5162 Router

Installation

323-1955-201 - Standard Revision C
November 2023

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Contents

Publication history

The following list provides the publication history.

November 2023
Revision C

Standard revision of this document. This revision includes the following modification:

- Chassis installation
  - — Added a procedure on mounting the chassis into a two post rack in a mid-mount

June 2023
Revision B

Second standard release of this document.

May 2022
Revision A

Standard release of this document.

About this document

This document directs network technicians and system administrators in the installation and start up of 5162 Router from Ciena® Corporation.

Hyperlinks are indicated by blue text in this document.

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Intended audience

This document is intended for users, such as network technicians and system administrators, who will install the system into a packet networking environment.

It assumes that the intended users possess basic knowledge of, but not limited to:

- Proper hardware installation
- Proper hardware diagnostics
- Ethernet concepts
- IEEE standards
- IETF standards
- Open Systems Interconnection (OSI) Seven Layer Model
- Local Area Networks (LAN)
- Virtual Local Area Networks (VLAN)

Related documents

This document is part of a documentation suite that fully describes the system.

For more information about the documentation suite, refer to *Getting Started* for the release you are using.

CHAPTER 1
Ordering hardware

The chassis has a modular and scalable design that enables flexibility for various deployment and future upgrade scenarios.

The following table provides the ordering information for the selectable parts necessary to complete the chassis.

Table 1 Hardware part codes

Part number	Description	Notes
Chassis		
170-5162-900	5162, (2)100GbE QSFP28,(40)10GbE/1GbE SFP+, SYNC, (2)SLOTS AC OR DC	Base unit
Power units Power units can be AC or DC, however, the combination of AC and DC units in the same chassis is not supported.		
170-0092-900	5162 DC PLUGGABLE POWER SUPPLY, -48 VDC	DC power distribution unit
170-0093-900	5162 AC PLUGGABLE POWER SUPPLY, WIDE RANGE 120/240 VAC	AC power supply
AC Power The AC power variant of the chassis requires an AC power cable that matches the local requirements for your installation site. The AC power supplies have an IEC C14 power connector. To connect properly, an AC power cord must end with an IEC C13 or a Universal C13 power connector.		
170-0111-900	AC POWER CORD, IEC C13, AUTO LOCK, AUSTRALIA,TYPE I	AC power cord for installations in Australia
170-0112-900	AC POWER CORD, IEC C13, AUTO LOCK, SWITZERLAND,TYPE J	AC power cord for installations in Switzerland
170-0113-900	AC POWER CORD, IEC C13, AUTO LOCK, EUROPE,TYPE F	AC power cord for installations in Europe

Part number	Description	Notes
170-0114-900	AC POWER CORD, IEC C13, AUTO LOCK, NORTH AMERICA,TYPE B	AC power cord for installations in North America
170-0115-900	AC POWER CORD, IEC C13, AUTO LOCK, UNITED KINGDOM,TYPE G	AC power cord for installations in the United Kingdom
170-0116-900	AC POWER CORD, IEC C13, AUTO LOCK, UNIVERSAL IEC C14	AC power cord for universal installations
Mounting kits The chassis ships with a four-post, 19 in. rack mount kit. All kits include mounting brackets, cable management brackets, and screws.		
170-0157-900	19 INCHES 4 POST RACK MOUNT BRACKETS, FOR USE W/ 5170/5162	Brackets for four-post 19 inch rack
170-0356-900	ETSI 4 POST RACK MOUNT BRACKETS, FOR USE W/5162/5170	Brackets for four-post ETSI rack
170-0192-900	19 INCHES 2 POST RACK MIDMOUNT BRACKETS, FOR USE W/ 5170/5162	Brackets for two-post 19 inch rack
170-0193-900	19 INCHES 2 POST RACK FLUSHMOUNT BRACKETS, FOR USE W/ 5170/5162	Flushmount brackets for two-post 19 inch rack
170-0194-900	23 INCHES 2 POST RACK MIDMOUNT BRACKETS, FOR USE W/ 5170/5162	Brackets for two-post 23 inch rack
70-0195-900	23 INCHES 2 POST RACK FLUSHMOUNT BRACKETS, FOR USE W/ 5170/5162	Flushmount brackets for two-post 23 inch rack
Other optional parts		
170-0149-900	5162 SPARE PLUGGABLE FAN UNIT	Replacement fan module

CHAPTER 2
Technical specifications

The following table summarizes the technical specifications.

Table 2 Specifications

Feature		**Specification**
Fault tolerance	Redundant power supplies	Two hot-swappable AC or DC power supplies.
	Redundant fans	Tolerance for one fan failure
Power rating	AC input power	AC power unit rating consists of two ranges: • 100 VAC -127 VAC, 50/60 Hz, 2.0 A Recommended fuse/breaker size: 5 A • 200 VAC - 240 VAC, 50/60 Hz, 1.0 A Recommended fuse/breaker size: 3 A
	DC input power	DC power unit rating range: • -40 VDC to -72 VDC, -48 VDC (nominal), 4.0 A Recommended fuse/breaker size: 10 A
Power consumption	Typical power consumption (with standard optics)	• 120 VAC input load = 169 W • 240 VAC input load = 185 W • 45 VDC input load = 144 W
	Maximum power consumption (with standard optics)	• 120VAC input load = 309 W • 240VAC input load = 325 W • 48VDC input load = 284 W

Feature		**Specification**
Connector types	(40) 1/10 GbE SFP/SFP+	SFP/SFP+ optics
	(2) 100 GbE QSFP	QSFP28 optics
	1 Console port	RJ45 (EIA-561)
	1 PPS	SMB connector
	CLK GPS/10 Mhz	SMB connector
	BITS	RJ45
	SYNC	RJ45
	1 Management port	RJ45
	1 USB port	USB device
	IEC C14 AC power connector	
Physical	Chassis dimensions	4.45 cm H x 44.09 cm W x 55.93 cm D (1.75 in H x 17.36 in W x 22.02 in D)
	Rack unit height	1 RU
	Base chassis weight (no PSUs, no optics)	20 lbs (9. 07kg)
	Weight with 2 PSUs (no optics)	25 lbs (11. 34kg)
	4-post rack bracket depth	min 23 in. (58.42 cm) max 35 in. (88.9 cm)
Environmental	Operating humidity	5% to 90%, non-condensing
	Ambient operating temperature	Includes indoor locations and partially controlled environments. 0°C to +40°C (32°F to 104°F)
	Storage temperature	-40°C to +70°C (-40°F to 158°F)

CHAPTER 3
Installation preparation

This chapter provides details about the requirements to be completed prior to installation.

This chapter:

- lists documents to review prior to installation
- reviews chassis and rack requirements
- reviews clearances required for proper ventilation
- describes proper handling procedures for the chassis

Required documents

Prior to installation, review the latest versions of supporting documentation as applicable to the intended installation.

Required documents are:

- Installation Specification (IS) and Bill of Materials (BOM)
- Regional, customer, and site-specific regulatory, installation, and safety requirements
- Ciena® Standard Cleaning and Equipment Safety Practices (009-2003-121)
- Ciena® Installation Workmanship Standards (009-7B03-000)
- Telcordia Electromagnetic Compatibility and Electrical Safety GR-1089-CORE
- Telcordia Generic Installation Standards GR-1275 CORE
- European Telecommunications Standards Institute (ETSI) 300 119 Equipment Engineering
- European Telecommunication Standard for equipment practice

DANGER
Risk of injury or damage to equipment
Review all the safety information and ensure that both site and personnel satisfy stated requirements.

DANGER
Risque de blessures ou de dommages à l'équipement
Vérifiez toute l'information de sécurité et assurez-vous que le site et le personnel répondent aux exigences énoncées.

危險
有造成人身傷害或設備損壞的風險

查看所有安全信息並確保現場和人員都滿足規定的要求。

DANGER
Risk of electric shock
Disconnect all power sources before servicing to avoid shock hazard.

DANGER
Risque de choc électrique
Débranchez toutes les sources d'alimentation avant l'entretien afin d'éviter tout risque de choc.

危險
觸電風險

請在維修之前斷開所有電源，以免觸電。

WARNING
This equipment is not suitable for use in locations where children are likely to be present.

