



Preface

This document is the *Cisco uBR924 Cable Access Router Software Configuration Guide* and describes the configuration of the Cisco uBR924 cable access router. This section describes the following topics:

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Audience

This configuration guide is designed for system administrators who have some experience downloading software from the World Wide Web and configuring cable modem/router systems. This guide is also directed to the network administrators who are responsible for administering the customer's local area network.

All users should have some experience with configuring Cisco routers and using the Cisco IOS command-line interface (CLI). A basic familiarity with DOCSIS 1.0, DOCSIS 1.0+ quality of service (QoS) principles, H.323, and SGCP/MGCP is helpful.

Cable system installers and technicians should be familiar with their cable plant's base operating parameters and subscriber service offerings. Cable system support engineers and administrators should be acquainted with cable data networks and WAN communications protocols. Network administrators should be familiar with the principles of IP routing and subnetting; some of the advanced configurations also require a thorough understanding of access lists and how to use them.



Note

This document contains instructions to install or configure the Cisco uBR924 cable access router using procedures that only qualified personnel should perform. This document is not intended for subscribers. Refer to the [“Subscriber Publications”](#) section of this preface for a list of documents available for subscribers.

Purpose

This configuration guide explains the initial and basic software configuration procedures for the Cisco uBR924 cable access router. This guide contains procedures for configuring the Cisco uBR924 router for both data only operation, as well as for voice and data operation. This guide also describes how to set up basic security, the headend interface (CMTS-to-CM), and how to use ROM monitor.

Organization

This guide is organized into the chapters and appendixes shown in [Table 1](#), which also shows the changes from the previous version of this guide:

Table 1 Organization

Chapter	Title	Description	Changes from the Previous Release
Chapter 1	Overview	Provides an overview of the Cisco uBR924 cable access router and its possible configurations.	Includes features added in Cisco IOS Release 12.1(5)T.
Chapter 2	DOCSIS-Bridging Configuration	Describes how to configure the router for its default of DOCSIS-compliant bridging operation.	None.
Chapter 3	Advanced Data-Only Configurations	Describes how to configure the router for various data-only configurations such as routing operation and IPSec encryption.	None.
Chapter 4	Voice over IP Configurations	Describes how to configure the router for Voice over IP (VoIP) traffic using either the H.323v2 or SGCP/MGCP call control protocols.	None.
Appendix A	Using Cisco IOS Software	Describes the basics of using the Cisco IOS command line interface (CLI).	None.
Appendix B	Using the Cable Monitor Tool	Describes how to display diagnostic information about the Cisco uBR924 cable access router using any web browser.	None.
Appendix C	Using the ROM Monitor	Describes how to use the Cisco IOS ROM monitor.	Minor changes on entering ROMMON mode and returning to normal mode.
Appendix D	New and Changed Commands Reference	Lists the commands that are new to the Cisco IOS 12.1 T software releases.	Includes commands added in Cisco IOS Release 12.1(5)T.


Note

For a complete list of changes in each Cisco IOS release, see the Release Notes that accompany that release.

Document Conventions

This publication uses the following conventions:

Convention	Meaning	Comments
Boldface	Commands and keywords you enter literally as shown	offset-list
<i>Italics</i>	Variables for which you supply values	command <i>type interface</i> You replace the variable with the type of interface. In contexts that do not allow italics, such as online help, arguments are enclosed in angle brackets (< >).
Square brackets ([])	Optional elements	command [abc] abc is optional (not required), but you can choose it.
Vertical bars ()	Separated alternative elements	command [abc def] You can choose either abc or def, or neither, but not both.
Braces ({ })	Required choices	command { abc def } You must use either abc or def, but not both.
Braces and vertical bars within square brackets ([{ }])	A required choice within an optional element	command [abc { def ghi }] You have three options: <ul style="list-style-type: none"> • Nothing • abc def • abc ghi
Caret character (^)	Control key	The key combinations ^D and Ctrl-D are equivalent: Both mean hold down the Control key while you press the D key. Keys are indicated in capital letters, but are not case sensitive.
A string	A non-quoted set of characters	For example, when setting an SNMP community string to <i>public</i> , do not use quotation marks around the string; otherwise, the string will include the quotation marks.
System prompts	Denotes interactive sessions, indicates that the user enters commands at the prompt	The system prompt indicates the current command mode. For example, the prompt <code>Router (config) #</code> indicates global configuration mode.
Screen font	Terminal sessions and information the system displays	
Angle brackets (< >)	Non-printing characters such as passwords	
Exclamation points (!) at the beginning of a line	A comment line	Comments are sometimes displayed by the Cisco IOS software.

