Preparing for the Installation

Before you install the Cisco Remote PHY Shelf 7200, consider the following:

- Power and cabling requirements that must be in place at your installation sites
- Equipment required to install the Cisco Remote PHY Shelf 7200
- Environmental conditions your installation site must meet to maintain normal operation

Note Do not unpack the equipment until you are ready to install it. Keep the equipment in the shipping container to prevent accidental damage until you determine an installation site.

Prerequisites and Preparation

Before you perform the procedures in this guide, we recommend that you:

- Read the safety guidelines in the next section and review the electrical safety and ESD-prevention guidelines in this guide.
- Ensure that you have all of the necessary tools and equipment.
- Ensure that the power and cabling requirements are in place at your installation site.
- Ensure that the equipment required to install the device is available.

- Ensure that your installation site meets the environmental conditions to maintain normal operation.

Before installing the device, you must consider power and cabling requirements that must be in place at your installation site, special equipment for installing the device, and the environmental conditions your installation site must meet to maintain normal operation.

The shipping package for the device is engineered to reduce the chances of product damage associated with routine material handling experienced during shipment:

- Device should always be transported or stored in its shipping package in the upright position.
- Keep the device in the shipping container until you have determined the installation site.

Note Inspect all items for shipping damage. If an item appears damaged, contact a Cisco customer service representative immediately.

Note Do not unpack the module until you are ready to install it. Keep the module in the shipping container to prevent accidental damage until you determine an installation site. Use the appropriate unpacking documentation included with the module.

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

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

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

General Safety Guidelines

Before you begin the installation or replacement procedure, review the safety guidelines in this section to avoid injuring yourself or damaging the equipment.

When you install any component in a chassis, observe all caution and warning statements mentioned in this chapter. For warning translations, see the regulatory compliance and safety documentation that came with this product.

The following guidelines will help ensure your safety and protect the equipment. However, these guidelines may not cover all potentially hazardous situations you may encounter during system installation, *so be alert*.

- Install your product in compliance with the national and local electrical codes. In the United States, this means the National Fire Protection Association (NFPA) 70, United States National Electrical Code. In Canada, Canadian Electrical Code, part I, CC22.1. In other countries, International Electrotechnical Commission (IEC) 364, part 1 through part 7.
- Review the safety warnings listed in the regulatory compliance and safety documentation before installing, configuring, or performing maintenance on the product.
- Disconnect power at the source before you install or remove a chassis.
- Do not attempt to lift an object you might find too heavy to lift safely.
- Keep the chassis area clear and as dust free as possible during and after installation.
- Keep tools and chassis components away from walk areas.
- Do not wear loose clothing, jewelry (including rings and chains), or other items that could get caught in the chassis.
- Use the product in accordance with its marked electrical ratings and product usage instructions.

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

Safety Instructions

Note Do not unpack the module until you are ready to install it. Keep the module in the shipping container to prevent accidental damage until you determine an installation site. Use the appropriate unpacking documentation included with the module.

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

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

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage occurs when electronic cards or components are improperly handled, and can result in complete or intermittent failures. All line cards consist of a printed circuit card that is fixed in a metal carrier. Electromagnetic interference (EMI) shielding and connectors are integral components of the carrier. Although the metal carrier helps to protect the cards from ESD, use an antistatic strap each time you handle the modules. Handle the carriers by the edges only; never touch the cards or connector pins.

Static electricity can harm delicate components inside your system. To prevent static damage, discharge static electricity from your body before you touch any of your system components. As you continue to work on your system, periodically touch an unpainted metal surface on the computer chassis.

The following are guidelines for preventing ESD damage:

- Always use an ESD-preventive wrist or ankle strap and ensure that it makes good skin contact. Before removing a card from the chassis, connect the equipment end of the strap to the ESD plug at the bottom of the chassis below the power entry modules.
- Handle line cards by faceplates and carrier edges only; avoid touching the card components or connector pins.
- When removing a module, place the removed module component-side-up on an antistatic surface or in a static-shielding bag. If the module is to be returned to the factory, immediately place it in a static-shielding bag.
- Avoid contact between the modules and clothing. The wrist strap protects the card from ESD voltages only on the body; ESD voltages on clothing can still cause damage.
- When transporting a sensitive component, place it in an antistatic container or packaging.
- Handle all sensitive components in a static-safe area. If possible, use antistatic floor pads and workbench pads.