AVERTISSEMENT
Cet équipement ne convient pas à une utilisation dans des lieux susceptibles d'accueillir des enfants.

警告
此設備不宜在孩童所在場所使用

Chassis size and installation options

The chassis occupies one rack unit (RU) of a standard 19-inch equipment rack.

The chassis is designed so that all interface cabling connections are located on the front faceplate.

Figure 1 Front view

Airflow

The chassis contains five hot-swappable, field-replaceable, dual impeller fan modules.

Air is drawn through the intake vents on the front of the chassis and is exhausted through the rear. Air vents must not be obstructed in any way. Network Equipment-Building System (NEBS) specifications for clearances are:

- Front of chassis: 3 in. (8 cm)
- Rear of chassis: 3 in. (8 cm)

The system can tolerate the failure of one fan and maintain operation until a maintenance action can be scheduled. The maintenance action to replace the unit must be scheduled as soon as possible.

CAUTION
Risk of damage to equipment
No heat generating objects should be present in the vicinity of the air intake to avoid preheated air being drawn into the chassis. Intake temperatures outside the operating range can damage the system.

ATTENTION
Risque de dommages à l'équipement
Afin d'éviter que de l'air préchauffé ne soit aspiré dans le bâti, aucun objet produisant de la chaleur ne doit se trouver à proximité de la prise d'air. Toute température hors de la plage pourrait endommager le système.

警告
設備損壞風險

請勿在進氣口附近放置發熱物體，以免底盤吸入預熱空氣。若進氣溫度超過此溫度範圍，則可能會導致系統損壞

Proper handling

Improper handling of sensitive components can have the following consequences:

- damage to equipment such that the equipment does not function properly when in use
- misdiagnosed failure analysis report for a returned (RMA) unit

CAUTION
Risk of damage to modules and backplanes
This equipment contains Electrostatic Discharge (ESD) sensitive devices. Wear grounding straps when handling equipment and follow ESD procedures.

ATTENTION
Risque de dommages aux modules et aux fonds de panier
Cet équipement contient des dispositifs sensibles aux décharges électrostatiques (DES). Portez des sangles de mise à la terre si vous devez manipuler l'équipement et suivez les procédures relatives aux DES.

警告
有損害電路的風險

此設備含靜電放電 (ESD) 敏感元件。接觸該設備時，請佩戴接地帶，並遵循 ESD 程序。

Equipment containing integrated circuits can be damaged by static electricity that builds up on work surfaces and personnel. The effect of ESD damage may be immediate failure or it may manifest itself as a latent failure affecting the reliability of the equipment.

Observe the following precautions to avoid static charges and discharges:

- When handling the equipment (for example, storing, installing, or removing), always wear a grounded wrist strap or wear a heel strap and stand on a grounded, static-dissipating floor mat.
- Never touch the components, conductors, or connector pins.
- If possible, do not remove the equipment from its packaging until ready for use.
- If possible, open all packaging at a static-safe work station using properly-grounded wrist straps and static-dissipating table mats.
- Always store and transport modules in static-safe packaging.

To avoid physical damage to the equipment, store it in the original protective packaging container. Do not stack equipment without the use of the original protective packaging containers.

Required tools and equipment

When handling, installing, or removing the chassis, ensure the chassis is stored in ESD-protective packaging when not installed in an equipment rack.

The following tools and equipment are required whenever handling the chassis and must be available at the installation site:

- ESD-guard wrist strap
- ESD-guard heel grounders
- A Phillips screwdriver of suitable size to accommodate the rack screws
- Flat head screwdriver
- Anti-static bag or anti-static box

CAUTION
Risk of damage to circuits
This equipment contains Electrostatic Discharge (ESD) sensitive devices. Wear grounding straps when handling equipment and follow ESD procedures.

ATTENTION
Risque de dommages aux circuits
Cet équipement contient des dispositifs sensibles aux décharges électrostatiques (DES). Portez des sangles de mise à la terre si vous devez manipuler l'équipement et suivez les procédures relatives aux DES.

警告
迴路損壞風險

此設備含有對靜電放電 (ESD) 敏感的裝置。請在處理這類設備時，配戴接地帶並依照 ESD 程序執行作業。

List of procedures

The following is the procedure to create an ESD connection to protect the chassis from ESD damage.

- Procedure 1, "Creating an ESD connection to the rack"

Procedure 1 Creating an ESD connection to the rack

Create an ESD connection to the rack to protect the metal chassis from ESD damage.

Overview

The chassis is not equipped with an ESD jack. Ensure you are grounded to the equipment rack and the rack is grounded to the facility main ground.

Steps

1. Place the ESD wrist strap over your wrist.
2. Connect the ESD strap to an ESD jack on the equipment rack.
3. Ensure that the retractable cable is connected to the wrist strap and the rack.

CHAPTER 4
Unpacking and inspection

This chapter describes how to unpack the chassis from the shipping container and inspect the chassis for damage.

Serial number

The serial number and model number are located on a pull-out tab below the console port.

Figure 2 Serial number location

List of procedures

The following are the major steps for unpacking and inspecting a 5162 router.

- Procedure 2, “Unpacking the chassis”
- Procedure 3, “Inspecting for damage”
- Procedure 4, “Returning materials”

Procedure 2 Unpacking the chassis

Unpack the chassis to begin the installation.

Requirements

- Personnel involved in the installation must be trained in and have experience with Ciena® product installations.
- Follow site standards regarding system weight when unpacking and maneuvering the chassis.
- Inspect the shipping container for physical damage. If any components are damaged, refer to the instructions in "Returning materials" on page 22.

Overview

The following items are shipped:

- chassis
- mounting bracket kit for a four-post, 19-inch rack which contains:
  - two brackets
  - two cable supports
  - six 8-32 x 0.250-inch length flat head Phillips screws used to attach the brackets to the side of the chassis
  - ten 8-32 x 0.250-inch length truss head Phillips screws used to attach the sliding inner track brackets to the side of the chassis
  - two 8-32 x 0.500-inch length pan head Phillips screws used to attach the cable guides

Steps

1 Verify the shipping container contents against the shipping invoice.

2 Compare the labels on the shipping containers with the information on the packing list.

If there are	**Then**
discrepancies or missing components	stop and notify Ciena® Global Product Support. Have the following information available: • shipping invoice number • model and serial number of the damaged item • description of the discrepancy • effect of the discrepancy on the installation
no discrepancies or missing components	continue with the procedure

3 Remove the cardboard box and plastic bag from the shipping container.

4. Carefully lift the chassis out of the cardboard box.
5. Remove the foam block from the chassis.
6. Remove the chassis out of the ESD bag.
7. Ensure that the shipping container is empty.
8. Dispose of shipping container and packing materials in accordance with site requirements.

Procedure 3 Inspecting for damage

Inspect the chassis to ensure that it was not damaged in transit.

Overview

CAUTION
Risk of damage to circuit packs and backplanes
This equipment contains Electrostatic Discharge (ESD) sensitive devices. Wear grounding straps when handling equipment or making connections to the equipment and follow ESD procedures.

ATTENTION
Risque d'endommager les blocs de circuits et les fonds de panier
Cet équipement contient des dispositifs sensibles aux décharges électrostatiques (DES). Portez des sangles de mise à la terre si vous devez manipuler l'équipement ou établir des connexions à l'équipement et suivez les procédures relatives aux DES.

警告
迴路組及背板損壞風險

此設備含有對靜電放電 (ESD) 敏感的裝置。請在處理或連接設備時，配戴接地帶並依照 ESD 程序執行作業。

Steps

1 Visually inspect every surface of the chassis. Look for:

- chipped paint
- cracks
- breaks
- broken connectors
- electronics damage such as bent pins

2 Determine whether there is any damage.

If	Then
damage is identified	take the following actions: • photograph and record the damage • report the damage to the shipping courier • notify Ciena® Global Product Support about damaged components
no damage is identified	the chassis is ready to be positioned and installed.

Procedure 4 Returning materials

All returned equipment must have a Ciena return merchandise authorization (RMA) number. Ciena is not responsible for any item returned without this identifier.

