CISCO SYSTEMS

Cisco 836 Router and SOHO 96 Router Hardware Installation Guide

Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

Customer Order Number: DOC-7811438=
Text Part Number: 78-15281-02

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The following information is for FCC compliance of Class A devices: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio-frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to correct the interference at their own expense.

The following information is for FCC compliance of Class B devices: The equipment described in this manual generates and may radiate radio-frequency energy. If it is not installed in accordance with Cisco's installation instructions, it may cause interference with radio and television reception. This equipment has been tested and found to comply with the limits for a Class B digital device in accordance with the specifications in part 15 of the FCC rules. These specifications are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

Modifying the equipment without Cisco's written authorization may result in the equipment no longer complying with FCC requirements for Class A or Class B digital devices. In that event, your right to use the equipment may be limited by FCC regulations, and you may be required to correct any interference to radio or television communications at your own expense.

You can determine whether your equipment is causing interference by turning it off. If the interference stops, it was probably caused by the Cisco equipment or one of its peripheral devices. If the equipment causes interference to radio or television reception, try to correct the interference by using one or more of the following measures:

• Turn the television or radio antenna until the interference stops.

• Move the equipment to one side or the other of the television or radio.

• Move the equipment farther away from the television or radio.

• Plug the equipment into an outlet that is on a different circuit from the television or radio. (That is, make certain the equipment and the television or radio are on circuits controlled by different circuit breakers or fuses.)

Modifications to this product not authorized by Cisco Systems, Inc. could void the FCC approval and negate your authority to operate the product.

Cisco 836 Router and SOHO 96 Router Hardware Installation Guide

CONTENTS

INDEX

Preface

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

Audience

This guide is written for service technicians who have no experience in installing routers. The guide is intended to instruct the technicians in connecting the router to the network as quickly as possible.

Organization

This guide contains the following chapters:

- Chapter 1, “Product Overview,” describes the features of the Cisco 836 and Cisco SOHO 96 routers and their features.
- Chapter 2, “Installation,” provides information on preinstallation procedures, mounting and connecting the router, configuring of the router, and verifying the router connections.
- Chapter 3, “Troubleshooting,” describes problems with the router and tells how to identify and solve them.

- Appendix A, “Specifications and Cables,” provides Cisco part numbers for cables that you can order and contains port connector pinouts and specifications for cables that you might need to provide.

Conventions

This section describes the conventions used in this guide. Refer to the *Regulatory Compliance and Safety document for the Cisco 800 Series and SOHO Series Routers* for applicable translated warnings.

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 836 Router and SOHO 96 Router Hardware Installation Guide*, the documentation set for these routers includes the following:

- *Cisco 836 and Cisco SOHO 96 Routers Cabling and Setup Quick Start Guide*
- *Cisco 800 Series Routers Software Configuration Guide*
- *Upgrading Memory in Cisco 800 Series Routers*
- *Regulatory Compliance and Safety Information for the Cisco 800 Series and SOHO Series Routers*

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*

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 836 router and the Cisco SOHO 96 router are asymmeric digital subscriber line (ADSL)-over-integrated service digital network (ISDN) routing devices. These routers have an integrated 4-port Ethernet switch for the LAN and an ADSL physical interface for the WAN, and ISDN basic rate interface (BRI) WAN connectivity. This ISDN BRI interface can be used for normal WAN connections or can be configured as a backup connection for the ADSL WAN interface. These features allow the routers to connect a corporate telecommuter or a small office to a central office or an Internet service provider (ISP) over an ADSL interface.

The routers support high-speed encryption, a 10/100BASE-T switch, and dial backup functionality via the ISDN port. The autosensing function in these routers eliminates the need for a crossover cable and allows the router to detect medium dependent interface in normal mode (MDI) or medium dependent interface in crossover mode (MDIX) in any other PC or hub with a straight-through cable or a crossover cable. The routers are capable of bridging and multiprotocol routing between the LAN and WAN ports.

The dial backup feature allows the user to connect the ISDN port to the ISDN service provider as a backup link to the WAN in case the ADSL service goes down. This feature gives the Cisco 836 and Cisco SOHO 96 routers a high level of performance and security.

The Cisco 836 router is designed with both hardware-based and software-based encryption, while the Cisco SOHO 96 supports only the software-based encryption. The Cisco 836 router supports the addition of Flash or SDRAM memory, as either a factory upgrade or a field-installed option. The Cisco SOHO 96 router has a fixed memory configuration.

Features

Table 1-1 summarizes the features of the Cisco 836 and Cisco SOHO 96 routers.

Table 1-1 Summary of Cisco 836 and Cisco SOHO 96 Routers Features

Feature	Description
10BASE-T/100BASE-T Ethernet switch	Provides connection to 10BASE-T (10 Mbps) or 100BASE-T (100 Mbps) Ethernet networks. Compatible with 10/100-Mbps devices.
ADSL over ISDN (ADSLoISDN) port	Provides connection to an ADSL over ISDN network. Does not support auto-switch function.
Flash memory	8 MB of Flash memory, with up to 16 MB of expandable Flash memory on the Flash module.
ISDN S/T port	Provides connection to ISDN service provider by using the dial backup and the remote management functions for the router when main ADSL link goes down.
Synchronous dynamic RAM (SDRAM)	32 MB of SDRAM on board.
Ease of installation	Color-coded ports and cables reduce the chance of error.
Cisco IOS software	Supports standard Cisco IOS software.
Cisco Router Web Setup	Provides a web-based software tool for basic router configuration.
LAN interface	Fully compliant with IEEE 802.3 and IEEE 802.3u. Automatic MDI/MDIX crossover function eliminates the need for crossover cables.
Console port	Provides connection to a terminal or PC for troubleshooting and for software configuration using a command-line interface (CLI). This port is configured as a data communication equipment (DCE) port with a hardware handshake.
Dying gasp	Provides dying gasp function. If the router is going to lose power, this function detects the situation and sends a signal to warn digital subscriber line access multiplexers (DSLAMs) of the line drops.