Caution For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 ohms.

Caution Always tighten the captive installation screws on all the system components when you are installing them. These screws prevent accidental removal of the module, provide proper grounding for the system, and help ensure that the bus connectors are properly seated in the backplane. To ensure proper grounding and mechanical support, the captive screws on the front cards should be tightened to 10-12 in-lbs and the rear PIC cards should be tightened to 6-8 in-lbs. Never use cordless or corded drills to tighten screws; power screwdrivers and hand tools are acceptable.

Plant Wiring Guidelines

When planning the location of the new system, consider the distance limitations for signaling, EMI, and connector compatibility, as described in the following sections.

Warning **This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.**Statement 1045.

When wires are run for any significant distance in an electromagnetic field, interference can occur between the field and the signals on the wires. This fact has two implications for the construction of plant wiring:

- Bad wiring practice can result in radio interference emanating from the plant wiring.
- Strong EMI, especially when it is caused by lightning or radio transmitters, can destroy the signal drivers and receivers in this equipment, and can even create an electrical hazard by conducting power surges through lines and into equipment. (Review the safety warnings.)

Note To predict and remedy strong EMI, you may also need to consult experts in radio frequency interference (RFI).

If wires exceed recommended distances, or if wires pass between buildings, give special consideration to the effect of a lightning strike in your vicinity. The electromagnetic pulse caused by lightning or other high-energy phenomena can easily couple enough energy into unshielded conductors to destroy electronic devices. If you have had problems of this sort in the past, you may want to consult experts in electrical surge suppression and shielding.

Electrical Equipment Guidelines

Follow these basic guidelines when you are working with any electrical equipment:

- Before beginning any procedures requiring access to the chassis interior, locate the emergency power-off switch for the room in which you are working.
- Disconnect all power and external cables before installing or removing a chassis.
- Do not work alone when potentially hazardous conditions exist.

- Never assume that power has been disconnected from a circuit; always check.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe. Never install equipment that appears damaged.
- Carefully examine your work area for possible hazards such as moist floors, ungrounded power extension cables, and missing safety grounds.

In addition, use the following guidelines when working with any equipment that is disconnected from a power source, but is 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 wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.

Warning **Statement 1001—**Work During Lightning Activity

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

Unpacking and Verifying Shipping Contents

Note Save the original Cisco box and packaging in which your equipment was sent and received in.

Before you begin

Read the safety guidelines and review the electrical safety and ESD-preventive guidelines.

Caution Ensure that you are properly grounded with an ESD-preventive wrist strap.

Note We recommend that you have at least two people available to help with the installation and ensure safe lifting.

Step 1 Inspect the box for any shipping damage. (If there is damage contact your service representative).

Step 2 Carefully cut the packaging straps that secure the shipping container to the pallet and open the top of the outer shipping container.

Step 3 Locate and remove the accessory kit. Set the accessory kit aside.

Step 4 Remove the top foam cap.

Step 5 Remove the screws that fasten the brackets that are used for attaching the chassis to the pallet using #2 Phillips screwdriver.

Step 6 Slide the ESD plastic bag off the chassis.

Step 7 Verify that you have received all of the required and ordered components.

Checking the Shipping Container Contents

Use the components list shown in the following table to check the contents of the Cisco Remote PHY Shelf 7200 shipping container. Do not discard the shipping container. You need the container if you move or have to ship the Cisco Remote PHY Shelf 7200 in the future.

Table 1: Cisco Remote PHY Shelf 7200 Shipping Container Contents

Component	Description
Chassis	Cisco Remote PHY Shelf 7200 is shipped configured as either AC or DC systems with up to 4 power modules.
Accessories Kit **Note** You must order the Accessories Kit separately if you order the Cisco Remote PHY Shelf 7200 chassis as a spare.	2 Installation Support Brackets 1 Grounding Lug, #4 straight 1 left and 1 right rear RF cable management brackets 8 DC Power Lugs, #4 AWG, 90 deg 2 RF PIC removal tools
	Sets of screw for: • ¼-20 screws for Grounding lug (2 screws (silver) with star washers)
Optional Equipment	Power cords if an AC power supplies were shipped. There are none for the DC power supply units.

