CISCO SYSTEMS

Cisco 831 Router and SOHO 91 Router Hardware Installation Guide

CONTENTS

Preface

This preface describes the audience, organization, and conventions used in this guide. It also describes related documentation and how to access electronic documentation.

Audience

This guide is intended for service technicians who have no experience installing routers and whose goal is to connect the router to the network as quickly as possible.

Organization

This guide contains the following information:

- Chapter 1, "Product Overview"—Describes the routers and their features.

- Chapter 2, "Installation"—Provides information on preinstallation procedures, mounting and connecting of the routers, and verifying the router connections.

- Chapter 3, "Troubleshooting"—Describes problems that might develop and how to identify and solve them.

- Appendix A, "Specifications and Cables"—Provides port connector pinouts and specifications for cables that you might need to provide.

Conventions

This section describes the conventions used in this guide.

Note Means *reader take note*. Notes contain helpful suggestions or references to additional information and material.

Caution This symbol means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

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 the standard practices for preventing accidents.**

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.**

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.**

Attention **Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents.**

Warnung   **Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung 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.**

Avvertenza   **Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. 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.**

Advarsel   **Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du vare oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker.**

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.**

¡Atención!   **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.**

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.**

Related Documentation

In addition to this *Cisco 831 Router and SOHO 91 Router Hardware Installation Guide*, the Cisco 831 documentation set includes the following:

- *Cisco 831 Router and SOHO 91 Router Cabling and Setup Quick Start Guide*
- *Cisco 800 Series Software Configuration Guide*
- *Regulatory Compliance and Safety Information for Cisco 800 Series and SOHO Series Routers*
- The latest version of the *Cisco IOS Release Notes*

You might also need to refer to the following documents:

- *Cisco IOS Release 12.0 Quality of Service Solutions Configuration Guide*
- *Cisco IOS Security Configuration Guide, Release 12.0*
- *Upgrading Memory in Cisco 800 Routers*

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation at this URL:

http://www.cisco.com/univercd/home/home.htm

You can access the Cisco website at this URL:

http://www.cisco.com

You can access international Cisco websites at this URL:

http://www.cisco.com/public/countries_languages.shtml

Documentation DVD

Cisco documentation and additional literature are available in a Documentation DVD package, which may have shipped with your product. The Documentation DVD is updated regularly and may be more current than printed documentation. The Documentation DVD package is available as a single unit.

Registered Cisco.com users (Cisco direct customers) can order a Cisco Documentation DVD (product number DOC-DOCDVD=) from the Ordering tool or Cisco Marketplace.

Cisco Ordering tool:

http://www.cisco.com/en/US/partner/ordering/

Cisco Marketplace:

http://www.cisco.com/go/marketplace/

Ordering Documentation

You can find instructions for ordering documentation at this URL:

http://www.cisco.com/univercd/cc/td/doc/es_inpck/pdi.htm

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Ordering tool:

  http://www.cisco.com/en/US/partner/ordering/

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 1 800 553-NETS (6387).

Documentation Feedback

You can send comments about technical documentation to bug-doc@cisco.com.

You can submit comments by using the response card (if present) behind the front cover of your document or by writing to the following address:

Cisco Systems
Attn: Customer Document Ordering
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Cisco Product Security Overview

Cisco provides a free online Security Vulnerability Policy portal at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

From this site, you can perform these tasks:

- Report security vulnerabilities in Cisco products.
- Obtain assistance with security incidents that involve Cisco products.
- Register to receive security information from Cisco.

A current list of security advisories and notices for Cisco products is available at this URL:

http://www.cisco.com/go/psirt

If you prefer to see advisories and notices as they are updated in real time, you can access a Product Security Incident Response Team Really Simple Syndication (PSIRT RSS) feed from this URL:

http://www.cisco.com/en/US/products/products_psirt_rss_feed.html

Reporting Security Problems in Cisco Products

Cisco is committed to delivering secure products. We test our products internally before we release them, and we strive to correct all vulnerabilities quickly. If you think that you might have identified a vulnerability in a Cisco product, contact PSIRT:

- Emergencies — security-alert@cisco.com

- Nonemergencies — psirt@cisco.com

Tip We encourage you to use Pretty Good Privacy (PGP) or a compatible product to encrypt any sensitive information that you send to Cisco. PSIRT can work from encrypted information that is compatible with PGP versions 2.*x* through 8.*x*.

Never use a revoked or an expired encryption key. The correct public key to use in your correspondence with PSIRT is the one that has the most recent creation date in this public key server list:

http://pgp.mit.edu:11371/pks/lookup?search=psirt%40cisco.com&op=index&exact=on

In an emergency, you can also reach PSIRT by telephone:

- 1 877 228-7302
- 1 408 525-6532

Obtaining Technical Assistance

For all customers, partners, resellers, and distributors who hold valid Cisco service contracts, Cisco Technical Support provides 24-hour-a-day, award-winning technical assistance. The Cisco Technical Support Website on Cisco.com features extensive online support resources. In addition, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not hold a valid Cisco service contract, contact your reseller.

Cisco Technical Support Website

The Cisco Technical Support Website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day, 365 days a year, at this URL:

http://www.cisco.com/techsupport

Access to all tools on the Cisco Technical Support Website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

http://tools.cisco.com/RPF/register/register.do

Note Use the Cisco Product Identification (CPI) tool to locate your product serial number before submitting a web or phone request for service. You can access the CPI tool from the Cisco Technical Support Website by clicking the **Tools & Resources** link under Documentation & Tools. Choose **Cisco Product Identification Tool** from the Alphabetical Index drop-down list, or click the **Cisco Product Identification Tool** link under Alerts & RMAs. The CPI tool offers three search options: by product ID or model name; by tree view; or for certain products, by copying and pasting **show** command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco TAC engineer. The TAC Service Request Tool is located at this URL:

http://www.cisco.com/techsupport/servicerequest

For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco TAC engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)
EMEA: +32 2 704 55 55
USA: 1 800 553-2447

For a complete list of Cisco TAC contacts, go to this URL:

http://www.cisco.com/techsupport/contacts

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—Your network is "down," or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- Cisco Marketplace provides a variety of Cisco books, reference guides, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:

  http://www.cisco.com/go/marketplace/

- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:

  http://www.ciscopress.com

- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:

  http://www.cisco.com/packet

- *iQ Magazine* is the quarterly publication from Cisco Systems designed to help growing companies learn how they can use technology to increase revenue, streamline their business, and expand services. The publication identifies the challenges facing these companies and the technologies to help solve them, using real-world case studies and business strategies to help readers make sound technology investment decisions. You can access iQ Magazine at this URL:

  http://www.cisco.com/go/iqmagazine

- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:

  http://www.cisco.com/ipj

- World-class networking training is available from Cisco. You can view current offerings at this URL:

  http://www.cisco.com/en/US/learning/index.html

Product Overview

The Cisco 831 router and Cisco SOHO 91 Ethernet-to-Ethernet routers can connect a corporate telecommuter or small office to an Internet service provider (ISP) over a broadband or Ethernet connection to the following sites:

- Corporate LANs

- The Internet

The Cisco 831 and SOHO 91 routers are switch-capable routers that provide a 4-port Ethernet switch for the LAN. The routers are capable of bridging and multiprotocol routing between LAN and WAN ports.