Table 1-1 Summary of Cisco 836 and Cisco SOHO 96 Routers Features (continued)

Feature	Description
IPSec hardware accelerator	Only the Cisco 836 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 1 (SHA-1), Message Digest 5 (MD5), Hash-based Message Authentication Code (HMAC); and Lempel-Ziv-Stac (LZS) compression and Microsoft Point-to-Point Compression (MPPC).
Wall-mounting brackets	Mount the router on a wall or other vertical surface.

Router Overview

The following section shows the front and back panels of the Cisco 836 router and the Cisco SOHO 96 router. The Cisco 836 router and the Cisco SOHO 96 router each have four Ethernet ports.

Front Panels

Figure 1-1 and Figure 1-2 show the front panels of Cisco 836 router and the Cisco SOHO 96 router, respectively.

Figure 1-1 Cisco 836 Front Panel

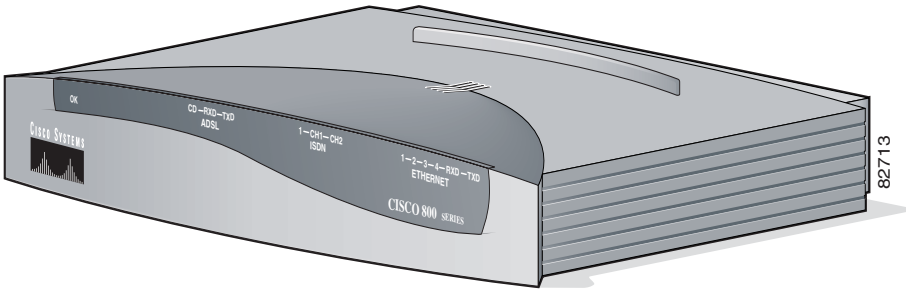
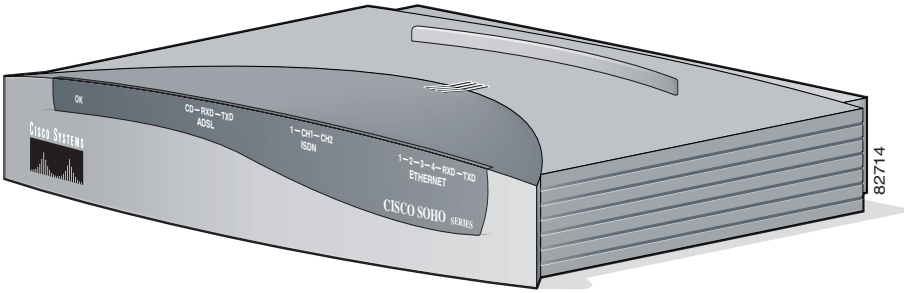


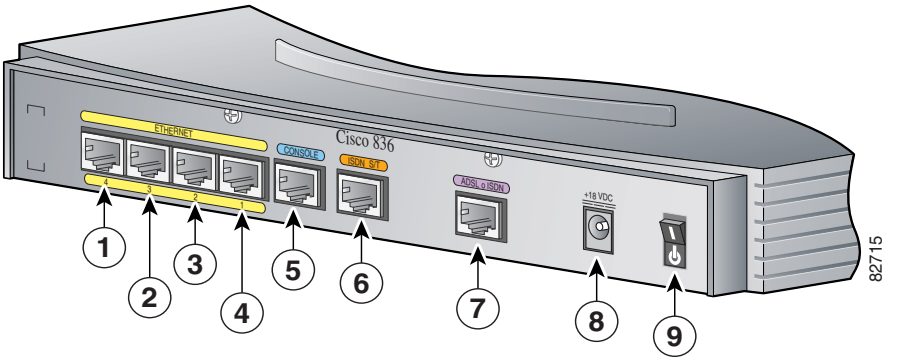
Figure 1-2 Cisco SOHO 96 Front Panel



Back Panel

Figure 1-3 shows the back panel of the Cisco 836 router. The back panel of the Cisco SOHO 96 router is nearly identical to the back panel of the Cisco 836 router. Only the labels are different—the Cisco SOHO 96 router's label reads "Cisco SOHO 96." All the physical ports are the same.

Figure 1-3 Cisco 836 Back Panel



1	Ethernet port 4 connects to Ethernet network device	**6**	ISDN S/T port connects to ISDN service provider
2	Ethernet port 3 connects to Ethernet network device	**7**	ADSLoISDN port connects to external wall jack
3	Ethernet port 2 connects to Ethernet network device	**8**	Input jack connects to desktop power supply
4	Ethernet port 1 connects to Ethernet network device	**9**	Power on/off button
5	Console port connects to PC or terminal		

LED Functions

Table 1-2 summarizes the functions of the LEDs on the Cisco 836 router and the Cisco SOHO 96 router.

Table 1-2 Functions of LEDs on the Cisco 836 Router and the Cisco SOHO 96 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.
ADSL_CD	Green	On when the ADSL carrier detects status and connects to the DSLAM successfully.
ADSL_RXD	Green	On when the ADSLoISDN port receives data. Off when no data is being downloaded.
ADSL_TXD	Green	On when the ADSLoISDN port sends data. Off when no data is being uploaded.
ISDN_1	Green	On when ISDN D channel connects successfully.
ISDN_CH1	Orange	On when ISDN B1 channel connects successfully. Blinks when the B1 channel receives or sends data, or when data passes through ISDN channel 1.

