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Release Notes for Cisco 6400 NSP for Cisco IOS Release 12.0(5)DB

February 18, 2002

These release notes for the Cisco 6400 node switch processor (NSP) support Cisco IOS Release 12.0DB, up to and including Release 12.0(5)DB1. These release notes are updated as needed to describe new features, memory requirements, hardware support, software platform deferrals, and changes to the microcode or modem code and related documents.

For a list of the software caveats that apply to Release 12.0(5)DB1, see the “Caveats” section on page 8 and *Caveats for Cisco IOS Release 12.0 T*. The caveats document is updated for every maintenance release and is located on Cisco Connection Online (CCO) and the Documentation CD-ROM.

Use these release notes in conjunction with the cross-platform *Release Notes for Cisco IOS Release 12.0* located on Cisco Connection Online (CCO) and the Documentation CD-ROM.

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System Requirements

This section describes the system requirements for Cisco IOS Release 12.0(5)DB1 and includes the following sections:

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Memory Requirements

Table 1 describes the memory requirements for the Cisco 6400 platform supported by Cisco IOS Release 12.0 DB.

Table 1 Memory Requirements for the Cisco 6400 Universal Access Concentrator

Feature Set	Image Name	Minimum Required Flash Disk	Required Main Memory	Runs from
Cisco 6400	c6400s-wp-mz.120-5.DB	3.5 MB Flash	64 MB DRAM	RAM

When used in a redundant configuration, the primary and backup NSPs should have identical hardware configurations, including DRAM size, Flash memory size, and Flash disk size. To learn about redundancy in the Cisco 6400, see “Configuring System Features” in the *Cisco 6400 UAC Software Configuration Guide*.

Hardware Supported

Cisco IOS Release 12.0(5)DB1 supports the Cisco 6400 NSP. For detailed descriptions of the new hardware features, see the “New and Changed Information” section on page 5.

Software Compatibility

Cisco recommends that Release 12.0(5)DB1 software is used concurrently with Cisco IOS Release 12.0(5)DC for the Cisco 6400 node route processor (NRP). For information about Release 12.0(5)DC for the NRP, see *Release Notes for Cisco 6400 Node Route Processor (NRP) for Cisco IOS Release 12.0(5)DC*.

Note Use of the combined network management Ethernet (NME) interface requires Release 12.0(5)DC for the NRP. See the “Combined Network Management Ethernet Interface” section on page 5 for more information.

Determining Your Software Release

To determine the version of Cisco IOS software currently running on the Cisco 6400 NSP, log in to the NSP and enter the **show version EXEC** command. The following is sample output from the **show version** command performed on the Cisco 6400. The version number is indicated on the second line as shown below:

```
Cisco Internetwork Operating System Software
IOS (tm) C6400 Software (C6400S-WP-M), 12.0(5) DB1 .....
```

The output includes additional information including processor revision numbers, memory amounts, hardware IDs, and partition information. To upgrade to a new software release, see the “Cisco Connection Online” section on page 15.

Upgrading to a New Release

For specific information on upgrading a dual-NSP system to a new software release, see “Configuring System Features” in the *Cisco 6400 UAC Software Configuration Guide*.

For information about upgrading to a new software release, see the product bulletin *Cisco IOS Software Release 12.0 Upgrade Paths and Packaging Simplification* located at:

<http://www.cisco.com/kobayashi/library/12.0/120MigrPaths.pdf>

If you do not have an account on CCO and want general information about upgrading to a new software release, see the product bulletin *Cisco IOS Software Release 11.3 Upgrade Paths and Packaging Simplification (#703: 12/97)* on CCO at:

Service & Support: Product Bulletins: Software

Under **Cisco IOS 11.3**, click **Cisco IOS Software Release 11.3 Upgrade Paths (#703: 12/97)**

This product bulletin does not contain information specific to Cisco IOS Release 12.0 but provides generic upgrade information that may apply to Cisco IOS Release 12.0.