Overview

The following information is required to obtain an RMA number:

- Ciena Customer Support contact information, located in the copyright statement of this publication
- serial number of item to be returned
- model number of item to be returned
- description of the problem
- return address and phone number
- declaration of emergency or non-emergency condition

Steps

1 Contact a Ciena Customer Support Representative and provide the required information.

An RMA is created and is used to track the defective item.

CHAPTER 5
Chassis installation

The chassis is one rack unit (RU) tall and is designed to fit in a standard four post 19-inch or ETSI rack or a two post 19-inch or 23-inch rack in a flush-mount or mid-mount installation. The chassis can also be placed on a desktop.

The chassis is shipped with a four-post, 19-inch mounting bracket kit. If required, mounting kits for other installation types can be ordered separately. Use the mounting kit that matches your installation requirements.

Ensure that the selected mounting structure can support the weight of the chassis and all its components. For weight specifications, refer to "Technical specifications" on page 7.

List of procedures

The following are the procedures provided for installing the chassis.

- Procedure 5, "Mounting in a 4-post 19-inch rack"
- Procedure 6, "Mounting in a 2-post, front-mount rack"
- Procedure 7, "Mounting in a 2-post, mid-mount rack"
- Procedure 8, "Installing the chassis on a desktop"

Procedure 5 Mounting in a 4-post 19-inch rack

This procedure mounts the chassis into a four post rack in a front-mount installation. Installation for the 19-inch and ETSI racks is the same. The19-inch brackets are used in these instructions.

Requirements

The rack into which the chassis will be installed must be properly grounded. If your installation location does not allow left side access to the chassis, the supplemental ground cable needs to be routed and connected to the chassis before mounting the chassis. Refer to “Chassis ground installation” on page 39.

The rack must be securely anchored to the floor prior to installing the chassis into the rack.

The following items are required for proper installation of the chassis:

- four rack mounting screws for securing the chassis to the rack
- Phillips screwdriver(s) that fit the kit and screws
- rack-mount kit

Overview

The chassis mounting brackets are attached to the sides of an unpowered and unconnected chassis and are used to position the chassis in a rack.

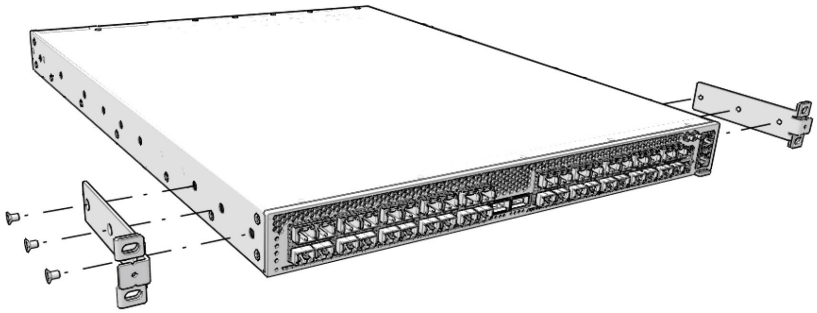
The bracket kit includes cable supports. The cable supports are installed on the front brackets and are used to keep the cables out of adjacent equipment space by directing them along the faceplate of the chassis.

Steps

Securing the mounting brackets to the chassis

1 Align the holes on the first mounting bracket with the mounting holes on the side of the chassis.

Figure 3 Mounting bracket chassis hole positions

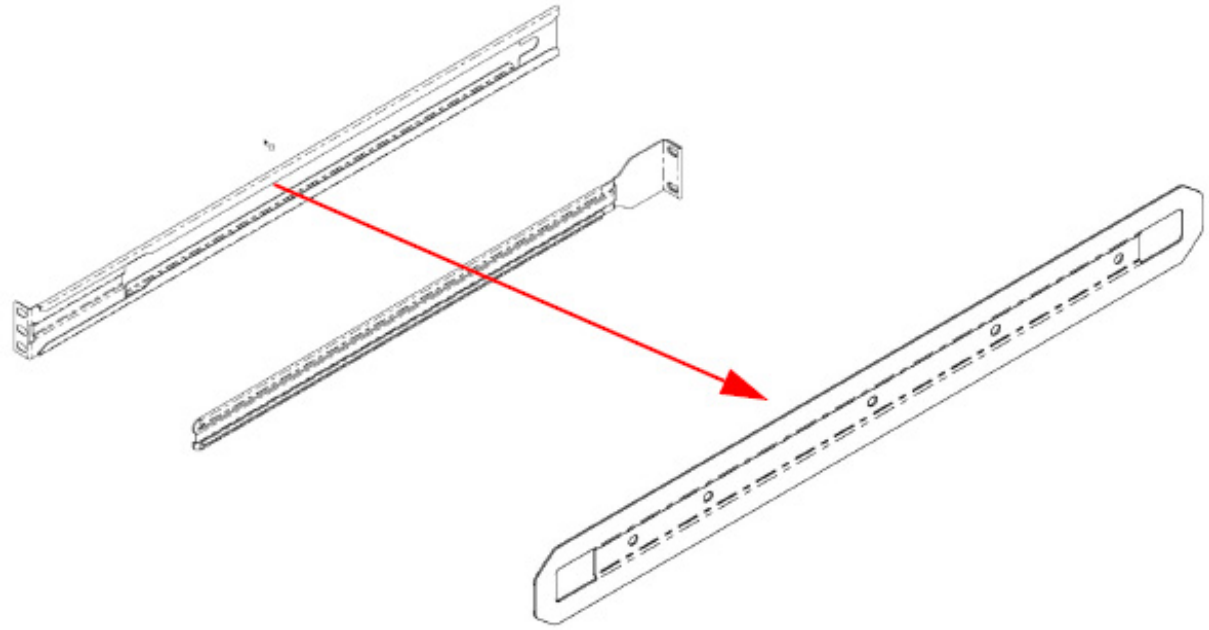


2 Install screws in holes to secure the mounting bracket to the chassis.

3 Align and secure the second mounting bracket to the opposite side of the chassis.

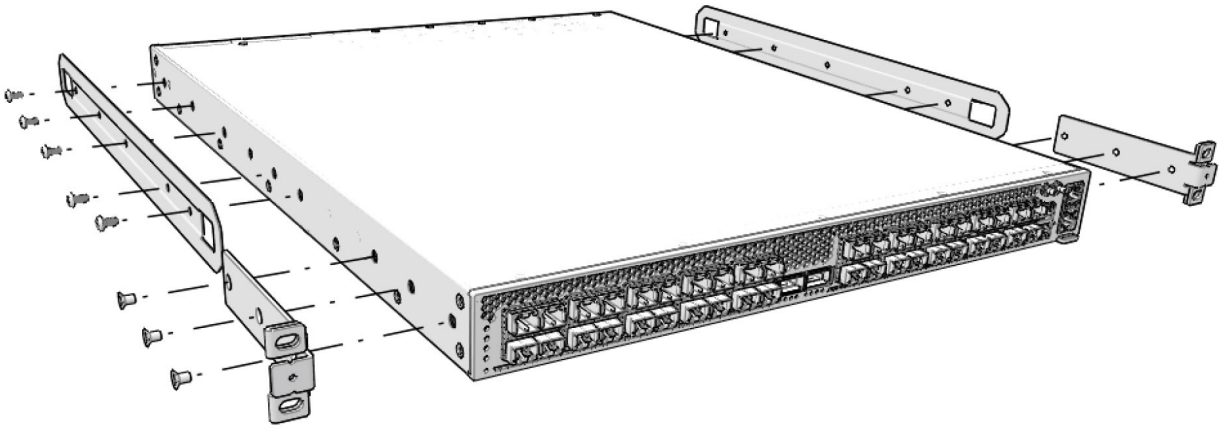
4 Remove the sliding inner track bracket with the mounting holes from the mounting bracket.

Figure 4 Track bracket



5 Align the track bracket holes with the 5 rear mounting holes on the side of the chassis, making sure that the top and bottom angled rails of the bracket angle away from the chassis. The center of the bracket should lay flat against the chassis.