Table 1-2 Functions of LEDs on the Cisco 836 Router and the Cisco SOHO 96 Router (continued)

LED	Color	Function
ISDN_CH2	Orange	On when ISDN B2 channel connects successfully. Blinks when the B2 channel receives or sends data, or when data passes through ISDN channel 2.
E1 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 Status	Green	On when Ethernet 2 connects to the Ethernet interface successfully. Blinks when Ethernet 1 receives or sends data, or when data passes through Ethernet 2.
E3 Status	Green	On when Ethernet 3 connects to the Ethernet interface successfully. Blinks when Ethernet 1 receives or sends data, or when data passes through Ethernet 3.
E4 Status	Green	On when Ethernet 4 connects to the Ethernet interface successfully. Blinks when Ethernet 1 receives or sends data, or when data passes through Ethernet 4.

Installation

This chapter provides information on the following topics:

Preparing for Installation

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

Safety

This section provides safety warnings and electrostatic and router damage information for the Cisco 836 and Cisco SOHO 96 routers.

Warnings

Before installing the router, read the following warnings:

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

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

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

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

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 **To reduce the risk of fire, use only No.26 AWG or large 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 **Ths ISDN connection is regarded as a source of voltage that should be inaccessible to user contact. Do not attempt to tamper with or open any public telephone operator (PTO)-provided equipment or connection hardware. Any hardwired connection (other than by a nonremovable, connect-one-time-only plug) must be made only by PTO staff or suitably trained engineers.**

Warning **Network hazardous voltages are present in the ISDN cable. If you detach the ISDN cable, detach the end away from the router first to avoid possible electric shock. Network hazardous voltages also are present on the system card in the area of the ISDN port (RJ-45 connector), regardless of when power is turned off (by pressing power switch to standby).**

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

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 with the combination of synthetic fibers and dry atmosphere.

Always follow these steps to prevent ESD when you remove and replace 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.

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.

Note 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 (Mohm).

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
• ADSL cable (lavender)
• Console cable, RJ-45-to-DB-9 (light blue)
• ISDN cable (orange)
• Ethernet cable (yellow)
• Product documentation

To prepare for installation, follow these steps:

Step 1 Remove yellow Ethernet cable, light blue console cable, and product documentation from the accessory kit. Remove the desktop power supply, orange ISDN S/T cable, the lavender ADSL cable, and the black power cord from the box. Gather the Ethernet devices to be connected to the router: hub, server, workstation, or PC.

Step 2 If you plan to connect an analog telephone or fax machine, gather these devices. You must also provide the telephone cable to connect each device.

Step 3 If you plan to configure the software using a terminal or PC connected to the router, provide the terminal or PC.

Note Unless otherwise specified, a lavender straight-through RJ-11to RJ-11 cable is provided as the ADSL cable. The user can select one of two other cables instead—a crossover RJ-11 to RJ-11 ADSL cable or a straight-through RJ-11 to RJ- 45 ADSL cable. Each router is supplied with only one ADSL cable, which the user selected during the ordering process.

Note The optional orange ISDN S/T cable used for connecting a Cisco 836 router's ISDN port to the ISDN service provider is for dial backup and remote management. The Cisco SOHO 96 router needs this cable for remote management. The user may order this optional cable additionally.

Note There are six different power cords. Each was designed to meet the specifications of the cable wall jack for a particular country. Each of the six power cords is different from the others. The default cord shown in Figure 2-1 is European Union standard specification.

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 cables, see Appendix A, "Specifications and Cables," for cable specifications. If this appendix does not provide specifications for a particular cable, we strongly recommend that you order the cable from Cisco Systems.
- If the symbol of suitability (☒) appears above a port, you can connect the port directly to a public network that follows the European Union standards.

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 to your router.**

Installing the Router

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

1. Connect the Ethernet devices to the router.
2. Connect the ADSL line.
3. Connect a terminal or PC to the configuration port of the router if you are troubleshooting or configuring the router by using the command-line interface (CLI).
4. Connect the router to the power source and turn on the router.
5. Verify the links, using the router LEDs.

Connecting Ethernet Devices

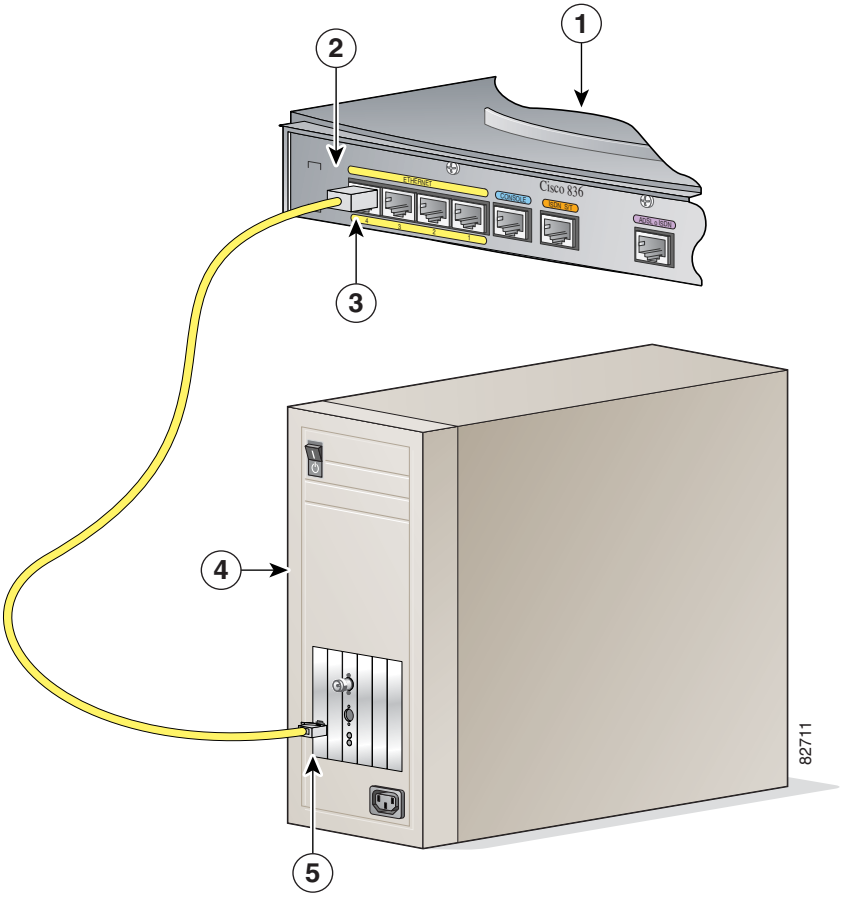
You can use a cable to connect an Ethernet devices to the router's LAN port.

