Preinstallation Requirements and Planning for Cisco 3800 Series Routers

This document describes preinstallation requirements and planning for Cisco 3800 series integrated services routers. It contains the following sections:

Safety Recommendations

Follow these guidelines to ensure general safety:

- Keep the router area clear and dust-free during and after installation.
- If you remove the router cover, put it in a safe place.
- Keep tools and components away from walk areas.
- Do not wear loose clothing that could get caught in the router. Fasten your tie or scarf and roll up your sleeves.
- Wear safety glasses when working under conditions that might be hazardous to your eyes.
- Do not perform any action that creates a hazard to people or makes the equipment unsafe.

Warning **Read the installation instructions before connecting the system to the power source.** Statement 1004

Warning **This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.** Statement 1017

Warning **Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.** Statement 1029

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.** Statement 1030

Warning **To prevent personal injury or damage to the chassis, never attempt to lift or tilt the chassis using the handles on modules (such as power supplies, fans, or cards); these types of handles are not designed to support the weight of the unit.** Statement 1032

Warning **This equipment must be installed and maintained by service personnel as defined by AS/NZS 3260. Incorrectly connecting this equipment to a general-purpose outlet could be hazardous. The telecommunications lines must be disconnected 1) before unplugging the main power connector or 2) while the housing is open, or both.** Statement 1043

Warning **Ultimate disposal of this product should be handled according to all national laws and regulations.** Statement 1040

Warning **To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of 40 deg. C** Statement 1047

Safety with Electricity

Follow these guidelines when working on equipment powered by electricity:

Warning **Read the installation instructions before connecting the system to the power source.** Statement 1004

- Locate the emergency power-off switch in the room in which you are working. Then, if an electrical accident occurs, you can quickly turn off the power.
- Disconnect all power before doing the following:
  - Installing or removing a router
  - Working near power supplies
- Look carefully for possible hazards in your work area, such as moist floors, ungrounded power extension cables, frayed power cords, and missing safety grounds.
- Do not work alone if hazardous conditions exist.
- Never assume that power is disconnected from a circuit. Always check.

- If an electrical accident occurs, proceed as follows:
  - Use caution; do not become a victim yourself.
  - Turn off power to the device.
  - 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.

In addition, use the following guidelines when working with any equipment that is disconnected from a power source, but still connected to telephone wiring or other network cabling:

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for it.
- Never touch uninsulated telephone wires or terminals unless the telephone line is disconnected at the network interface.
- Use caution when installing or modifying telephone lines.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. It can occur if electronic printed circuit cards are improperly handled and can cause complete or intermittent failures. Always follow ESD prevention procedures when removing and replacing modules:

- Ensure that the router 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 router frame to channel unwanted ESD voltages safely to ground. To guard against ESD damage and shocks, the wrist strap and cord must operate effectively.
- If no wrist strap is available, ground yourself by touching a metal part of the router.

Caution For the safety of your equipment, periodically check the resistance value of the antistatic strap. It should be between 1 and 10 megohms (Mohm).

General Site Requirements

This section describes the requirements your site must meet for safe installation and operation of your router. Ensure that the site is properly prepared before beginning installation. If you are experiencing shutdowns or unusually high errors with your existing equipment, this section can also help you isolate the cause of failures and prevent future problems.

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 for connection to TN and IT power systems.** Statement 1007

The AC power supply autoselects either 110 V or 220 V operation. All routers include a 6-foot (1.8-meter) electrical power cord. A label near the power inlet indicates the correct voltage, frequency (AC-powered systems only), and current draw for the router.

Table 1 lists power requirements for Cisco 3800 series routers.

Table 1 Power Requirements for Cisco 3800 Series Routers

Router	Power Supply	Input Power	Input Voltage Tolerance Limits
Cisco 3825 and 3825-NOVPN without IP phone power output	AC	100 to 240 VAC 3 A at 110 V; 2 A at 230 V 47 to 63 Hz	85–264 VAC
	DC	24 to 60 VDC, positive or negative, autoranging 12 A at 24 V; 5 A at 60 V	18–72 VDC
Cisco 3825 and 3825-NOVPN with IP phone power output	AC	100 to 240 VAC 8 A at 110 V; 4 A at 230 V 47 to 63 Hz	85–264 VAC
Cisco 3845 and 3845-NOVPN without IP phone power output	AC	100 to 240 VAC 4 A at 110 V; 2 A at 230 V 47 to 63 Hz	85–264 VAC
	DC	24 to 60 VDC, positive or negative, autoranging 19 A at 24 V; 8 A at 60 V	18–72 VDC
Cisco 3845 and 3845-NOVPN with IP phone power output	AC	100 to 240 VAC 9 A at 110 V; 4 A at 230 V 47 to 63 Hz	85–264 VAC

Site Environment

Cisco 3800 series routers should normally be installed in an equipment rack. (For instructions, see "Installing Cisco 3800 Series Routers in an Equipment Rack.") The location of your router and the layout of your equipment rack or wiring room are extremely important considerations for proper operation. Equipment placed too close together, inadequate ventilation, and inaccessible panels can cause malfunctions and shutdowns, and can make maintenance difficult. Plan for access to both front and rear panels of the router. Refer to the "Router Airflow Diagrams" to help ensure proper ventilation.

Cisco 3800 series routers operate at a temperature of 32 to 104 degrees F (0 to 40 degrees C) and a humidity of 5 to 95 percent (noncondensing).

When planning your site layout and equipment locations, remember the precautions described in the next section, "Site Configuration," to help avoid equipment failures and reduce the likelihood of environmentally caused shutdowns. If you are experiencing shutdowns or an unusually high number of errors with your existing equipment, these precautions may help you isolate the cause of the failures and prevent future problems.

