CHAPTER 2

Preparing to Install the Cisco 2500 Series Access Server

This chapter describes the tasks you must perform before you begin to install the Cisco 2500 series access server. It includes the following sections:

- Safety Recommendations
- General Site Requirements
- Installation Checklist
- Creating a Site Log
- Cabling Considerations
- Console and Auxiliary Port Considerations
- Network Connection Considerations
- Inspecting the System

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 and others could fall over them.
- Do not wear loose clothing that could get caught in the chassis. 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 translated versions of this warning, refer to 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 act quickly to turn off the power.
- Disconnect all power by turning off the power and unplugging the power cord before doing the following:
  - Installing or removing a chassis
  - Working near power supplies
- Do not work alone if potentially hazardous conditions exist.
- Never assume that power is disconnected from a circuit. Always check.

Warning Read the installation instructions before you connect the system to its power source. (To see translated versions of this warning, refer to the appendix "Translated Safety Warnings.")

- Look carefully for possible hazards in your work area, such as moist floors, ungrounded power extension cables, frayed power cords, 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 chassis 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 chassis.

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 access server can be placed on a desktop or mounted in a rack or on a wall.

Site Environment

The location of individual chassis 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, keep in mind the precautions described in the next section, "Preventive Site Configuration" 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 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 access server and will help you avoid environmentally caused equipment failures:

- 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 described in the section "Safety Recommendations" earlier in this chapter 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 effectively within it. An open chassis allows air leaks, which may interrupt and redirect the flow of cooling air from internal components.

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 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.
- 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 chassis. The best placement of the baffles depends on the airflow patterns in the rack, which are found by experimenting with different arrangements.

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 The device is designed to work with TN power systems. (To see translated versions of this warning, refer to the appendix "Translated Safety Warnings.")

The access server power supply includes the following features:

- Autoselects either 110V or 220V operation.
- All units include a 6-foot (1.8-meter) electrical power cord. (A label near the power cord indicates the correct voltage, frequency, current draw, and power dissipation for your unit.)

Warning This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15A U.S. (240 VAC, 10A international) is used on the phase conductors (all current-carrying conductors). (To see translated versions of this warning, refer to the appendix "Translated Safety Warnings.")

Installation Checklist

The Installation Checklist lists the procedures for initial hardware installation of a new access server. 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. (See the following section, “Creating a Site Log.”)

Installation checklist for site_____

Access server name_____

Task	Verified by	Date
Installation checklist copied		
Background information placed in Site Log		
Site power voltages verified		
Installation site prepower check completed		
Required tools available		
Additional equipment available		
Access server received		
Optional UniverCD received or ordered, printed documentation received		
Chassis components verified		
Initial electrical connections established		
ASCII terminal attached to console port, or modem attached to console port (for remote configuration)		
Signal distance limits verified		
Startup sequence steps completed		
Initial system operation verified		
Software image verified		

Creating a Site Log

The Site Log provides a record of all actions relevant to the system. Keep it near the chassis where anyone who performs tasks has access to it. Use the Installation Checklist (see the previous section "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. Each time a procedure is performed on the system, update the Site Log to reflect the following:
  - Configuration changes
  - Changes and Updates to Cisco IOS software
  - Maintenance schedules and requirements
  - Corrective maintenance procedures performed
  - Intermittent problems
  - Related comments and notes

Cabling Considerations

When setting up your access server, consider distance limitations and potential electromagnetic interference (EMI) as defined by the Electronic Industries Association (EIA).

Warning The ports labeled "Ethernet," "10BaseT," "Token Ring," "Console," and "AUX" are safety extra-low voltage (SELV) circuits. SELV circuits should only be connected to other SELV circuits. Because the BRI circuits are treated like telephone-network voltage, avoid connecting the SELV circuit to the telephone network voltage (TNV) circuits. (To see translated versions of this warning, refer to the appendix "Translated Safety Warnings.")

Distance Limitations

Following are the distance limitation specifications for Ethernet, Token Ring, and serial interfaces.

Ethernet Connections

The distance limitations for the IEEE 802.3 (10Base5 coaxial cable) specification indicate a maximum segment distance of 1,640 feet (500 m) at a transmission rate of 10 megabits per second (Mbps).

The distance limitations for Ethernet 10BaseT indicate a maximum segment distance of 328 feet (100 m); Ethernet 10Base2 has a maximum segment distance of 656 feet (200 m).

Token Ring Connections

The distance limitations for the IEEE 802.5 specification indicate a maximum segment distance of 328 feet (100 m) at a transmission rate of 4 or 16 Mbps for unshielded twisted-pair (UTP) cable. The distance limitation when using shielded twisted-pair (STP) cabling is 1,640 feet (500 m).