Figure 5 Attach the mounting bracket



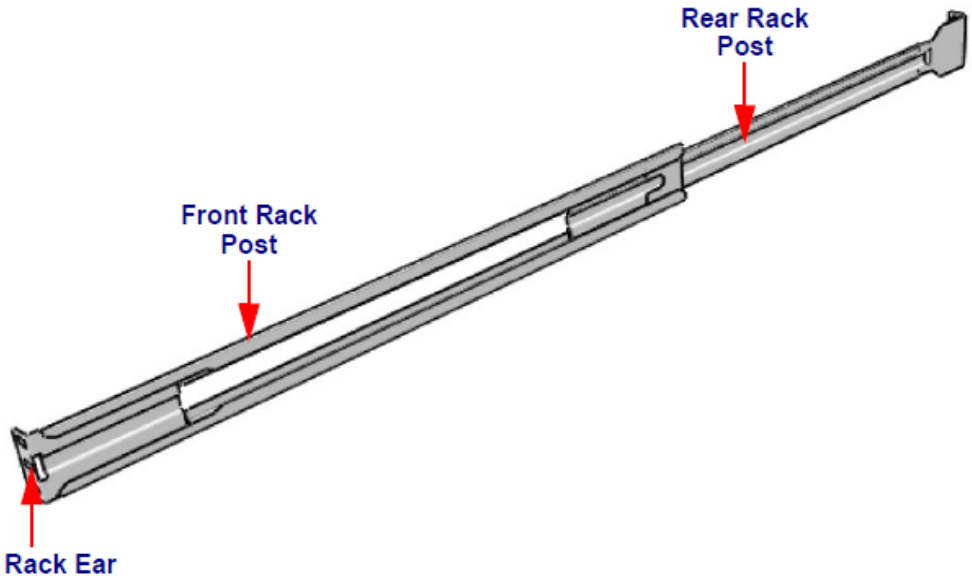
6 Use a Phillips screw driver to secure the inner bracket to the chassis with the 5 provided screws.

7 Secure the second track bracket to the opposite side of the chassis.

Securing the rack posts to the rack

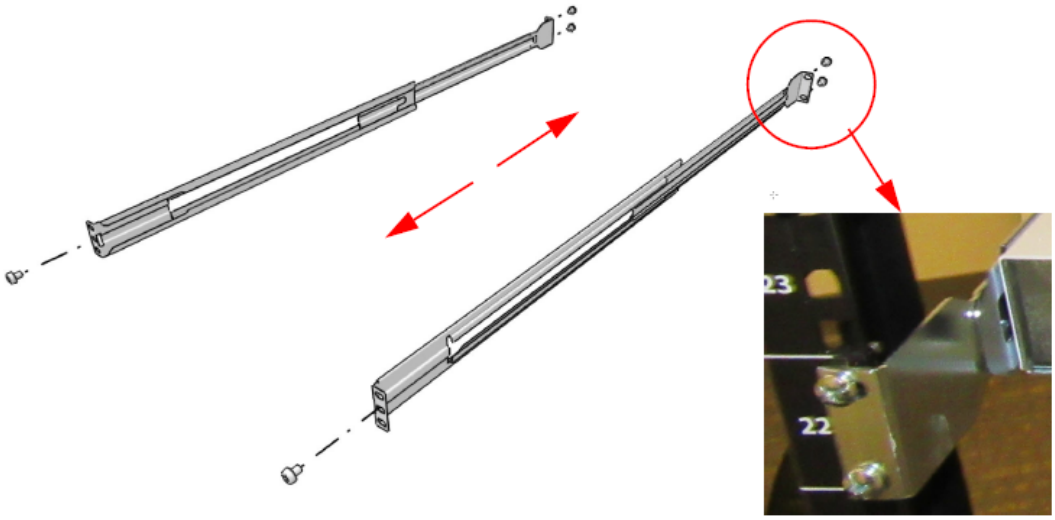
8 With the rear rack post inserted into front rack post, align the bracket so that the rack ears are pointed away from the chassis.

Figure 6 Rack post orientation



9 Secure the front rack post in the desired position in the rack using a customer-provided rack screw inserted in the center hole of the rack ear.

Figure 7 Securing the rack posts



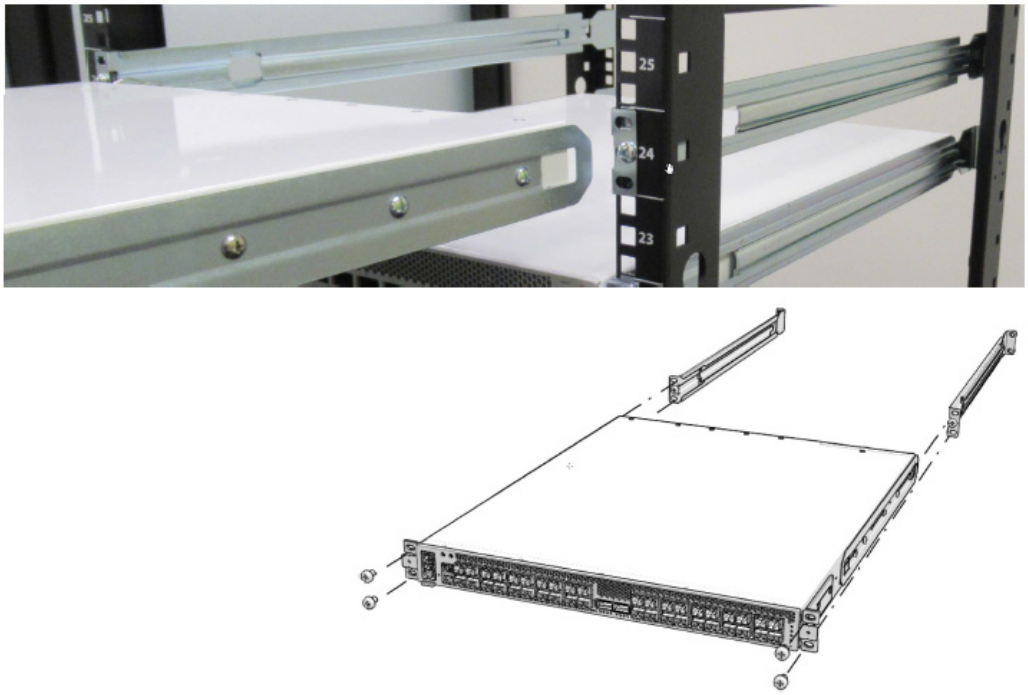
10 Making sure that they are installed at the same rack location on the rear of the rack, secure the rear rack post to the rack by sliding the bracket out until it meets the rack and inserting 2 customer-provided rack screws into the holes on the rear rack ears.

11 Making sure that it is installed at the same rack location on the opposite side of the rack, install the second bracket in the same manner.

Installing the chassis in the rack

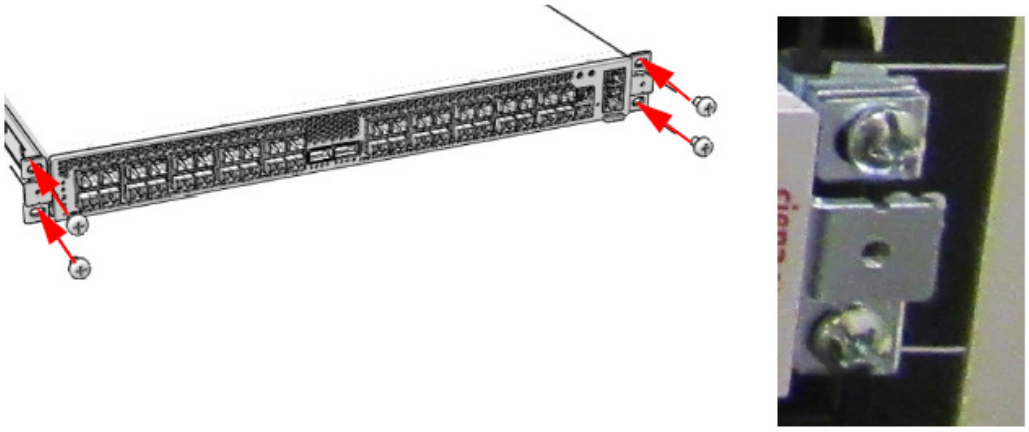
12 Align the rails of the track bracket installed on the chassis with the channels of the front rack brackets already installed in the rack, then slide the 5162 into the rack.

