Cisco 827 and SOHO 77 Routers Hardware Installation Guide

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Customer Order Number: DOC-786854=
Text Part Number: 78-6854-03

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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.)

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Cisco 827 and SOHO 77 Routers Hardware Installation Guide

Preface

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

Audience

This guide is intended for service technicians who have no experience installing routers but whose goal is to connect routers to networks as quickly as possible.

Organization

This guide is organized as follows:

- Chapter 1, "Product Overview"—Describes the Cisco 827 and SOHO 77 routers and their features.
- Chapter 2, "Installation"—Provides information on preinstallation, mounting, connecting, and configuring the router, and verification of router connections.
- Chapter 3, "Troubleshooting"—Describes problems with the router and 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.

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 827 Routers and SOHO 77 Hardware Installation Guide*, the documentation for the Cisco 827 routers includes the following:

- *Cisco 820 Series and SOHO Series Router Cabling and Setup Quick Start Guide*
- *Cisco 827 Routers Software Configuration Guide*
- *Cisco 827 Routers Release Notes*
- *Software Enhancements for the Cisco 800 Routers and SOHO 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 827 and SOHO 77 routers can connect a corporate telecommuter or small office to an Internet service provider (ISP) over asymmetric digital subscriber line (ADSL) lines to the following types of networks:

- Corporate LANs
- Internet

The routers are capable of bridging and multiprotocol routing between LAN and WAN ports.

Features

Table 1-1 summarizes the features of the Cisco 827 series and SOHO 77 series routers.

Table 1-1 Cisco 827 and SOHO 77 Routers Features Summary

Feature	Routers	Description
10BASE-T Ethernet port(s)	All	Provides connection to 10BASE-T (10-Mbps) Ethernet networks. Compatible with 10/100-Mbps devices.
ADSL port	All	Provides connection to ADSL network.
Telephone ports	Cisco 827-4V	Provides connection to telephone or fax machine connected to telephone services through ADSL line.
Flash memory	• Cisco 827-4V • Cisco 827H • Cisco 827 • SOHO 77H • SOHO 77	• 12 MB of Flash memory. • 12 MB of Flash memory. • 12 MB of Flash memory. • 8 MB of Flash memory. • 8 MB of Flash memory.
Dynamic RAM (DRAM)	• Cisco 827-4V • Cisco 827H • Cisco 827 • SOHO 77H • SOHO 77	• 16 MB of DRAM and 8-MB DIMM card. • 16 MB of DRAM. Supports 4-,8-, or 16-MB DIMMS. • 16 MB of DRAM. • 16 MB of DRAM. • 16 MB of DRAM.
Ease of installation	All	Color-coded ports and cables to reduce the chance of error.
Cisco IOS software	All	Supports Cisco IOS software.
Cisco Router Web Setup	All	Provides a web-based software tool for basic configurations.
Console port	All	Provides connection to terminal or PC for troubleshooting and for software configuration using command-line interface.
Cable lockable	• Cisco 827-4V • Cisco 827 • SOHO 77	Provides complementary feature for physically securing router.
Locking power connector	All	Locks power connector in place.
Wall-mounting feature	All	Brackets on router bottom provide for mounting the router on a wall or vertical surface.

Router Overview

Table 1-2 tells how many Ethernet and telephone ports each Cisco 827 router and SOHO 77 router has.

Table 1-2 Router Ports

Router	Ethernet Ports	Telephone Ports
Cisco 827-4V	1	4
Cisco 827H	4	0
Cisco 827	1	0
SOHO 77H	4	0
SOHO 77	1	0

Front Panels

Figure 1-1 through Figure 1-3 show the front panels of the Cisco 827 routers.

Figure 1-1 Cisco 827-4V Front Panel

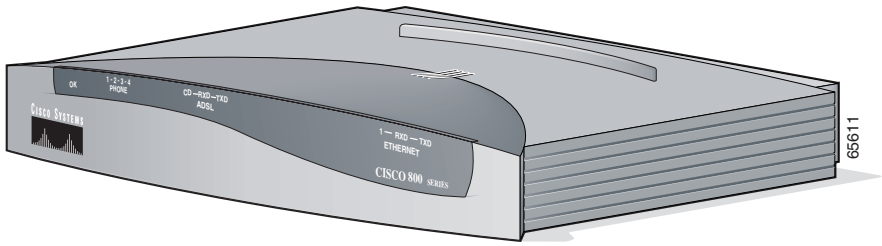


Figure 1-2 Cisco 827H Front Panel

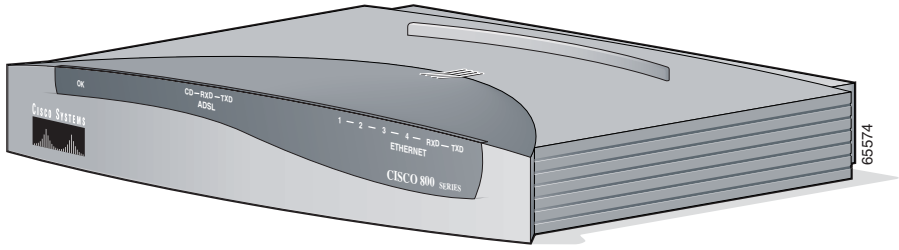


Figure 1-3 Cisco 827 Front Panel

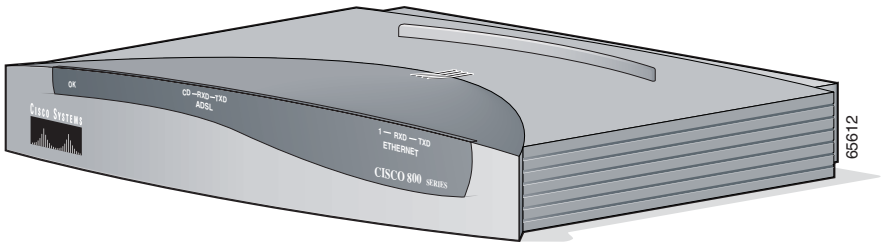


Figure 1-4 and Figure 1-5 show the front panels of the SOHO 77 routers.