Connecting a Server, PC, or Workstation

Follow the steps given after Figure 2-1 to connect the router to a PC with an Ethernet network interface card (NIC) installed, or to connect a server or workstation to the router. (Figure 2-1 shows a Cisco 836 router, but it also applies to a Cisco SOHO 96 router. The procedure applies to both the Cisco 836 router and the Cisco SOHO 96 router.)

The Ethernet port on the Cisco 836 router and the Cisco SOHO 96 router supports the auto-crossover function, whose autosensing ability allows the router to connect automatically to the hub or PC.

Figure 2-1 Connecting a Server, PC, or Workstation to the Router



1	Cisco 836 router	**4**	PC
2	One end of the yellow Ethernet cable that connects to Ethernet port 4 on the router	**5**	Other end of the Ethernet cable that connects to the RJ-45 port on the network interface card (NIC)
3	Ethernet port 4		

Perform the following steps to connect the PC to Ethernet port 4 (or to port 1, 2, or 3) on the router:

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

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

Note Leave the PCs that you connect to the router turned off until after you complete the router installation.

You can connect additional PCs to Ethernet ports 1, 2, and 3.

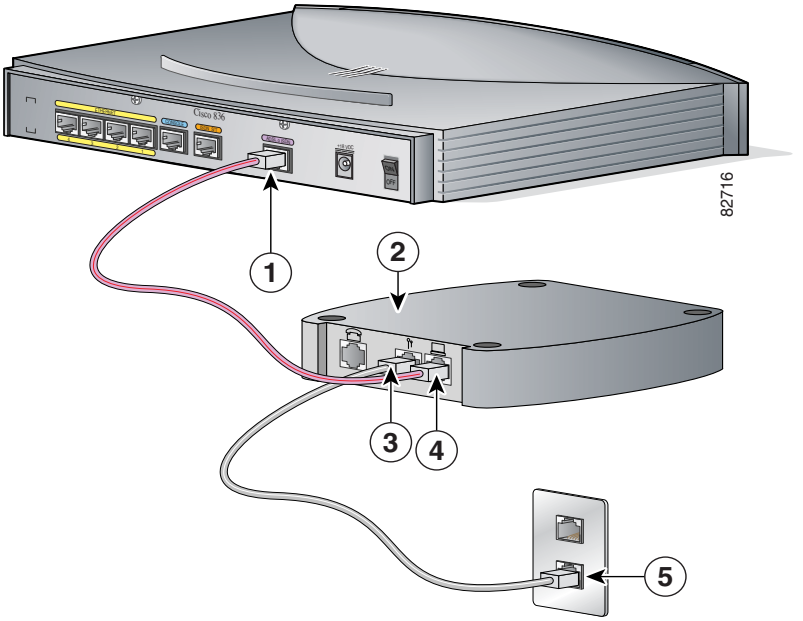
To verify the connection, check that the Ethernet 1 LED on the front panel is on after you complete the router installation.

Connecting an ADSL Line

The procedure for connecting an ADSL line depends on the router and, in some cases, on the location. Figure 2-2 shows how to connect the ADSL line to a cable wall jack. Follow the steps given after Figure 2-2 to connect the ADSL line to a cable wall jack. (Figure 2-2 depicts a Cisco 836 router, but it also applies to the Cisco SOHO 96 router. The connection steps apply to both the Cisco 836 router and the Cisco SOHO 96 router.)

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

Figure 2-2 Connecting an ADSL Line to a Wall Jack



1	One end of the ADSL over ISDN (ADSLoISDN) cable that connects to the ADSLoISDN port on the router	**4**	RJ-11 end of the ADSLoISDN cable that connects to the splitter
2	ADSL splitter provided by ADSL service provider	**5**	Other end of the unshielded Category 5 cable that connects to the wall jack
3	RJ-11 end of an unshielded Category 5 cable that connects to splitter		

Note The user has to provide the unshielded Category 5 cable to connect to the splitter.

Perform the following steps to connect the ADSL line to a cable wall jack:

Step 1 Connect the RJ-11 end of the ADSL over ISDN cable to the ADSLoISDN port on the router.

Step 2 Connect the other RJ-11 end of the ADSL over ISDN cable to the splitter's local ADSL connector port.

