Preparing for Installation

This chapter, which describes the tasks you must perform *before* starting actual system installation, contains the following sections:

- Safety Recommendations
- General Site Requirements
- Installation Checklist
- Site Log
- Tools and Equipment Required
- Preparing to Make Connections
- Network Connection Considerations
- Inspecting the Router

Safety Recommendations

Follow these guidelines to ensure general safety:

- Keep the chassis area clear and dust-free during and after installation.
- Put the removed chassis cover in a safe place.
- Keep tools away from walk areas where you or others could trip over them.
- Do not wear loose clothing that could get caught in the chassis. Fasten your tie or scarf and sleeves.
- Wear safety glasses when working under any conditions that might be hazardous to your eyes.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.

Safety with Electricity

Follow these guidelines when working on equipment powered by electricity.

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 you serious burns or weld the metal object to the terminals of power and ground.

- Locate the emergency power-off switch in the room in which you are working. Then, if an electrical accident occurs, you can act quickly to shut the power off.

- Before working on the router, turn off the power and unplug the power cord.

- Disconnect all power before doing the following:

  — Installing or removing a chassis

  — Working near power supplies

  — Performing a software upgrade

- Do not work alone when potentially hazardous conditions exist.

- Never assume that power has been disconnected from a circuit. Always check.

- Look carefully for possible hazards in your work area, such as moist floors, ungrounded power extension cables, and missing safety grounds.

- If an electrical accident occurs, proceed as follows:

  — Use caution; do not become a victim yourself.

  — Turn off power to the router.

  — If possible, send another person to get medical aid. Otherwise, assess the victim's condition and then call for help.

  — Determine if the person needs rescue breathing or external cardiac compressions; then take appropriate action.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. It occurs when electronic printed circuit cards are improperly handled and can result in complete or intermittent failures.

Always follow ESD prevention procedures when removing and replacing cards. Ensure that the chassis is electrically connected to earth ground. Wear an ESD wrist strap, ensuring that it makes good skin contact. Connect the clip to an unpainted chassis frame surface to safely channel unwanted ESD voltages to ground. To properly guard against ESD damage and shocks, the wrist strap and cord must operate effectively.

If no wrist strap is available, ground yourself by touching the metal part of the chassis.

General Site Requirements

This section describes the requirements your site must meet for safe installation and operation of your router. Ensure that your site is properly prepared before beginning installation.

The router can be used as desktop or rack-mounted equipment in a data processing or lab environment. Optional rack-mount kits are available. Instructions come with the rack-mount kit.

Note For desktop mounting, use the rubber feet provided. They protect the chassis and provide a nonskid surface for the chassis.

Site Environment

The location of individual chassis and the layout of your equipment rack or wiring room are extremely important for proper router operation. Equipment placed too close together, inadequate ventilation, and inaccessible panels can cause router malfunctions, and shutdowns and can make router maintenance difficult.

When planning your site layout and equipment locations, use the following precautions to help avoid equipment failures and reduce the likelihood of environmentally caused shutdowns. If you are currently experiencing shutdowns or unusually high errors with your existing equipment, these precautions may help you isolate the cause of failures and prevent future problems.

Preventive Site Configuration

The following precautions will help you plan an acceptable operating environment for your router and will help to avoid environmentally caused equipment failures:

- Remember that electrical equipment generates heat. Ambient air temperature might not be adequate to cool equipment. Ensure that the room in which you operate your router has adequate air circulation.

- Always follow the ESD-prevention procedures in the section "Preventing Electrostatic Discharge Damage" to avoid damage to equipment. Damage from static discharge can cause immediate or intermittent equipment failure.

- Ensure that the chassis cover is secure. The chassis is designed to allow cooling air to flow within. An open chassis allows air leaks, which may in turn interrupt and redirect the flow of cooling air across internal components.

Equipment Racks

The following tips will help you plan an acceptable equipment rack configuration:

- Enclosed racks must have adequate ventilation. Ensure that the rack is not overly congested because each unit generates heat. An enclosed rack should have louvered sides and a fan to provide cooling air.

- In an enclosed rack with a ventilation fan in the top, excessive heat generated by equipment near the bottom of the rack can be drawn upward and into the intake ports of the equipment above.

- Baffles can help to isolate exhaust air from intake air, which also helps to draw cooling air through the chassis. The best placement of the baffles depends upon the air flow patterns in the rack, which can be found by trial and error.

- When equipment installed in a rack fails, particularly in an enclosed rack, try operating the equipment by itself, if possible. Turn off other equipment in the rack (and in adjacent racks) to allow the unit under test a maximum of cooling air and clean power.

