>Cisco IOS Command Summary</i> • <i>Cisco IOS Debug Command Reference</i> • <i>Cisco IOS Dial Services Quick Configuration Guide</i> • <i>Cisco IOS New Features Index</i> (CCO and Documentation CD only) • <i>Cisco IOS System Error Messages</i> 	

**Note**

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

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 docs, 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.

The CCO 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
- Telnet: [cco.cisco.com](telnet://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.

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.

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

Language	E-mail Address
English	tac@cisco.com
Hanzi (Chinese)	chinese-tac@cisco.com
Kanji (Japanese)	japan-tac@cisco.com

Language	E-mail Address
Hangul (Korean)	korea-tac@cisco.com
Spanish	tac@cisco.com
Thai	thai-tac@cisco.com

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>.

Configuration Tips on the Cisco Technical Assistance Center Home Page

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

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, log in, and click on this path: **Technical Assistance Center: Technical Tips**.

The following sections are provided from the Technical Tips page:

- Configuration Cookbooks—Cisco Configuration Cookbooks contain common configuration examples that demonstrate how to configure various internetworking technologies on Cisco devices.
- Field Notices—Field Notices are designed to provide notification of any critical issues regarding Cisco products. These include problems descriptions, safety or security issues and hardware defects.
- Frequently Asked Questions (FAQs)—Collections of the most frequently asked technical questions about Cisco hardware and software.
- Hardware—Technical Tips related to specific hardware platforms, including the following:
 - Access Products
 - Comm Servers
 - Core Products
 - General Cabling Information
 - Internet Products
 - LAN2LAN
 - Product Support Pages
 - Security Products
 - WAN Switching Products
 - Workgroup Products

- Hot Tips— Popular tips and hints gathered from Cisco's Technical Assistance Center (TAC). Most of these documents are also available from the TAC Fax-on-Demand service. To access Fax-on-Demand and receive documents at your fax machine, call 888-50-CISCO (888-502-4726). From international areas, call 415-596-4408.
- Internetworking Features—Tips on using and deploying Cisco IOS software features and services, including the following:
 - LAN & Workgroup
 - Router Management
 - Routing Protocols
 - Security
 - SNA Features
 - Voice and Multimedia Technologies
 - WAN Features
- Sample Configurations—Actual configuration examples complete with topology and annotations for the following areas:
 - Software Products
 - Cisco ICM/NAM
 - Cisco Live!
 - Cisco IOS Software Bulletins
 - Cisco TCP/IP Suite 100
 - General Cisco IOS
 - Internet/Intranet Appliances and Software
 - Network Management
 - Security Technical Tips
 - WAN Switching Products and Software
- Special Collections—Other Helpful Documents:
 - Case Studies
 - Cisco Standard Icons
 - References & RFCs
 - Security Advisories

Documentation Feedback

We appreciate and value your comments:

- 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.
- 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:

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 Document Resource Connection
 170 West Tasman Drive
 San Jose, CA 95134-9883

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

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