



# Release Notes for the 820 Series Routers for Cisco IOS Release 12.1(1)XB

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April 10, 2000

These release notes describe new features and significant software components for the Cisco 827 and Cisco 827-4V Routers that support Cisco IOS Release 12.1 T, up to and including Release 12.1(1)XB. These release notes are updated as needed to describe new memory requirements, new features, new hardware support, software platform deferrals, microcode or modem code changes, related document changes, and any other important changes. Use these release notes with the *Cross-Platform Release Notes for Cisco IOS Release 12.1* located on CCO and the Documentation CD-ROM.

For a list of the software caveats that apply to Release 12.1(1)XB, refer to the section “Caveats” and to the online *Caveats for Cisco IOS Release 12.1 T* document. The caveats document is updated for every 12.1 T maintenance release and is located on Cisco Connection Online (CCO) and the Documentation CD-ROM.

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# System Requirements

This section describes the system requirements for Release 12.1(1)XB and includes the following sections:

- Memory Requirements
- Hardware Supported, page 2
- Determining Your Software Release, page 3
- Upgrading to a New Software Release, page 3
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## Memory Requirements

This section describes the memory requirements for the Cisco IOS feature sets supported by Cisco IOS Release 12.1(1)XB on the Cisco 827 and Cisco 827-4V Routers.

**Table 1** *Memory Requirements for the Cisco 827 and Cisco 827-4V Routers*

Platforms	Image Name	Image	Recommended Flash Memory <sup>1</sup>	Recommended DRAM Memory	Runs From
Cisco 827	IP	c827-y6-mz	12 MB	16 MB	RAM
Cisco 827-4V	IP Voice Plus	c827v-y6-mz	12 MB	24 MB	RAM
Cisco 827-4V	IP/IPX Voice Plus	c827v-nsy6-mz	12 MB	24 MB	RAM

1. Cisco 827 routers use 4 MB of Flash memory for storing internal information such as the ROM monitor. Only the remainder of the Flash memory is available for storing Cisco IOS images and is displayed by using the command `show flash`.

## Hardware Supported

Cisco IOS Release 12.1(1)XB supports the following Cisco 800 series routers:

- Cisco 827
- Cisco 827-4V

For detailed descriptions of new hardware features, see New and Changed Information, page 6.

**Table 2** *Supported Interfaces for the Cisco 800 Series*

Router	Ethernet Ports	ADSL Ports	Telephone Ports	Console Ports
Cisco 827	One 10BaseT (RJ-45)	RJ-45	–	RJ-45
Cisco 827-4V	One 10BaseT (RJ-45)	RJ-45	Four (RJ-11)	RJ-45

## Cisco 827 and Cisco 827-4V Routers

The Cisco 827 and Cisco 827-4V Routers provide the following key hardware features:

- The routers provide connection to an ADSL network or telephones and fax machines through an ADSL port.
- Flash memory: Default is 12 MB and is expandable to 20 MB. If 12 MB is Flash is installed, 4 MB hosts the ROMMON and NVRAM and 8 MB is used for the Cisco IOS images.
- Cisco 827 Router Dynamic RAM: Default is 16 MB of DRAM and is expandable to 32 MB.
- Cisco 827-4V Router Dynamic RAM: Default is 24 MB and is expandable to 32 MB. The Cisco 827-4V Router also contains an 8-MB DIMM card.
- The central processing unit is a 50 MHz MPC 855T RISC processor.
- Color-coded ports and cable reduce the chance of cabling errors.
- Routers can be stacked or mounted on a wall.
- The routers provide locking power connectors and a Kensington-compatible locking slot.