- When mounting a chassis in an open rack, ensure that the rack frame does not block the intake or the exhaust ports. If the chassis is installed on slides, check the position of the chassis when it is seated all the way into the rack.

Power Supply

Following are features of the router power supply:

- Autoselects either 110-volt or 220-volt operation.

- Includes a 6-foot electrical power cord. A label near the power cord indicates the correct voltage and current draw for your unit.

Check the power at your site to ensure that you are receiving "clean" power (free of spikes and noise). Install a power conditioner if necessary.

Install proper grounding to avoid damage from lightning and power surges.

Installation Checklist

The Installation Checklist (see Figure 2-1) lists all the procedures for initial hardware installation of new routers. Make a copy of this checklist and mark your entries as each procedure is completed. Include a copy of the checklist for each router in your Site Log. (See the "Site Log" section.)

Installation Checklist

for site

_____

Task	Verified by	Date
Installation Checklist copied		
Background information placed in Site Log		
Required tools available		
Additional equipment available		
Environmental specifications verified		
Site power voltages verified		
Installation site prepower check completed		
Date router received		
Date router documentation received		
Chassis components verified		
Software version verified		
Initial electrical connections established		
ASCII terminal attached to console port		
Signal distance limits verified		
Startup sequence steps completed		
Initial router operation verified		

Router name _____

Chassis serial number _____

Figure 2-1 Installation Checklist

Site Log

The Site Log provides a historical record of all actions relevant to the router. Keep it in a common place near the chassis where anyone who performs tasks has access to it. Use the Installation Checklist to verify steps in the installation and maintenance of your router. Site Log entries might include the following:

- Installation progress—Make a copy of the Installation Checklist and insert it into the Site Log. Make entries as each procedure is completed.

- Upgrades and removal or replacement procedures—Use the Site Log as a record of ongoing router maintenance and expansion history. Each time any procedure is performed on the router, update the Site Log to reflect the following:

    — Configuration changes

    — Maintenance schedules and requirements

    — Corrective maintenance procedures performed

    — Intermittent problems

    — Related comments

Tools and Equipment Required

You need the following tools and equipment to install the router:

- ESD cord and wrist strap

- Screwdrivers: No. 1 and No. 2 Phillips

Preparing to Make Connections

When viewed from the rear of the chassis, the power connector and switch appear on the right side. The ports for the router console, auxiliary (AUX), LAN (Token Ring or Ethernet), and serial line appear to the left of the power connector and switch. The configuration depends on which model you purchase. Refer to Figures 2-2 and 2-3 for rear views of the router.

The router console port is the top, left female 25-pin D connector on the back of the chassis. The auxiliary port is located directly below the console port.
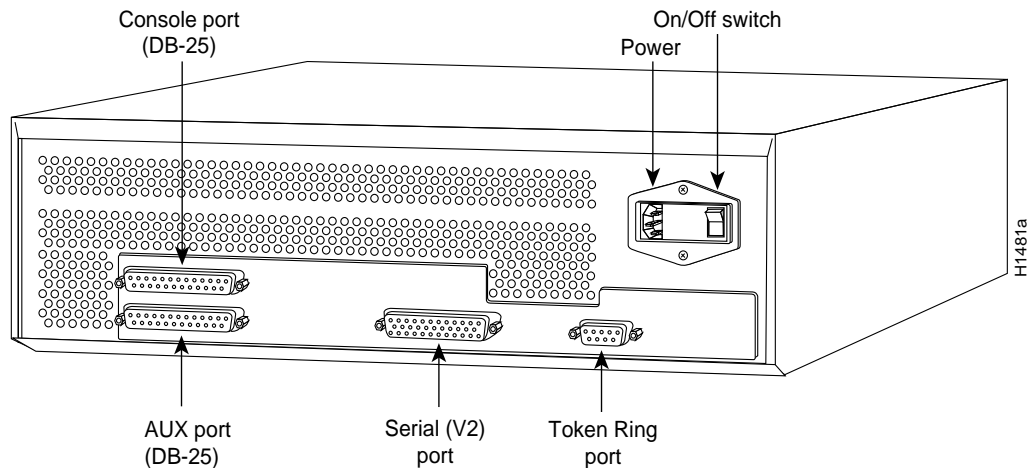
Console port
(DB-25)

On/Off switch
Power

H1481a

AUX port
(DB-25)

Serial (V2)
port

Token Ring
port

Figure 2-2   Router—Rear View with Token Ring and Serial Ports

Console port
(DB-25)