Figure 1-4 SOHO 77H Front Panel

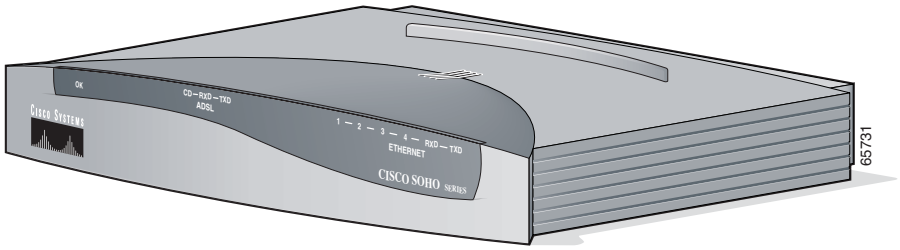
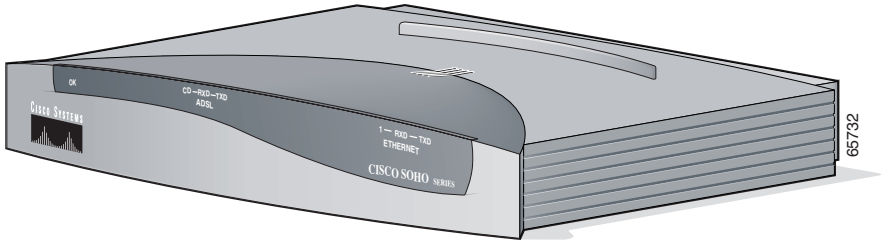


Figure 1-5 SOHO 77 Front Panel



Back Panels

Figure 1-6 through Figure 1-8 show the back panels of the Cisco 827 routers.

Figure 1-6 Cisco 827-4V Back Panel

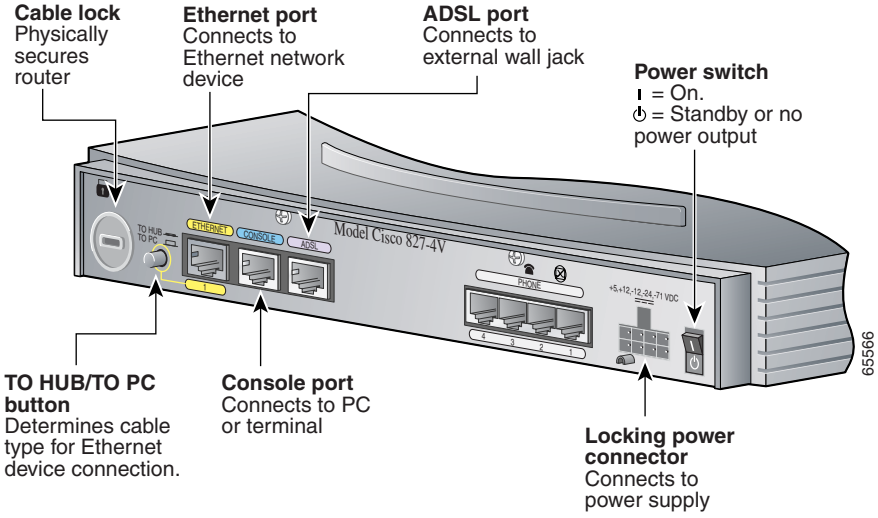


Figure 1-7 Cisco 827H Back Panel

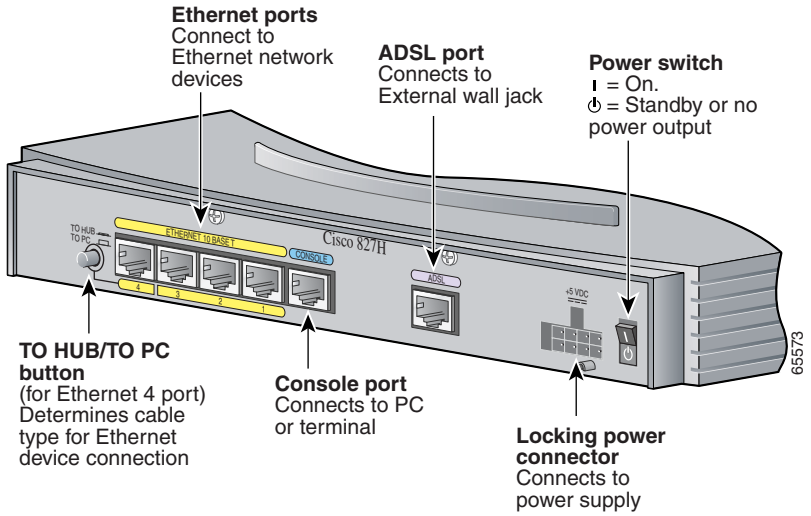


Figure 1-8 Cisco 827 Back Panel

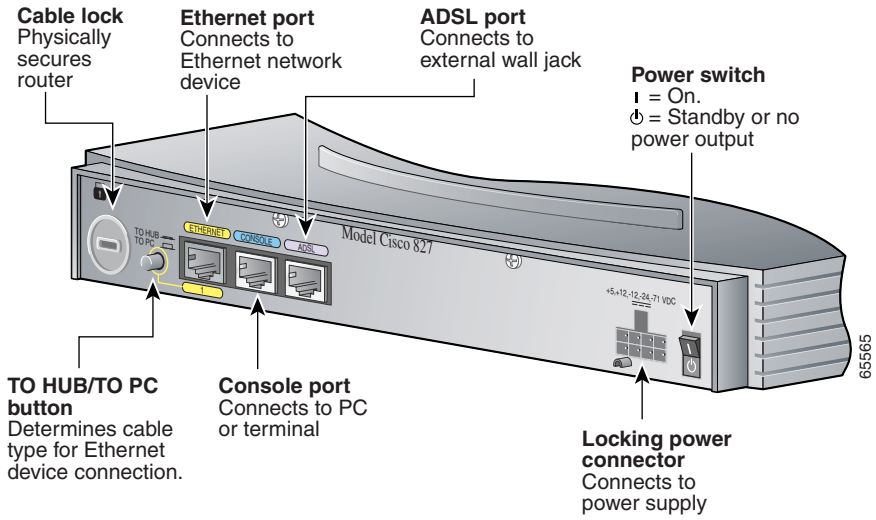


Figure 1-9 and Figure 1-10 show the back panels of the SOHO 77 routers.