Chassis-Lifting Guidelines

The chassis is not intended to be moved frequently. Before you install the system, ensure that your site is properly prepared so that you can avoid having to move the chassis later to accommodate power sources and network connections.

Each time you lift the chassis or any heavy object, follow these guidelines:

- Ensure that your footing is solid, and balance the weight of the chassis between your feet.
- Lift the chassis slowly; never move suddenly or twist your body as you lift.
- Keep your back straight and lift with your legs, not your back. If you must bend down to lift the chassis, bend at the knees, not at the waist, to reduce the strain on your back muscles.
- Ensure all installed components in the chassis are secured.
- Always disconnect all external cables before lifting or moving the chassis.

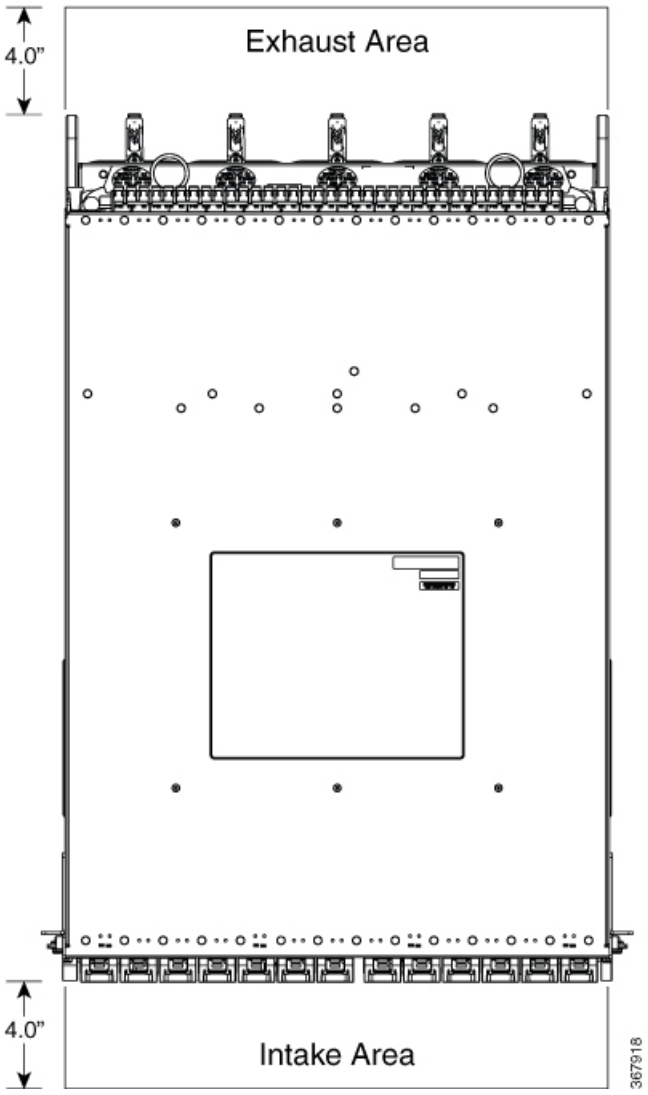
General Rack Installation Guidelines

The Cisco Remote PHY Shelf 7200 can be installed either front or mid rack-mount.

When planning your rack installation, consider the following guidelines:

- The Cisco Remote PHY Shelf 7200 requires a minimum of 7 rack units (12.25 inches or 31.12 cm) of vertical rack space. Measure the proposed rack location before mounting the chassis in the rack.
- Before using a particular rack, check for obstructions (such as a power strip) that could impair rack-mount installation. If a power strip does impair a rack-mount installation, remove the power strip before installing the chassis, and then replace it after the chassis is installed.
- Allow sufficient clearance around the rack for maintenance. If the rack is mobile, you can push it back near a wall or cabinet for normal operation and pull it out for maintenance (installing or moving cards, connecting cables, or replacing or upgrading components). Otherwise, allow 36 inches (91.44 cm) of clearance to remove field-replaceable units.
- Maintain a minimum clearance of 4 inches (10.16 cm) on the front and back sides of the chassis for the cooling air inlet and exhaust ports, respectively. Avoid placing the chassis in an overly congested rack. Also avoid placing large bundles of cables blocking air intakes or exhausts, or directly next to another equipment rack. The heated exhaust air from other equipment can enter the inlet air vents and cause an over temperature condition inside the device.