Feature Set Table

The Cisco IOS software is packaged in feature sets (also called software images) depending on the platform. Each feature set contains a specific set of Cisco IOS features. The Cisco 6400 can only use a single image called c6400s-wp-mz.



Caution This feature set table contains only a selected list of features. This table is not a cumulative or complete list of all the features in each image.

Table 2 lists the features supported by the c6400s-wp-mz image for the Cisco 6400.

Table 2 Feature List for the Cisco 6400 Node Switch Processor

Supported Features

SNMP

Hardware redundancy

Web-based configuration

SONET APS support

DHCP client support

Table 2 Feature List for the Cisco 6400 Node Switch Processor (continued)

Supported Features
Telco alarm support
Left-justified E.164 AFI support
IP
NTP
TACACS+
Telnet
Point-to-point and point-to-multipoint permanent VCCs and VPCs
Point-to-point and point-to-multipoint switched VCCs and VPCs (UNI 3.0)
Point-to-point and point-to-multipoint switched VCCs and VPCs (UNI 3.1)
Point-to-point and point-to-multipoint switched VCCs and VPCs (UNI 4.0)
Multipoint-to-point UNI signaling
Soft VCCs and VPCs
VP tunneling
VPI/VCI range support in ILMI 4.0
PNNI hierarchy
ILMI version 4.0
IISP
LANE client (LEC) and LANE Services (LES/BUS/LECS) on NSP
Token Ring LANE services
ATM ARP server on NSP
ATM ARP client on NSP
Port snooping
OAM F4 and F5
E.164 address translation and autoconversion
ATM access lists
ATM accounting
ATM RMON
Multiple, weighted, dynamic thresholds for selective packet marking and discard
Shaped VP tunnels for CBR traffic
Substitution of other service categories in shaped VP tunnels
Dual leaky bucket policing
Scheduler/Service Class/PVC configuration
Logical multicast support (up to 254 leaves per output port, per point-to-multipoint VC)
Network clocking enhancements for smooth switchover
Per-VC or per-VP nondisruptive snooping
Support for non-zero MCR on ABR connections
Access lists on ILMI registration
CUGs

Table 2 Feature List for the Cisco 6400 Node Switch Processor (continued)**Supported Features**

ATM soft restart

ATM accounting enhancements

Signaling diagnostics and MIB

New and Changed Information

The following sections list the new features supported by the Cisco 6400 in Cisco IOS Release 12.0(5)DB.

No New Features in Release 12.0(5)DB1

There are no new hardware or software features in Release 12.0(5)DB1.

New Software Features in Release 12.0(5)DB

ATM Software Enhancements

Release 12.0(5)DB for the Cisco 6400 NSP includes a number of software enhancements, including hierarchical VP tunnels, frame relay network and service interworking, and network clock distribution protocol. For more information about the ATM capabilities of the Cisco 6400 NSP, refer to the following documents:

- *Guide to ATM Technology*
- *ATM Switch Router Quick Configuration Guide*
- *ATM Switch Router Software Configuration Guide*
- *ATM Switch Router Command Reference*

Combined Network Management Ethernet Interface

The combined network management Ethernet (NME) interface allows the entire Cisco 6400 system, including the NSP and all installed NRPs, to be managed through a single Ethernet interface. The NME interface eliminates the need for Ethernet cables and connections on individual NRPs. For more information about using the combined NME interface, see “Configuring the NSP” and “Configuring the NRP” in the *Cisco 6400 UAC Software Configuration Guide*.

Note Use of the combined network management Ethernet (NME) interface may require an NSP upgrade. Use the **show hardware** command in privileged EXEC mode to determine the NSP hardware version; “HW version 1.1” indicates an NSP that can support the combined NME interface. If you have an older NSP and wish to use the combined NME interface, replace the NSP with part number 800-03785-03 w/ Deviation D99-3628 applied, or part number 800-03785-06 or later. For information about removing or installing an NSP, see the *Cisco 6400 UAC FRU Installation and Replacement Guide*.