Figure 1-9 SOHO 77H Back Panel

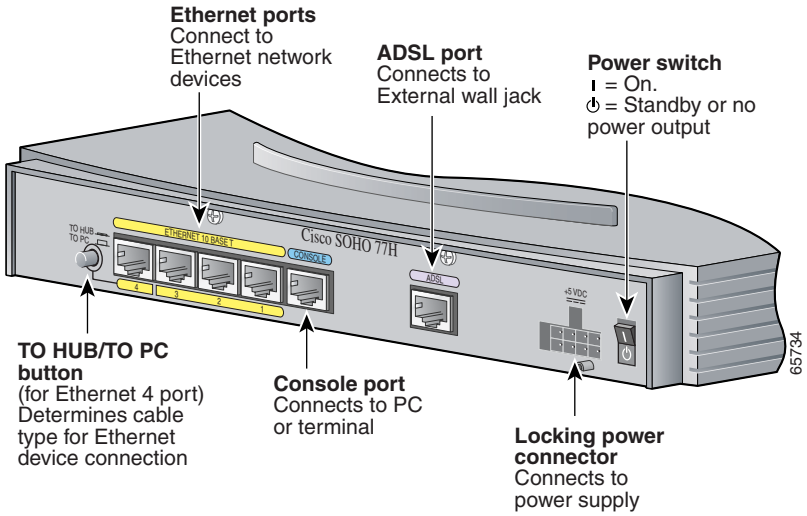
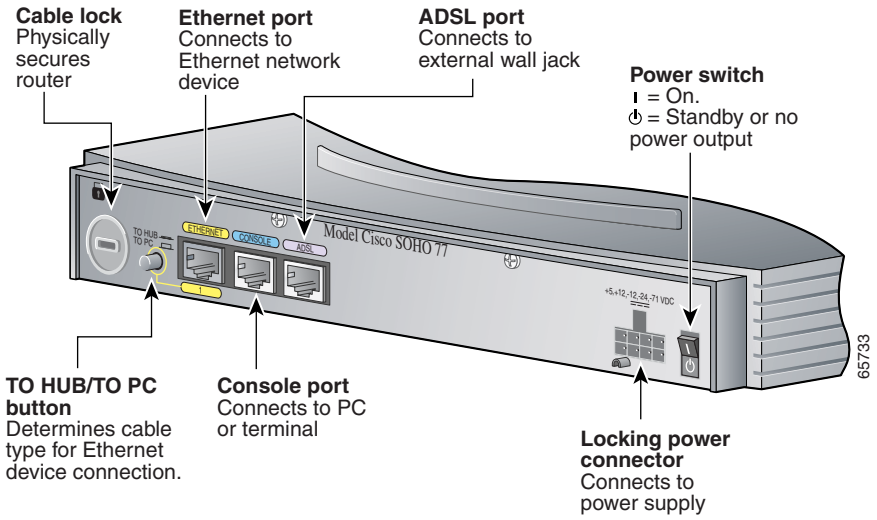


Figure 1-10 SOHO 77 Back Panel



LEDs

Table 1-3 summarizes the functions of the LEDs on the Cisco 827-4V router.

Table 1-3 LED Functions on Cisco 827-4V Router

LED	Color	Function
OK LED	Green	On when power is supplied to the router and when the router completes the self-test procedure and begins operating.
PHONE 1, 2, 3, 4	Green	On when basic telephone service is in use.

Table 1-3 LED Functions on Cisco 827-4V Router (continued)

LED	Color	Function
ADSL CD	Green	On when the ADSL device is physically connected. Blinks when the connection has a problem. See Chapter 3, "Troubleshooting."
ADSL RXD	Green	Blinks when an ADSL port receives data.
ADSL TXD	Green	Blinks when an ADSL port sends data.
ETHERNET 1	Green	On when Ethernet device is connected. Blinks when the connection has a problem. See Chapter 3, "Troubleshooting."
ETHERNET RXD	Green	Blinks when an Ethernet port receives a packet.
ETHERNET TXD	Green	Blinks when an Ethernet port sends a packet.

Table 1-4 summarizes the function of the LEDs on the Cisco 827H router and the SOHO 77H router.

Table 1-4 Functions of LEDs on the Cisco 827H Router and SOHO 77H Router

LED	Color	Function
OK LED	Green	On when power is supplied to the router and when the router completes the self-test procedure and begins operating.
ADSL CD	Green	On when the ADSL device is physically connected. Blinks when the connection has a problem. See Chapter 3, "Troubleshooting."
ADSL RXD	Green	Blinks when the ADSL port receives data.
ADSL TXD	Green	Blinks when the ADSL port sends data.
ETHERNET 1, 2, 3, 4	Green	On when Ethernet device is connected. Blinks when the connection has a problem. See Chapter 3, "Troubleshooting."
ETHERNET RXD	Green	Blinks when an Ethernet port receives a packet.
ETHERNET TXD	Green	Blinks when an Ethernet port sends a packet.

Table 1-5 summarizes the function of the LEDs on the Cisco 827 router and SOHO 77 router.

Table 1-5 LED Functions on Cisco 827 Router and SOHO 77 Router

LED	Color	Function
OK LED	Green	On when power is supplied to the router and when the router completes the self-test procedure and begins operating.
ADSL CD	Green	On when the ADSL device is physically connected. Blinks when the connection has a problem. See Chapter 3, "Troubleshooting."
ADSL RXD	Green	Blinks when an ADSL port receives data.
ADSL TXD	Green	Blinks when an ADSL port sends data.
ETHERNET 1	Green	On when Ethernet device is connected. Blinks when the connection has a problem. See Chapter 3, "Troubleshooting."
ETHERNET RXD	Green	Blinks when an Ethernet port receives a packet.
ETHERNET TXD	Green	Blinks when an Ethernet port sends a packet.

Installation

This chapter provides information on the following topics:

Preparing for Installation

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

Safety

This section provides safety warnings and electrostatic and router damage information for the Cisco 827 routers and SOHO 77 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 the power 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 **Ultimate disposal of this product should be handled according to all national laws and regulations.**

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.**

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 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 observe the warnings in the preceding section, "Safety."

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 (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)
• ADSL cable (lavender)
• Ethernet cable (yellow)
• Product documentation

To prepare for installation, follow these steps:

Step 1 Obtain the ADSL line.

Step 2 Remove the yellow Ethernet cable, light blue console cable, lavender ADSL cable, product documentation, and Cisco 800 Documentation CD-ROM from the Open Me First 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, server, workstation, or PC.

Step 3 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 (this cable is usually provided with the device).

Step 4 If you plan to configure the software using a terminal or PC connected to the router, provide the terminal or PC.

Step 5 If you plan to use the cable lock feature available on the Cisco 827, SOHO 77, and Cisco 827-4V routers, you must provide a Kensington or equivalent locking cable.