Site Configuration

The following precautions help you plan the operating environment for your router and help avoid environmentally caused equipment failures:

- Ensure that the room where your router operates has adequate circulation. Electrical equipment generates heat. Without adequate circulation, ambient air temperature may not cool equipment to acceptable operating temperatures.
- Always follow ESD-prevention procedures described in the "Preventing Electrostatic Discharge Damage" section on page 3 to avoid damage to equipment. Damage from static discharge can cause immediate or intermittent equipment failure.
- Ensure that the router cover or motherboard tray and module rear panels are secure. All empty network module slots, interface card slots, and power supply bays must have filler panels installed. The router is designed to allow cooling air to flow within it through specially designed cooling slots. A router with uncovered openings creates leaks that may interrupt and reduce the flow of air across internal components.

Equipment Racks

You can install Cisco 3800 series routers in a 19-inch rack, or in a 23-inch rack with adapters from your rack manufacturer. For mounting procedures, see the "Rack-Mounting the Router" section on page 2 of "Installing Cisco 3800 Series Routers in an Equipment Rack."

Consider the following information when planning your equipment rack configuration:

- Allow clearance around the rack for maintenance.
- Enclosed racks must have adequate ventilation. Ensure that the rack is not congested, because each router generates heat. An enclosed rack should have louvered sides and a fan to provide cooling air. Heat generated by equipment near the bottom of the rack can be drawn upward into the intake ports of the equipment above.
- When mounting a router in an open rack, ensure that the rack frame does not block the intake ports or exhaust ports. If the router is installed on slides, check the router's position when it is seated into the rack.
- Baffles can help to isolate exhaust air from intake air, which also helps to draw cooling air through the router. The best placement of the baffles depends on the airflow patterns in the rack, which can be found by experimenting with different configurations. Refer to the "Router Airflow Diagrams" to help ensure proper ventilation.
- When equipment installed in a rack (particularly in an enclosed rack) fails, try operating the equipment by itself, if possible. Power off other equipment in the rack (and in adjacent racks) to allow the router being tested a maximum of cooling air and clean power.

Installation Checklist

This sample installation checklist lists steps in installing a new router. Make a copy of it and mark the entries when completed. Include a copy of the checklist for each router in your site log (described in the next section, "Creating a Site Log").

Installation checklist for site_____

Router name_____

Task	Verified by	Date
Installation Checklist copied		
Background information placed in site log		
Site power voltages verified		
Installation site power check completed		
Required tools available		
Additional equipment available		
Router received		
Product registration card received		
Cisco.com contact information label received		
Router components verified		
Initial electrical connections established		
ASCII terminal (for local configuration) or modem (for remote configuration) available		
Signal distance limits verified		
Startup sequence steps completed		
Initial operation verified		
Software image verified		

Creating a Site Log

The site log contains a record of all actions related to the router. Keep it in an accessible place near the router, where anyone who performs these actions has access to it. Site log entries might include the following information:

- Installation progress—Make a copy of the installation checklist and insert it into the site log. Make an entry as each procedure is completed.
- Upgrade and maintenance procedures—Use the site log as a record of ongoing router maintenance and expansion history, such as the following events:
  - Installation of network modules
  - Removal or replacement of network modules
  - Other upgrades
  - Configuration changes
  - Maintenance schedules and requirements
  - Maintenance procedures performed
  - Intermittent problems
  - Comments and notes

Inspecting the Router

Do not unpack the router until you are ready to install it. If the final installation site will not be ready for some time, keep the router in its shipping container to prevent accidental damage.

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

- Router
- 6-ft (1.8-m) AC power cord (for AC-powered routers)
- Ethernet cable for Gigabit Ethernet interface
- One pair of rack-mount brackets for a 19-inch rack, with screws to attach the brackets to the router
- NEBS-compliant two-hole barrel grounding lug and two mounting screws
- Cable management bracket (Cisco 3825 and 3825-NOVPN router only)
- RJ-45-to-DB-9 adapter cable for console port
- RJ-45-to-DB-25 adapter cable for auxiliary port
- Any optional equipment that you ordered
- Cisco product registration card and Cisco.com card

Inspect all items for shipping damage. If anything appears to be damaged, or if you encounter problems installing or configuring your router, contact customer service. For warranty information, see the "Cisco 90-Day Limited Hardware Warranty Terms" section on page 10 of "Introduction to Cisco 3800 Series Routers Hardware Documentation." For technical support, see the "Cisco One-Year Limited Hardware Warranty Terms" section on page 9 of that document.

Required Tools and Equipment for Installation and Maintenance

You need the following tools and equipment to install and upgrade the router and its components:

- Number 1 and number 2 Phillips screwdrivers
- Equipment rack and screws to attach router mounting brackets to the rack
- Wire and wire-crimping tool for connecting the router chassis to earth ground
  - – AWG 6 (13 mm^2) wire for NEBS-compliant chassis grounding
  - – AWG 14 (2 mm^2) or larger wire for NEC-compliant chassis grounding
  - – AWG 18 (1 mm^2) or larger wire for EN/IEC 60950-compliant chassis grounding
- For NEC-compliant grounding, a ring terminal with an inner diameter of 1/4 inch (5 to 7 mm)
- Cables for connection to WAN and LAN ports

Note For information on cables and cable specifications for WAN and LAN ports on network modules and interface cards, refer to the *Cisco Network Modules Hardware Installation Guide*, the *Cisco Interface Cards Installation Guide*, and the *Cisco Modular Access Router Cable Specifications*.

- Console (ASCII terminal or PC running HyperTerminal or similar terminal emulation software) configured for 9600 bps, 8 data bits, no parity, and 1 stop bit
- Modem for remote administrative access (optional)
- ESD-preventive cord and wrist strap for procedures that require access to internal components