Cisco 831 and SOHO 91 routers support high-speed encryption, 10/100-Mbps switching, and dial backup functionality via the auxiliary console port. The autosensing function in the routers eliminates the need for a crossover cable and allows the routers to detect the medium dependent interface in normal mode (MDI) or medium dependent interface in crossover mode (MDIX) in any other PC/hub with a straight-through cable or crossover cable.

The dial backup function allows the user to connect an analog modem to the console port as a backup link to the WAN in case the ADSL service goes down. These features give the Cisco 831 and SOHO 91 routers a high level of performance and security.

The Cisco 831 router is designed with hardware-based encryption, while the Cisco SOHO 91 supports software-based encryption. The Cisco 831 router supports the ability to add Flash memory or SDRAM, either as a factory upgrade or a field-installed option. The SOHO 91 router has a fixed memory configuration.

Features

Table 1-1 summarizes the features of these routers.

Table 1-1   Feature Summary for Cisco 831 Router and SOHO 91 Router

Feature	Description
10BASE-T/100BASE-T built-in switch ports	Provides connection to 10/100BASE-T (10/100-Mbps) Ethernet networks. Compatible with 10/100-Mbps devices.
WAN port	Provides connection to 10BASE-T. Compatible with 10-Mbps devices. Can be connected to other network devices, such as cable modem, ADSL, and router.
Flash memory	8 MB of Flash memory; up to 16 MB of expandable Flash memory on the Flash module.
Synchronous dynamic RAM (SDRAM)	32 MB of SDRAM on board.
Ease of installation	Color-coded ports and cables reduce the chance of installation error.
Cisco IOS software	Supports Cisco IOS software.
Cisco Router Web Setup application	Provides a web-based software tool for basic configurations and selected applications.
Console port	Provides a connection to the terminal or PC for software configuration or troubleshooting using the command-line interface.
Wall-mount feature	Brackets on router bottom provide a means for mounting the router on a wall or vertical surface.
IPSec Hardware Accelerator	Only the Cisco 831 router supports this feature. The Hifn 7902 security processor implements symmetric key encryption, public key encryption, authentication and data compression in hardware. Algorithms implemented by the processor include Data Encryption Standard (DES) and Triple DES (3DES); Secure Hash Algorithm (SHA-1), Message Digest 5 (MD5), Hash-based Message Authentication Code (HMAC); and Lempel-Zif-Stac (LZS) compression; and Microsoft Point-to-Point Compression (MPPC).

Table 1-2 describes the ports on the Cisco 831 and SOHO 91 routers.

Table 1-2   Cisco 831 and SOHO 91 Router Ports

Router	Built-In Switch	WAN Ethernet Port	Console Port
Cisco 831	Four 10/100 BASE-T RJ-45	One 10BASE-T RJ-45	RJ-45
SOHO 91	Four 10/100 BASE-T RJ-45	One 10BASE-T RJ-45	RJ-45

Router Overview

This section shows the front and back panels of the routers.

Front Panel

Figure 1-1 shows the front panel of the Cisco 831 router (Figure 1-1 depicts the front panel of a Cisco 831 router, but the front panel of the Cisco SOHO 91 router is the same).

Figure 1-1   Front Panel of Cisco 831 Router
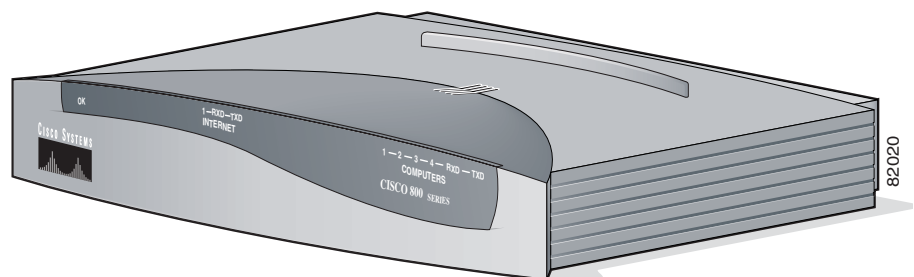
Back Panel

Figure 1-2 shows the back panel of the Cisco 831 router (Figure 1-2 depicts the back panel of a Cisco 831 router, but the back panel of the Cisco SOHO 91 router is nearly identical).

Figure 1-2   Cisco 831 Back Panel
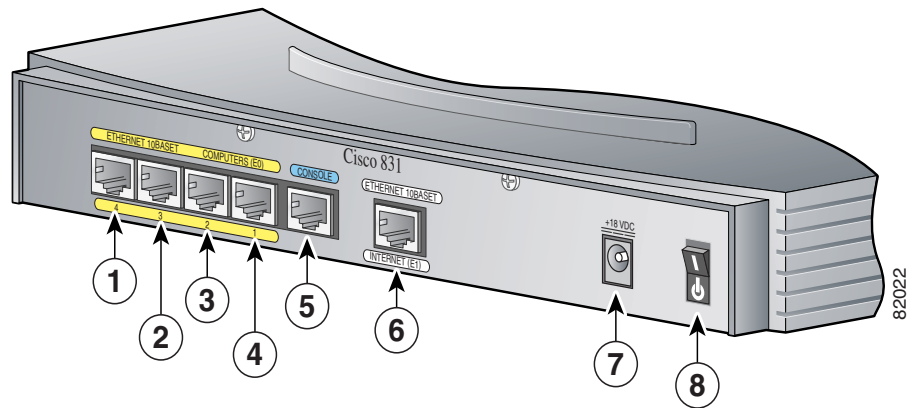
1	Ethernet port 4 of the built-in switch connects to Ethernet network devices	5	Console port connects to PC or terminal
2	Ethernet port 3 of the built-in switch connects to Ethernet network devices	6	WAN port connects to Internet or switch
3	Ethernet port 2 of the built-in switch connects to Ethernet network devices	7	Input jack connects to power supply
4	Ethernet port 1 of the built-in switch connects to Ethernet network devices	8	Power on/off button

LED Functions

Table 1-3 summarizes the functions of the LEDs on the routers.

Table 1-3   Functions of LEDs on the Cisco 831 Router and SOHO 91 Router

LED	Color	Function
PWR_OK	Green	On when DC power is being supplied to the router. The light blinks if an error occurs during boot-up.
WAN_LED_OK	Green	On when WAN Ethernet carrier detects status and connects to the digital subscriber line access multiplexer (DSLAM) successfully.
WAN_LED_RxD	Green	Blinks when WAN Ethernet receives data.
WAN_LED_TxD	Green	Blinks when WAN Ethernet transmits data. Off when no data is being uploaded.
E1 (port 1 of built-in switch) Status	Green	On when Ethernet 1 connects to the Ethernet interface successfully. Blinks when Ethernet 1 receives or sends data, or when data passes through Ethernet 1.
E2 (port 1 of built-in switch) Status	Green	On when Ethernet 2 connects to the Ethernet interface successfully. Blinks when Ethernet 2 receives or sends data, or when data passes through Ethernet 2.
E3 (port 1 of built-in switch) Status	Green	On when Ethernet 3 connects to the Ethernet interface successfully. Blinks when Ethernet 3 receives or sends data, or when data passes through Ethernet 3.
E4 (port 1 of built-in switch) Status	Green	On when Ethernet 4 connects to the Ethernet interface successfully. Blinks when Ethernet 4 receives or sends data, or when data passes through Ethernet 4.
LAN_RxD	Green	Blinks when built-in Ethernet switch receives data from the WAN port.
LAN_TxD	Green	Blinks when built-in Ethernet switch transmits data to the WAN port.

