CHAPTER 2

Preparing for Installation

This chapter provides safety information and describes the tasks you must perform *before* you install the Cisco 2518.

This chapter includes the following topics:

- Safety recommendations
- General site requirements
- Installation checklist
- Creating a site log
- Distance limitations
- Interference considerations
- Console and auxiliary port considerations
- Network connection considerations
- Inspecting the system
- Preparing your system for operation

Safety Recommendations

Follow these guidelines to ensure general safety:

- Keep the router/hub area clear and dust-free during and after installation.
- Keep tools away from walk areas where you and others could fall over them.

- Do not wear loose clothing that could get caught in the router/hub. Fasten your tie or scarf and roll up your sleeves.
- Wear safety glasses if you are 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.

Maintaining 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 serious burns or can weld the metal object to the terminals. To see this warning in multiple languages, see the appendix "Translated Safety Warnings."

- Locate the emergency power-off switch for the room in which you are working. Then, if an electrical accident occurs, you can quickly turn off the power.
- Before working on the system, turn off the power and unplug the power cord.

Warning Before working on a chassis or working near power supplies, unplug the power cord on AC units; disconnect the power at the circuit breaker on DC units. To see this warning in multiple languages, see the appendix "Translated Safety Warnings."

- Disconnect all power before doing the following:
  - Installing or removing a router/hub
  - Working near power supplies
  - Performing a software upgrade
- Do not work alone if potentially hazardous conditions exist.

Warning Do not work on the system or connect or disconnect cables during periods of lightning activity. To see this warning in multiple languages, see the appendix "Translated Safety Warnings."

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

Warning Do not touch the power supply when the power cord is connected. For systems with a power switch, line voltages are present within the power supply even when the power switch is off and the power cord is connected. For systems without a power switch, line voltages are present within the power supply when the power cord is connected. To see this warning in multiple languages, see the appendix "Translated Safety Warnings."

- 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 system.
  - If possible, send another person to get medical aid. Otherwise, assess the condition of the victim 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 components are improperly handled and can result in complete or intermittent failures.

Always follow ESD-prevention procedures when removing and replacing components. Ensure that the router/hub is electrically connected to earth ground. Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Connect the clip to an unpainted surface of the chassis frame 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 router/hub.

Caution For safety, periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms.

General Site Requirements

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

The Cisco 2518 is designed to be rack-mounted in a wiring closet, or placed on a desktop.

Warning Ultimate disposal of this product should be handled according to all national laws and regulations. To see this warning in multiple languages, see the appendix "Translated Safety Warnings."

Site Environment

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

When planning your site layout and equipment locations, use the precautions in the following sections to help avoid equipment failures and reduce the possibility of environmentally caused shutdowns. If you are currently experiencing shutdowns or unusually high errors with your existing equipment, these precautions can 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 the Cisco 2518 and will help you avoid environmentally caused equipment failures:

- Remember that electrical equipment generates heat. Ambient air temperature might not be adequate to cool equipment to acceptable operating temperatures without adequate circulation. Ensure that the room in which you operate your system has adequate air circulation.

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

Configuring 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.
- When mounting a router/hub in an open rack, ensure that the rack frame does not block the intake or the exhaust ports. If the router/hub is installed on slides, check the position of the router/hub when it is seated all the way into the rack.
- 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 it in the rack.
- Baffles can help to isolate exhaust air from intake air, which also helps to draw cooling air through the router/hub. The best placement of the baffles depends on the airflow patterns in the rack, which you can find by trying different arrangements.
- When equipment installed in a rack fails, 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.

Power Supply Considerations

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.

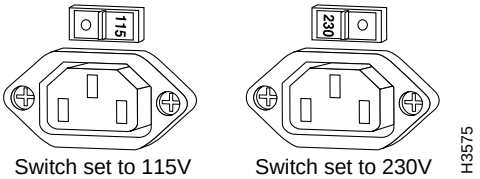
Warning To avoid injury, read the installation instructions before you connect the system to its power source. To see this warning in multiple languages, see the appendix “Translated Safety Warnings.”

Caution To avoid damage from lightning and power surges, install proper grounding.

