CHAPTER 2

Preparing to Install the Universal Access Server

This chapter describes the tasks you must perform before you begin to install the access server and includes the following sections:

- Safety Recommendations
- General Site Requirements
- Creating a Site Log
- Preparing to Connect to a Network

Safety Recommendations

Because and device that uses electricity must be handled carefully, 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.

Warning Ultimate disposal of this product should be handled according to all national laws and regulations. (To see translated versions of this warning, refer to the Regulatory Compliance and Safety Information document that accompanied the access server.)

Maintaining Safety with Electricity

Follow these guidelines when you work 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 Regulatory Compliance and Safety Information document that accompanied the access server.)

- 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.
- Before working on the system, unplug the power cord.
- Disconnect all power before doing the following:
  - Installing or removing a chassis
  - Working near power supplies

Warning When installing the unit, the ground connection must always be made first and disconnected last. (To see translated versions of this warning, refer to the Regulatory Compliance and Safety Information document that accompanied the access server.)

- 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 Regulatory Compliance and Safety Information document that accompanied the access server.)

- 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. ESD damage occurs when electronic components are improperly handled and can result in complete or intermittent failures.

Always follow ESD-prevention procedures when you remove and replace 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 grounding clip to an unpainted surface of the chassis frame to safely ground unwanted ESD voltages. To guard against ESD damage and shocks, the wrist strap and cord must operate properly. 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 (Mohms).

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.

Site Environment

The access server can be placed on a desktop or mounted in a rack. The location of the access server 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, shutdowns, and make maintenance difficult.

When planning your site layout and equipment locations, keep in mind the precautions described in the following section, “Preventive Site Configuration,” to help avoid equipment failures and reduce the possibility of environmentally caused shutdowns. If you are currently experiencing shutdowns or an unusually high number of errors with your existing equipment, these precautions might help you isolate the cause of failures and prevent future problems.

Preventive Site Configuration

The following precautions 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 where your system is located has adequate air circulation.
- Always follow the ESD-prevention procedures described in the previous section “Safety Recommendations” 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 can 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. Because each unit generates heat, ensure that the rack is not overly congested. An enclosed rack should have louvered sides and a fan to provide cooling air.
- When you mount a chassis in an open rack, ensure that the rack frame does not block the intake or 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. Ensure that you provide adequate ventilation for equipment at the bottom of 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 you can find 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 Regulatory Compliance and Safety Information document that accompanied the access server.)

The access server AC 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 the 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 Regulatory Compliance and Safety Information document that accompanied the access server.)

Creating a Site Log

The Site Log provides a record of all actions relevant to the access server. Keep it near the chassis where anyone who installs or maintains the router has access to it. Site Log entries can 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.
- Upgrade and maintenance procedures—Use the Site Log as a record of ongoing system maintenance and expansion. Each time a procedure is performed on the access server, update the Site Log to reflect the following:
  - Configuration changes
  - Changes and updates to Cisco Internetworking Operating System (Cisco IOS) software
  - Maintenance schedules and requirements
  - Corrective maintenance procedures performed
  - Intermittent problems
  - Related comments and notes

Preparing to Connect to a Network

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

Warning The Ethernet AUI, serial, console, and auxiliary ports contain safety extra-low voltage (SELV) circuits. PRI circuits are treated like telephone-network voltage (TNV) circuits. Avoid connecting SELV circuits to TNV circuits. (To see translated versions of this warning, refer to the Regulatory Compliance and Safety Information document that accompanied the access server.)

Dual T1 PRI Card

The dual T1 Primary Rate Interface (PRI) WAN card includes two RJ-48C ports. Cables are not included with the cards; however, port pinouts are listed in the section "Dual T1 PRI Card Port Pinouts" in the appendix "Cabling Specifications for the Universal Access Server."

Warning Network hazardous voltages are present in the T1 PRI cable. If you detach the cable, detach the end away from the router first to avoid possible electric shock. Network hazardous voltages are also present in the area of the T1 PRI (RJ–48C) ports, regardless of whether power is OFF or ON. (To see translated versions of this warning, refer to the Regulatory Compliance and Safety Information document that accompanied the access server.)

Table 2-1 lists the network specifications you should consider before connecting the dual T1 PRI card to a network.

Table 2-1 Dual T1 PRI Card Network Specifications

Description	Specification
Line rate	1.544 Mbps
Data rates	*number* x 56 or *number* x 64 kbps, where *number* = 1 to 24
Standards	AT&T Pub. 62411, 54016, and 43801 ANSI T1.403

Dual E1 PRI Card

The dual E1 Primary Rate Interface (PRI) WAN card includes two DB-15 ports for terminating 120-ohm balanced lines or 75-ohm unbalanced lines. Jumper settings on the card configure the ports for the line termination. Jumper positions and settings are listed in the section “Installing the Dual E1 PRI Card” in the appendix “Maintaining the Universal Access Server.”