Preventing Router Damage

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, "Specifications and Cables," for cabling specifications. If this appendix does not provide specifications for a particular cable, we strongly recommend ordering 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.**

Mounting the Router

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

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

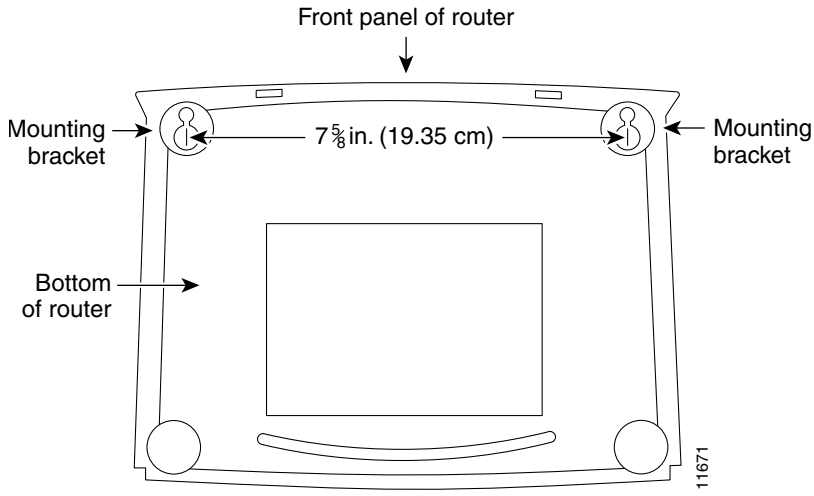
Mounting on a Table

Do not cover or obstruct the router vents, which are located on the sides of 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 2-1 shows the mounting brackets.

Figure 2-1 Wall-Mounting Brackets (Bottom of Router)



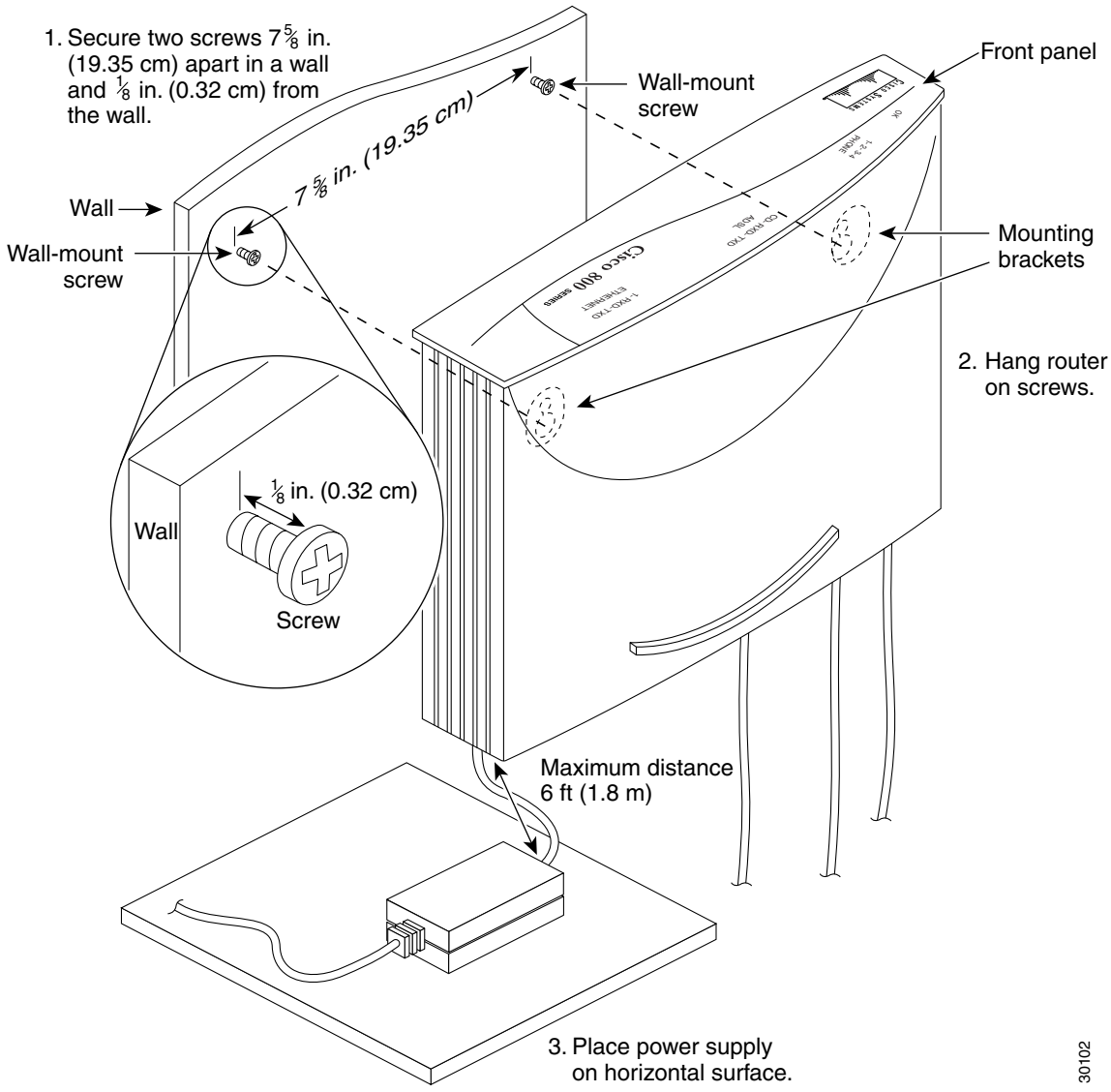
Caution If you are mounting the router on drywall, use two hollow wall-anchors (1/8-in. with 5/16-in. drill bit, or M3 with 8-mm drill bit) to secure the screws. If the screws are not properly anchored, the strain of the network cable connections could pull the router from the wall.

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

- Because the LEDs are used as status and problem indicators, the LEDs on the front panel must face upward and 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, strain on the power supply cable could cause it to disconnect from the connector on the router back panel.

To mount the router, follow the steps in Figure 2-2. The last page of this manual provides a template for measuring the distance between the screws.

Figure 2-2 Mounting Router on a Wall



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 an optional analog telephone or fax machine.

4. Connect a terminal or PC to the router for software configuration using the command-line interface (CLI) or for troubleshooting.
5. Connect the router to the power source.
6. Verify the links using the router LEDs.