On/Off switch
Power

H1483a

AUX port
(DB-25)
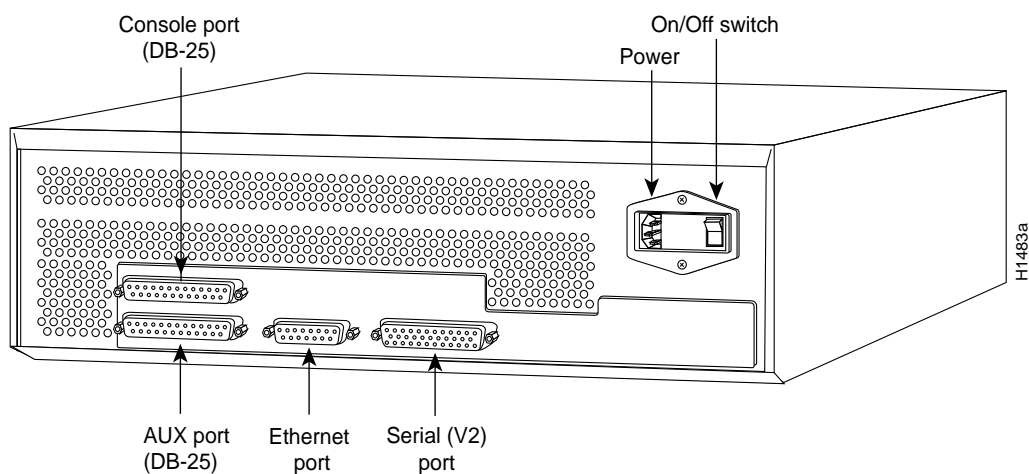
Ethernet
port

Serial (V2)
port

Figure 2-3   Router—Rear View with Ethernet and Serial Ports

RS-232 Connections

When setting up your router, consider distance limitations and potential electromagnetic interference (EMI) as defined in the Electronic Industries Association's (EIA) Recommended Standard 232-C.

Distance Limitations

As with all signaling systems, RS-232 signals can travel a limited distance at any given bit rate; generally, the slower the data rate, the greater the distance. Table 2-1 shows the standard relationship between bit rate and distance.

Table 2-1   RS-232 Speed and Distance Limitations

Data Rate (Baud)	Distance (Feet)	Distance (Meters)
2400	200	60
4800	100	30
9600	50	15
19200	25	7.6
38400	12	3.7

Note   RS-232 is often used in violation of these specifications. If you understand the electrical problems that can arise and can compensate for them, you might be able to get good results at distances greater than those shown in Table 2-1; however, do so at your own risk. We recommend that you stay within the standard-defined distance.

Interference Considerations

When you run cables for any significant distance in an electromagnetic field, interference can occur between the field and the signals on the cables. This fact has two implications for the construction of terminal plant cabling:

- The plant cabling can emanate radio interference if it is unshielded for too long a distance.

- Strong electromagnetic interference, especially as caused by lightning or radio transmitters, can destroy the RS-232 drivers and receivers in the server.

If you use twisted-pair cables in your plant cabling with a good distribution of grounding conductors, the plant cabling is unlikely to emit radio interference. When exceeding the distances listed in Table 2-1, ground the conductor for each data signal.

To predict and remedy strong electromagnetic interference, consult experts in radio frequency interference (RFI).

If you have cables exceeding the distances in Table 2-1, or if you have cables that pass between buildings, you must give special consideration to the effect of lightning strikes or ground loops. The electromagnetic pulse caused by lightning or other high-energy phenomena can easily couple enough energy into unshielded conductors to destroy electronic devices. If your site has experienced problems of this sort, consult experts in lightning suppression and shielding.

Most data centers cannot resolve the infrequent but potentially catastrophic problems just described without pulse meters and other special equipment. Take precautions to avoid these problems by providing a properly grounded and shielded environment, with special attention to issues of electrical surge suppression.

Console and Auxiliary Port Considerations

Before connecting the console and auxiliary ports, read the following sections.

Console Port Connections

Each router includes a female DB-25 connector asynchronous router console port wired as a data communications equipment (DCE) device. The default parameters for this port follow:

- 9600 baud

- 8 data bits

- No parity generated or checked

- 1 stop bit

Table A-1 lists the pinouts for the console port.

Auxiliary Port Connections

A male DB-25 connector auxiliary port (labeled *AUX* on the chassis rear) is included on all router units. (See Figure 2-2 and Figure 2-3.) The AUX port is a data terminal equipment (DTE) port to which you can attach an RS-232 connector from a channel service unit/data service unit (CSU/DSU) or protocol analyzer for network access. Table A-2 lists the pinouts for this auxiliary console port.

Network Connection Considerations

Read this section in preparation to making network connections.