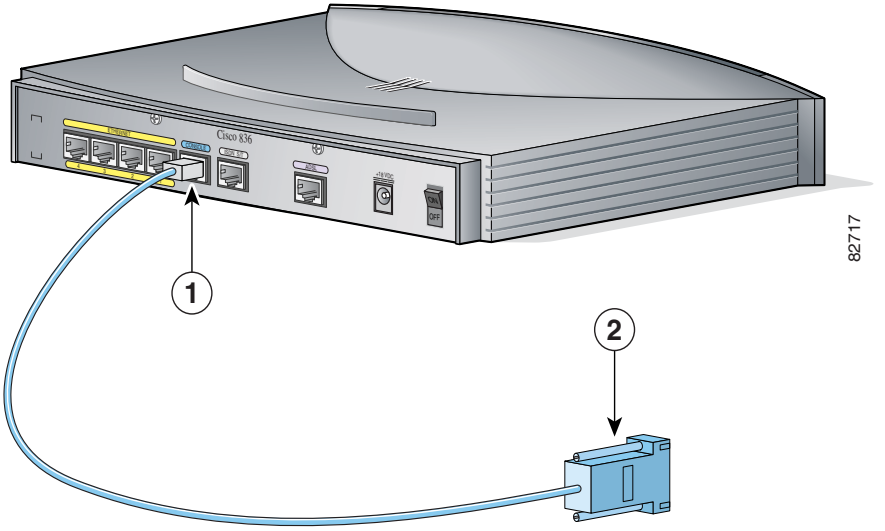
Step 3 Connect the unshielded Category 5 cable from the splitter's outside ADSL port to a wall jack.

Connecting a Terminal or PC to the Router's Console Port (Optional)

You can connect either a terminal or a PC to the router's console port. You can use the terminal or PC for configuring the software via the CLI or for troubleshooting. To connect a terminal or PC, follow the steps given after Figure 2-3. (Figure 2-3 shows a Cisco 836 router, but it also applies to the Cisco SOHO 96 router. The connection procedure applies to both the Cisco 836 router and the Cisco SOHO 96 router.)

Note Unless you are an experienced network administrator, it is recommended that you use the Cisco Router Web Setup software to configure the router. Use of this software is described in the "Using Cisco Router Web Setup to Configure the Router" section on page 2-47.

Figure 2-3 Connecting a Terminal or PC to the Router's Console Port



1	RJ-45 end of the light blue cable that connects to console port on the router	**2**	DB-9 connector on the other end of the cable that connects to the terminal or PC

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

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

Step 2 Connect the DB-9 connector at the other end of the cable to the terminal or PC.

If you have experience configuring Cisco routers and prefer to use the CLI, refer to the *Cisco 800 Series Routers Software Configuration Guide* for instructions on configuring the router.

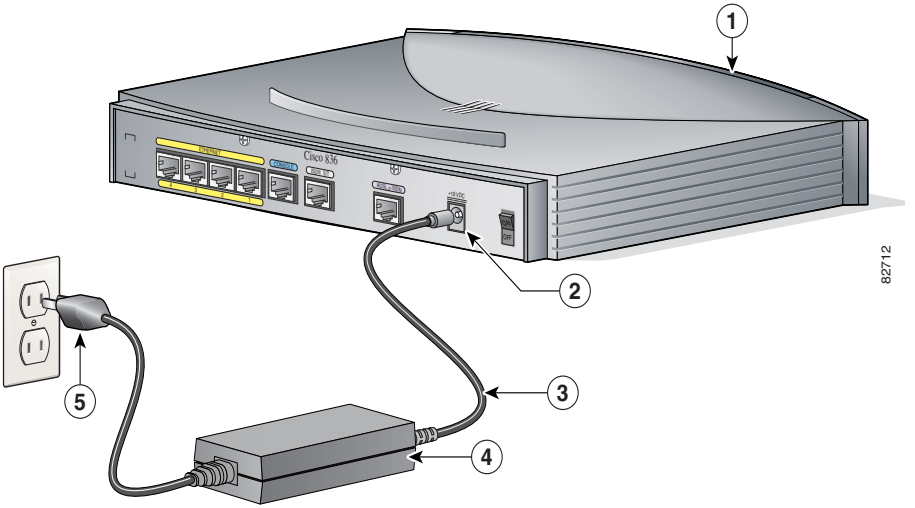
Connecting the AC Adapter

To connect the power supply, follow the steps given after Figure 2-4. (Figure 2-4 depicts a Cisco 836 router, but the process also applies to the Cisco SOHO 96 router. The connection steps apply to both the Cisco 836 router and the Cisco SOHO 96 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).**

Figure 2-4 Connecting the AC Adapter



1	Cisco 836 router	**4**	Desktop power supply
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.

Note Be sure to use the power supply that was shipped with your router. Although you may be able to connect another Cisco power supply to your router, that power supply may not provide all the features that are provided by the power supply that shipped with your router.

Connecting ISDN Port to ISDN Service Provider

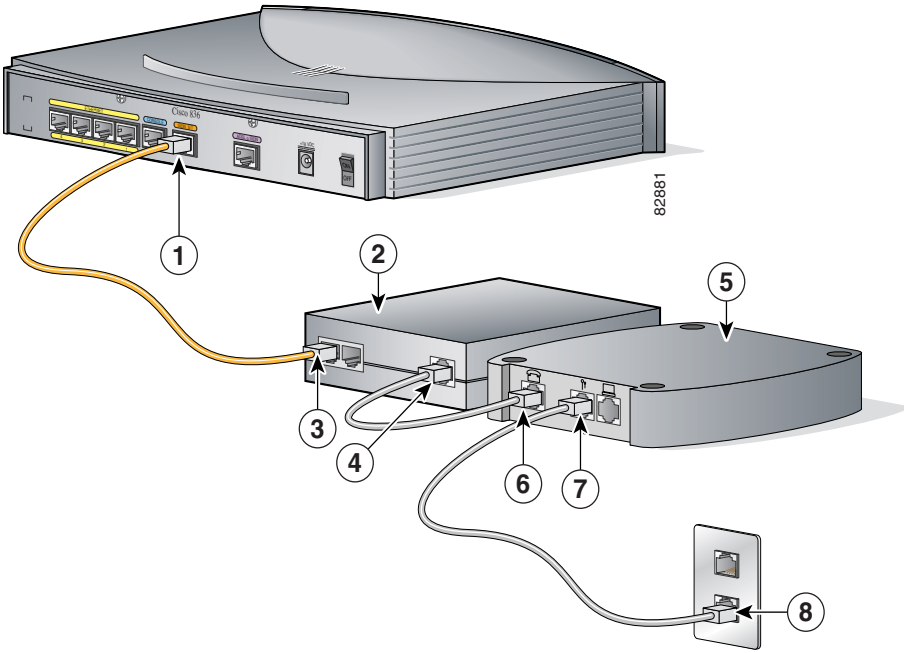
The Cisco 836 router is designed with the dial backup function, allowing you to connect the ISDN S/T port to the ISDN service provider as a backup link to the WAN port in case the ADSL service goes down. The Cisco 836 router supports both the dial backup and remote management features; the Cisco SOHO 96 router supports only the remote management function.

