Prepare for Router Installation

Before you install the Cisco 900 Series Integrated Services Routers, you must prepare your site for the installation. This chapter provides pre-installation information, such as recommendations and requirements that should be considered before installing your router.

See the following sections to prepare for installation:

Safety Recommendations

Warning IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Safety With Electricity

Warning No user-serviceable parts inside. Do not open. Statement 1073

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

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

Prevent 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 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 anti-static strap. It should be between 1 and 10 megohms (Mohm).

General Site Requirements

Warning   Installation of the equipment must comply with local and national electrical codes. Statement 1074

Warning   Connect the Chassis to Earth Ground—To reduce the risk of electric shock, the chassis of this equipment needs to be connected to permanent earth ground during normal use. Statement 445

Warning   This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 20A. Statement 1005

Warning   Take care when connecting units to the supply circuit so that wiring is not overloaded. Statement 1018

Warning   To prevent the system from overheating, do not operate the devices in an area that exceeds the maximum recommended ambient temperature. Statement 1047.

Table 1: Ambient Temperature of SKUs

SKU		Ambient Temperature
Internal PSU	C921-4P C931-4P	50 °C
	C921-4PLTENA C921-4PLTEAS C921-4PLTEAU C921-4PLTEGB	45 °C
External PSU	C921J-4P C926-4P C926-4PLTEGB C927-4P C927-4PM C927-4PLTEGB C927-4PMLTEGB C927-4PLTEAU	45 °C

Note   For altitudes above sea-level, de-rate the ambient operating temperature 1°C per 1000-feet of elevation.

Note   Cisco 900 series routers are fanless, normally run warm to the touch, and require adequate clearances for proper heat dissipation and ventilation.

Site Selection Guidelines

The Cisco 900 Series ISRs require specific environmental operating conditions. Temperature, humidity, altitude, and vibration can affect the performance and reliability of the router. The following sections provide specific information to help you plan for the proper operating environment.

The Cisco 900 Series ISRs are designed to meet the industry EMC, safety, and environmental standards described in the Regulatory Compliance and Safety Information for the Cisco 900 Series ISR document.

Rack Requirements

Routers with internal Power Supplies can be mounted in a 19-inch rack using rack-mount brackets (optional kit). Routers with external Power Supplies require a customer-provided tray for mounting in a rack.

The following information helps you plan your equipment rack configuration:

- Allow clearance around the rack for maintenance.

- Allow at least one rack unit of vertical space between routers; more clearance is required when stacking multiple Cisco 900 Series ISRs. Provide adequate heat removal mechanism so that heat does not build up in the rack and the air surrounding the router is well within the specified operating ambient temperature condition.

  Note More spacing may be required depending on the installation environment.

- 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 it.

Router Environmental Requirements

Cisco 900 Series ISRs can be installed on a desk or a shelf, under a desk or a shelf, on a wall, and in a rack, depending on the SKU. The location of your router and the layout of your equipment rack or wiring room are extremely important considerations for proper operation. Equipment installed too close together, inadequate ventilation, and inaccessible panels can cause malfunctions and shutdowns, and can make maintenance difficult. Plan your installation site for accessing both front and rear panels of the router.

When planning your site layout and equipment locations, refer to the General Site Requirements , section. If you are currently experiencing shutdowns or an unusually high number of errors with your existing equipment, these precautions and recommendations may help you isolate the cause of failure and prevent future problems.

- 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 to avoid damage to equipment. Damage from static discharge can cause immediate or intermittent equipment failure.

- 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.

Power Guidelines and Requirements

Cisco 900 series routers come with the following power options:

- Routers with internal AC power supply

- Routers with external AC power supply

Table 2: SKUs with Internal and External Power Supplies

Power Supply	SKU
Internal	C921-4P
	C921-4PLTENA
	C921-4PLTEAS
	C921-4PLTEAU
	C921-4PLTEGB
	C931-4P
External	C921J-4P
	C926-4P
	C926-4PLTEGB
	C927-4P
	C927-4PM
	C927-4PLTEGB
	C927-4PMLTEGB
	C927-4PLTEAU

Note Do not hang the Power Supply Unit (PSU) from the power socket. Place it on a surface.

Note Check the power at your site to ensure that you are receiving power that is free of spikes and noise. Install a power conditioner if necessary

Table 3: Power Requirements for Cisco 900 Series ISRs

Power Source	SKU models	Input Rated	Output Rated
18W AC External Power Supply (PWR-18W-AC(=))	• C921J-4P	100-240V, 0.5A	12VDC, 1.5A
30W AC External Power Supply (PWR-30W-AC(=))	• C926-4P • C927-4P • C927-4PM • C926-4PLTEGB • C927-4PLTEGB • C927-4PMLTEGB • C927-4PLTEAU	100-240V, 1.0A	12VDC, 2.5A

Network Cabling Specifications

The following sections describe the cables and thee specifications required to install Cisco 900 Series ISRs:

Console Port Connections

The Cisco 900 ISR has both EIA/TIA-232 asynchronous (RJ-45) and USB2.0 compliant serial console ports. The console ports do not have any hardware flow control. Shielded USB cables with properly terminated shields are recommended.

EIA/TIA-232

Depending on the cable and the adapter used, this port appears as a DTE or DCE device at the end of the cable.

The default parameters for the console port are 9600 baud, 8 data bits, 1 stop bit, and no parity. The console port does not support hardware flow control. For detailed information about installing a console terminal, see the Connecting to a Console Terminal or Modem section.

For cable and port pinouts, see the Cisco Modular Access Router Cable Specifications document available on cisco.com.

Console Port Considerations

The router includes an asynchronous serial console port. The console ports provide access to the router using a console terminal connected to the console port. This section discusses important cabling information to consider before connecting the router to a console terminal or modem.

Console terminals send data at speeds slower than modems do; therefore, the console port is ideally suited for use with console terminals.

Preparing for Network Connections

When setting up your router, consider distance limitations and potential electromagnetic interference (EMI) as defined by the applicable local and international regulations.

Network connection considerations are provided for:

See the following online document for more information about network connections and interfaces:

- Cisco Modular Access Router Cable Specifications

Ethernet Connections

The IEEE has established Ethernet as standard IEEE 802.3. The routers support the following Ethernet implementations:

- 1000BASE-T—1000 Mb/s full-duplex transmission over a Category 5 or better unshielded twisted-pair (UTP) cable. Supports the Ethernet maximum length of 328 feet (100 meters).
- 100BASE-T—100 Mb/s full-duplex transmission over a Category 5 or better unshielded twisted-pair (UTP) cable. Supports the Ethernet maximum length of 328 feet (100 meters).
- 10BASE-T—10 Mb/s full-duplex transmission over a Category 5 or better unshielded twisted-pair (UTP) cable. Supports the Ethernet maximum length of 328 feet (100 meters).

See the Cisco Modular Access Router Cable Specifications document on Cisco.com for information about Ethernet cables, connectors, and pinouts.

Required Tools and Equipment for Installation

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

- Phillips screwdrivers: small, 3/16-in. (4 to 5 mm) and medium, 1/4-in. (6 to 7 mm)

- Screws that fit your rack

- Wire crimper

- Wire for connecting the chassis to an earth ground:

    - AWG 14 (2 mm^2) or larger wire for chassis grounding

- For grounding, an appropriate user-supplied ring terminal sized appropriately for a #6-32 screw.