Caution Some versions of the Cisco 2518 do not have auto-switching power supplies. Before applying power to the router/hub, make sure the input voltage selection switch on the power supply is set to the correct voltage for your area. See Figure 2-1.

Warning A voltage mismatch can cause equipment damage and may pose a fire hazard. If the voltage indicated on the label is different from the power outlet voltage, *do not connect the chassis to that receptacle*. To see this warning in multiple languages, see the appendix "Translated Safety Warnings."

Figure 2-1 Power Supply Input Voltage Selection Switch



Installation Checklist

The installation checklist lists the procedures for initial hardware installation of a new Cisco 2518. Make a copy of this checklist and mark the entries as you complete each procedure. Include a copy of the checklist for each system in your site log.

Installation checklist for site _____

Installation checklist copied	Verified by	Date
Background information placed in the site log		
Environmental specifications verified		
Site power voltages verified		
Installation site prepower check completed		
Required tools available		
Additional equipment available		
Power supply input voltage selection switch set		
Unit received		
UniverCD or printed documentation received, if ordered		
Router/Hub components verified		
Software version verified		
Initial electrical connections established		
Terminal or PC attached to the Cisco router/hub console port		
Modem attached to the console port (for remote configuration)		
Signal distance limits verified		
Startup sequence steps completed		
Initial system operation verified		

LAN interface name _____

Unit serial number _____

Creating a Site Log

The site log provides a historical record of all actions relevant to the Cisco 2518. Keep the site log in an easily accessible place near the router/hub where anyone who performs tasks has access to it. Use the installation checklist to verify steps in the installation and maintenance of your system. 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 on the checklist as you complete each procedure.

- Upgrades and maintenance procedures

  Use the site log as a record of ongoing system maintenance and expansion history. Each time a procedure is performed on the system, update the site log to reflect the following:

  — Configuration changes

  — Maintenance schedules and requirements

  — Corrective maintenance procedures performed

  — Intermittent problems

  — Related comments and notes

Distance Limitations

When setting up your Cisco 2518, consider distance limitations and potential electromagnetic interference (EMI) as defined by the Electronic Industries Association (EIA). Following are the distance limitation specifications for serial interfaces.

Ethernet Connections

The IEEE 802.3 specification for the maximum length of an Ethernet unshielded twisted pair (UTP) segment is 328 feet (100 meters) at a transmission rate of 10 Mbps.

Serial Connections

As with all signaling systems, EIA/TIA-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 baud rate and maximum distance.

Table 2-1 EIA/TIA-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

Caution EIA/TIA-232 is often used at greater distances than those specified in Table 2-1. If you understand the electrical problems that can arise and can compensate for them, you might still be able to get good results; however, do so at your own risk. We recommend that you stay within the distances defined by the standard.

The use of balanced drivers allows EIA/TIA-449 signals to travel greater distances than the EIA/TIA-232 standard. Table 2-2 lists the standard relationship between baud rate and maximum distance for EIA/TIA-449 signals. These limits are also valid for V.35 and X.21.

Table 2-2 EIA/TIA-449 Speed and Distance Limitations

Data Rate (Baud)	Distance (Feet)	Distance (Meters)
2400	4,100	1,250
4800	2,050	625
9600	1,025	312
19200	513	156
38400	256	78
56000	102	31
T1	50	15

Caution The EIA/TIA-449 and V.35 interfaces support data rates up to 2.048 Mbps. Exceeding this maximum could result in loss of data and is not recommended; *do so at your own risk*.

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:

- Plant cabling can emit radio interference if it is unshielded for too long a distance.
- Strong EMI, especially that caused by lightning or radio transmitters, can destroy the EIA/TIA-232 drivers and receivers in the Cisco 2518.

If you use twisted-pair cables with a good distribution of grounding conductors in your plant cabling, emitted radio interference is not likely. If you exceed the maximum distances, ground the conductor for each data signal; however, this practice is not recommended.

If you have cables exceeding recommended distances, or if you have cables that pass between buildings, 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 this type of problem, consult experts in lightning suppression and shielding.