**Caution**

Means *reader be careful*. You are capable of doing something that might result in equipment damage or loss of data.

**Note**

Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this guide.

**Timesaver**

Means *the described action saves time*. You can save time by performing the action described in the paragraph.

**Warning**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. (To see translations of the warnings that appear in this publication, refer to the appendix, “Translated Safety Warnings,” in the installation guide that accompanied this device.)

Waarschuwing

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen. (Voor vertalingen van de waarschuwingen die in deze publicatie verschijnen, kunt u het aanhangsel “Translated Safety Warnings” (Vertalingen van veiligheidsvoorschriften) in de installatiegids die bij dit toestel is ingesloten, raadplegen.

Varoitus

Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista. (Tässä julkaisussa esiintyvien varoitusten käännökset löydät tämän laitteen mukana olevan asennusoppaan liitteestä “Translated Safety Warnings” (käännetyt turvallisuutta koskevat varoitukset).)

Attention

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures. Avant d'accéder à cet équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures courantes de prévention des accidents. Pour obtenir les traductions des mises en garde figurant dans cette publication, veuillez consulter l'annexe intitulée « Translated Safety Warnings » (Traduction des avis de sécurité) dans le guide d'installation qui accompagne cet appareil.

Warnung

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körpervletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewußt. (Übersetzungen der in dieser Veröffentlichung enthaltenen Warnhinweise finden Sie im Anhang mit dem Titel “Translated Safety Warnings” (Übersetzung der Warnhinweise) in der diesem Gerät beiliegenden Installationsanleitung.)

Avvertenza	Questo simbolo di avvertenza indica un pericolo. Si è in una situazione che può causare infortuni. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi ai circuiti elettrici ed essere al corrente delle pratiche standard per la prevenzione di incidenti. La traduzione delle avvertenze riportate in questa pubblicazione si trova nell'appendice, "Translated Safety Warnings" (Traduzione delle avvertenze di sicurezza), del manuale d'installazione che accompagna questo dispositivo.
Advarsel	Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du være oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker. (Hvis du vil se oversettelser av de advarslene som finnes i denne publikasjonen, kan du se i vedlegget "Translated Safety Warnings" [Oversatte sikkerhetsadvarsler] i installasjonsveiledningen som ble levert med denne enheten.)
Aviso	Este símbolo de aviso indica perigo. Encontra-se numa situação que lhe poderá causar danos físicos. Antes de começar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possíveis acidentes. (Para ver as traduções dos avisos que constam desta publicação, consulte o apêndice "Translated Safety Warnings" - "Traduções dos Avisos de Segurança", no guia de instalação que acompanha este dispositivo).
Advertencia	Este símbolo de aviso significa peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos estándar de prevención de accidentes. (Para ver traducciones de las advertencias que aparecen en esta publicación, consultar el apéndice titulado "Translated Safety Warnings," en la guía de instalación que se acompaña con este dispositivo.)
Varning!	Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador. (Se förklaringar av de varningar som förekommer i denna publikation i appendix "Translated Safety Warnings" [Översatta säkerhetsvarningar] i den installationshandbok som medföljer denna anordning.)

Acronyms and Terms

To fully understand the content of this guide, you should be familiar with the acronyms and terms listed in this section. These terms are specific to the operation of a data cable network; more general networking acronyms and terms can be found in *Internetworking Terms and Acronyms*, available on CCO and the Documentation CD-ROM.

- 3DES—Triple Data Encryption Standard.
- ASIC—Application Specific Integrated Circuit.
- BPI—Baseline Privacy Interface.
- BPI+ —Extension to the initial BPI standard with improved authentication and encryption.
- CM—Cable modem.
- CMTS—Cable Modem Termination System (headend).
- CoS—Class of service.
- CPE—Customer Premises Equipment.