Note To make a connection to the ISDN service, you need to connect the orange ISDN S/T cable to the ISDN port.

To connect the router's ISDN S/T port to the ISDN service provider, follow the steps given after Figure 2-6. This procedure applies to both the Cisco 836 router and the Cisco SOHO 96 router.

Note The user must provide the two unshielded Category 5 cables that connect the NT1 box to the splitter and that connect the splitter to the wall jack.

Figure 2-5 Connecting the ISDN Port to the ISDN Service Provider



1	ISDN S/T port on the Cisco 836 router	**5**	ADSL splitter provided by ADSL service provider
2	Network termination 1 (NT1) box	**6**	Other end of the first unshielded Category 5 cable that connects to the telephone line port on the splitter
3	RJ-45 end of the ISDN S/T cable that connects the ISDN S/T port to the S/T port on the NT1 box	**7**	One end of the second unshielded Category 5 cable that connects the telecommunication service port on the splitter.
4	One end of the first unshielded Category 5 cable that connects the U port on the NT1 box to the splitter	**8**	Other end of the second unshielded Category 5 cable connects to the wall jack

Perform the following steps to connect the Cisco 836 router's ISDN port to the ISDN service provider:

Step 1 Connect one end of the orange ISDN S/T cable to the Cisco 836 router's ISDN S/T port.

Step 2 Connect the other end of the orange ISDN S/T cable to the S/T port on the NT1 box.

Step 3 Connect the first unshielded Category 5 cable from the U port on the NT1 box to the telephone line port on the splitter.

Step 4 Connect the second unshielded Category 5 cable from the telecommunication service port on the splitter to the wall jack to allow a link to the network service provider.

Note There are RJ-45 connectors at both ends of the default orange ISDN S/T cable used in the preceding procedure. However, an RJ-45 to RJ-11 ISDN S/T cable is available upon request if the wall jack at the site requires an RJ-11 connector. Contact your router reseller for the appropriate cable.

Note The cable for connecting the NT1 box to the splitter is not included in the accessory kit. The user must provide this cable.

Using the Router LEDs to Check Links

Use the LEDs on the front of the router to check the links between the router and any attached Ethernet devices or telephone. See Table 1-2 on page 1-5 to verify the link status of devices attached to the Cisco 836 and Cisco SOHO 96 routers.

Mounting the Router

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

- Table or other horizontal surface
- Wall or other vertical surface

Mounting on a Table

Place the router firmly on a table, and perform the tasks identified in the "Installing the Router" section on page 2-33.

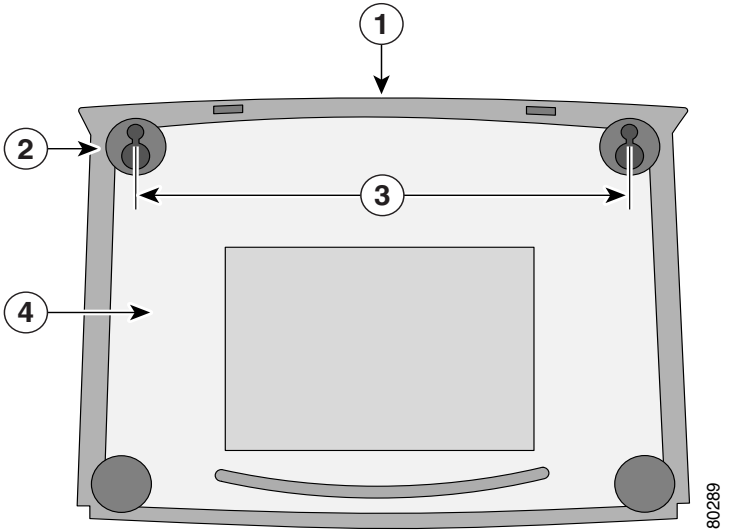
Caution Do not cover or obstruct the router vents, which are located on the sides of the router. If the vents are covered or obstructed, overheating could occur and cause damage to the router.