Installation

This chapter provides information on the following topics:

- Preparing for Installation
- Preventing Damage to the Router
- Installing the Router
- Verifying Router Operation
- Mounting the Router
- Connecting to a Website
- What to Do If You Cannot Connect to a Website

Preparing for Installation

This section provides information on safety, mounting of the router, and unpacking the router box.

Safety

This section provides the safety warnings and information about electrostatic and router damage that are applicable to the Cisco 831 and SOHO 91 routers.

Warnings

Before installing the router, read the following warnings:

Warning **Read the installation instructions before you connect the system to its power source.**

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.**

Warning **No operator serviceable parts inside. Refer servicing to qualified personnel.**

Warning **Before working on a chassis or working near power supplies, unplug the power cord on AC units; disconnect the power at the circuit breaker on DC units.**

Warning **This equipment is intended to be grounded. Ensure that the host is connected to earth ground during normal use.**

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15A U.S. (240 VAC, 10A international) is used on the phase conductors (all current-carrying conductors).**

Warning **Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.**

Warning   **The ports labeled "10BaseT", 100BaseTX", and "10/100" are safety extra-low voltage (SELV) circuits. SELV circuits should only be connected to other SELV circuits. Avoid connecting these circuits to telephone network voltage (TNV) circuits.**

Warning   **To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables.**

Warning   **Do not work on the system or connect or disconnect cables during periods of lightning activity.**

Warning   **This equipment is not designed for making emergency telephony calls when the power fails. Alternative arrangements should be made for access to emergency services. Access to emergency services can be affected by any call-barring function of this equipment.**

Warning   **If the symbol of suitability with an overlaid cross (⊘) appears above a port, you must not connect the port to a public network that follows the European Union standards. Connecting the port to this type of public network can cause severe injury or damage your router.**

Warning   **Before working on a system that has a standby/off switch, turn off the power by pressing the power switch to standby and unplug the power cord.**

Warning   **Ultimate disposal of this product should be handled according to all national laws and regulations.**

Warning **To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord.**

Warning **This equipment contains a ring signal generator (ringer), which is a source of hazardous voltage. Do not touch the RJ-11 (phone) port wires (conductors), the conductors of a cable connected to the RJ-11 port, or the associated circuit-board when the ringer is active. The ringer is activated by an incoming call.**

Warning **During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.**

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) is a transfer of electrostatic charge between bodies of different electrostatic potentials, such as an operator and a piece of electrical equipment. It occurs when electronic components are improperly handled, and it can damage equipment and impair electrical circuitry. Electrostatic discharge is more likely to occur in the presence of synthetic fibers and dry atmosphere.

Always use the following ESD-prevention procedures when removing and replacing components:

Step 1 Wear an ESD-preventive wrist strap that you provide, ensuring that it makes good skin contact.

Caution To properly guard against ESD damage and shocks, the wrist strap and cord must operate effectively. Always follow the guidelines in the preceding section, "Warnings."

Step 2 Do not touch any exposed contact pins or connector shells of interface ports that do not have a cable attached.

If cables are connected at one end only, do not touch the exposed pins at the unconnected end of the cable. This device is intended for use in residential and commercial environments only.

⚠️

Caution   Periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms (Mohms).

Unpacking the Box

Table 2-1 lists the items that come with your router. All these items are in the accessory kit that is inside the box that your router came in. If any of the items is missing or damaged, contact your customer service representative.

Table 2-1   Router Box Contents

• Power cord (black)
• Desktop power supply
• Console cable, RJ-45-to-DB-9 (light blue)
• Async modem cable for dial backup and remote management, RJ-45-to-DB-25 (light blue) (ORDERED SEPARATELY)
• Two Ethernet cables (yellow)
• Product documentation

To prepare for installation, follow these steps:

Step 1   Obtain a broadband or Ethernet connection from your service provider.

Step 2   Remove the yellow Ethernet cables, light blue console cable, and product documentation from the plastic bag. Remove the desktop power supply and the black power cord from the accessory kit. Gather the Ethernet devices to be connected to the router: hub, servers, workstations, or PCs.

Step 3   If you plan to configure the software using IOS commands via the console port, provide a terminal or PC to connect to the console port.

Step 4   If you plan to use the cable-lock feature, provide a Kensington or equivalent locking cable.

Preventing Damage to the Router

Follow these guidelines when connecting devices to your router:

- Connect the color-coded cables supplied by Cisco Systems to the color-coded ports on the back panel.

- If you must supply your own cable, see Appendix A for cabling specifications. If this appendix does not provide specifications for a particular cable, we strongly recommend ordering the cable from Cisco Systems.

Installing the Router

To install the router, you need to perform these tasks in the following order:

1. Connect the Ethernet devices to the router.

2. Connect the router to a broadband modem or Ethernet switch.

3. Connect a terminal or PC to the router (for software configuration using the command-line interface [CLI] or troubleshooting).

4. Connect the router to the power source.

5. Verify the router installation.

6. Mount the router.

Connecting a Server, PC, or Workstation

Figure 2-1 shows a Cisco 831 router connecting to a PC. (Figure 2-1 shows a Cisco 831 router, but it also applies to a SOHO 91 router.) To connect one of these devices to built-in Ethernet switch port 4, follow the steps given after Figure 2-1. (The connection procedure applies to both the Cisco 831 router and the SOHO 91 router.)