New Hardware Features Supported in Release 12.0(5)DB

OC12 Node Line Card

The OC12 node line card (NLC) supports bandwidth up to 622 Mbps between the Cisco 6400 Universal Access Concentrators and the network backbone. The OC12 NLC is a full-height card that mounts in the chassis on a full-height carrier module. For more information about installing an OC12 NLC, see the *Cisco 6400 UAC FRU Installation and Replacement Guide*.

AC Power Entry Module

The AC power entry module (PEM) provides power conversion directly from the facility VAC input power to the -48VDC used internally in the Cisco 6400 chassis. AC power comes into the AC PEM through a power cord attached to the front faceplate. An additional AC PEM can be used for redundancy. For more information about installing an AC PEM, see the *Cisco 6400 UAC Hardware Installation Guide*.

No New Features in Release 12.0(4)DB

There are no new features supported by the Cisco 6400 NSP in Cisco IOS Release 12.0(4)DB.

New Hardware Features Supported in Release 12.0(3)DB

DS3 Node Line Card

A new DS3 node line card (NLC) has been developed for the Cisco 6400 chassis. The DS3 NLC is a half-height card that mounts in the chassis on a full-height carrier module. Coaxial interface cables are connected to the DS3 using BNC connectors on the back of the Cisco 6400 chassis. For more information about installing a DS3 NLC, see the *Cisco 6400 UAC FRU Installation and Replacement* guide.

No New Features in Release 12.0(2)DB

There are no new features supported by the Cisco 6400 NSP in Cisco IOS Release 12.0(2)DB.

New Software Features in Cisco IOS Release 12.0(1)DB

Redundancy

Resiliency for both the NSP and NRP is based on extended high system availability (EHSA). If the NRP fails, no virtual circuits (VCs) from the NSP must be reconfigured. The NRP blades also support online insertion and removal (OIR). When operating in non-redundant mode, the NRPs appear as separate network management entities, and can be accessed via individual console ports.

Synchronous Optical Network (SONET) Automatic Protection Switching (APS)

SONET APS provides a mechanism to support redundant transmission circuits, such as single-mode fibers, between SONET devices. Automatic switchover from the primary or working circuit to the backup or protection circuit happens when the working circuit fails or degrades.

The Cisco 6400 supports 1+1, linear, unidirectional, non-reverting APS operation on its redundant OC-3/STM-1 ports.

Telco Alarms

A telco uses system alarms to help monitor equipment and identify the cause of physical system problems within the central office. There are three levels of alarms: minor, major, and critical, and there are many sources of alarm conditions. Temperature thresholds are one source, but alarms can be triggered by card failure, SONET APS failures, NRP failures, and generic alarms.

The Cisco 6400 includes environmental monitoring hardware and a digital thermometer that measures the temperature of the intake air flow and the temperature at the hottest part of the chassis. Temperature thresholds for each alarm type and location are automatically set, based on empirically determined values that vary depending on the number and type of boards inserted in the chassis. In addition to the automatically set thresholds, you can set your own thresholds for minor and major temperature alarms.

The Cisco 6400 supports BellCore standard alarms, and additional commands have been added that allow you to manage the alarms and reset chassis components as needed.

Dynamic Host Configuration Protocol (DHCP) Client

The Cisco 6400 acts as a DHCP client and automatically acquires an IP address, subnet mask, and default route from a DHCP server on the network. This feature allows you to install the Cisco 6400 in the central office using non-technical personnel. The plug-n-play option allows you to configure the Cisco 6400 from a Network Operations Center (NOC), without being physically close to the system.

Web Console

Web Console is a graphical user interface (GUI) lets you set or change the system configuration and monitor system activity. The Web Console application is accessible from any Web browser on the Telco management network. You can configure basic system parameters, Simple Network Management Protocol (SNMP) management parameters, set up subscribers, and monitor the current status of your chassis LEDs from anywhere on the network with Web Console.