Warning Network hazardous voltages are present in the E1 PRI cable. If you detach the cable, detach the end away from the router first to avoid possible electric shock. Network hazardous voltages are also present in the area of the E1 PRI (DB-15) ports, regardless of whether power is OFF or ON. (To see translated versions of this warning, refer to the Regulatory Compliance and Safety Information document that accompanied the access server.)

Cable specifications and port pinouts are listed in the section“Dual E1 PRI Card Cable Assemblies and Pinouts” in the appendix “Cabling Specifications for the Universal Access Server.”

Synchronous Serial Connections

The serial ports on the access server are five-in-one synchronous serial 60-pin, D-type connectors. The synchronous serial ports (except the EIA-530) can be configured as data terminal equipment (DTE) or data communications equipment (DCE), depending on the attached cable. All DTE serial ports require that external clocking be provided by a data service unit/channel service unit (DSU/CSU) or other DCE device.

You must use a special serial cable to connect the access server to a modem or DSU/CSU. 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 “Cabling Specifications for the Universal Access Server” 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, Cisco discourages you from making your own serial cables.

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 2-2 shows the standard relationship between baud rate and maximum distance.

Table 2-2 EIA/TIA-232 Speed and Distance Limitations

Data Rate (Baud)	Distance (Feet)	Distance (Meters)
2400	200	60
4800	100	30
9600	50	15
19200	50	15
38400	50	15
57600	25	7.6
115200	12	3.7

The use of balanced drivers allows EIA/TIA-449 signals to travel greater distances than the EIA/TIA-232 standard. Table 2-3 lists the standard relationship between baud rate and the maximum distance for EIA/TIA-449 signals. These limits are also valid for V.35 and X.21.

Table 2-3 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

Data Rate (Baud)	Distance (Feet)	Distance (Meters)
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 can result in loss of data and is not recommended.

Ethernet Connections

The Ethernet attachment unit interface (AUI) port on the access server is located on the rear panel of the chassis. Use the following equipment to connect to the Ethernet AUI port:

- Ethernet AUI cable connected to a transceiver
- Ethernet transceiver connected directly to the AUI port

The connection to the AUI port can be attached using either a slide-latch or jackscrew connector.

The distance limitations for the IEEE 802.3 (10Base5 coaxial cable) specification indicate a maximum segment distance of 1640 feet (500 m) at a transmission rate of 10 Mbps.

Console and Auxiliary Port Considerations

The access server includes an asynchronous serial console and auxiliary port. The console and auxiliary ports provide access to the access server either locally (with a console terminal) or remotely (with a modem). This section discusses important cabling information to consider before connecting a console terminal (an ASCII terminal or PC running terminal emulation software) to the console port or modem to the auxiliary port.

The main difference between the console and auxiliary ports is that the auxiliary port supports hardware (RTS/CTS) flow control and the console port does not. Flow control paces the transmission of data between a sending device and a receiving device.

Flow control ensures that the receiving device can absorb the data sent to it before the sending device sends more. When the buffers on the receiving device are full, a message is sent to the sending device to suspend transmission until the data in the buffers has been processed. Because the auxiliary port supports flow control, it is ideally suited for use with the high-speed transmissions of a modem. Console terminals transmit at slower speeds than modems; therefore, the console port is ideally suited for use with console terminals.

Console Port Connections

The access server includes an EIA/TIA-232 asynchronous serial console port (RJ-45). Depending on the cable and the adapter used, this port will appear as a DTE or DCE device at the end of the cable. Your router comes with cables and adapters to connect a console terminal (an ASCII terminal or PC running terminal emulation software) to the console port. To connect an ASCII terminal to the console port, use the RJ-45 roll-over cable with the female RJ-45-to-DB-25 adapter (labeled Terminal). To connect a PC running terminal emulation software to the console port, use the RJ-45 roll-over cable with the female RJ-45-to-DB-9 adapter (labeled Terminal). 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. For detailed information about installing a console terminal, see the section “Connecting the Console Terminal and Modem” in the chapter “Installing the Universal Access Server.” See the appendix “Cabling Specifications for the Universal Access Server” for cable and port pinouts.

Auxiliary Port Connections

The access server includes an EIA/TIA-232 asynchronous serial auxiliary port (RJ-45) that supports flow control. Depending on the cable and the adapter used, this port will appear as a DTE or DCE device at the end of the cable. Your router comes with a cable and an adapter to connect a modem to the auxiliary port. To connect a modem to the auxiliary port, use the RJ-45 roll-over cable with the male RJ-45-to-DB-25 adapter (labeled Modem). For detailed information about connecting devices to the auxiliary port, see the section “Connecting a Modem to the Auxiliary Port” in the chapter “Installing the Universal Access Server.” See the appendix “Cabling Specifications for the Universal Access Server” for cable and port pinouts.

Alarm Port Connections

The three pin alarm port is a future enhancement that will connect the access server to an external audio, visual, or other alarm. The alarm port is not supported by current versions of the system software or the feature cards.