## Determining Your Software Release

To determine the version of Cisco IOS software currently running on your Cisco 800 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) 800 Software (c827-y6-mz), Version 12.1(1)XB, RELEASE SOFTWARE
```

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

## Upgrading to a New 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](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](http://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](http://www.cisco.com) and following this path: **Service & Support: Software Center: IOS Upgrade Planner**.

## 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)XB supports the same feature sets as Releases 12.1 and 12.1 T, but Release 12.1(1)XB can include new features supported by the Cisco 827 and Cisco 827-4V Routers. Table 3 lists the feature sets supported by the Cisco 827 and Cisco 827-4V Routers.

**Table 3** *Feature Sets Supported by the Cisco 827 and Cisco 827-4V Routers*

Image Name	Feature Set Matrix Terms	Software Image	Platform
Cisco 827 Series IOS IP	IP	c827-y6-mz	Cisco 827
Cisco 827 Series IOS IP/IPX Voice Plus	IP/IPX, Voice, Plus	c827v-y6-mz	Cisco 827-4V
Cisco 827 Series IOS IP Voice Plus	IP, Voice, Plus	c827v-nsy6-mz	Cisco 827-4V

Table 4 lists the features and feature sets supported by the Cisco 827 and Cisco 827-4V Routers in Cisco IOS Release 12.1(1)XB. The table uses 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 4** *Feature List by Feature Set for the Cisco 827 and Cisco 827-4V Routers*

Features	Feature Sets		
	IP	IP/Voice Plus	IP/IPX/Voice Plus
<b>Address Conservation</b>			
DHCP Client Address Negotiation	Yes	Yes	Yes
IPCP Address Negotiation	Yes	Yes	Yes
NAT Many to One (PAT)	Yes	Yes	Yes
NAT Many to Many (Multi-NAT)	Yes	Yes	Yes
<b>Bandwidth Optimization</b>			
NetBIOS Name Caching	Yes	Yes	Yes
STAC Compression	Yes	Yes	Yes
<b>Business-Class Quality of Service</b>			
CBR, VBRrt, VBRnrt, UBR Traffic Classes	Yes	Yes	Yes
Class-Based Weighted Fair Queuing	No	Yes	Yes
IP Policy Routing	No	Yes	Yes
Per-Virtual Circuit Queuing	Yes	Yes	Yes
Per-Virtual Circuit Shaping	Yes	Yes	Yes
Weighted Random Early Detection	No	Yes	Yes

**Table 4 Feature List by Feature Set for the Cisco 827 and Cisco 827-4V Routers**

Features	Feature Sets		
	IP	IP/Voice Plus	IP/IPX/Voice Plus
<b>Business-Class Security</b>			
GRE Tunneling	No	Yes	Yes
IP (and IPX when applicable) Basic and Extended Access Lists	Yes	Yes	Yes
NetBIOS Access Lists	Yes	Yes	Yes
PAP, CHAP, Local Password	Yes	Yes	Yes
Route and Router Authentication	Yes	Yes	Yes
<b>Ease of Use and Deployment</b>			
Cisco Fast Step Software	Yes	Yes	Yes
Easy IP Phase I and II	Yes	Yes	Yes
<b>Enhanced Security</b>			
Cisco IOS Firewall	No	No	No
Context-Based Access Control Lists	No	No	No
Denial-of-Service Detection	No	No	No
IPSec Encryption with 3DES and L2TP	No	No	No
Java Blocking	No	No	No
Real-Time Alerts	No	No	No
<b>LAN</b>			
IP	Yes	Yes	Yes
IPX	No	No	Yes
Transparent Bridging	Yes	Yes	Yes
<b>Management</b>			
CiscoView	Yes	Yes	Yes
SNTP	No	Yes	Yes
SNMP, Telnet, Console Port	Yes	Yes	Yes
Syslog	No	Yes	Yes
TACACS+ (also a security feature)	Yes	Yes	Yes
TFTP Client and Server	Yes	Yes	Yes
<b>Routing</b>			
IP Enhanced IGRP	No	Yes	Yes
IP Multicast (relay only)	Yes	Yes	Yes
IP-Policy Routing	Yes	Yes	Yes
IPX RIP/SAP IPX WAN	No	No	Yes
RIP, RIPv2	Yes	Yes	Yes
<b>Voice Features (Cisco 827-4V only)</b>			

**Table 4 Feature List by Feature Set for the Cisco 827 and Cisco 827-4V Routers**

Features	Feature Sets		
	IP	IP/Voice Plus	IP/IPX/Voice Plus
G.711, G.729a, G.723.1 Codecs with High-Performance DSP Support	No	Yes	Yes
Loop-Start Key-System or Direct Phone Support	No	Yes	Yes
RAS Gatekeeper Communications Protocol	No	Yes	Yes
VoIP H.323	No	Yes	Yes

## New and Changed Information

The following sections list the new hardware and software features supported by the Cisco 800 series for Release 12.1 T:

### New Hardware and Software Features in Release 12.1(1)XB

The following sections list the new hardware and software features supported by the Cisco Cisco 827 and Cisco 827-4V Routers for Release 12.1(1)XB.

#### Cisco 827 and Cisco 827-4V Routers

The Cisco 827 and Cisco 827-4V asymmetric digital subscriber line (ADSL) routers use Cisco IOS software to provide business-class functionality for small- and medium-sized business offices and corporate telecommuting workers. The routers support up to 20 users in a small office or telecommuting environment with differentiated classes of service, integrated toll-quality voice and data, business-class security, and manageability.

### New Software Features in Release 12.1(1)

For information regarding the features supported in Cisco IOS Release 12.1, refer to the Cross-Platform Release Notes and New Feature Documentation links at the following location on CCO:

<http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/index.htm>

This URL is subject to change without notice. If it changes, point your web browser to CCO, and click on the following path:

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

# Limitations and Restrictions

## Supported MIBs

The following MIBs are supported in the Cisco 827 routers:

- ADSL-LINE-MIB
- ADSL-DMT-LINE-MIB
- ATM-FORUM-MIB
- ATM-FORUM-ADDR-REG
- ATM-MIB
- CISCO-AAL5-MIB
- CISCO-ADSL-DMT-LINE-MIB
- CISCO-ATM-EXT-MIB
- CISCO-BULK-FILE-MIB
- CISCO-CAR-MIB
- CISCO-DIAL-CONTROL-MIB
- CISCO-FLASH-MIB
- CISCO-IETF-ATM2-PVCTRAP-MIB
- CISCO-IMAGE-MIB
- CISCO-IP-STAT-MIB
- CISCO-MEMORY-POOL-MIB
- CISCO-PING-MIB
- CISCO-QUEUE-MIB
- CISCO-RAS-MIB
- CISCO-SNAPSHOT-MIB
- CISCO-STACKMAKER-MIB
- CISCO-SYSLOG-MIB
- CISCO-TCP-MIB
- CISCO-VOICE-ANALOG-IF-MIB
- CISCO-VOICE-COMMON-DIAL-CONTROL-MIB
- CISCO-VOICE-DIAL-CONTROL-MIB
- CISCO-VOICE-IF-MIB
- DIAL-CONTROL-MIB
- ENTITY-MIB
- IF-MIB
- IGMP-MIB
- INT-SERV-GUARANTEED-MIB

- INT-SERV-MIB
- IPMROUTE-MIB
- NOVELL-IPX-MIB
- NOVELL-RIPSAP-MIB
- OLD-CISCO-CHASSIS-MIB
- OLD-CISCO-CPU-MIB
- OLD-CISCO-INTERFACE-MIB
- OLD-CISCO-IP-MIB
- OLD-CISCO-MEMORY-MIB
- OLD-CISCO-NOVELL-MIB
- OLD-CISCO-SYSTEM-MIB
- OLD-CISCO-TCP-MIB
- PIM-MIB
- RFC1398-MIB (ETHERMIB)
- RFC1213-MIB
- RSVP-MIB
- SNMPv2-MIB
- TCP-MIB
- UDP-MIB
- XGCP-MIB

## Important Notes

The following sections contain important notes about Cisco IOS Release 12.1 that can apply to the Cisco 827 and Cisco 827-4V Routers. (Also, see the “Caveats” section on page 12.)

## ADSL Cable Requirements

The ADSL cable that you connect to the Cisco 827 router must be 10BaseT Category 5, unshielded twisted-pair (UTP) cable. Using regular telephone cable can introduce line errors.

## DHCP Client Support

Perform the following steps to configure the router for DHCP client support:

- 
- Step 1** Configure the BVI interface by entering the command **ip address dhcp client-id Ethernet 0**.

Specifying the value **client-id ethernet0** causes that the MAC address of the Ethernet interface to be used as the client ID when the DHCP request is sent. Otherwise, the MAC address of the BVI interface is used as the client ID.

**Step 2** Configure NAT.

- a. Configure the BVI interface by entering the **nat outside** command.
- b. Configure the Ethernet interface by entering the **nat inside** command.
- c. Create an access list under NAT by entering the **access-list 1 permit ip address** command to match all Ethernet IP addresses.
- d. Configure the source list under NAT by entering the command **ip nat inside source list 1 interface BVI 1 overload**.

**Step 3** This step is optional. Configure the Cisco 827 router to act as a DHCP server.

- a. At the `config-if` router prompt, enter the `server name` command **ip dhcp pool**.
- b. Enter the command **import all** to have the Cisco 827 router retrieve the Microsoft Windows nameserver (WINS) and domain name system (DNS) server addresses for name resolution.

## Sample Configuration