Important Notes

This section contains important information about use of your Cisco 6400 UAC NSP.

Web Console Issues

The Web Console application is designed to use JavaScript, which is available with both Netscape Navigator and Microsoft Internet Explorer. However, a number of issues are present when using either application. To date, using Netscape Navigator 4.x has resulted in fewer issues than Microsoft Internet Explorer 4.x.

Before using the Web Console application, verify that your browser is set to use at least 4 MB (4096 KB) of cache memory.

The following sections tell how to deal with some of the browser issues affecting each application.

Microsoft Internet Explorer 4.x

Web Console might not reflect the most current redundancy status and auto synchronization setting because the check box and option buttons are not displayed properly. Therefore, you must verify your configuration by viewing the configuration file.

An empty dialog box might display after you apply new settings in any of the Web Console pages. If an empty dialog box is displayed, click the Internet Explorer **Refresh** button to view your new settings.

The **show interface** command on the Status page fails with Internet Explorer. There is no workaround, so this function is not available.

Netscape Navigator 4.x

If a blank window is displayed after you resize your Navigator window, click the **Reload** button to redisplay the page.

Frequent and rapid clicking on the Web Console Status page can cause syntax and LED errors. This problem is eliminated if the browser cache is set to 4096 KB.

Using Verbose Debug Options

On a dual-NSP system, switchovers can occur if verbose debugging commands, such as **debug all** or **debug oir** commands, are used. To avoid this situation when using verbose **debug** commands, execute the **redundancy keepalive disable** command at the EXEC prompt prior to turning on the **debug** command. After debugging is disabled, enter the **redundancy keepalive enable** command to restore normal system operation.

ATM Generic Flow Control Field

When an ATM cell is received on the NSP, the generic flow control (GFC) field of the ATM cell is passed without modification to the outbound virtual circuit. This is not compliant with the ATM Forum UNI specification, version 3.1, which requires all bits of the GCF field to be reset to zero.

Caveats

This section contains open and resolved caveats for the current Cisco 6400 NSP IOS release only.

Caveats in Cisco IOS Release 12.0(5)T also apply to Release 12.0(5)DB1. For information on caveats in the Cisco IOS Release 12.0(5)T, refer to the “Caveats” sections in the *Cross-Platform Release Notes for Cisco IOS Release 12.0* located on CCO and the Documentation CD-ROM. This section contains caveats affecting all maintenance releases.

Note If you have an account with CCO, you can use Bug Navigator II to find caveats of any severity for any release. Bug Navigator II can be found at <http://www.cisco.com/support/bugtools>, or from CCO, select **Software & Support: Tools: Bug Toolkit II**.

Open Caveats—Release 12.0(5)DB1

There are no open caveats in Release 12.0(5) DB1.

Resolved Caveats—Release 12.0(5)DB1

All the caveats listed in this section are resolved in Cisco IOS Release 12.0(5) DB1. This section describes only severity 1 and 2 caveats and select severity 3 caveats.

- CSCdw65903

An error can occur with management protocol processing. Please use the following URL for further information:

<http://www.cisco.com/cgi-bin/bugtool/onebug.pl?bugid=CSCdw65903>

Open Caveats—Release 12.0(5)DB

This section describes possibly unexpected behavior by Release 12.0(5)DB. This section describes severity 1, 2, and selected severity 3 caveats.

- CSCdk46692

The **dir disk0:** command shows the disk is still present even after it has been removed. A message is sent to the console log when a PCMCIA disk is removed. Do not attempt any disk operations after the removal notice is displayed because they will not work.

Resolved Caveats—Release 12.0(5)DB

There are no additional caveats resolved in Release 12.0(5) DB.