Ethernet Connections

On systems with an Ethernet port, the Ethernet port is located to the right of the console and auxiliary ports. (See Figure 2-3.) Standard 15-pin Ethernet transceiver cables and IEEE 802.3 attachment unit interface (AUI) cables can be used to connect to your network. An 18-inch transition cable is provided for each Ethernet port. This cable provides flexibility for alternate connection configurations. Three configurations are possible:

- The transition cable can be used by itself to connect the router directly to the media attachment unit (MAU) or transceiver. (See Figure 2-4.)

- The transition cable can be used as a flexible extension of the router Ethernet port. An Ethernet transceiver cable with a slide-latch-type connector (802.3 AUI cable) will mate with the female end of the 18-inch transition cable. (See Figure 2-5.)

- An Ethernet transceiver cable with thumbscrew connectors can be connected directly to the router port without using the 18-inch transition cable.
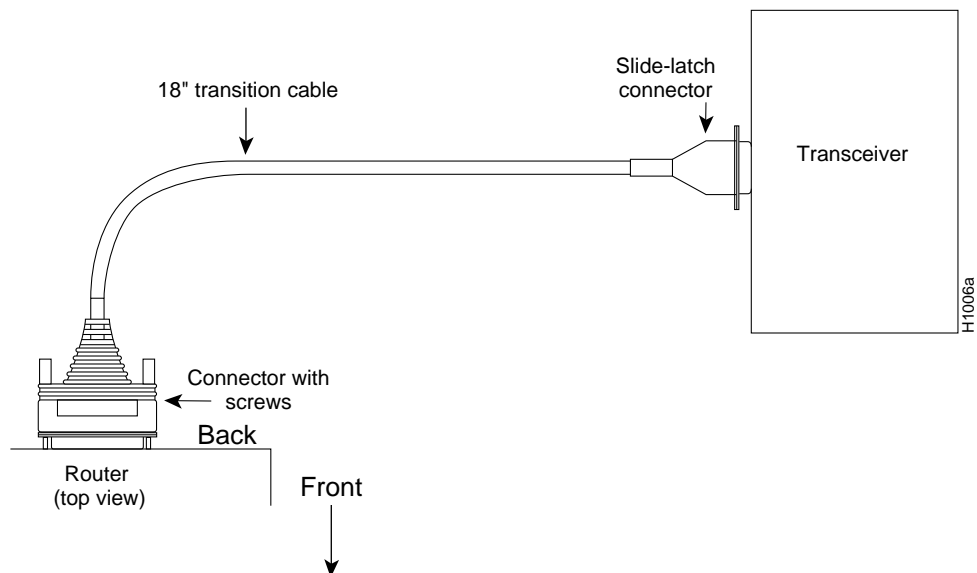
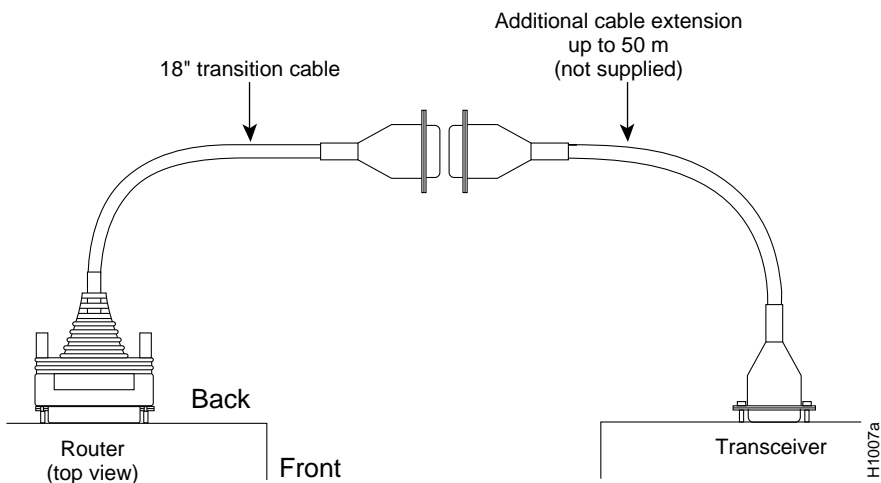**Figure 2-4 Router Transition Cable Connections**

Figure 2-5 Extending the Transceiver Cable from the Router Ethernet Port

Token Ring Connections

On systems with a Token Ring port, the Token Ring port is located to the right of the serial port. (See Figure 2-2.) Use a standard 9-pin Token Ring lobe cable (not supplied) to connect the router directly to a media attachment unit (MAU). (See Figure 2-6.)