Figure 8 Aligning the rails



13 Secure the chassis to the rack using 2 customer-provided rack screws.

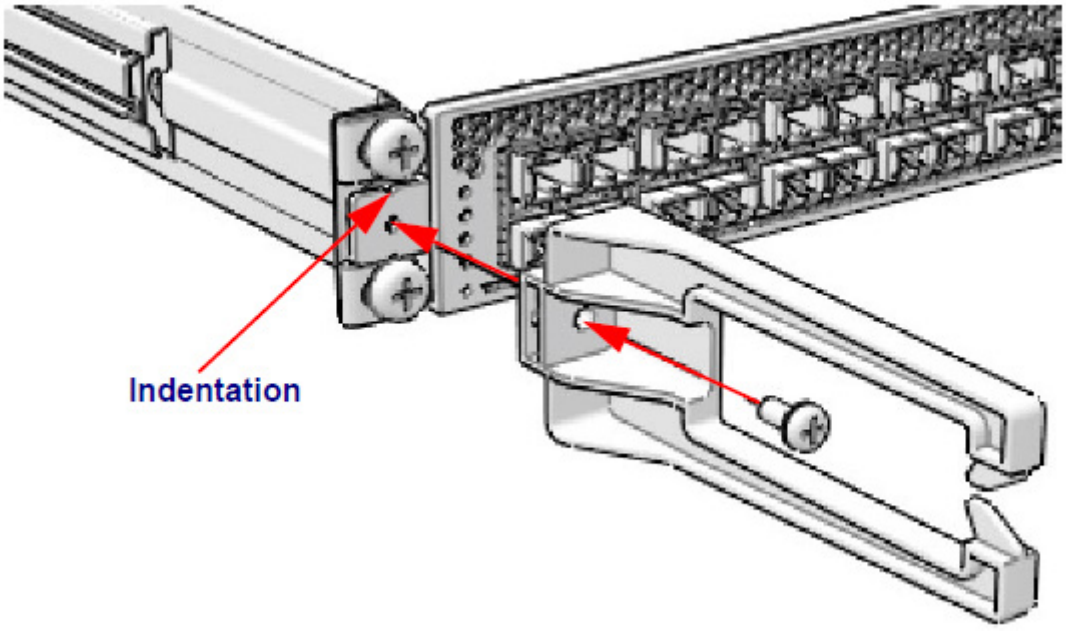
Figure 9 Securing the chassis



Cable guide installation

14 Install the cable guides on the rack ears using the screws provided in the kit. One screw is used per bracket. Once installed, the 2 small tabs on the bottom of the cable guide will lock into the indentations at the top and bottom of the bracket screw hole to prevent the guide from rotating. The following image shows the insertion location of the screw on the cable guide and on the bracket.

Figure 10 Mounting bracket with cable guide



Procedure 6 Mounting in a 2-post, front-mount rack

This procedure mounts the chassis into a two post rack in a front-mount installation. Installation for the 19-inch and 23-inch racks is the same. The19-inch brackets are used in these instructions.

Requirements

The rack into which the chassis will be installed must be properly grounded. If your installation location does not allow left side access to the chassis, the supplemental ground cable needs to be routed and connected to the chassis before mounting the chassis. Refer to “Chassis ground installation” on page 39.

The rack must be securely anchored to the floor prior to installing the chassis into the rack.

The following items are required for proper installation of the chassis:

- four rack mounting screws for securing the chassis to the rack
- Phillips screwdriver(s) that fit the kit and screws
- rack-mount kit

Overview

The chassis mounting brackets are attached to the sides of an unpowered and unconnected chassis and are used to position the chassis in a rack.

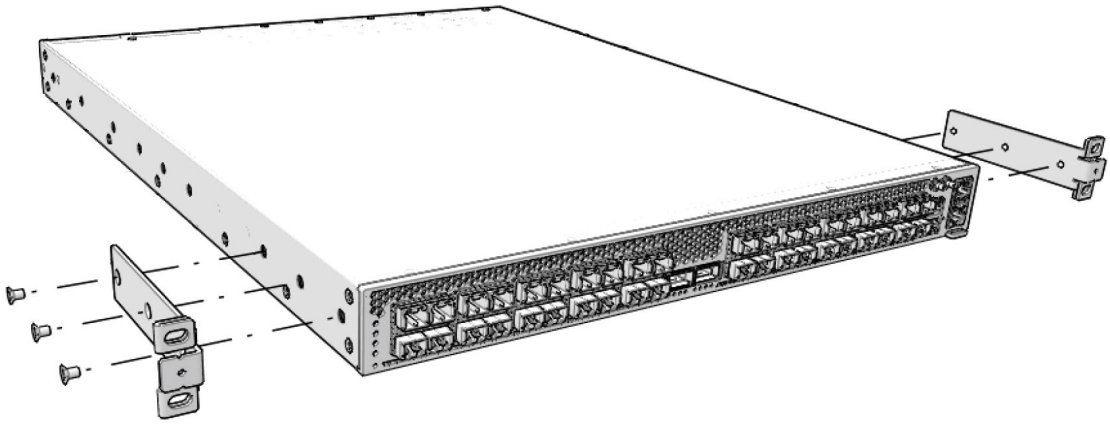
The bracket kit includes cable guides. The cable guides are installed on the front brackets and are used to keep the cables out of adjacent equipment space by directing them along the faceplate of the chassis.

Steps

Securing the mounting brackets to the chassis

1. Align the holes on the front mounting bracket with the front three mounting holes on the side of the chassis.
2. Secure the mounting bracket to the chassis with three of the provided flathead screws.

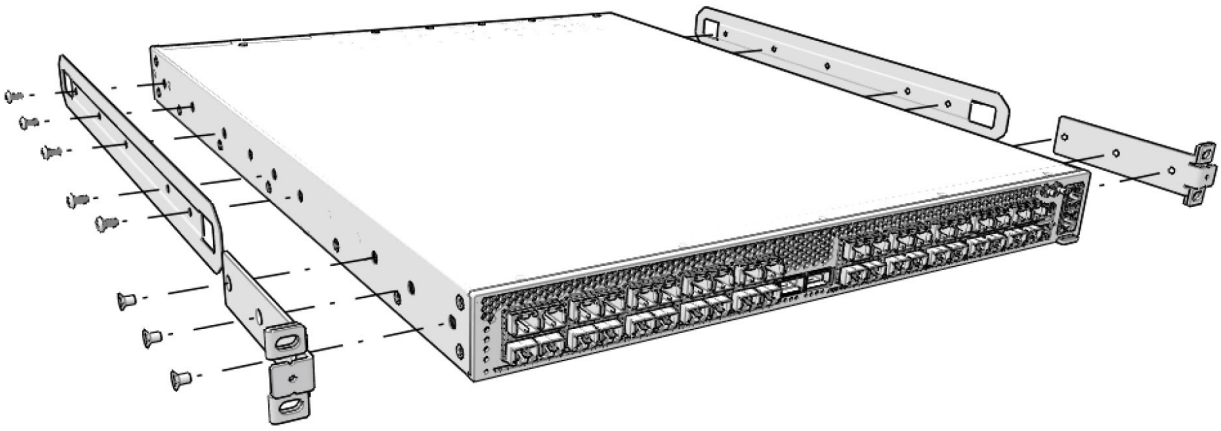
Figure 11 Securing the mounting bracket



3 Align and secure the second mounting bracket to the opposite side of the chassis with the remaining three flathead screws.

4 Align the holes on the track bracket with the five rear mounting holes on the side of the chassis, making sure that the top and bottom angled rails of the bracket angle away from the chassis. The center of the bracket should lay flat against the chassis.