Figure 1: Minimum Clearance Area



Avoid placing the chassis in an overly congested rack or directly next to another equipment rack; otherwise, the heated exhaust air from the other equipment can enter the inlet air vents and cause a high temperature condition inside the router.

Caution To prevent chassis overheating, never install a Cisco Remote PHY Shelf 7200 in an enclosed space that is not properly ventilated or air conditioned.

- Always install heavier equipment in the lower half of a rack to maintain a low center of gravity to prevent the rack from falling over.
- Install and use the cable-management accessories included with the router to keep cables organized and out of the way of the cards and processors. Ensure that cables from other equipment already installed in the rack do not impair access to the cards or require you to disconnect cables unnecessarily to perform equipment maintenance or upgrades.

- Ensure that cables from other equipment already installed in the rack do not impair access to the cards or require you to disconnect cables unnecessarily to perform equipment maintenance or upgrades.
- Provide an adequate chassis ground (earth) connection for your chassis.

Site Planning

This section contains site-planning information, and will help you plan for the installation of the Cisco Remote PHY Shelf 7200.

General Precautions

Observe the following general precautions when using and working with the Cisco Remote PHY Shelf 7200:

- Keep your system components away from radiators and heat sources and do not block cooling vents.
- Do not spill food or liquids on your system components and never operate the product in a wet environment.
- Do not push any objects into the openings of your system components. Doing so can cause fire or electric shock by shorting out interior components.
- Position system cables and power supply cable carefully. Route system cables and power supply cable and plug such that they cannot be stepped on or tripped over. Be sure that nothing else rests on your system component cables or power cable.
- Do not modify power cables or plugs. Consult a licensed electrician or your power company for site modifications. Always follow your local and national wiring rules.
- If you turn off your system, wait at least 30 seconds before turning it on again to avoid system component damage.

Consider the following best practices before installing the Cisco Remote PHY Shelf 7200.

- **Elevated Operating Ambient**: If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
- **Reduced Air Flow**: Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- **Mechanical Loading**: Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- **Circuit Overloading**: Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- **Reliable Earthing**: Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (For example, the use of power strips).

Note For proper installation and grounding of the antenna, refer to national and local codes (for example: U.S NFPA 70, National Electrical Code, Article 810, Canada: Canadian Electrical Code, Section 54).

Site Selection Guidelines

The Cisco Remote PHY Shelf 7200 requires specific environmental operating conditions. Temperature, humidity, altitude, and vibration can affect the performance and reliability of the device. The following sections provide specific information to help you plan for a proper operating environment.

Site Environmental Requirements

Environmental monitoring protects the system and components from damage caused by excessive voltage and temperature conditions. To ensure normal operation and avoid unnecessary maintenance, plan and prepare your site configuration before installation.

Environmental Requirements for the Cisco Remote PHY Shelf 7200

The table below lists the operating and non-operating environmental site requirements. The ranges listed are those within which the equipment continues to operate; however, a measurement that is approaching the minimum or maximum of a range indicates a potential problem. You can maintain normal operation by anticipating and correcting environmental anomalies before they approach a maximum operating range.

Table 2: Specifications for Operating and Non-operating Environments for the Cisco Remote PHY Shelf 7200

Specification	Minimum
Power Consumption	4200W facility power input to the Cisco Remote PHY Shelf 7200
Thermal Heat Dissipation	14330 BTU/hr
Temperature Range	Nominal: 32 to 104ºF (0 to 40ºC)
	Maximum: 32 to 122ºF (0 to 50ºC)
Temperature Storage	-40 to 158ºF (-40 to 70ºC)
Relative Humidity Operational (Maximum)	5 to 90% **Note** Not to exceed 0.024 kg water per 1 kg of dry air.
Relative Humidity Storage	5 to 95% **Note** Not to exceed 0.024 kg water per 1 kg of dry air.
Operating Altitude	-200 to 13,700 ft (-60 to 4175m)

Electrical Circuit Requirements

Each Cisco Remote PHY Shelf 7200 requires a dedicated electrical circuit for each power module. If you equip it with multiple power supplies, you must provide a separate circuit for each power supply to avoid compromising the power redundancy feature.