Figure 2-1   Connecting a Server, PC, or Workstation
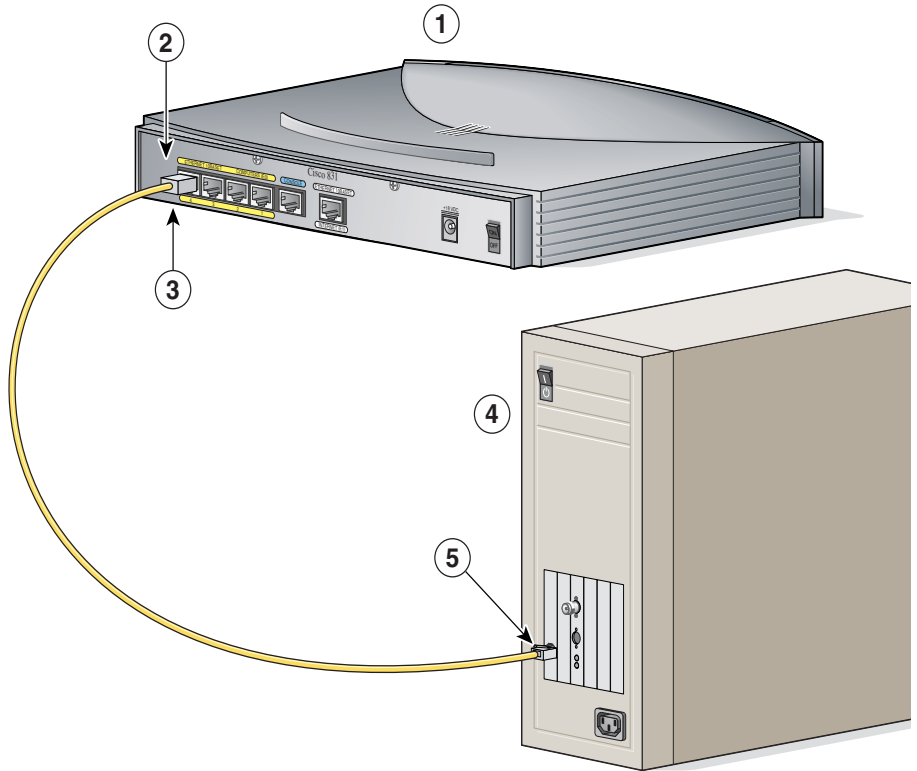
1	Cisco 831 router	**4**	PC
2	Yellow Ethernet cable	**5**	RJ-45 port on the network interface card (NIC)
3	Built-in Ethernet switch port 4 on the router		

Perform the following steps to connect the PC to port number 4 of the built-in switch:

Step 1   Connect one end of the yellow Ethernet cable to built-in Ethernet switch port 4 on the router.

Step 2   Connect the other end of the cable to the RJ-45 port on the NIC installed in the PC, server, or workstation.

✎
Note   Leave the PCs that you are connecting to the router turned off until after you complete the router installation.

You can connect additional servers, PCs, or workstations to built-in Ethernet switch ports 1, 2, and 3.

Connecting an External Ethernet Switch (Optional)

If more than four PCs need to be connected to each other in an office, you may connect an external Ethernet switch to the router's built-in switch to add additional Ethernet connections to the router. To connect an external Ethernet switch to a built-in Ethernet switch port on the router, follow the steps given after Figure 2-2. (Figure 2-2 shows a Cisco 831 router, but it also applies to a SOHO 91 router. The connection procedure applies to both the Cisco 831 router and the SOHO 91 router.)

Figure 2-2   Connecting to an Ethernet Switch
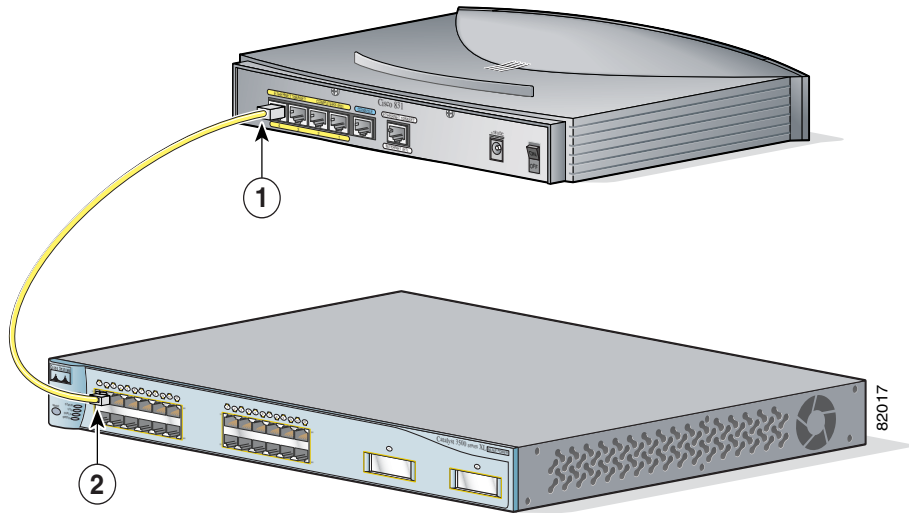
1	Built-in Ethernet switch port 4 on the router	**2**	An available port on the external Ethernet switch

Perform the following steps to connect the router to an external Ethernet switch:

Step 1   Connect one end of the yellow cable to built-in Ethernet switch port 4 on the router.

Step 2   Connect the other end of cable to the available port on the Ethernet switch to add additional Ethernet connections.

Turn on the Ethernet switch if it is not already turned on.

Connecting to the Internet

You can use an installed broadband modem to connect to the Internet.

Connecting a Broadband Modem

To connect to an installed DSL, cable, or long-reach Ethernet modem, follow the steps given after Figure 2-3. (Figure 2-3 shows a Cisco 831 router, but it also applies to a SOHO 91 router. The connection procedure applies to both the Cisco 831 router and the SOHO 91 router.)

Figure 2-3   Connecting to a Broadband Modem
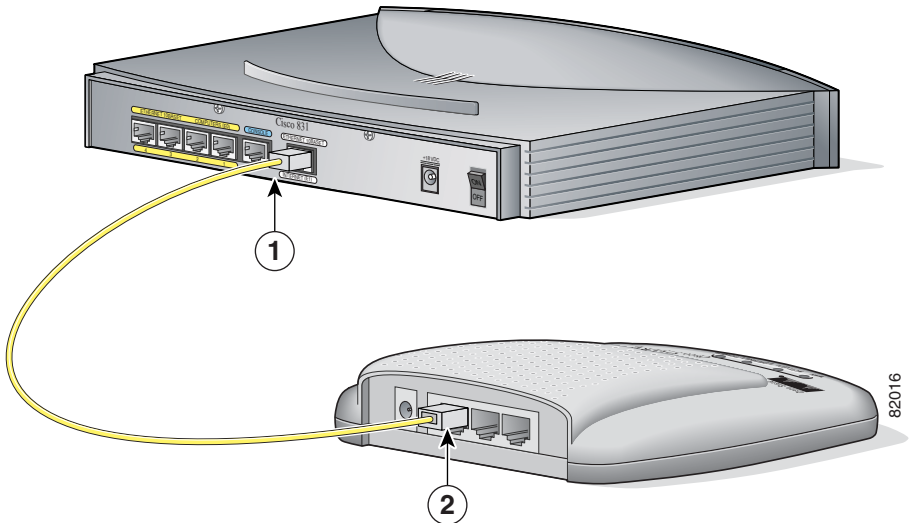
1	Cisco 831 router's Ethernet Internet port	2	An available port on the modem

Perform the following steps to connect the router to an installed DSL, cable, or long-reach Ethernet modem:

Step 1   Connect one end of the yellow cable to the router's Ethernet Internet port.

Step 2   Connect the other end of cable to the available port on the modem.

Follow the instructions provided with your broadband modem to determine which port on the modem to connect to. Turn on the broadband modem if it is not already turned on.

Note   If the factory default configuration does not allow you to connect to the Internet, it is recommended that you configure your router using the Cisco Router Web Setup (CRWS) software. The CRWS software is installed on your router at the factory. See the "What to Do If You Cannot Connect to a Website" section on page 2-22 for instructions on starting the CRWS software.