Connect Ethernet Devices

Table 2-2 lists the Ethernet devices you can connect to Cisco 827, Cisco 827-4V, and SOHO 77 routers; the connections for each device; and the settings of the router TO HUB/TO PC button (the default setting is IN).

Table 2-2 Ethernet Device Connections for Cisco 827, Cisco 827-4V, and SOHO 77 Routers

Network Device Connected To Router	Router Port	Ethernet Cable Type[1]	Router HUB/NO HUB Button Setting	Network Device Button Setting[2]
Hub with equivalent to router TO HUB/TO PC button	ETHERNET port 1	Straight-through	IN	MDI (IN)
Hub with equivalent to router TO HUB/TO PC button	ETHERNET port 1	Straight-through	OUT	MDI-X (OUT)
Hub without equivalent to router TO HUB/TO PC button	ETHERNET port 1	Straight-through	OUT	MDI-X (OUT)
Server, PC, or workstation	ETHERNET port 1	Straight-through	OUT	–

1. Cisco provides a yellow straight-through cable. You provide crossover or additional straight-through cables. For details on cables, see Appendix A, "Specifications and Cables."
2. Hub vendors choose different names for the button that controls the cable selection. This table uses the Cisco 1528 Micro Hub 10/100 with an MDI/MDI-X button as an example. Determine the button name and setting for your particular hub. Refer to your hub documentation for details.

Table 2-3 lists the Ethernet devices you can connect to Cisco 827H and SOHO 77H routers, the connections for each device, and the settings of the router TO HUB/TO PC button (the default setting is IN).

Table 2-3 Ethernet Device Connections for Cisco 827H and SOHO 77H Routers

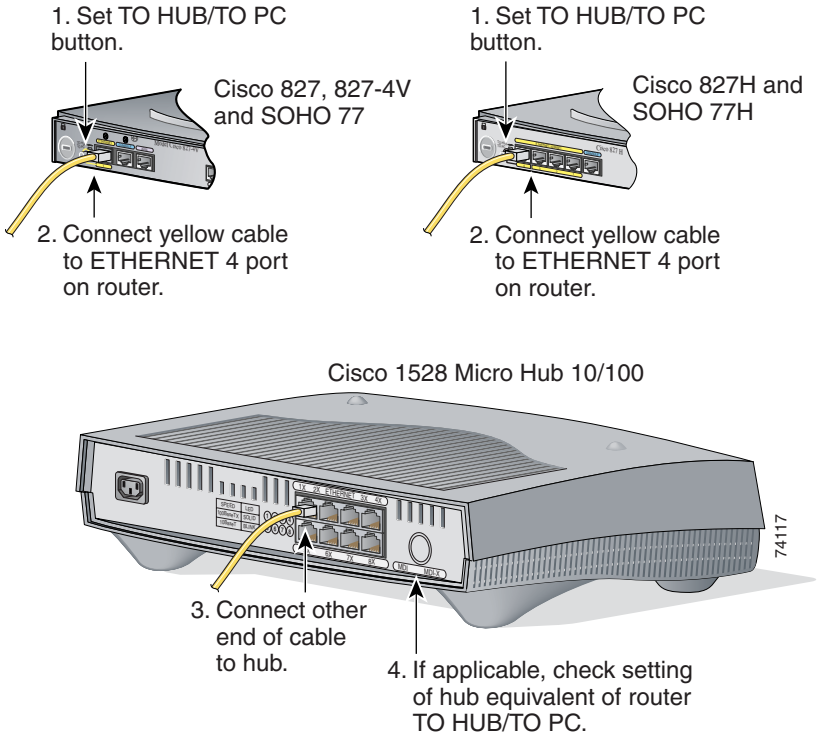
Network Device Connected to Router	Router Port	Ethernet Cable Type[1]	Router TO HUB/TO PC Button Setting	Network Device Button Setting[2]
Hub with equivalent to router TO HUB/TO PC button	ETHERNET port 4	Straight-through	IN	MDI (IN)
Hub with equivalent to router TO HUB/TO PC button	ETHERNET port 4	Straight-through	OUT	MDI-X (OUT)
Hub without equivalent to router TO HUB/TO PC button	ETHERNET port 4	Straight-through	OUT	MDI-X (OUT)
Server, PC, or workstation	ETHERNET port 4	Straight-through	OUT	–
Hub with equivalent to router TO HUB/TO PC button	ETHERNET port 1, 2, 3	Crossover	N/A	MDI (IN)
Hub with equivalent to router TO HUB/TO PC button	ETHERNET port 1, 2, 3	Straight-through	N/A	MDI-X (OUT)
Hub without equivalent to router TO HUB/TO PC button	ETHERNET port 1, 2, 3	Crossover	N/A	MDI-X (OUT)
Server, PC, or workstation	ETHERNET port 1, 2, 3	Straight-through	N/A	–

1. Cisco provides a yellow straight-through cable. You provide crossover or additional straight-through cables. For cable specifications, see Appendix A, "Specifications and Cables."
2. Hub vendors choose different names for the button that controls the cable selection. This table uses the Cisco 1528 Micro Hub 10/100 with an MDI/MDI-X button as an example. Determine the button name and setting for your particular hub. See your hub documentation for details.

Connecting Hubs

Before connecting a hub to the router, see Table 2-2 to determine how to set the router TO HUB/TO PC button. To connect a hub to the router, follow the steps in Figure 2-3.