The Cisco Remote PHY Shelf 7200 can be powered by a DC or AC source. Ensure that equipment grounding is present and observe power-strip ratings. Make sure that the total ampere rating of all the products plugged into the power strip does not exceed 80 percent of the rating.

Note The Cisco Remote PHY Shelf 7200 can support four AC or four DC power supplies. The Cisco Remote PHY Shelf 7200 does not support mixed AC and DC power supply units in the same chassis.

The following table contains specifications for DC-powered systems for the Cisco Remote PHY Shelf 7200.

Table 3: Cisco Remote PHY Shelf 7200 DC Power Supply System Input Requirements

System Input Rating (in A)	Circuit Breaker (in A)		AWG # Wire	
	Minimum	Maximum	Minimum	Maximum
60 A per DC Power Module	Always 60 A		AWG #4 or AWG #6	AWG #2[2]

Note If AWG #2 wire is used for DC power module connections, the chassis ground wire must also be upgraded to an AWG #2 wire and connector.

The following table lists AC and DC power supply system rating requirements for the Cisco Remote PHY Shelf 7200.

Table 4: AC and DC Power Supply Specifications for the Cisco Remote PHY Shelf 7200

Description	Specification
Power supply voltage range	AC = 180 to 264 VAC DC = -40 to -72 VDC
Power supply declared ratings	AC = 200 to 240 VAC DC = –48/–60 VDC
Line frequency rating	50/60 Hz for AC power supplies

Equipment Rack Guidelines

The placement of racks can affect personnel safety, system maintenance, and the system's ability to operate within the environmental characteristics. Choose a proper location for the Cisco Remote PHY Shelf 7200 by going through the guidelines that are listed in the following topics.

Locating for Safety

If the Cisco Remote PHY Shelf 7200 is the heaviest or the only piece of equipment in the rack, consider installing it at or near the bottom to ensure that the rack's center of gravity is as low as possible.

Locating for Easy Maintenance

Maintain 4 inch of clearance from obstructions (or any cluttered cables) to the front intake and rear fan exhaust. This space ensures that you can remove the Cisco Remote PHY Shelf 7200 components and perform routine maintenance and upgrades easily.

Avoid installing the Cisco Remote PHY Shelf 7200 in a congested rack and consider how the routing of cables from other pieces of equipment in the same rack might affect access to the device.

The front and top of the chassis must remain unobstructed to ensure adequate airflow and prevent overheating inside the chassis.

Allow the following clearances for normal system maintenance:

- At the top of the chassis—At least 3 in. (7.6 cm)
- At the bottom of the chassis—At least 0.2 in. (5 mm)
- In front of the chassis and behind the chassis—4 in.

To avoid problems during installation and ongoing operation, follow these general precautions when you plan the equipment locations and connections:

- Use the **show environment all** and the **show facility-alarm status** commands regularly to check the internal system status. The environmental monitor continually checks the interior chassis environment; it provides warnings for high temperature and creates reports on any occurrences. If warning messages are displayed, take immediate action to identify the cause and correct the problem.
- Keep the Cisco Remote PHY Shelf 7200 off the floor and out of the areas that collect dust.
- Follow ESD-prevention procedures to avoid damage to equipment. Damage from static discharge can cause immediate or intermittent equipment failure.

Tools and Equipment

The following tools and equipment are recommended as the minimum necessary equipment to install the Cisco Remote PHY Shelf 7200. You may need additional tools and equipment to install associated equipment and cables. You may also require test equipment to check electronic and optical signal levels, power levels, and communications links.

Table 5: Tools required for installation

Part	Tools Required
Chassis	• ESD-preventive wrist strap • #2 Phillips torque screwdriver

Part	Tools Required
Power Shelf	• ESD-preventive wrist strap • T15 Torx driver
Power Module	• ESD-preventive wrist strap • 3/16" flat-blade or #2 Philips torque screwdriver
RPD, PIC, Fan Tray	• ESD-preventive wrist strap • 3/16" flat-blade torque screwdriver
Fan Module	• ESD-preventive wrist strap • No tools are required