Connecting a Terminal or PC to the Console Port

The console port is a service port to which you can connect a terminal or PC in order to configure the software by using the command-line interface (CLI) or to troubleshoot problems with the router. To connect a terminal or PC to the console port, follow the steps given after Figure 2-4. (Figure 2-4 shows a Cisco 831 router, but it also applies to a SOHO 91 router. The connection procedure applies to both the Cisco 831 router and the SOHO 91 router.)

Figure 2-4   Connecting a Terminal or PC to the Console Port
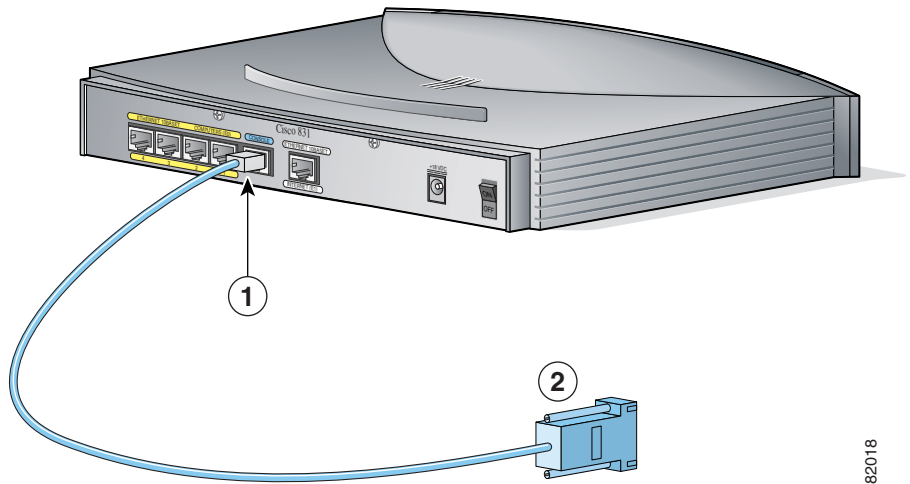
1	Console port on the router	2	DB-9 connector

Perform the following steps to connect the router's console port to a terminal or PC:

Step 1 Connect the RJ-45 connector on the light blue cable to the router console port.

Step 2 Connect the DB-9 connector to a terminal or PC.

Connecting the AC Adapter

To connect the AC adapter, follow the steps given after Figure 2-5. (Figure 2-5 shows a Cisco 831 router, but it also applies to a SOHO 91 router. The connection procedure applies to both the Cisco 831 router and the SOHO 91 router.)

Warning   **The device is designed to work with TN power systems.**

> ⚠
> **Warning** **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15A U.S. (240 VAC, 16A international) is used on the phase conductors (all current-carrying conductors).**

> ⚠
> **Warning** **This equipment is designed to be grounded. Ensure that the host is connected to earth ground during normal use.**

Figure 2-5   Connecting the AC adapter
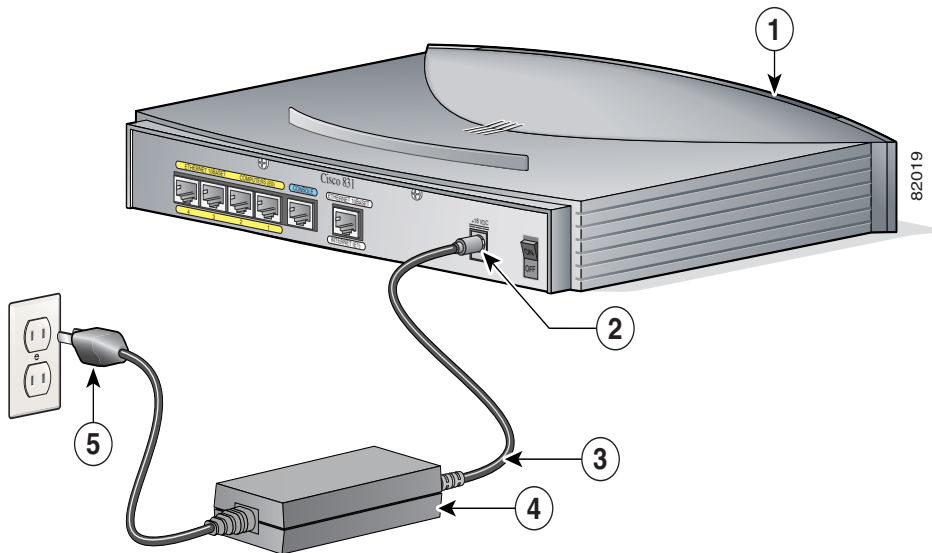
1	Cisco 831 router	**4**	Desktop power adapter
2	Router input jack	**5**	Power cord plug
3	Power cord		

Perform the following steps to connect the router to the AC adapter:

Step 1   Connect one end of the power supply cable to the router's input jack.

Step 2   Connect the other end of the power supply cable to the desktop power adapter.

Step 3   Plug the power cord of the desktop power adapter into an electrical outlet.

Connecting the Console Port to an Async Modem

The Cisco 831 router is designed with the dial backup function, which allows the user to connect an analog modem to the console port as a backup link to the WAN port in case the ADSL service goes down. The Cisco 831 router supports the dial backup and remote management features; the SOHO 91 router supports only the remote management function.

Note   To connect an analog modem to the console port, you will need an optional SOHO/800 Series Router Modem Cable. Contact your router vendor to order this cable.

To connect the Cisco 831 router's console port to an async modem, follow the steps given after Figure 2-6. The connection procedure applies only to a Cisco 831 router.