To prevent EMI, consult experts in radio-frequency interference (RFI).

In order to avoid possible EMI interference, follow these recommendations:

- Use category 3 UTP cables for the Ethernet hub ports.
- Run the AC power cord away from the Ethernet cables to minimize noise coupling.

Console and Auxiliary Port Considerations

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

Management Card Console Port Connection

The management card has an RJ-45 console asynchronous serial port. This port connects to a terminal or PC with a special blue colored RJ-45 to DB-25 console cable, which is supplied. The default parameters for the console port are 9600 baud, 8 data bits, no parity generated or checked, and 1 stop bit. The console port does not support hardware flow control.

Note You cannot use this console cable for Ethernet or router auxiliary port connections.

Router Card Auxiliary Port Connections

The router card has an RJ-45 asynchronous (AUX) serial port that is used as an auxiliary port. This port connects to a terminal using an RJ-45-to-DB-25 adapter. Depending on the adapter used, this port becomes a data communications equipment (DCE) device or a data terminal equipment (DTE) device. To use the terminal as a console, you should use a DCE RJ-45-to-DB-25 adapter. The default parameters for the port are 9600 baud, 8 data bits, no parity generated or checked, and 2 stop bits.

Network Connection Considerations

This section contains information about connecting the Ethernet, serial, and BRI ports to your network.

RJ-45 Ethernet

The Ethernet hub ports are located on the Cisco 2518 router/hub port card, and on the router card. Use a modular, RJ-45, UTP cable to connect the Ethernet ports to workstations, PCs, servers, or a media attachment unit (MAU). To connect to another hub, use a cross-connect UTP cable.

Serial

Two serial interface ports are located on the router card. The serial ports use 60-pin, D-type connectors. All serial interfaces except the EIA-530 interface can be configured as DCE using a DCE cable. The DTE serial port needs external clocking, which is provided by a channel service unit/data service unit (CSU/DSU) or modem.

You must use a special serial cable to connect the router card to a modem or CSU/DSU. This cable is available from Cisco Systems and can be ordered with the system. The cable uses a DB-60 connector on the router/hub end. For cable specifications, see the appendix "Cabling Specifications." For ordering information, contact a customer service representative.

BRI

The Basic Rate Interface (BRI) port is an RJ-45 8-pin jack located to the right of the serial port on the daughter card. Use an appropriate cable to connect the system directly to the ISDN through the NT1. The common carrier will provide the NT1 connection worldwide, except in North America, where the NT1 is owned by individual customers.

Warning Before opening the chassis, disconnect the telephone-network cables to avoid contact with telephone-network voltages. To see this warning in multiple languages, see the appendix "Translated Safety Warnings."

Inspecting the System

Do not unpack the Cisco 2518 until you are ready to install it; keep the router/hub in its shipping container to prevent accidental damage. When you have determined where you want to install the Cisco 2518, proceed with the unpacking.

The router/hub, cables, UniverCD or printed 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 the following items:

- Cisco 2518 router/hub
- 6-foot (1.8-meter) power cord
- Blue management card console cable (RJ-45-to-DB-25F)
- Black category 3 UTP cable used to connect the router's Ethernet port to port 23 of the hub port card
- Optional equipment (such as network interface cables, auxiliary cable, and so forth)
- Warranty booklet
- UniverCD and optional printed publications (including this publication), as specified by your order

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

Preparing Your System for Operation

To prepare your system for operation:

Step 1 Place the Cisco 2518 on a desktop or in a rack.

Step 2 Connect the Ethernet hub ports to a patch panel, punch-down block, or workstations.

Step 3 Connect an Ethernet cable (supplied by Cisco) from the router card Ethernet port to port 23 on the hub port card.

Step 4 After you ensure that the input voltage selection switch on the power supply is in the proper position, connect the Cisco 2518 to a power source.

Step 5 Connect a console to the Cisco 2518 management card console port. See the section “Management Card Console Port Connection” in this chapter.

Step 6 Connect the router to your wide-area network.

Step 7 Power on the Cisco 2518.

Step 8 Configure the Cisco 2518 SNMP agent, if applicable.

Step 9 Configure the router card software.