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 2-6 Wall-Mounting Brackets (Bottom of Router)



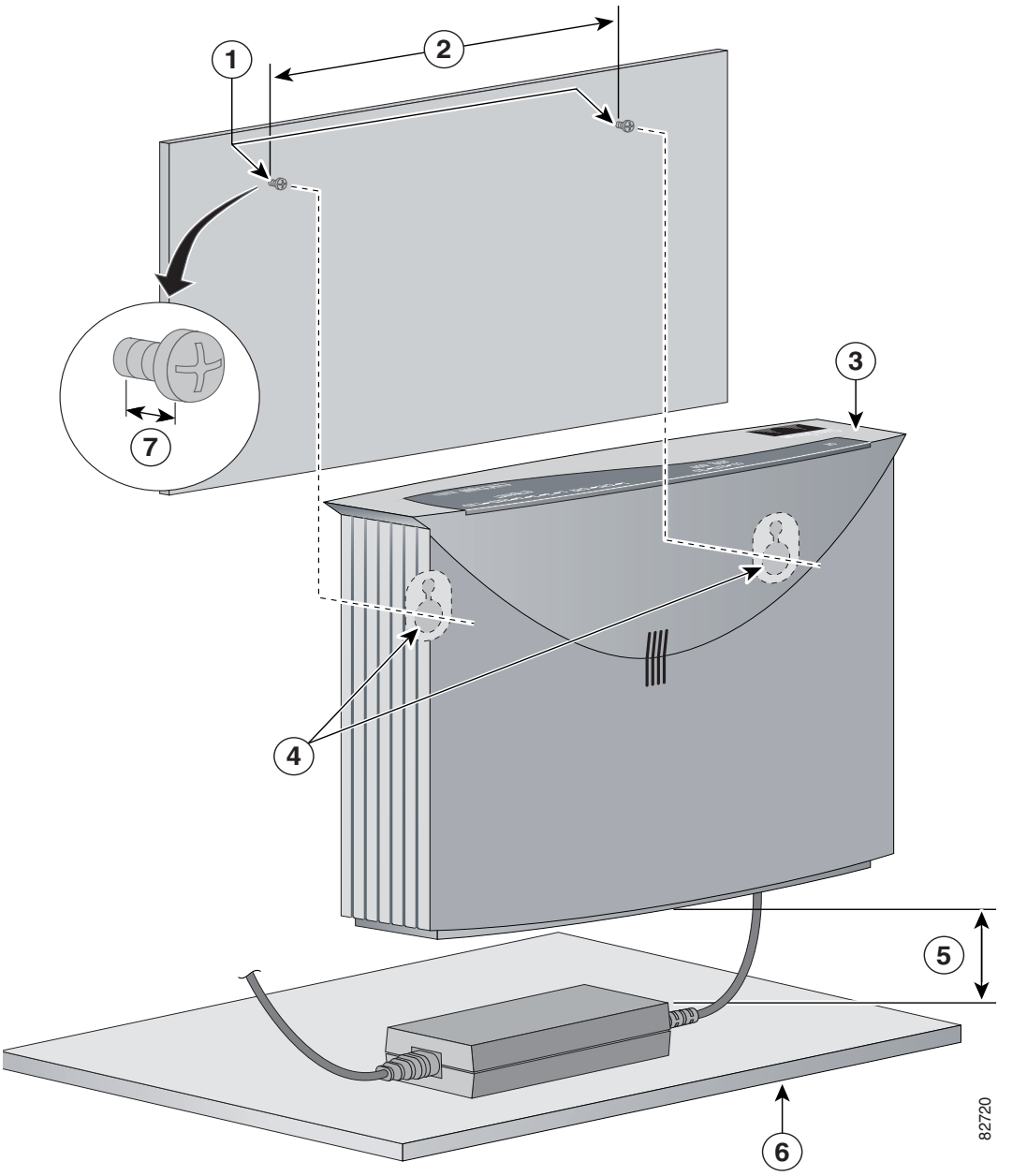
1	Front panel of router	**3**	Distance between two mounting brackets (7 5/8 in. or 19.35 cm)
2	Mounting bracket	**4**	Bottom of router

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

- Because you will use the LEDs as status and problem indicators, the LEDs on the front panel must face upward and must be easily visible.
- The back panel must face downward to reduce strain on the cable connections.
- The power supply must rest on a horizontal surface such as the floor or a table. If the power supply is not supported, it could place strain on the power supply cable and cause it to disconnect from the connector on the router back panel.

To mount the router on a wall, follow the steps given after Figure 2-7.

Figure 2-7 Mounting the Router on a Wall



1	Two number-six, 3/4-in. screws	**5**	Maximum distance between the router and the power supply (6 ft [1.8 m])
2	Distance between the two screws (7 5/8 in. [19.35 cm])	**6**	Horizontal surface for placing the power supply
3	Cisco 836 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 centimeters) apart into a wall and 1/8 inch (0.32 centimeter) from the wall.

Step 2 Hang the router on the screws as shown in Figure 2-8.

Step 3 Place the power supply on a horizontal surface.

Configuring the Router

When you finish installing the router, you must configure the router software. First, check the PC configurations to ensure that all the connected PCs will be able to communicate with the router. Then configure the router software, using the web interface.

Checking the PC Configuration

Each PC that is connected to the router must be configured to use TCP/IP and to obtain its IP address automatically. Follow these steps to configure each PC that is running Microsoft Windows NT or Microsoft Windows 95, 98, 2000, Windows ME, and Windows XP. 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 and 98; it is shown as a cable icon in the Protocol window on Microsoft Windows NT. If the icon is not visible, click **Add**, and add the Microsoft TCP/IP protocol.

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. Check **Obtain an IP address from a DHCP server** if it is not checked. The IP address and Subnet mask fields should be grayed out.

Step 5 Click **OK** to accept all changes and exit this window. 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.

Using Cisco Router Web Setup to Configure the Router

Cisco strongly recommends that inexperienced network administrators use the Cisco Router Web Setup application that has been installed on the router. To use this application, complete the following steps:

Step 1 Start, or restart, one of the PCs connected to the router through Ethernet port 1, 2, 3, or 4.

Step 2 Open a web browser. Make sure that your 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 universal resource locator (URL) **http://10.10.10.1**. The CRWS home page will appear in one or two minutes.