Related Documentation

The following sections describe the documentation available for the Cisco 6400 Universal Access Concentrator. The most up-to-date documentation can be found on the web via Cisco Connection Online (CCO) and on the Documentation CD-ROM. These electronic documents might contain updates and modifications made after the hard copy documents were printed.

These release notes should be used in conjunction with the documents listed in the following sections:

- Release-Specific Documents, page 9
- Platform-Specific Documents, page 10
- Feature Modules, page 11
- Cisco IOS Software Document Set, page 12

Release-Specific Documents

The following documents are specific to Release 12.0 T. They are located on CCO and the Documentation CD-ROM:

- *Release Notes for Cisco IOS Release 12.0 T:*

To access the cross-platform *Release Notes for Cisco IOS Release 12.0 T* on CCO, follow this path:

Service and Support: Technical Documentation: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.0: Release Notes: Cross-Platform Release Notes

To access the cross-platform *Release Notes for Cisco IOS Release 12.0* on the Documentation CD-ROM, follow this path:

Cisco IOS Software Configuration: Cisco IOS Release 12.0: Release Notes: Cross-Platform Release Notes

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

To access these documents, refer to the Software Center at this path on CCO:

Service and Support: Technical Documentation

- Caveat documents:

As a supplement to the caveats listed in the “Caveats” section in these release notes, see the *Caveats for Cisco IOS Release 12.0 T* document, which contains caveats applicable to all platforms for all maintenance releases of Release 12.0 T.

To access the caveat document on CCO, follow this path:

Service and Support: Technical Documentation: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.0: Caveats: Caveats for Cisco IOS Release 12.0 T

To access the caveat document on the Documentation CD-ROM, follow this path:

Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS 12.0: Caveats: Caveats for Cisco IOS Release 12.0 T

Note If you have an account with CCO, you can use Bug Navigator II to find caveats of any severity for any release. Bug Navigator II can be found at <http://www.cisco.com/support/bugtools>, or from CCO, select **Software & Support: Tools: Bug Toolkit II**.

Platform-Specific Documents

The documents listed in Table 3 are available for the Cisco 6400 UAC. These documents are also available online at Cisco Connection Online (CCO) and on the Documentation CD-ROM.

To access Cisco 6400 documentation on CCO, follow this path:

Service and Support: Technical Documents: Documentation Home Page: DSL Products: Cisco 6400

To access Cisco 6400 documentation on the Documentation CD-ROM, follow this path:

DSL Products: Cisco 6400

Table 3 Platform Documents for the Cisco 6400 Universal Access Concentrator

Document Title	Chapter Topics
<i>Cisco 6400 UAC Hardware Installation Guide</i>	<ul style="list-style-type: none"> About This Manual Hardware Description Preparing for Installation Installing the Cisco 6400 Troubleshooting Maintaining the Cisco 6400 System Specifications Glossary Configuration Worksheets Installing the AC-Input Power Shelf and Power Supply
<i>Cisco 6400 UAC Site Planning Guide</i>	<ul style="list-style-type: none"> About This Guide Cisco 6400 Overview Site Planning Considerations System Specifications Cabling Specifications Glossary
<i>Regulatory Compliance and Safety Information for the Cisco 6400</i>	<ul style="list-style-type: none"> Overview of the Cisco 6400 Universal Access Concentrator General Documentation Information Agency Approvals Translated Safety Warnings Cisco Connection Online
<i>Cisco 6400 UAC Software Configuration Guide and Command Reference</i>	<ul style="list-style-type: none"> About This Guide Product Overview and Configuration Cisco IOS Software Fundamentals Using the Web Console Configuring the NSP Configuring System Features Configuring the NRP Configuring Interfaces Command Reference MIB Information Resolving Error Messages Glossary
<i>Cisco 6400 FRU Installation and Replacement</i>	<ul style="list-style-type: none"> Tools and Equipment Required General Safety Precautions and Maintenance Guidelines Replacing the Front Cover Powering Down the System Backing Up the PCMCIA Card Maintaining the Air Filter Replacing an NSP Module Replacing an NRP Module Installing or Replacing a Half-Height NLC Replacing a PEM Replacing the Blower Module and Fans Verifying Plug-In Module and Component Installation

Feature Modules

Feature modules describe new features supported by Release 12.0 DB. Feature modules are available online only. In the next printing of the Cisco IOS documentation set, feature modules will be included as updates to the Cisco IOS Documentation set. Each feature module consists of a brief overview of the feature, benefits, configuration tasks, and a command reference.