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
19,200	50	15

Data Rate (Baud)	Distance (Feet)	Distance (Meters)
38,400	50	15
57,600	25	7.6
115,200	12	3.7

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.

Console and Auxiliary Port Considerations

This section discusses important cabling information that must be considered before you connect the terminals or modems to console and auxiliary ports. The console port and the auxiliary port are used to provide access to the system either locally or remotely.

Console Port Connections

Each access server system includes an EIA/TIA-232 (RJ-45) console asynchronous serial port. This port connects to a terminal using an RJ-45 cable and an RJ-45-to-DB-25 adapter. Depending on the cable and the adapter used, this port will appear as a data terminal equipment (DTE) or data communications equipment (DCE) device at the end of the cable. To connect to a console terminal, use an RJ-45 rollover cable with a female DTE connector (labeled "Terminal") for connection to the console port. For detailed information on installing the console terminal see the section "Connecting to the Console Port" in the chapter "Installing the Cisco 2500 Series Access Server.")

The appendix "Cable Specifications" lists the pinout for the console port. The default parameters for the console port are 9600 baud, 8 data bits, no parity, and 2 stop bits. The console port does not support hardware flow control or modem control.

Auxiliary Port Connections

An EIA/TIA-232 (RJ-45) auxiliary asynchronous serial port is included on all access servers. This port can connect to a modem for remote maintenance, or terminal services. Use an RJ-45 rollover cable with a male modem (MMOD) adapter (labeled "Modem") for this connection. For detailed information on connecting devices to the auxiliary port, see the section "Connecting a Modem to the Auxiliary Port" in the chapter "Installing the Cisco 2500 Series Access Server." See the appendix "Cable Specifications" for the pinout for this auxiliary port.

Network Connection Considerations

This sections describes important cabling information that must be considered before making your network connections. The Ethernet or Token Ring ports are used to connect to a LAN; the synchronous serial ports are used to connect to a WAN; and the asynchronous ports are used to provide remote access to the access server.

Ethernet Connections

The Ethernet port is located on the left of the rear panel of the access server. The port is labeled AUI. Use an Ethernet transceiver to connect the access server directly to the network.

You can use the following equipment to connect to the Ethernet AUI port:

- An Ethernet AUI cable connected to a transceiver
- An Ethernet transceiver connected directly to the access server's AUI port

The connection to the AUI port can be attached using one of two connector types, as follows:

- Slide latch connectors
- Jackscrew connectors

Note Ethernet cables are not shipped as standard with the access server.

Token Ring Connections

The Token Ring port is located on the left of the rear panel and is labeled TOKEN RING. Use a standard 9-pin Token Ring lobe cable (not supplied) to connect the access server directly to a media attachment unit (MAU).

Synchronous Serial Connections

The synchronous serial interface ports are located on the rear of the access server to the right of the Ethernet or Token Ring connector. The ports are labeled SERIAL 0 and SERIAL 1 (from left to right when facing the rear panel). The serial ports are 60-pin, D-type connectors. All serial interfaces (except the EIA-530) can be configured as DTE or DCE, depending on the attached cable. All DTE serial ports require that external clocking be provided by a channel service unit/data service unit (CSU/DSU) or other DCE device.

You must use a special serial cable to connect the access server to a modem or CSU/DSU. This cable is available from Cisco and is usually ordered with the system. The cable uses a DB-60 connector on the chassis end. See the appendix "Cable Specifications" for cable pinouts. For ordering information, contact a customer service representative.

Note Because of the small size of the pins on the DB-60 serial connector, attempting to manufacture your own serial cables is not recommended.

Asynchronous Serial Connections

The asynchronous serial ports use one or two 68-pin connectors located on the far left of the rear panel. Each of the connectors provides eight asynchronous ports. The lower port is labeled ASYNC 1–8, and the upper port is labeled ASYNC 9–16. Breakout cables that divide into eight RJ-45 connectors each are connected to the asynchronous connectors.

RJ-45-to-DB-25 adapters are used to connect to external devices such as modems, printers, or terminals. RJ-45-to-DB-25 adapters are available from Cisco for either DCE or DTE connections. See the appendix “Cable Specifications” to select the correct adapter, and for pinouts for the RJ-45-to-DB-25 adapters.

Inspecting the System

Do not unpack the access server until you are ready to install it. If the 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 access server installed, proceed with the unpacking.

The access server, 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 all of the following items:

- Access server
- 6-foot (1.8-meter) power cord
- Jackscrews for the AUI connector
- Console and auxiliary cabling kit (two RJ-45 roll-over cables, one terminal adapter, and one modem adapter)
- Optional equipment (such as network interface cables, and asynchronous breakout cables)

- Warranty pack
- UniverCD and optional printed publications, as specified on 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.