Figure 12 Attaching the mounting brackets



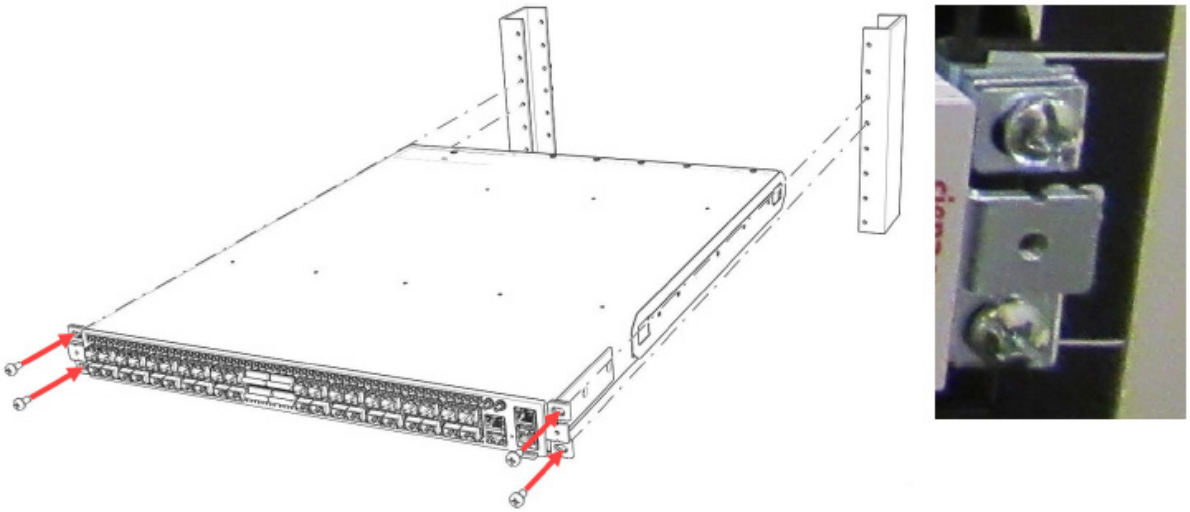
5 Use a Phillips screw driver to secure the inner bracket to the chassis with five of the provided 1/4 inch screws.

6 Secure the second track bracket to the opposite side of the chassis with the remaining 1/4 inch screws.

Installing the chassis in the rack

7 Secure the chassis in the desired position in the rack using two customer-provided rack screws inserted into the top and bottom holes of the rack ear.

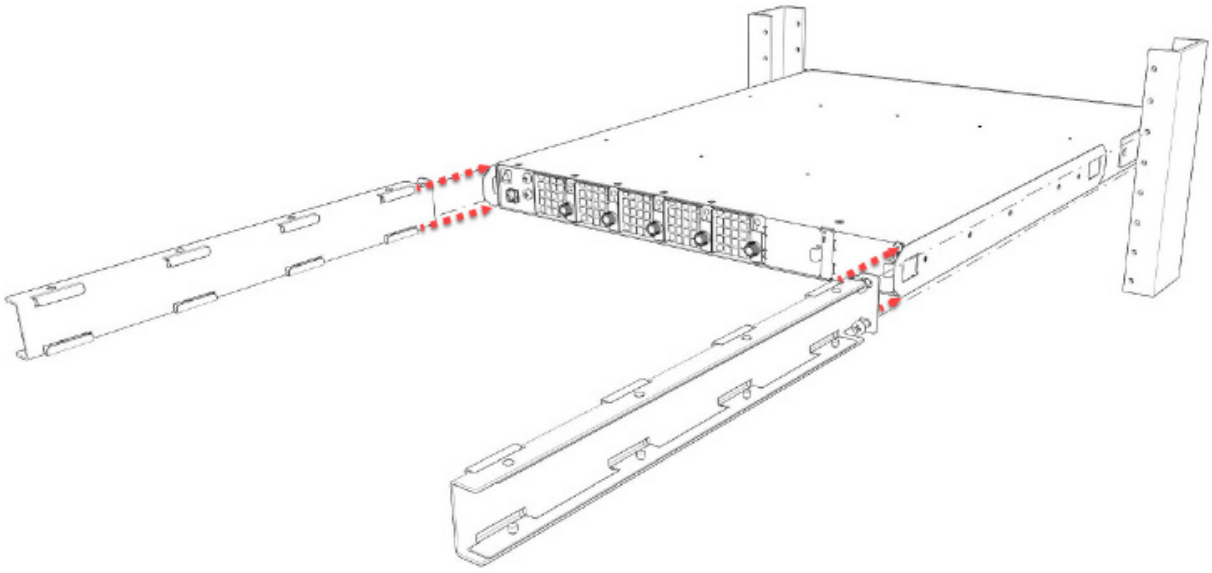
Figure 13 Securing the chassis



Securing the chassis to the rack

8 Slide the rear mounting bracket onto the installed track bracket, from the rear of the chassis, as shown in the image below.

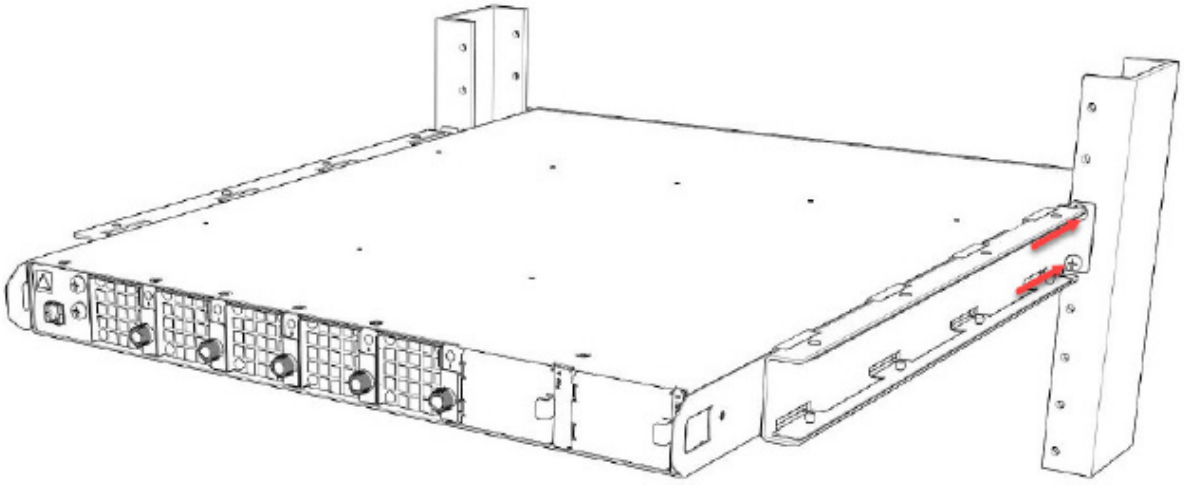
Figure 14 Installing the rear mounting brackets



9 Slide a second rear mounting bracket onto the track bracket on the other side of the chassis.

10 Secure the rear rack bracket to the rear of the rack with two customer-provided rack screws into the holes on the rear rack ears.

Figure 15 Securing the rear brackets to the posts

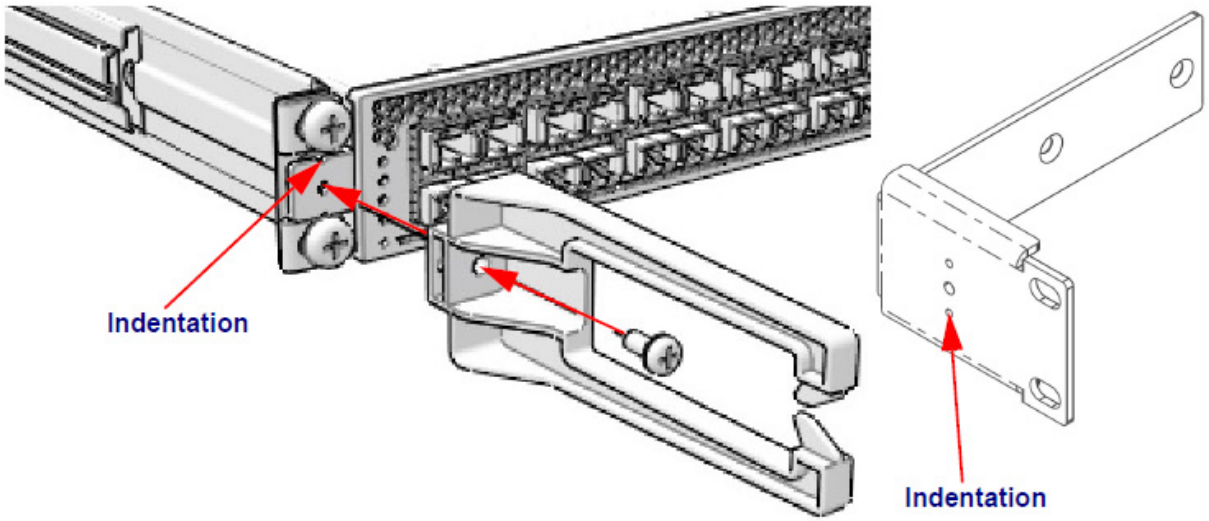


11 Secure the rear rack bracket on the opposite side of the chassis with two additional customer-provided rack screws.

Cable guide installation

12 Install the cable guides on the front bracket ears using the screws provided in the kit. One screw is used per cable guide. Once installed, the two small tabs on the bottom of the cable guide will lock into the indentations at the top and bottom of the bracket screw hole to prevent the guide from rotating. The following image shows the insertion location of the screw on the cable guide and on the bracket as well as on the 23-in bracket.