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 your PC is automatically configured to receive an IP address. Follow the instructions in the *Cisco Router Web Setup Troubleshooting Guide* section, 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 equal to or greater than 2; 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 there is no name in the field, return to Step 3 in the "Checking the PC Configuration" section on page 2-46 and add TCP to the list of protocols. Then return to the "Using Cisco Router Web Setup to Configure the Router" section on page 2-47, and complete the procedure.

Step 4 If you have no special configuration requirements, click the **Router Setup** link on the home page, and then click **Easy Setup**. (This may appear as **Quick Setup** on some models.) Then, enter the username and password provided to you by your Internet service provider, and click **Apply**.

Step 5 If you need to configure special features such as Network Address Translation (NAT), click the appropriate links on the home page, and complete the configuration screens.

Step 6 Click the **Password** link on the home page, and set a password for the router.

Step 7 Click the **Test Connection** link on the home page, and allow the connection to be tested.

Step 8 Select **Start/Run**, and type **winipcfg** in the Open field of the Run window. When the IP Config window appears, click **Release** to release the PC's IP address. Then click **Renew** to renew the PC's IP address.

Alternatively, open the Run window, and enter **ipconfig /release** to release the PC's IP address.Then enter **ipconfig /renew** to renew the IP address of the PC.

Step 9 Open a web browser on the PC, and connect to a website.

The router installation is complete when you have connected to a website.

Troubleshooting

This chapter describes symptoms of problems that could occur with the Cisco 836 or Cisco SOHO 96 routers, identifies the likely underlying problems, and provide steps for solving the problems. The problems are grouped as follows:

- Problems during first startup
- Problems after router is running

For information about problems that could occur with the software, refer to the *Cisco 800 Series Routers 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, make sure that you have the following information available:

- Router model and serial number (on the back panel)
- Maintenance agreement or warranty information
- Date you received the 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: 1. Make sure that all connections to and from the power supply are secure. 2. Make sure that the power outlet has power. 3. Make sure that the power switch is set to ON. 4. If the problem continues, the power supply might be faulty. Contact your Cisco reseller.
No connection to Ethernet device. (Ethernet 1 LED is off.)	A cable-related problem: • Improperly connected cable • Damaged cable	Perform the following tasks: 1. To make sure that you have cabled the device correctly, see the "Connecting a Terminal or PC to the Router's Console Port (Optional)" section on page 2-12. 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.
No connection to ADSL link. (The CD LED on the front panel is off for a long time.)	Wrong cable	• To make sure that you are using the correct cable, see Appendix A, "Specifications and Cables."

Table 3-1 Problems During First Startup (continued)

Symptom	Problem	Solutions
No connection to ADSL link. (The CD LED on the front panel is off for a long time.)	Improperly connected cable	• Make sure that you have connected the ADSL cable properly. See the "Connecting an ADSL Line" section on page 2-10. • Make sure that the ADSL port is connected to the correct port on the ISDN splitter. • Make sure that the connectors at both ends of the cable are securely seated.

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. (Ethernet LED 1, 2, 3, or 4 is off or blinking.)	A cable-related problem: • Disconnected cable • Damaged cable	• Make sure that the Ethernet port is not configured to be administratively down. • Make sure that the device connected to the Ethernet port is connected, powered on, and properly configured. • Make sure that the connectors at both ends of the cable are secure. • 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.

Table 3-2 Problems After Router Is Running (continued)

Symptom	Problem	Solutions
Connection to the ADSL line is intermittent or lost. (The CD LED on the front panel is off.)	A cable-related problem: • Disconnected cable • Damaged cable	• Make sure that the Ethernet port is not configured to be administratively down. • Make sure that the device connected to the Ethernet port is connected, powered on, and properly configured. • Make sure that the connectors at both ends of the cable are secure. • 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 ADSL line or WAN port is loose. (The CD LED and the Ethernet LED 1, 2, 3, or 4 on the front panel are off).	Problem with ADSL or WAN service	• Check all passwords and device names to make sure that they are correct. • Contact your ADSL line or WAN service provider to determine whether there is a problem with the ADSL or WAN service.

Specifications and Cables

This appendix provides system, port, and cabling specifications for the Cisco 836 and Cisco SOHO 96 series routers.

This chapter provides information on the following topics:

System Specifications

Table A-1 outlines the system specifications for the Cisco 836 and Cisco SOHO 96 series 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)	1.48 lb. (0.67 kg)

Table A-1 System Specifications (continued)

Description	Design Specification
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 (4,570 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 (3,000 m)
Router Power	
AC input voltage	100 to 250 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 and SOHO Series Router* document that shipped with your router.

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

Port Connector Pinouts

This section provides pinouts for the following connectors:

- ADSL—See Table A-2.
- Console (for connecting a terminal or PC)—See Table A-3.

Table A-2 ADSL Cable Pinouts (RJ-11-to-RJ-45)

RJ-11 Pin	Function	RJ-45 Pin	Function
1	Unused	1	Unused
2	Unused	2	Unused
3	Ring	3	Unused
4	Tip	4	Ring
5	Unused	5	Tip
6	Unused	6	Unused
		7	Unused
		8	Unused

Table A-3 Console Connector Pinouts (RJ-45-to-DB-9)

RJ-45 Pin	Function	DB-9 Pin
1	RTS	8
2	DTR	6
3	TXD	2
4	GND	5
5	GND	5
6	RXD	3
7	DSR	4
8	CTS	7

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

- 9600 baud
- Eight 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 cables
- Crossover cables

Ethernet Cable Specifications

Table A-4 lists 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 higher

Maximum Cable Distance

Table A-5 provides the maximum distance of Ethernet and telephone 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)

Numerics

A

B

C

D

E

F

H

I

L

M

N

P

R

S

T

U

V

W