```

Current configuration:
!
version 12.0
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname c827
!
!
ip subnet-zero
ip dhcp excluded-address 10.10.10.1
!
ip dhcp pool SERVER
network 10.10.10.0 255.255.255.0
default-router 10.10.10.1
import all
!
!
!
bridge irb
!
!
!
!
interface Ethernet0
ip address 10.10.10.1 255.255.255.0
no ip directed-broadcast
ip nat inside
!
interface ATM0
no ip address
no ip directed-broadcast
no atm ilmi-keepalive
bundle-enable
hold-queue 208 in
!

```

```
interface ATM0.1 point-to-point
no ip directed-broadcast
pvc 1/100
    encapsulation aal5snap
!
bridge-group 1
!
interface ATM0.2 point-to-point
ip address 5.0.0.2 255.0.0.0
no ip directed-broadcast
pvc 1/101
    protocol ip 5.0.0.1 broadcast
    protocol ip 5.0.0.5 broadcast
    encapsulation aal5snap
!
!
interface BVI1
ip address dhcp client-id Ethernet0
no ip directed-broadcast
ip nat outside
!
ip nat inside source list 1 interface BVI1 overload
ip classless
ip route 0.0.0.0 0.0.0.0 BVI1
no ip http server
!
access-list 1 permit 10.10.10.0 0.0.0.255
bridge 1 protocol ieee
bridge 1 route ip
!
voice-port 1
timing hookflash-in 0
!
voice-port 2
timing hookflash-in 0
!
voice-port 3
timing hookflash-in 0
!
voice-port 4
timing hookflash-in 0
!
!
line con 0
exec-timeout 0 0
transport input none
stopbits 1
line vty 0 4
password lab
login
!
scheduler max-task-time 5000
end
```

## Downloading Images

Delete files in the router Flash memory before attempting to download new images.

**Caution**

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Use the **delete** command, not **erase**, to free up space. Entering **erase** removes all files, including the configuration.

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## Flash Memory

Cisco 827 routers use 4 MB of Flash memory for storing internal information such as the ROM monitor. Only the remainder of the Flash memory is available for storing Cisco IOS images and is displayed by using the command **show flash**. For example, if the router reports 8 MB of Flash, the actual amount of onboard Flash memory is 12 MB, even though only 8 MB are displayed and available for Cisco IOS image storage.

## Multilink PPP and Interleaving

Multilink PPP fragments large data packets to allow small voice packets to be interleaved between them. However, apart from first-in-first-out (FIFO) queuing, no other kind of output queuing mechanisms are currently supported with PPP over ATM. Consequently, when multilink PPP is configured on the Cisco 827 routers, large packets are fragmented, but small voice packets are not interleaved between them.

## NAT Support for H.323 Signaling

NAT does not support alerting H.225 messages, therefore, NAT communication cannot be established between router end points. NAT support for H.323 signaling is limited to the application Netmeeting.

## Phone Mate Answering Machine Model 9200

Phone Mate model 9200 answering machines fail to recognize the ringing signal sent by AMD R79 ringing SLIC. Tests were performed with the Phone Mate models 3750 and 9300.

## PPP over AAL5SNAP Encapsulation Support

PPP over AAL5SNAP encapsulation is currently not supported, although the context sensitive help mentions that it can be configured.

# Caveats

Caveats describe unexpected behavior or defects in Cisco IOS software releases. Severity 1 caveats are the most serious caveats, severity 2 caveats are less serious, and severity 3 caveats are the least serious of these three severity levels.

All caveats in Release 12.1 T are also in Release 12.1(1)XB. For information on caveats in Cisco IOS Release 12.1 T, refer to the *Caveats for Cisco IOS Release 12.1 T* document. For information on caveats in Cisco IOS Release 12.1, refer to the *Caveats for Cisco IOS Release 12.1* document. These publications list severity 1 and 2 caveats, and are located on CCO and the Documentation CD-ROM.



## 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>.

# Related Documentation

The following sections describe the documentation available for the Cisco 827 and Cisco 827-4V 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 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**

- 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 Cisco IOS Release 12.1 and 12.1 T*

The *Caveats for Cisco IOS Release 12.1* and *Caveats for Cisco IOS Release 12.1 T* documents 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**

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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>.