- DES—Data Encryption Standard.
- DOCSIS 1.0—Data Over Cable Service Interface Specification.
- DOCSIS 1.0+—Extension of the DOCSIS 1.0 standard with features that support quality of service (QoS) options to offer better than best effort, low latency, and low jitter services.
- Downstream—Transmission of traffic from the CMTS (headend) to the CM (cable modem).
- IPSec—IP network security.
- Kbps—Kilobits per second.
- MAC—Media Access Control.
- Mbps—Megabits per second.
- MODEM—modulator/demodulator.
- MSO—Multiple Systems Operator.
- NIU/STB—Network Interface Unit/Set-Top Box.
- PPS—Packets per second.
- QAM—Quadrature Amplitude Modulation.
- QoS—Quality of service.
- QPSK—Quadrature Phase Shift Keying.
- RF—Radio frequency.
- SID—Service Identifier (DOCSIS MAC-level service flow identifier)
- SM—Subscriber Modem or Spectrum Manager.
- uBR—Universal broadband router.
- Upstream—Transmission of traffic from CM (cable modem) to the CMTS (headend).
- VoIP—Voice over IP.

Related Documentation

Refer to the following Cisco documents for related information. The documents can be found online at Cisco Connection Online (CCO) or on the Documentation CD-ROM. You can also order printed copies of most current documents.

**Note**

The list that follows is not all-inclusive. New documents and revisions occur frequently.

Cisco uBR924 Cable Access Router

- *Cisco uBR924 Cable Access Router Software Configuration Guide* (this manual)
- *Cisco Cable CPE Error Messages*
- *Cisco uBR924 Cable Access Router Hardware Installation Guide*
- *Cisco uBR924 Cable Access Router Quick Start Guide*
- *DOCSIS CPE Configurator Help*

- Release Notes for each release of Cisco IOS software for the Cisco uBR924 cable access router

**Note**

The *Cisco uBR924 Cable Access Router Installation and Configuration Guide* is still available on CCO but has been superseded by the hardware and software guides listed above.

CMTS Hardware Installation Publications

- *Cisco uBR7200 Series Universal Broadband Router Hardware Installation Guide*
- *Cisco uBR7200 Series Universal Broadband Router Software Configuration Guide*
- *Cisco uBR7200 Series Universal Broadband Router Cable Modem Card Installation and Configuration*
- *Cisco uBR7200 Series Universal Broadband Router Port Adapter Installation and Configuration*
- *Cisco uBR7200 Series Universal Broadband Router 550-Watt DC-Input Power Supply Replacement Instructions*
- *Cisco uBR7200 Series Universal Broadband Router Subchassis and Midplane Replacement Instructions*
- *Cisco uBR7200 Series Rack-Mount and Cable-Management Kit Installation Instructions*
- *Cisco uBR7200 Series Universal Broadband Router Fan Tray Replacement Instructions*
- *Cisco uBR7200 Series Universal Broadband Router Feature Enhancements*

Cisco IOS Publications

- *Cisco IOS Release 12.1 New Feature Documentation* for feature module descriptions on Cisco IOS Release 12.1-based releases
- *Cisco IOS Release 12.1 Configuration Guides and Command References* for task and command descriptions on Cisco IOS Release 12.1-based releases

**Note**

Use the *Cisco IOS Command Reference Master Index(es)* to obtain document pointers for specific software release feature sets and commands.

Configuration Editor and Network Management Publications

- *Cisco Cable Configuration Guide* for information on the Cisco Network Registrar (CNR) product
- *CiscoView: Internetworking Device Monitoring and Management*
- *CiscoView Incremental Installation Quick Reference Guide*
- CiscoWorks documentation for networks that use the Simple Network Management Protocol (SNMP) to monitor Cisco uBR924 router

Subscriber Publications

- *Quick Start, Cisco uBR924 Cable Access Router Subscriber Setup*

**Note**

Service provider and subscriber publications for other models of Cisco uBR900 Series cable access routers are also available on CCO.

Obtaining Documentation

World Wide Web

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

Documentation CD-ROM

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

Ordering Documentation

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

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

Obtaining Technical Assistance

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

Cisco Connection Online

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

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

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

You can access CCO in the following ways:

- WWW: www.cisco.com
- 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
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>.

Documentation Feedback

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

You can e-mail your comments to bug-doc@cisco.com.

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

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

We appreciate and value your comments.