Figure 2-3 Connecting a Hub to the Router



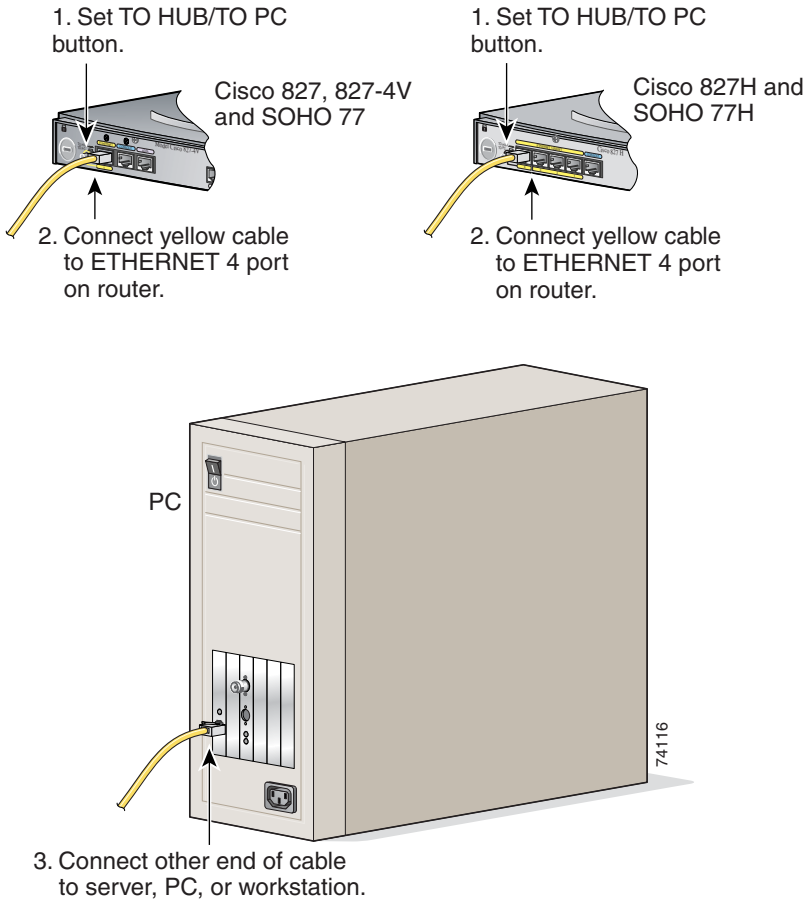
To verify the hub connection, check that the port's Ethernet LED on the front panel is on after you complete the router installation.

Connecting a Server, PC, or Workstation

Before connecting a server, PC, or workstation to the router, see Table 2-2 on page 2-7 to determine how to set the router TO HUB/TO PC button.

To connect a server, PC, or workstation to the router, follow the steps in Figure 2-4 on page 2-10.

Figure 2-4 Connecting a Server, PC, or Workstation to the Router



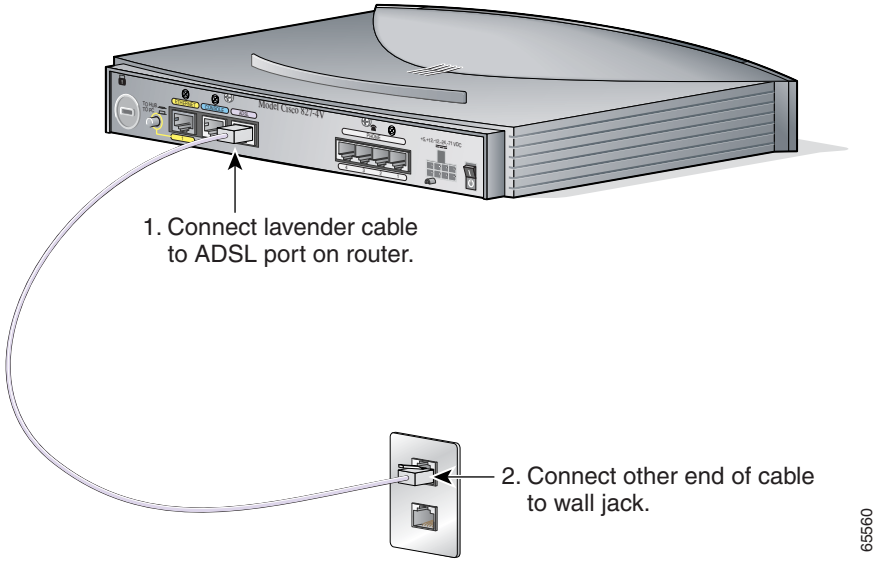
To verify the connection, check that the Ethernet 1 LED is on after you complete the router installation.

Connect an ADSL Line

The procedure for connecting an ADSL line depends on the router and, in some cases, on the location. Figure 2-5 shows how to connect the ADSL line to a cable wall jack. (Figure 2-5 depicts a Cisco 827-4V router, but the process is the same for Cisco 827, Cisco 827H, SOHO 77, and SOHO 77H routers.)

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

Figure 2-5 Connecting an ADSL Line to a Wall Jack

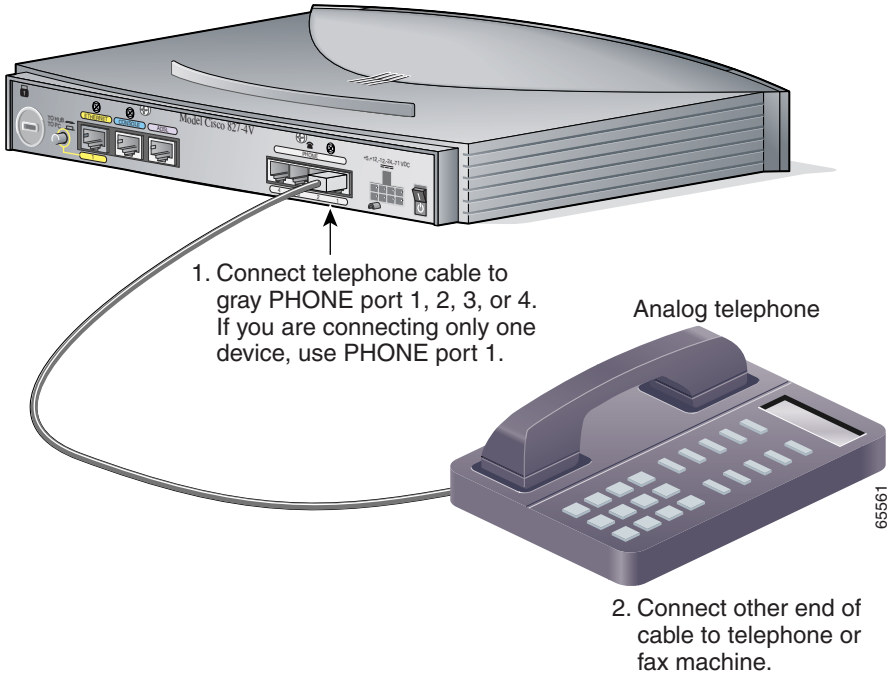


Connect an Analog Telephone or Fax Machine (Cisco 827-4V Routers Only)

You can connect as many as four devices such as analog push button telephones or fax machines to a Cisco 827-4V router. Each device is connected to basic telephone services through the color-coded gray phone ports.