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## Platform-Specific Documents

These documents are available for the Cisco 827 and Cisco 827-4V Routers on CCO and the Documentation CD-ROM:

- *Cisco 827 Routers Hardware Installation Guide*
- *Quick Start Guide - Setting Up the Cisco 827 Router*
- *Cisco 827 Routers Software Configuration Guide*
- *Quick Start Guide - Setting Up the Cisco 827 Routers*
- *Release Notes for Cisco 827 Routers*

On CCO at:

**Technical Documents: Documentation Home Page: Access Servers and Access Routers: Fixed Configuration Access Routers: Cisco 827 Routers**

On the Documentation CD-ROM at:

**Cisco Product Documentation: Access Servers and Access Routers: Fixed Configuration Access Routers: Cisco 827 Routers**

## Feature Modules

Feature modules describe new features supported by Release 12.1 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.

To reach the Release 12.1 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 12.1X Releases: New Features in 12.1(1)X Releases**
- 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 12.1X Releases: New Features in 12.1(1)X Releases**

## 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 5 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 5 Cisco IOS Software Release 12.1 Documentation Set**

Books	Chapter 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>	<ul style="list-style-type: none"> <li>Configuration Fundamentals Overview</li> <li>Using the Command-Line Interface (CLI)</li> <li>Using Configuration Tools</li> <li>Configuring Operating Characteristics</li> <li>Managing Connections, Menus, and System Banners</li> <li>Using the Cisco Web Browser</li> <li>Using the Cisco IOS File System</li> <li>Modifying, Downloading, &amp; Maintaining Configuration Files</li> <li>Loading and Maintaining System Images</li> <li>Maintaining Router Memory</li> <li>Rebooting a Router</li> <li>Configuring Additional File Transfer Functions</li> <li>Monitoring the Router and Network</li> <li>Troubleshooting a Router</li> <li>Performing Basic System Management</li> <li>System Management Using System Controllers</li> <li>Web Scaling Using WCCP</li> <li>Managing Dial Shelves</li> </ul>
<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>	<ul style="list-style-type: none"> <li>Overview of Apollo Domain, Banyan VINES, DECNET, ISO CLNS, and XNS</li> <li>Configuring Apollo Domain</li> <li>Configuring Banyan VINES</li> <li>Configuring DECnet</li> <li>Configuring IOS CLNS</li> <li>Configuring XNS</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Cisco IOS AppleTalk and Novell IPX Configuration Guide</i></li> <li>• <i>Cisco AppleTalk and Novell IPX Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>AppleTalk and Novel IPX Overview</li> <li>Configuring AppleTalk</li> <li>Configuring Novell IPX</li> </ul>
<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 Bridging and IBM Networking Command Reference, Volume II</i></li> </ul>	<ul style="list-style-type: none"> <li>Overview of SNA Internetworking</li> <li>Overview of Bridging</li> <li>Configuring Transparent Bridging</li> <li>Configuring Source-Route Bridging</li> <li>Configuring Token Ring Inter-Switch Link</li> <li>Configuring Token Ring Route Switch Module</li> <li>Overview of IBM Networking</li> <li>Configuring Remote Source-Route Bridging</li> <li>Configuring Data-Link Switching Plus+</li> <li>Configuring Serial Tunnel and Block Serial Tunnel</li> <li>Configuring LLC2 and SDLC Parameters</li> <li>Configuring IBM Network Media Translation</li> <li>Configuring Frame Relay Access Support</li> <li>Configuring NCIA Server</li> <li>Configuring the Airline Product Set</li> <li>Configuring DSPU and SNA Service Point Support</li> <li>Configuring SNA Switching Services</li> <li>Configuring Cisco Transaction Connection</li> </ul>

Table 5 Cisco IOS Software Release 12.1 Documentation Set (continued)

Books	Chapter Topics
(Continued) <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 Bridging and IBM Networking Command Reference, Volume II</i></li> </ul>	Configuring Cisco Mainframe Channel Connection Adapters Configuring CLAW and TCP/IP Offload Support Configuring CMPC and CSNA Configuring CMPC+ Configuring the TN3270 Server
<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>	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"> <li>• <i>Cisco IOS Interface Configuration Guide</i></li> <li>• <i>Cisco IOS Interface Command Guide</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 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