Figure 16 Mounting bracket with cable guide (23-inch bracket, right)



Procedure 7 Mounting in a 2-post, mid-mount rack

This procedure mounts the chassis into a two post rack in a mid-mount installation. Installation for the 19-inch and 23-inch racks is the same. The19-inch brackets are used in these instructions.

Requirements

The rack into which the chassis will be installed must be properly grounded. If your installation location does not allow left side access to the chassis, the supplemental ground cable needs to be routed and connected to the chassis before mounting the chassis. Refer to “Chassis ground installation” on page 39.

The rack must be securely anchored to the floor prior to installing the chassis into the rack.

The following items are required for proper installation of the chassis:

- four rack mounting screws for securing the chassis to the rack
- Phillips screwdriver(s) that fit the kit and screws
- rack-mount kit

Overview

The chassis mounting brackets are attached to the sides of an unpowered and unconnected chassis and are used to position the chassis in a rack.

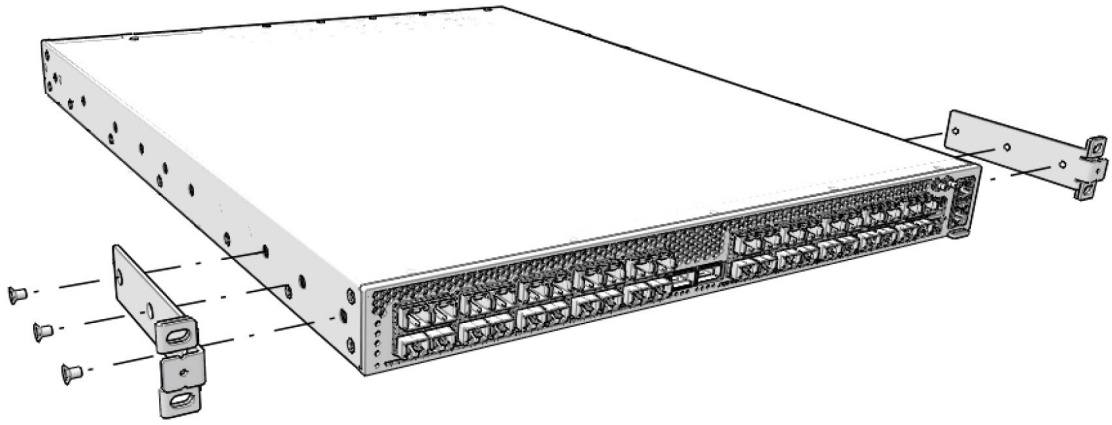
The bracket kit includes cable guides. The cable guides are installed on the front brackets and are used to keep the cables out of adjacent equipment space by directing them along the faceplate of the chassis.

Steps

Securing the mounting brackets to the chassis

1. Using one of the four brackets provided in the mid-mount kit, align the three bracket holes with the front 3 mounting holes on the side of the chassis.
2. Secure the bracket to the chassis with the three of the provided flat-head screws.

Figure 17 Securing the front bracket



3 Align and secure a second bracket to the opposite side of the chassis with three additional flat-head screws.

4 Position the third mounting bracket, based on the setback value mentioned in the following figure.

Figure 18 Mid-mount bracket secured at 212.35 mm (8.36 in) setback

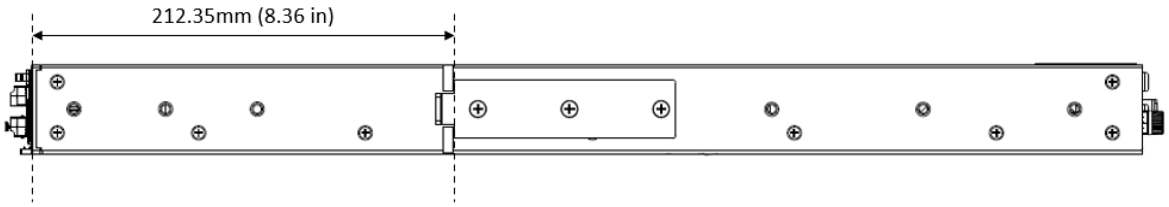
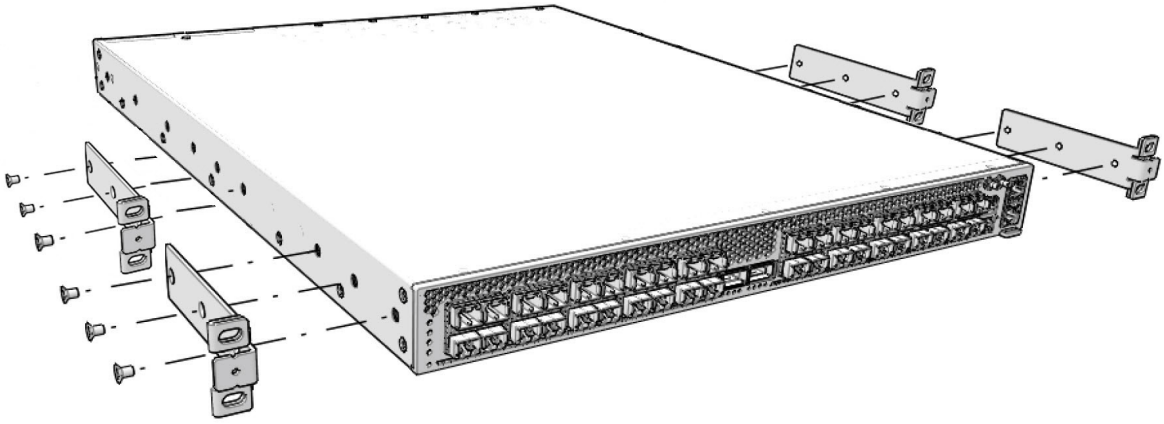


Figure 19 Attaching the mounting brackets



5 Use a Phillips screw driver to secure the third bracket to the chassis with three additional flat-head screws.

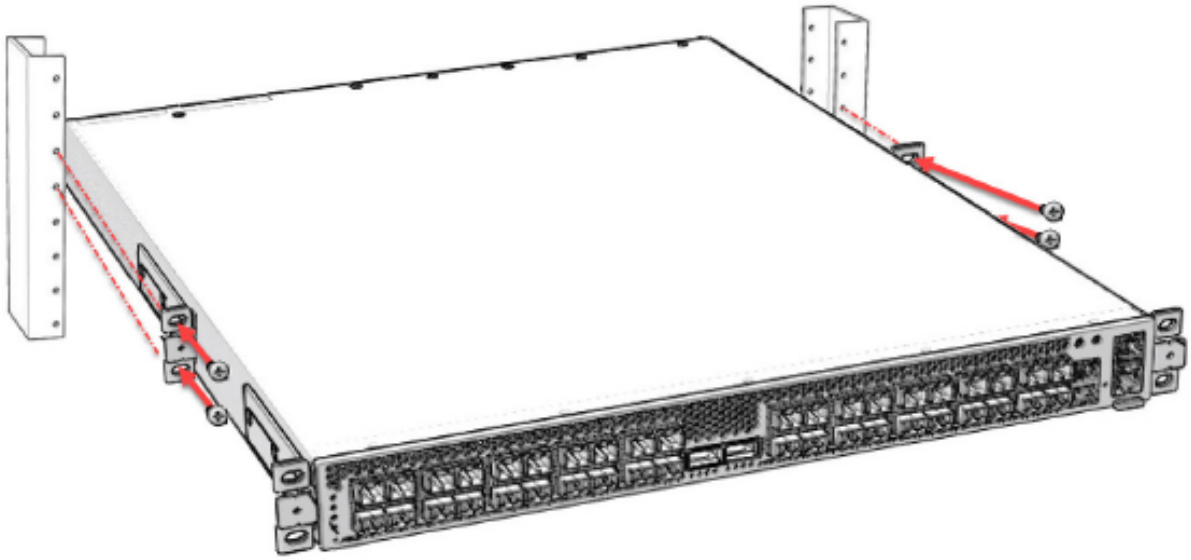
6 Similarly, secure the last mounting bracket, to the opposite side of the chassis with the remaining flat-head screws.