Figure 2-6 Router Token Ring Cable Connections
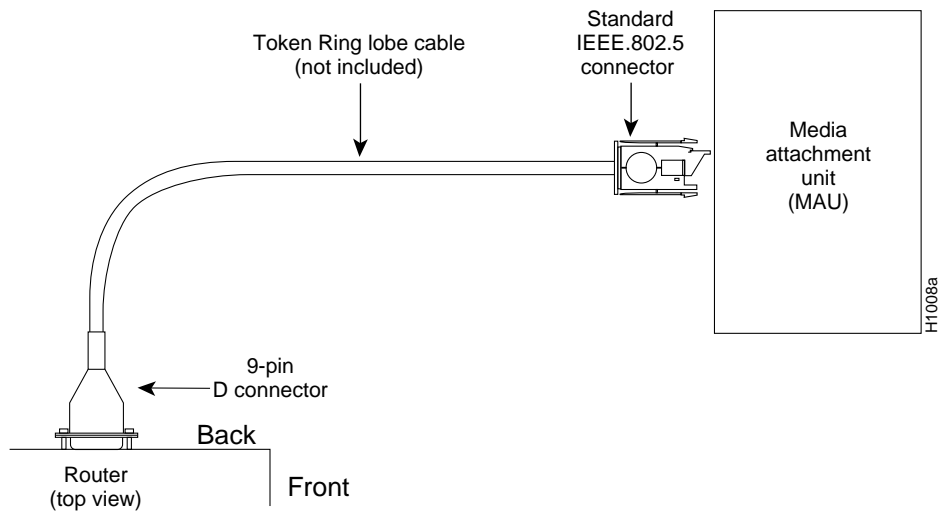
Serial Connections

The serial interface port is located to the left of the Token Ring or to the right of the Ethernet port on the back of the router. (See Figure 2-2 and Figure 2-3 respectively.) The serial port is a 50-pin, D-type subconnector. This port is DTE and requires that clocking be provided by a CSU/DSU or modem.

Note   The router is available as DTE only.

You must use a special serial cable (available from your router supplier) to connect the router to a modem or CSU/DSU. (See Figure 2-7.) See Appendix A for cable specifications.

Note   If the system's serial port is labeled with *V2* (see Figure 2-2 and Figure 2-3 for location), then for optimum performance, use the version of the cable with the part number ending in -02.
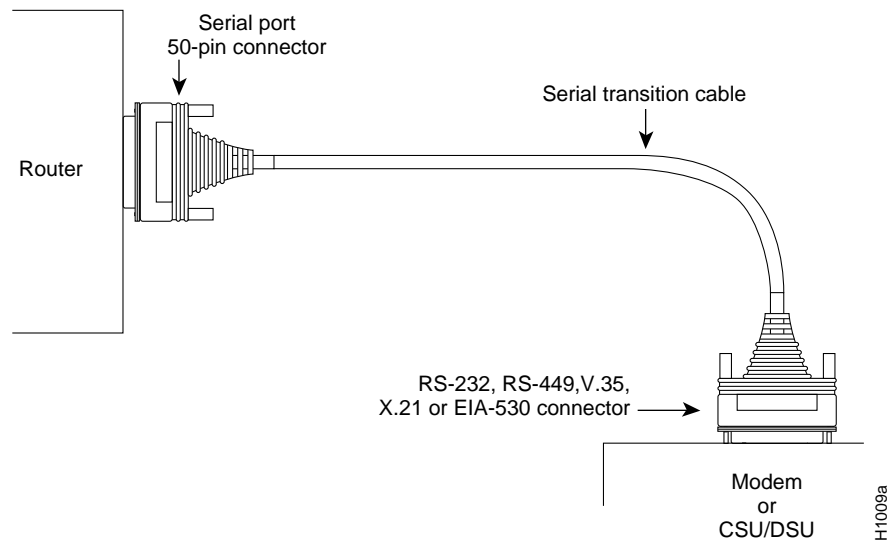
Figure 2-7   Router Serial Cable Connections

Inspecting the Router

Do not unpack the router until you are prepared to install it. If its final installation site will not be ready for some time, keep the chassis in its shipping container to prevent accidental damage. When you have determined where you want the router installed, proceed with the unpacking.

The router, cables, publications, and any optional equipment you ordered might be shipped in more than one container. When you unpack each shipping container, check the packing list to ensure that you received all of the following items:

- Router
- 6-foot power cord
- This publication and optional companion publications as specified by the customer order
- Network connection cables

Inspect all items for shipping damage. If anything appears damaged, or if you encounter problems when installing or configuring your router, contact a customer service representative.