**Table 5 Cisco IOS Software Release 12.1 Documentation Set (continued)**

Books	Chapter Topics
<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>	<ul style="list-style-type: none"> <li>Multiservice Applications Overview</li> <li>Configuring Voice over IP</li> <li>Configuring Gatekeepers (Multimedia Conference Manager)</li> <li>Configuring Voice over Frame Relay</li> <li>Configuring Voice over ATM</li> <li>Configuring Voice over HDLC</li> <li>Configuring Voice-Related Support Features</li> <li>Configuring PBX Signaling</li> <li>Configuring Store and Forward Fax</li> <li>Configuring Video Support</li> <li>Configuring Head-End Broadband Access Router Features</li> <li>Configuring Subscriber-End Broadband Access Router Features</li> <li>Configuring Synchronized Clocking</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Cisco Quality of Service Solutions Configuration Guide</i></li> <li>• <i>Cisco IOS Quality of Service Solutions Command Reference</i></li> </ul>	<ul style="list-style-type: none"> <li>Quality of Service Overview</li> <li>Classification Overview</li> <li>Configuring Policy-Based Routing</li> <li>Configuring QoS Policy Propagation via Border Gateway Protocol</li> <li>Configuring Committed Access Rate</li> <li>Congestion Management Overview</li> <li>Configured Weighted Fair Queueing</li> <li>Configuring Custom Queueing</li> <li>Configuring Priority Queueing</li> <li>Congestion Avoidance Overview</li> <li>Configuring Weighted Random Early Detection</li> <li>Policing and Shaping Overview</li> <li>Configuring Generic Traffic Shaping</li> <li>Configuring Frame Relay and Frame Relay Traffic Shaping</li> <li>Signalling Overview</li> <li>Configuring RSVP</li> <li>Configuring Subnetwork Bandwidth Manager</li> <li>Configuring RSVP-ATM Quality of Service Internetworking</li> <li>Link Efficiency Mechanisms Overview</li> <li>Configuring Link Fragmentation and Interleaving for Multilink PPP</li> <li>Configuring Compressed Real-Time Protocol</li> <li>IP to ATM CoS Overview</li> <li>Configuring IP to ATM CoS</li> <li>QoS Features for Voice Introduction</li> </ul>
<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>	<ul style="list-style-type: none"> <li>Security Overview</li> <li>AAA Overview</li> <li>Configuring Authentication</li> <li>Configuring Authorization</li> <li>Configuring Accounting</li> <li>Configuring RADIUS</li> <li>Configuring TACACS+</li> <li>Configuring Kerberos</li> <li>Radius Commands</li> </ul>

Table 5 Cisco IOS Software Release 12.1 Documentation Set (continued)

Books	Chapter Topics
(Continued)	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 Configuring Cisco Secure Integrated Software Intrusion Detection System Configuring Authentication Proxy 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
<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>	Cisco IOS Switching Services Overview 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
<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>	

**Table 5 Cisco IOS Software Release 12.1 Documentation Set (continued)**

Books	Chapter Topics
<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 Frame Relay Frame Relay-ATM Internetworking Configuring SMDS Configuring X.25 and LAPB
<ul style="list-style-type: none"> <li>• <i>Cisco IOS Configuration Guide Master Index</i></li> <li>• <i>Cisco IOS Command Reference Master Index</i></li> <li>• <i>Cisco IOS Command Summary</i></li> <li>• <i>Cisco IOS Debug Command Reference</i></li> <li>• <i>Cisco IOS Dial Services Quick Configuration Guide</i></li> <li>• <i>Cisco IOS New Features Index</i> (CCO and Documentation CD only)</li> <li>• <i>Cisco IOS System Error Messages</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 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**.

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- 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](mailto:cco-team@cisco.com).

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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.

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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>.

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

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[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, 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's 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.
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  - 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

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