Figure 2-6   Connect Console Port to an Async Modem
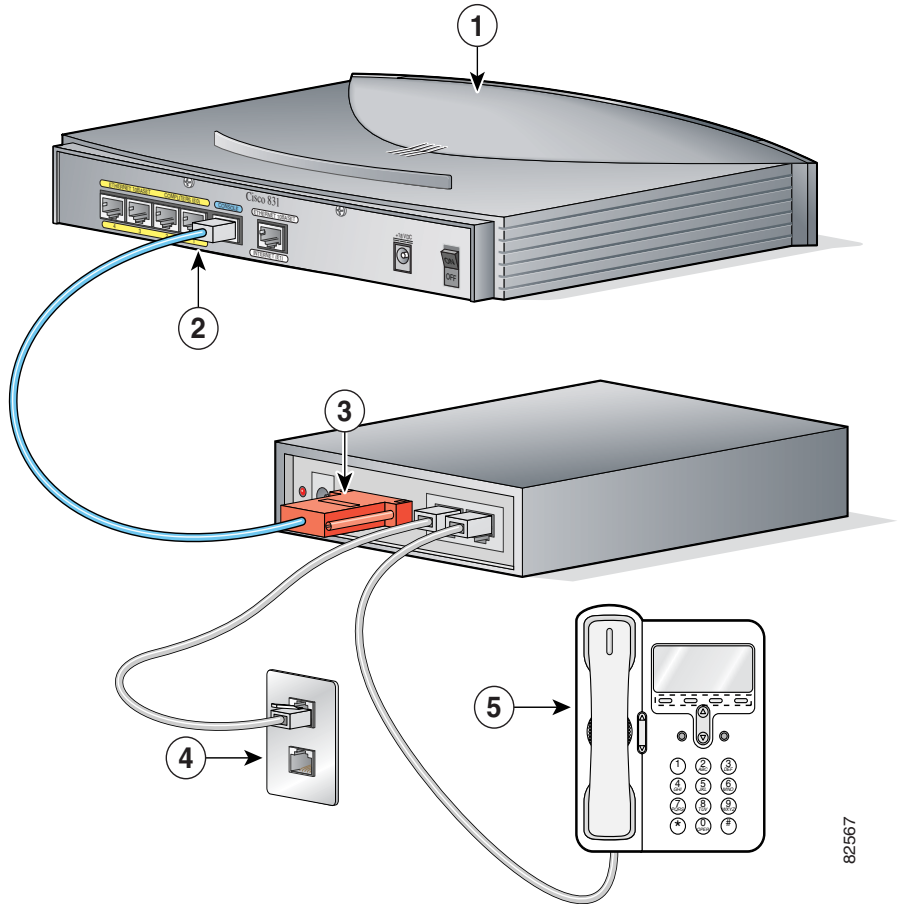
1	Cisco 831 router's console port	**4**	Wall jack
2	Router's console port	**5**	Telephone
3	An available port on an async modem		

Perform the following steps to connect the Cisco 831 router's console port to an async modem:

Step 1   Connect the RJ-45 end of the SOHO/800 Series Router Modem Cable to the Cisco 831 router's console port.

Step 2   Connect the DB-25 connector end of the SOHO/800 Series Router Modem Cable to an available port on the async modem.

Step 3   Connect one end of the RJ-11 cable to a wall jack.

Step 4   Connect the other end of the RJ-11 cable to a telephone line.

Checking the PC Configuration

Each PC that is connected to the router must be configured to use TCP/IP and to use DHCP automatically to obtain its IP address. Follow these steps to configure each PC that is running Microsoft Windows NT or Microsoft Windows 95, 98, or 2000. If the PC is running a different version of Microsoft Windows, refer to the documentation that came with the PC.

Step 1   Start the PC, and open the Control Panel.

Step 2   Click the **Network** icon to display the Network window.

Step 3   Verify that TCP/IP has been added and associated with the Ethernet adapter. TCP/IP is shown as a cable icon in the Configuration window on Microsoft Windows 95, 98 and 2000, and as a cable icon in the Protocol window on Microsoft Windows NT. If the icon is not visible, click **Add**, and add Microsoft TCP/IP.

Step 4   To verify that the PC is configured to obtain an IP address automatically, click the TCP/IP cable icon, and select the **IP address** tab in the TCP/IP Properties window. If it is unchecked, check **Obtain an IP address from a DHCP server**. The IP address and Subnet mask fields should be grayed out.

Step 5   To accept all changes and exit this window, click **OK**. Then click **OK** in the Network window.

Step 6   If you are prompted, click **Yes** to reboot the PC.

For more information on how to configure TCP/IP, refer to the *Cisco Router Web Setup Troubleshooting Guide*, which is available on Cisco.com.

Verifying Router Operation

To verify that all PCs are properly connected to the router and that the router is properly connected to the broadband modem or Ethernet switch, turn on all connected devices, and then use Table 2-2 on page 19 to help you verify correct router operation by checking the LEDs.

Table 2-2   Verifying Router Operation

Power/Link	LEDs to Check	Normal Patterns
Power	OK	On when power is supplied to router
To servers, PCs, or workstations connected to port 1, 2, 3, or 4 of the built-in Ethernet switch	COMPUTERS 1, 2, 3 or 4	• COMPUTERS 1, 2, 3 or 4 is on when the LAN port is physically connected to a server, PC, or workstation.
	INTERNET RXD	• INTERNET RXD blinks when a port on the built-in Ethernet switch receives an Ethernet packet.
	INTERNET TXD	• INTERNET TXD blinks when a port on the built-in Ethernet switch sends an Ethernet packet.
To broadband modem or external Ethernet switch	ETHERNET WAN	• ETHERNET WAN is on when the ETHERNET WAN port is physically connected to a broadband modem or external Ethernet switch.
	WAN RXD	• WAN RXD blinks when the ETHERNET WAN port receives an Ethernet packet.
	WAN TXD	• WAN TXD blinks when the ETHERNET WAN port sends an Ethernet packet.

Mounting the Router

You can mount your router on one of the following surfaces:

- Table or other horizontal surface

- Wall or other vertical surface

Mounting on a Table

Place the router on a table firmly, and perform the procedure in the "Installing the Router" section on page 2-6. Do not cover or obstruct the router vents, which are located on the router sides.

⚠️

Caution   The router vents cannot be covered or obstructed, otherwise overheating could occur and cause damage to the router.

Mounting on a Wall

You can mount the router on a wall or other vertical surface by using the molded mounting brackets on the bottom of the router and two number-six, 3/4-in. (M3.5 x 20 mm) screws. You must provide the screws. Figure 2-7 shows the mounting brackets.

⚠️

Caution   If you are mounting the router on drywall, use two hollow-wall anchors (1/8 in. with 5/16-in. drill bit, or M3 with 8-mm drill bit) to secure the screws. If the screws are not properly anchored, the strain of the network cable connections could pull the router from the wall.

Figure 2-7   Wall-Mounting Brackets (Bottom of Router)
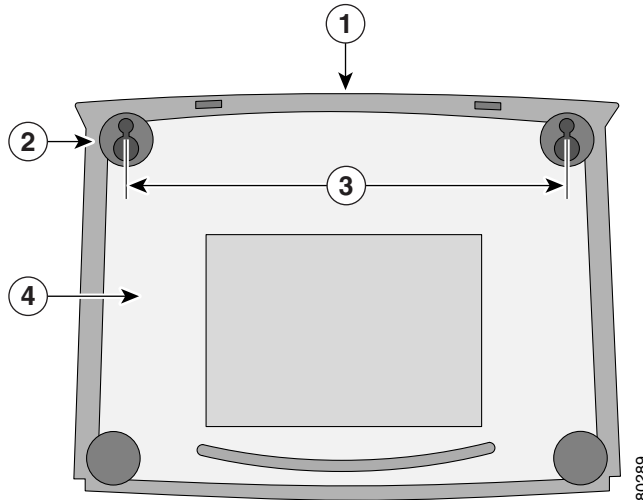
1	Front panel of router	3	Distance between two mounting brackets (7 5/8 inches or 19.35 cm)
2	Mounting bracket	4	Bottom of router

The following conditions must be met when you mount the router:

Because you will use the LEDs as status and problem indicators, the front panel must face upward and be easily visible.

The router must be mounted low enough for you to see the LEDs in case you need to troubleshoot a problem.

The power supply must rest on a horizontal surface such as the floor or a table. If the power supply is not supported, it might place strain on the power supply cable and cause it to disconnect from the connector on the router back panel.