To connect an analog telephone or fax machine, follow the steps in Figure 2-6. You must provide the telephone cable for connecting each device. The telephone cable is usually provided with the device.

Figure 2-6 Connecting an Analog Telephone or Fax Machine



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 (indicated by a clicking sound) by an incoming call.**

Caution Do not connect the router telephone ports to the telephone wall jack. These ports are not meant for direct connection to a public network. This connection can damage your router.

The gray phone ports are RJ-11 connectors. If you are outside North America, you must buy and attach adapters that allow telephones or fax machines to be connected to these RJ-11 connectors. In some countries, these adapters need additional electronics so that the telephones or fax machines will work properly with the router phone ports. For example, in the United Kingdom, you must buy an adapter that also provides a *master socket,* which causes incoming calls to ring the connected devices. For information on recommended master sockets, see Table 2-4.

Table 2-4 Recommended Vendors for Master Sockets Required for United Kingdom

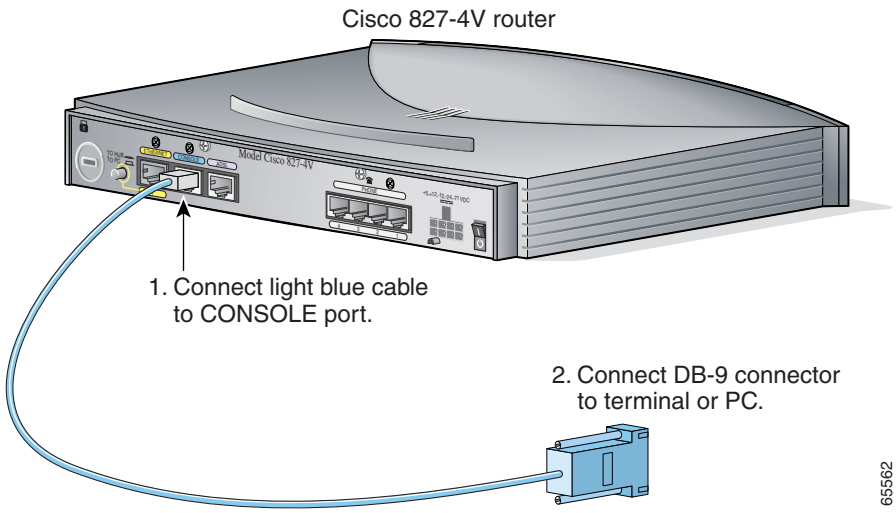
Vendor Name	Product Name	For More Information
RS Components	Avro Pacific Telephone Ring Adapter (part number 303-2000)	http://www.rswww.com/
Tandy	Export Adapter (part number 2797057)	http://www.tandy.co.uk/

Connect 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 command line interface (CLI) or for troubleshooting. To connect a terminal or PC, follow the steps in Figure 2-7. (Figure 2-7 depicts a Cisco 827-4V, but the process applies to connecting all Cisco 827 series routers and SOHO 77 series routers.)

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 2-16.

Figure 2-7 Connecting a Terminal or PC



If you have experience configuring Cisco routers and prefer to use the CLI, refer to the *Cisco 827 Router Software Configuration Guide* for instructions on configuring the router.

Connect the AC Adapter

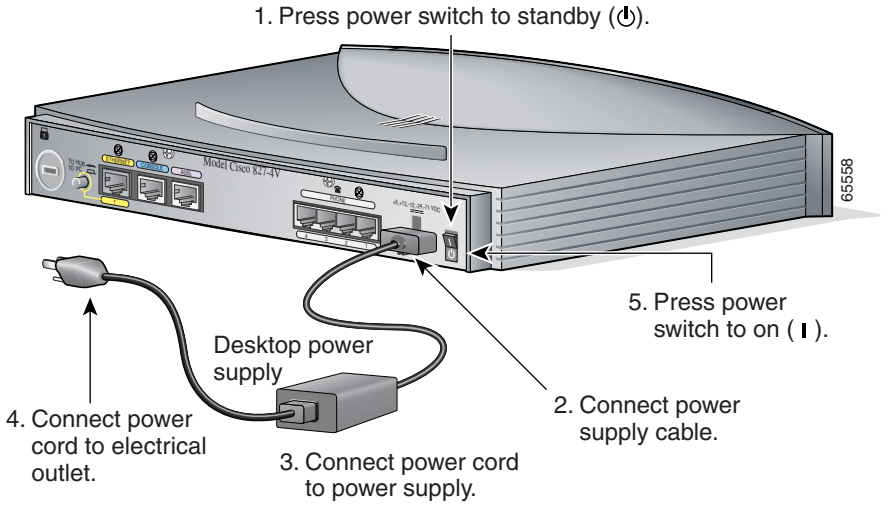
To connect the power supply, follow the steps in Figure 2-8. (Figure 2-8 depicts a Cisco 827-4V router, but the process is the same for the Cisco 827, Cisco 827H, SOHO 77, and SOHO 77H routers.)

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

Figure 2-8 Connecting the AC Adapter



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 the power supply that shipped with your router does.

Using the Router LEDs to Check Links

Use the LEDs on the front of the router to check the links between the router and attached Ethernet devices or telephones. Use Table 2-5 to verify the link status of devices attached to Cisco 827, Cisco 827-4V, and SOHO 77 routers.

Table 2-5 LED Patterns for Clsco 827, Cisco 827-4V and SOHO 77 Routers

Power/Link	LEDs to Check	Normal Patterns
Power	OK	On
To hub, server, PC, or workstation	ETHERNET 1, ETHERNET RXD, and ETHERNET TXD	• ETHERNET 1 is on when the Ethernet is physically connected. • ETHERNET RXD blinks when an Ethernet port receives an Ethernet packet. • ETHERNET TXD blinks when an Ethernet port sends an Ethernet packet.
To analog telephone or fax machine (827-4V only)	PHONE 1, PHONE 2, PHONE 3, PHONE 4[1]	On when telephone or fax machine is in use.

1. You can also pick up the handset and listen for a dial tone.

Use Table 2-6 to verify the link status of devices attached to Cisco 827H and SOHO 77H routers.

Table 2-6 LED Patterns for Cisco 827H and SOHO 77H Routers

Power/Link	LEDs to Check	Normal Patterns
Power	OK	On
To hub, server, PC, or workstation	ETHERNET 1, 2, 3, or 4; ETHERNET RXD; and ETHERNET TXD	• ETHERNET LED is on when the Ethernet is physically connected to the appropriate port. • RXD LED blinks when an Ethernet port receives an Ethernet packet. • TXD LED blinks when an Ethernet port sends an Ethernet packet.