- To reach the feature modules on the CCO home page, click on this path:
Service & Support: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.0: New Feature Documentation: New Features in 12.0-Based Limited Lifetime Releases
- To reach the feature modules on the Documentation CD-ROM, click on this path:
Cisco Product Documentation: Cisco IOS Software Configuration: Cisco IOS Release 12.0: New Feature Documentation: New Features in 12.0-Based Limited Lifetime Releases

Cisco IOS Software Document Set

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

Documentation Modules and Indexes

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

On CCO and the Documentation CD-ROM, two master hot-linked indexes provide indexing information for the Cisco IOS software documentation set: an index for the configuration guides and an index for the command references. In addition, individual books contain a book-specific index.

To access these indexes on CCO, follow this path:

Service and Support: Technical Documentation: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.0: Cisco IOS Release 12.0 Configuration Guides and Command References: Configuration Guide Master Index or Command Reference Master Index

To access these indexes on the Documentation CD-ROM, follow this path:

Cisco IOS Software Configuration: Cisco IOS Release 12.0: Cisco IOS Release 12.0 Configuration Guides and Command References: Configuration Guide Master Index or Command Reference Master Index

To access documentation related to an index entry, click on the page number following the entry.

Release 12.0 Documentation Set

Table 4 details the contents of the Cisco IOS Release 12.0 software documentation set. The document set is available in electronic form, and also in printed form upon request.

Note The most current Cisco IOS documentation can be found on the latest Documentation CD-ROM and on the Web. These electronic documents might contain updates and modifications made after the paper documents were printed.

To access the Cisco IOS documentation set on CCO, follow this path:

Service and Support: Technical Documentation: Documentation Home Page: Cisco IOS Software Configuration: Cisco IOS Release 12.0

To access the Cisco IOS documentation set on the Documentation CD-ROM, follow this path:

Cisco IOS Software Configuration: Cisco IOS Release 12.0

Table 4 Cisco IOS Software Documentation Set

Books	Chapter Topics
<ul style="list-style-type: none"> • <i>Configuration Fundamentals Configuration Guide</i> • <i>Configuration Fundamentals Command Reference</i> 	Configuration Fundamentals Overview Cisco IOS User Interfaces File Management Interface Configuration System Management
<ul style="list-style-type: none"> • <i>Network Protocols Configuration Guide, Part 1</i> • <i>Network Protocols Command Reference, Part 1</i> 	IP Addressing IP Services IP Routing Protocols
<ul style="list-style-type: none"> • <i>Network Protocols Configuration Guide, Part 2</i> • <i>Network Protocols Command Reference, Part 2</i> 	AppleTalk Novell IPX
<ul style="list-style-type: none"> • <i>Network Protocols Configuration Guide, Part 3</i> • <i>Network Protocols Command Reference, Part 3</i> 	Apollo Domain Banyan VINES DECnet ISO CLNS XNS
<ul style="list-style-type: none"> • <i>Wide-Area Networking Configuration Guide</i> • <i>Wide-Area Networking Command Reference</i> 	ATM Frame Relay SMDS X.25 and LAPB
<ul style="list-style-type: none"> • <i>Security Configuration Guide</i> • <i>Security Command Reference</i> 	AAA Security Services Security Server Protocols Traffic Filtering Network Data Encryption Passwords and Privileges Neighbor Router Authentication IP Security Options
<ul style="list-style-type: none"> • <i>Dial Solutions Configuration Guide</i> • <i>Dial Solutions Command Reference</i> 	Dial Business Solutions and Examples Dial-In Port Setup DDR and Dial Backup Remote Node and Terminal Service Cost-Control and Large-Scale Dial Solutions VPDN
<ul style="list-style-type: none"> • <i>Cisco IOS Switching Services Configuration Guide</i> • <i>Cisco IOS Switching Services Command Reference</i> 	Switching Paths for IP Networks Virtual LAN (VLAN) Switching and Routing