To mount the router, follow the steps given after Figure 2-8. Figure 2-9 shows a Cisco 831 router, but it also applies to the SOHO 91 router. The mounting procedure applies to both the Cisco 831 router and the SOHO 91 router.

Figure 2-8   Mounting Router on Wall
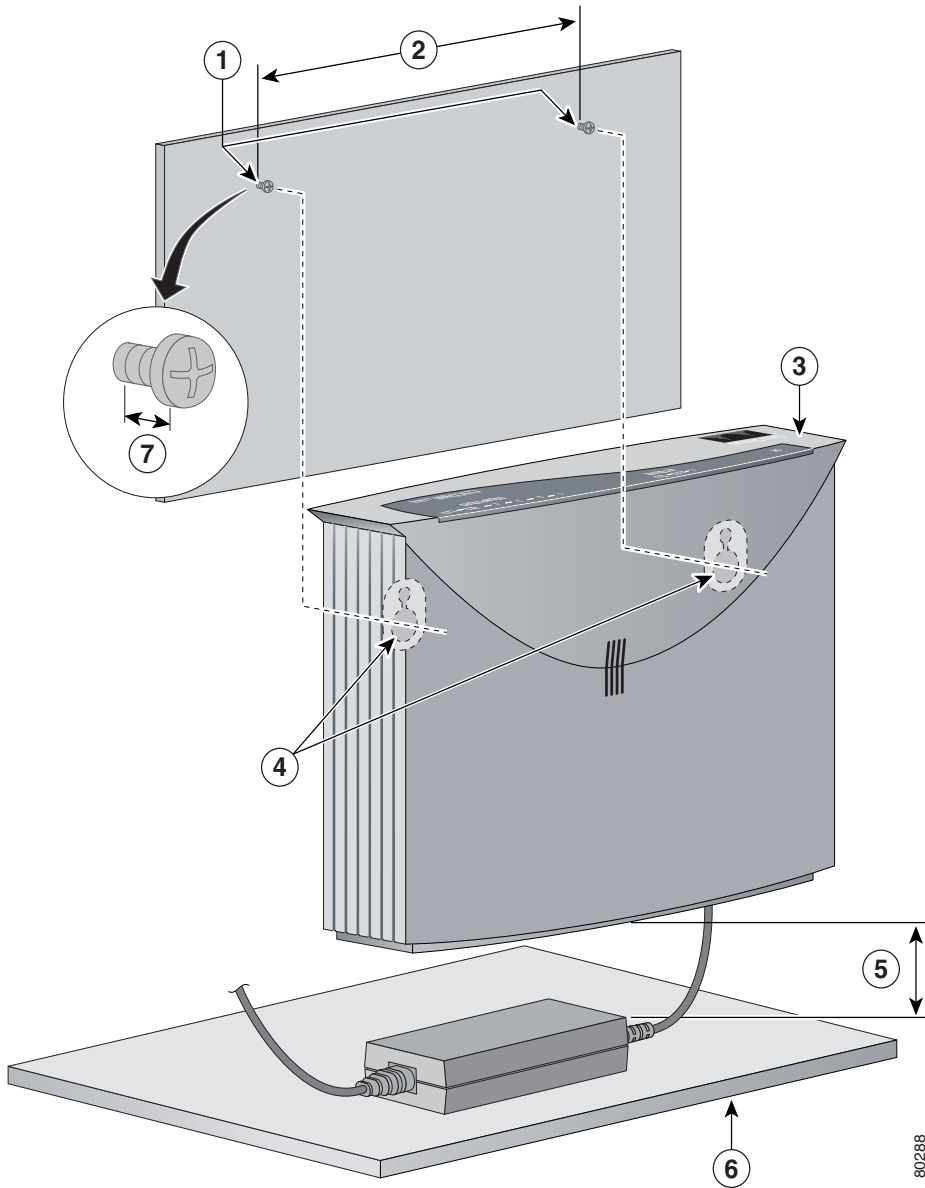
1	Two number-six, 3/4 in. screws	5	Maximum distance between the router and the power supply (6 ft [1.8m])
2	Distance between the two screws on the wall (7 5/8 in. [19.35 cm])	6	Horizontal surface on which to place the power supply
3	Cisco 831 router	7	Distance between the screw and the wall (1/8 in. [0.32 cm])
4	Mounting brackets		

Perform the following steps to mount the router on the wall:

Step 1 Secure two screws 7 5/8 inches (19.35 cm) apart into a wall and 1/8 inch (0.32 cm) from the wall.

Step 2 Hang the router on the screws as shown in Figure 2-9.

Step 3 Place the power supply on a horizontal surface.

Connecting to a Website

The router has been configured to work for the most common type of installation. Log on to a PC that is connected to the router, open a web browser, and connect to a website. If you connected to a website, you have completed setup and can continue to use the router.

If you cannot display a website, make sure that the broadband modem or Ethernet switch that the router is connected to is operating, and try again. If you still cannot connect to a website, you must follow the steps in the "What to Do If You Cannot Connect to a Website" section on page 2-22.

What to Do If You Cannot Connect to a Website

If you cannot connect to the Internet, using the factory configuration, or if you have loaded new Cisco IOS software on the router since you installed it, you can configure the router, using the Cisco Router Web Setup (CRWS) software. The CRWS software is already loaded on the router. This software is run from a PC connected to the router.

Starting the CRWS Software

Follow these steps to start the CRWS software:

Step 1   Start, or restart, a PC that is connected to one of the router's built-in Ethernet switch ports (1, 2, 3, or 4).

Step 2   Open a web browser. Make sure that the browser is set to work in online mode.

- In Internet Explorer, click the **File** menu, and verify that the "work offline" option is unchecked.

- In Netscape, the default selection in the File menu is set to work online.

Step 3   Enter the following universal resource locator (URL):

http://10.10.10.1

Tip   If the CRWS home page does not appear when you enter the URL **http://10.10.10.1**, test the connection between the PC and the router by doing the following:

1. Check that the OK LED on the router is on, and check the cable connection between the router and the PC.

2. If the CRWS home page still does not appear, verify that the web browser's "work offline" option is disabled.

3. If the web page still does not appear, verify that the PC is automatically configured to receive an IP address. Follow the instructions in the *Cisco Router Web Setup User Guide*, which is available on Cisco.com.

4. If the PC is configured to automatically receive an IP address, but the web page still does not appear, select **Start/Run**, type **winipcfg** in the Run window, and examine the address in the IP address field. The address should be in the format 10.10.10.X, in which X is a number that is 2 or greater; for example, 10.10.10.2 or 10.10.10.3. If the IP address is not in this format, verify that an Ethernet adapter name is visible in the Adapter field. If it is not, return to Step 3 in the "Checking the PC Configuration" section on page 2-16 and add TCP to the list of protocols. Then return to the beginning of the "Starting the CRWS Software" section on page 2-22, and complete the procedure.

Step 4   Click the **Router Setup** link in the Cisco Router Web Setup home page, and follow the instructions that appear in the page that is displayed.