Configuring the Router

When you have finished installing the router, you must configure the router software. First, check PC configurations to ensure that all 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 the Transmission Control Protocol/Internet Protocol (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 or 98. 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 greyed out.

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

Step 6 To reboot the PC, click **Yes** if you are prompted.

For more information on how to configure TCP/IP, refer to the *Cisco Router Web Setup Troubleshooting Guide*, which is available on the Cisco 800 and SOHO Series Product Documentation CD.

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 Type in 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. Be sure that the TO HUB/TO PC button is in the correct position. The button is in the correct position if the LED for the port on the front of the router is on.
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*, which is available on the Cisco 800 and SOHO Series Product Documentation CD.
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 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 "Checking the PC Configuration," add TCP to the list of protocols. Then return to "Using Cisco Router Web Setup to Configure the Router, page 2-16," 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 user name 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 827 or SOHO 77 routers, identifies the likely underlying problems, and provides steps for solving the problems. The problems are grouped into the following areas:

- Problems during first startup
- Problems after the router has been up and running

For more information about problems that could occur with the software, refer to the *Cisco 827 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 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 power switch.

Table 3-1 Problems During First Startup

Symptom	Problem	Solutions
All LEDs, including OK LED, are off.	No power to router.	Perform the following steps: 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 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 steps: 1. To make sure that you have cabled the device correctly, see Figure 2-3 or Figure 2-4 in Chapter 2, "Installation." 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.
	• Improperly set router TO HUB/TO PC button or hub equivalent of TO HUB/TO PC button.	• To make sure that you have set buttons correctly, see Table 2-2 on page 2-7 if you are installing a Cisco 827, Cisco 827-4V, or SOHO 77 router. See Table 2-3 on page 2-8 if you are installing a Cisco 827H or SOHO 77H router.
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, refer to Appendix A, "Specifications and Cables."
	• Improperly connected cable.	• To make sure that you have connected the ADSL cable properly, see Figure 2-5 in Chapter 2, "Installation." • 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 1, 2, 3, or 4 LED is off.)	• A cable-related problem: – Disconnected cable. – Damaged cable.	Perform the following steps: 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 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 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.
	• Problem with ADSL line or WAN service.	• 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 827 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. (5.1 x 24.6 x 21.6 cm)
Weight (does not include desktop power supply)	• Cisco 827-4V router: 1.5 lb. (0.68 kg) • Cisco 827H router: 1.48 lb. (0.67 kg) • Cisco 827 router: 1.48 lb. (0.67 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)
Router Power (Cisco 827, 827-4V, and SOHO 77)	
AC input voltage	100 to 250 VAC
Frequency	50 to 60 Hz
Power consumption	29W
Router Power (Cisco 827H and SOHO 77H)	
AC input voltage	100 to 240 VAC
Frequency	50 to 60 Hz
Power consumption	15W

Table A-1 System Specifications (continued)

Description	Design Specification
Telephone Port Power (Cisco 827-4V)	
Voltage	-24V and -71V

For information on regulatory compliance, refer to the *Regulatory Compliance and Safety Information for Cisco 827 Routers* 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:

- Ethernet—See Table A-2.
- Console (for connecting a terminal or PC)—See Table A-3.
- Telephone—See Table A-4.
- ADSL—See Table A-5
- Power—See Table A-6 and Table A-7.

Table A-2 shows the Ethernet connector pinouts for the Cisco 827-4V, Cisco 827, Cisco 827H, SOHO 77, and SOHO 77H routers.

Table A-2 Ethernet Connector Pinouts (RJ-45)

Pin	Function (TO HUB/TO PC Button – IN Position)	Function (TO HUB/TO PC Button – OUT Position)
1	TX+	RX+
2	TX–	RX–
3	RX+	TX+
4	Unused	Unused
5	Unused	Unused
6	RX–	TX–
7	Unused	Unused
8	Unused	Unused

Table A-3 shows the Ethernet connector pinouts for the Cisco 827-4V, Cisco 827, Cisco 827H, SOHO 77, and SOHO 77H routers.

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
- Eight data bits
- No parity
- One stop bit

Table A-4 shows telephone connector pinouts for the Cisco 827-4V router.

Table A-4 Cisco 827-4V Router Telephone Connector Pinouts (RJ-11)

Pin	Function
1	Unused
2	Tip
3	Ring
4	Unused

Table A-5 shows ADSL connector pinouts for the Cisco 827-4V, Cisco 827, Cisco 827H, SOHO 77, and SOHO 77H routers.

Table A-5 ADSL Connector Pinouts (RJ-11)

Pin	Function
1	Loopback to pin 6
2	Unused
3	Tip
4	Ring
5	Unused
6	Loopback to pin 1

Table A-6 shows the power connector pinouts for the Cisco 827, Cisco 827-4V, and SOHO 77 routers.

Table A-6 Cisco 827, Cisco 827-4V, and SOHO 77 Power Connector Pinouts

Pin	Function
1	ROF
2	RTN
3	+12
4	–12
5	+5
6	RTN
7	–71
8	–24

Table A-7 shows the power connector pinouts for the Cisco 827H and SOHO 77H routers.

Table A-7 Cisco 827H and SOHO 77H Power Connector Pinouts

Pin	Function
1	ROF
2	RTN
3	AC_Lost
4	Unused
5	+5VF
6	RTN
7	Unused
8	Unused

Cabling Specifications

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

- Straight-through cables
- Crossover cables

This section also provides information on Ethernet and telephone cable distance limitations. (Telephone cable connects a device to a telephone port.)

Ethernet Cable Specifications

Table A-8 lists the specifications for straight-through and crossover Ethernet cables.

Table A-8 Ethernet Cable Specifications

Type	Category	Shielding
10BASE-T	Category 3 or 5	Shielded twisted-pair (STP)
10BASE-T	–	Unshielded twisted-pair (UTP)

Maximum Cable Distances

Table A-9 provides the maximum distances of Ethernet and telephone cables that you can use to connect equipment to the router.

Table A-9 Maximum Cable Distances

Cable	Maximum Distance
Ethernet cables	328 ft (100 m)
Telephone cable	500 ft (152 m)

Numerics

A

B

C

D

E

F

H

I

L

M

N

P

R

S

T

U

V

W