Preinstallation Requirements and Planning for Cisco 2800 Series Routers

This document describes site requirements and equipment needed to install your Cisco 2800 series integrated services router. It includes the following sections:

Note To see translations of the warnings that appear in this publication, refer to the *Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information* document that accompanies your router.

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

Safety Recommendations

Follow these guidelines to ensure general safety:

- Keep the chassis area clear and dust-free during and after installation.
- If you remove the chassis cover, put it in a safe place.
- Keep tools and chassis components away from walk areas.
- Do not wear loose clothing that could get caught in the chassis. Fasten your tie or scarf and roll up your sleeves.

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- 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.

Safety with Electricity

Warning **This unit might have more than one power supply connection. All connections must be removed to de-energize the unit.** Statement 1028

Warning **Do not work on the system or connect or disconnect cables during periods of lightning activity.** Statement 1001

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

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 **The covers are an integral part of the safety design of the product. Do not operate the unit without the covers installed.** Statement 1077

Follow these guidelines when working on equipment powered by electricity:

- 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 chassis
  - 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.
- Never open the enclosure of the router's internal power supply.
- 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 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 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 chassis.

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 includes the following features:

- Autoselects either 110 V or 220 V operation.

- All units 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], current draw, and power dissipation for the unit.)

Table 1 lists power requirements for Cisco 2800 series routers.

Table 1 Power Requirements for Cisco 2800 Series Routers

Router	Power Source	Input Power	Input Voltage Tolerance Limits
Cisco 2801 without IP phone power output	AC	100 - 240 VAC, 2.0 A, 50 - 60 Hz	90 - 264 VAC
Cisco 2801 with IP phone power output	AC	100 - 240 VAC, 5.0 A, 50 - 60 Hz	90 - 264 VAC
Cisco 2811 without IP phone power output	AC	100 - 240 VAC, 2.0 A, 50 - 60 Hz	90 - 264 VAC
	DC	24 - 60 VDC, 8 A, positive or negative	18 - 72 VDC
Cisco 2811 with IP phone power output	AC	100 - 240 VAC, 4.0 A, 50 - 60 Hz	90 - 264 VAC
Cisco 2821 without IP phone power output	AC	100 - 240 VAC, 3.0 A, 50 - 60 Hz	90 - 264 VAC
	DC	24 - 60 VDC, 12 A, positive or negative	18 - 72 VDC
Cisco 2821 with IP phone power output	AC	100 - 240 VAC, 8.0 A, 50 - 60 Hz	90 - 264 VAC
Cisco 2851 without IP phone power output	AC	100 - 240 VAC, 3.0 A, 50 - 60 Hz	90 - 264 VAC
	DC	24 - 60 VDC, 12 A, positive or negative	18 - 72 VDC
Cisco 2851 with IP phone power output	AC	100 - 240 VAC, 8.0 A, 50 - 60 Hz	90 - 264 VAC
Cisco 2811, 2821, and 2851	Backup power: Cisco RPS-675 Redundant Power System	100 VAC, 10 A, or 240 VAC, 6 A	

Site Environment

Cisco 2800 series routers can be placed on a desktop or installed in a rack. This Cisco 2811 router can also be wall mounted. 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.

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 possibility of environmentally caused shutdowns. If you are currently 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 will help you plan an acceptable operating environment for your router and will help you avoid environmentally caused equipment failures:

- Ensure that the room where your router operates has adequate air circulation. Electrical equipment generates heat. Without adequate air 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 chassis cover and module rear panels are secure. All empty network module slots, interface card slots, and power supply bays must have filler panels installed. The chassis is designed to allow cooling air to flow within it, through specially designed cooling slots. A chassis with uncovered openings permits air leaks, which may interrupt and reduce the flow of air across internal components.

Equipment Racks

Cisco 2800 series routers include brackets for use with a 19-inch rack or, if specified in your order, optional larger brackets for use with a 23-inch rack.

Note Brackets for a 23-inch rack are not available for Cisco 2801 routers.

The following information will help you plan your equipment rack configuration:

- Allow clearance around the rack for maintenance.
- Allow at least one rack unit of vertical space between routers.
- 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 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 into 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 can be found by experimenting with different configurations.
- 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 under test a maximum of cooling air and clean power.

Installation Checklist

The sample installation checklist lists items and procedures for installing a new router. Make a copy of this checklist 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		
Router quick start guide received		
Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information document received		
Product registration card received		
Cisco.com contact information label received		
Chassis 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 provides a record of all actions related to the router. Keep it in an accessible 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 the router. 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 entries as each procedure is completed.
- Upgrade and maintenance procedures—Use the Site Log as a record of ongoing router maintenance and expansion history. A Site Log might include the following events:
  - Installation of network modules
  - Removal or replacement of network modules and 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 chassis in its shipping container to prevent accidental damage. When you are ready to install the router, proceed with unpacking it.

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-foot (1.8-meter) power cord (with AC-powered routers only)
- Rubber feet for desktop mounting (Cisco 2801 router only)
- Rack-mount brackets with screws for 19-inch racks
- Ground lug and two mounting screws (Cisco 2811, Cisco 2821, and Cisco 2851 routers only)
- Cable management bracket
- RJ-45-to-DB-9 console cable
- RJ-45-to-DB-25 modem cable (Cisco 2811, Cisco 2821, and Cisco 2851 routers only)
- DB-9-to-DB-25 connector adapter (Cisco 2801 router only)
- Optional equipment (such as network connection cables or additional rack-mount brackets)
- *Cisco 2800 Series Integrated Services Routers Quick Start Guide*,
- *Cisco 2800 and Cisco 3800 Series Integrated Services Routers Regulatory Compliance and Safety Information* document
- *Cisco Router and Security Device Manager (SDM) Quick Start Guide*
- 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. Warranty, service, and support information is in the quick start guide that shipped with your router.

Required Tools and Equipment for Installation and Maintenance

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

- ESD-preventive cord and wrist strap
- Number 2 Phillips screwdriver
- Flat-blade screwdrivers: small, 3/16-in. (4 - 5 mm) and medium, 1/4-in. (6 - 7 mm)
  - To install or remove modules
  - To remove the cover, if you are upgrading memory or other components
- Screws that fit your rack
- Wire crimper
- Wire for connecting the chassis to an 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, an appropriate user-supplied ring terminal, with an inner diameter of 1/4 in. (5-7 mm)

In addition, depending on the type of modules you plan to use, you might need the following equipment to connect a port to an external network:

- Cables for connection to the WAN and LAN ports (dependent on configuration)

Note For more information on cable specifications, refer to the online document *Cisco Modular Access Router Cable Specifications* on Cisco.com.

- Ethernet hub or PC with a network interface card for connection to an Ethernet (LAN) port.
- Console terminal (an ASCII terminal or a PC running HyperTerminal or similar terminal emulation software) configured for 9600 baud, 8 data bits, 1 stop bit, no flow control, and no parity.
- Modem for connection to the auxiliary port for remote administrative access (optional).
- Data service unit (DSU) or channel service unit/data service unit (CSU/DSU) as appropriate for serial interfaces.
- External CSU for any CT1/PRI modules without a built-in CSU.
- NT1 device for ISDN BRI S/T interfaces (if not supplied by your service provider).