Table 4 Cisco IOS Software Documentation Set (continued)

Books	Chapter Topics
<ul style="list-style-type: none"> • <i>Bridging and IBM Networking Configuration Guide</i> • <i>Bridging and IBM Networking Command Reference</i> 	<ul style="list-style-type: none"> Transparent Bridging Source-Route Bridging Remote Source-Route Bridging DLSw+ STUN and BSTUN LLC2 and SDLC IBM Network Media Translation DSPU and SNA Service Point SNA Frame Relay Access Support APPN NCIA Client/Server Topologies IBM Channel Attach
<ul style="list-style-type: none"> • <i>Cisco IOS Software Command Summary</i> • <i>Dial Solutions Quick Configuration Guide</i> • <i>System Error Messages</i> • <i>Debug Command Reference</i> 	

Service and Support

For service and support for a product purchased from a reseller, contact the reseller, who offers a wide variety of Cisco service and support programs described in “Service and Support” of *Cisco Information Packet* shipped with your product.

Note If you purchased your product from a reseller, you can access CCO as a guest. CCO is Cisco Systems’ primary real-time support channel. Your reseller offers programs that include direct access to CCO services.

For service and support for a product purchased directly from Cisco, use CCO.

Software 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 tips on configuring your Cisco products:

http://www.cisco.com/kobayashi/serv_tips.shtml

This URL is subject to change without notice. If it changes, point your Web browser to CCO and click on this path: **Products & Technologies: Products: Technical Tips.**

The following sections are provided from the Technical Tips page:

- Access Dial Cookbook—Contains common configurations or recipes for configuring various access routes and dial technologies.
- Field Notices—Notifies you of any critical issues regarding Cisco products and includes problem descriptions, safety or security issues, and hardware defects.
- Frequently Asked Questions—Describes the most frequently asked technical questions about Cisco hardware and software.

- **Hardware**—Provides technical tips related to specific hardware platforms.
- **Hot Tips**—Describes popular tips and hints gathered from the Cisco Technical Assistance Center (TAC). Most of these documents are available from the TAC Fax-on-demand service. To reach Fax-on-demand and receive documents at your fax machine from the United States, call 888-50-CISCO (888-502-4726). From other areas, call 650-596-4408.
- **Internetworking Features**—Lists tips on using and deploying Cisco IOS software features and services.
- **Sample Configurations**—Provides actual configuration examples that are complete with topology and annotations.
- **Software Products**—Contains Cisco IOS Software Bulletins, Cisco TCP/IP Suite 100, General Cisco IOS, Internet/Intranet Applications and Software, Network Management, Network Protection Software Tips, and WAN Switching Products and Software.
- **Special Collections**—Lists other helpful documents, including Case Studies, References & Request for Comments (RFCs), and Security Advisories.

Cisco Connection Online

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

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

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

You can reach CCO in the following ways:

- **WWW:** <http://www.cisco.com>
- **WWW:** <http://www-europe.cisco.com>
- **WWW:** <http://www-china.cisco.com>
- **Telnet:** cco.cisco.com
- **Modem:** From North America, 408 526-8070; from Europe, 33 1 64 46 40 82. Use the following terminal settings: VT100 emulation; databits: 8; parity: none; stop bits: 1; and connection rates up to 28.8 kbps.

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

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

Documentation CD-ROM

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