Step 5   When you complete setup using CRWS, connect to another website, using the connected PC. If you successfully connect to the website, then setup is complete, and you can continue using the router.

Troubleshooting

This chapter describes problems that could occur with the router hardware, possible causes of the problems, and steps for solving the problems. The problems are grouped as follows:

- Problems During First Startup
- Problems After Router Is Running

For more information on problems that could occur with the software, refer to the *Cisco 800 Series Software Configuration Guide.*

Before You Call Your Cisco Reseller

Some of the solutions in this chapter instruct you to contact your Cisco reseller. Before you contact your reseller, have the following information ready:

- Router model and serial number (on the back panel)
- Maintenance agreement or warranty information
- Date you received your router
- Brief description of the problem
- Brief description of the steps you have taken to solve the problem

Problems During First Startup

Table 3-1 lists problems that could occur the first time you turn on the router.

Table 3-1   Problems During First Startup

Symptom	Problem	Solutions
All LEDs, including OK LED, are off.	No power to router.	Perform the following tasks in order: 1. Make sure that the power switch is set to ON. 2. Make sure that all connections to and from the power supply are secure. 3. Make sure that the power outlet has power. 4. If the problem continues, the power supply could be faulty. Contact your Cisco reseller.
No connection to modem or Ethernet switch. (Internet LED is off.)	A cable-related problem: • Improperly connected cable. • Damaged cable.	Perform the following tasks in order: 1. To make sure that you have cabled the device correctly, see the "Connecting a Server, PC, or Workstation" section on page 2-6 or the "Connecting a Broadband Modem" section on page 2-10. 2. Make sure that the connectors at both ends of the cable are securely seated. 3. Make sure that the cable is not physically damaged. If it is damaged, order another cable from Cisco, or replace it with a similar cable.

Table 3-1   Problems During First Startup (continued)

Symptom	Problem	Solutions
No connection to Ethernet devices. (COMPUTER LEDs 1 through 4 are off.)	A cable-related problem: • Improperly connected cable. • Damaged cable.	Perform the following tasks in order: 1. To make sure that you have cabled the device correctly, see Figure 2-1 in the "Connecting a Server, PC, or Workstation" section on page 2-6 2. Make sure that the connectors at both ends of the cable are securely seated. 3. Make sure that the cable is not physically damaged. If it is damaged, order another cable from Cisco Systems, or replace it with a similar cable.
Cannot connect to the Internet	• Broadband modem or external Ethernet switch is not connected or turned on. • There is a problem with the broadband or WAN service. • Router is improperly configured.	• Reconnect the broadband modem or external Ethernet switch, and make sure that it is receiving power. • Check with the Internet service provider or corporate network administrator to determine whether there is a problem. • Use the Cisco Router Web Setup software to configure the router. Follow the procedure in the "What to Do If You Cannot Connect to a Website" section on page 2-22 (recommended), or configure the router using a PC that is connected to the console port.

Problems After Router Is Running

Table 3-2 lists problems that could occur after the router has been up and running.

Table 3-2   Problems After Router Is Running

Symptom	Problem	Solutions
Problems with Ethernet connection. (COMPUTER LEDs 1 through 4 are off.)	A cable-related problem: • Disconnected cable. • Damaged cable.	Perform the following tasks in order: **1.** Make sure that the connectors at both ends of the cable are secure. **2.** Make sure that the cable is not physically damaged. If it is damaged, order another cable from Cisco Systems, or replace it with a similar cable.
Connection to the broadband or Ethernet line is intermittent or lost. (The INTERNET 1 LED on the front panel is off.)	A cable-related problem: • Disconnected cable. • Damaged cable.	Perform the following tasks in order: **1.** Make sure that the connectors at both ends of the cable are secure. **2.** Make sure that the cable is not physically damaged. If it is damaged, order another cable from Cisco Systems, or replace it with a similar cable.
Connection to the broadband or Ethernet line is intermittent or lost. (The INTERNET 1 LED on the front panel is off.)	Problem with broadband line or WAN service.	Contact your broadband line or WAN service provider to determine whether there is a problem.

Specifications and Cables

This appendix provides system, port, and cabling specifications for the Cisco 831 and SOHO 91 routers.

System Specifications

Table A-1 outlines the system specifications for the routers.

Table A-1   System Specifications

Description	Design Specification
Physical Dimensions	
Dimensions (H x W x D)	2.0 x 9.7 x 8.5 in. (51 x 246 x 216 mm)
Weight (does not include desktop power supply)	1.5 lb (0.68 kg)
Environmental Operating Ranges	
Nonoperating temperature	–4 to 149°F (–20 to 65°C)
Nonoperating humidity	5 to 95% relative humidity
Nonoperating altitude	0 to 15,000 ft (4570 m)
Operating temperature	32 to 104°F (0 to 40°C)
Operating humidity	10 to 85% relative humidity
Operating altitude	0 to 10,000 ft (3000 m)

Table A-1   System Specifications (continued)

Description	Design Specification
Router Power	
AC input voltage	100 to 240 VAC
Frequency	50 to 60 Hz
Power consumption	Maximum of 18W
Voltage	18 VDC

For information on regulatory compliance, refer to the *Regulatory Compliance and Safety Information for Cisco 800 Series and SOHO Series Routers* document that was shipped with your router.

Warning   **Ultimate disposal of this product should be handled according to all national laws and regulations.**

LAN Port

The Cisco 831 and SOHO 91 routers provide a fixed onboard LAN connection, which has a 10/100-Mbps wire-speed non-blocking switch controller that performs the 10BASE-T/100BASE-T Ethernet switch operation. The automatic medium dependent interface in normal mode (MDI)/medium dependent interface in crossover mode (MDIX) crossover function eliminates the need for crossover cables. Table A-2 provides pinouts for the Ethernet LAN port on the routers.

Table A-2   Ethernet LAN Port

Pin	Function
1	RX+
2	RX–
3	TX+
4	Unused
5	Unused
6	TX–
7	Unused
8	Unused

Console Connector Pinouts

Table A-3 provides pinouts for console connector (for connecting a terminal or PC).

Table A-3   Console Connector Pinouts (RJ-45)

Pin	Function
1	RTS
2	DTR
3	TXD
4	GND
5	GND
6	RXD
7	DSR
8	CTS

The console port is configured as a data communications equipment (DCE) device. The default parameters for the console port are as follows:

- 9600 baud
- 8 data bits
- No parity
- One stop bit

Cabling Specifications

This section provides specifications for the following Ethernet cables, which you might need to provide:

- Straight-through cable
- Crossover cable

Thanks to the auto-crossover (autosensing) function, both straight-through and crossover cables can be used for the Ethernet LAN port.

Ethernet Cable Specifications

Table A-4 provides the specifications for straight-through and crossover Ethernet cables.

Table A-4   Ethernet Cable Specifications

Type	Category
10BASE-T	Category 3 or 5
100BASE-T	Category 5 or above

Maximum Cable Distance

Table A-5 provides the maximum distance of Ethernet cables that you can use to connect equipment to the router.

Table A-5   Maximum Cable Distance

Cable	Maximum Distance
Ethernet cables	328 ft (100 m)

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