Installing the chassis in the rack

7 Position the chassis in the desired location in the rack.

8 Secure the chassis to the rack with four, customer-supplied rack screws in the slots on the left and right rear brackets, making sure the chassis is installed at the same rack location on the both sides of the rack.

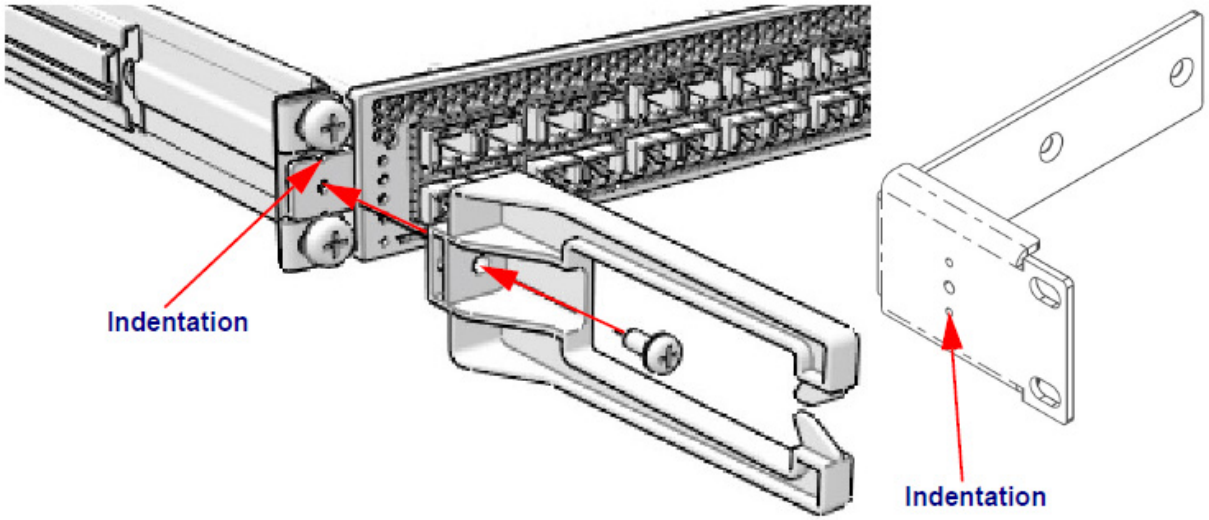
Figure 20 Securing the chassis



Cable guide installation

9 Install the cable guides on the front bracket ears using the screws provided in the kit. One screw is used per bracket. Once installed, the two small tabs on the bottom of the cable guide will lock into the indentations at the top and bottom of the bracket screw hole to prevent the guide from rotating. The following image shows the insertion location of the screw on the cable guide and on the bracket as well as on the 23-in bracket.

Figure 21 Mounting bracket with cable guide (23-inch bracket, right)



Procedure 8 Installing the chassis on a desktop

For a desktop installation, the mounting brackets are not used.

Requirements

To ensure that the fan assembly can provide adequate cooling, always provide a minimum of 3 inches (8 cm) of clearance on the front and rear of the chassis.

The desktop surface must be capable of supporting the weight of the chassis when fully loaded.

CAUTION
Risk of fire
Ensure the AC-powered chassis is placed directly on a non-combustible service.

ATTENTION
Risque d'incendie
S'assurer que le châssis alimenté en courant alternatif est placé directement sur un service non combustible.

警告
火災危險

確保交流供電的機箱直接放置在不可燃的服務上 .

Steps

1 Place the device in the desired location on a shelf or tabletop ensuring that adequate space is provided for cable and fiber management.

CHAPTER 6
Chassis ground installation

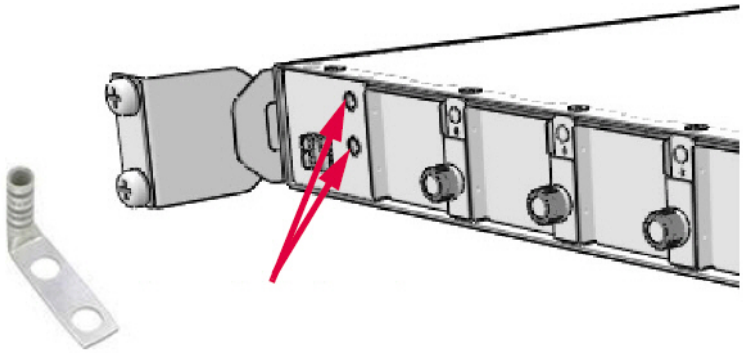
The chassis must be properly grounded before it is connected to the power source.

DANGER
Ensure that the chassis ground connection is installed
The ground connection provides safety ground and must be installed to adequately protect personnel and equipment.

DANGER
Assurez-vous de l'installation adéquate de la connexion de masse au bâti.
La connexion de masse assure une mise à la terre de sécurité et doit être installée de manière à protéger le personnel et l'équipement de façon adéquate.

The following figure shows the location of the ground attachment point at the rear of the chassis.

Figure 22 Location of the ground attachment point



If there is no access to the rear of the chassis, connect the ground wire to the chassis before mounting the chassis and attach the ground wire to the frame after the chassis is mounted.

1 “Route the ground cable” on page 42
2 “Prepare the ground cable” on page 42
3 “Chassis installation” on page 23
4 “Connect and verify ground cable” on page 43

List of procedures

The following procedure installs the chassis ground connection.

- Procedure 9, “Installing the chassis ground connection”

Procedure 9 Installing the chassis ground connection

Install the chassis ground connection.

Requirements

- The rack has been properly grounded to central office ground or facility ground in accordance with local and national regulations and safety guidelines, and local installation practices.
- All equipment cables and ground cables must conform to local regulatory standards and regional practices. Equipment cables and ground cables are not supplied by Ciena.

CAUTION
Possibility of power short
If the wire gauge used is too large, the system is in danger of shorting out.

ATTENTION
Possibilité de court-circuit
L'utilisation d'un câble de calibre trop élevé pourrait court-circuiter le système.

警告
斷電風險

如果所用線規過大，系統可能會短路。

This procedure requires the following tools and equipment:

- two hole compression-type ground terminal lug. Select a lug angle that suits the installation.
- torque wrench/driver capable of torquing No. 10 Keps nuts to 35 inch-pounds (3.95 Nm)
- #6 AWG (16 mm ^{2}) 7-strand copper insulated conductor grounding cable
- stripping and crimping tools that accommodate AWG gauge
- corrosion-preventing compound such as NO-OX
- clear 0.5 in. (12.7 mm) heat-shrink tubing
- heat gun suitable for heat-shrink tubing
- analog meter (Simpson 260 or equivalent) or a Digital Multimeter (DMM) with test leads

Steps

Route the ground cable

1 Route the ground cable so that one end extends to the ground attachment point on the chassis and the other end is at a suitable grounded position on the rack.

Note: Be sure to take into account that 9/16 in. (14 mm) of insulation is stripped from the cable to attach the terminal lug.

Prepare the ground cable

2 Strip and prepare the #6 AWG (16 mm 2) grounding cable to accept a two-hole compression-type ground terminal lug.

Figure 23 Crimp-type two-hole lug for grounding

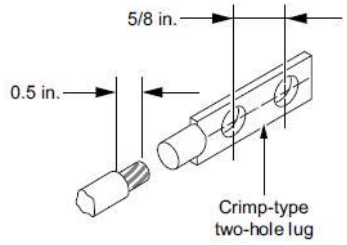
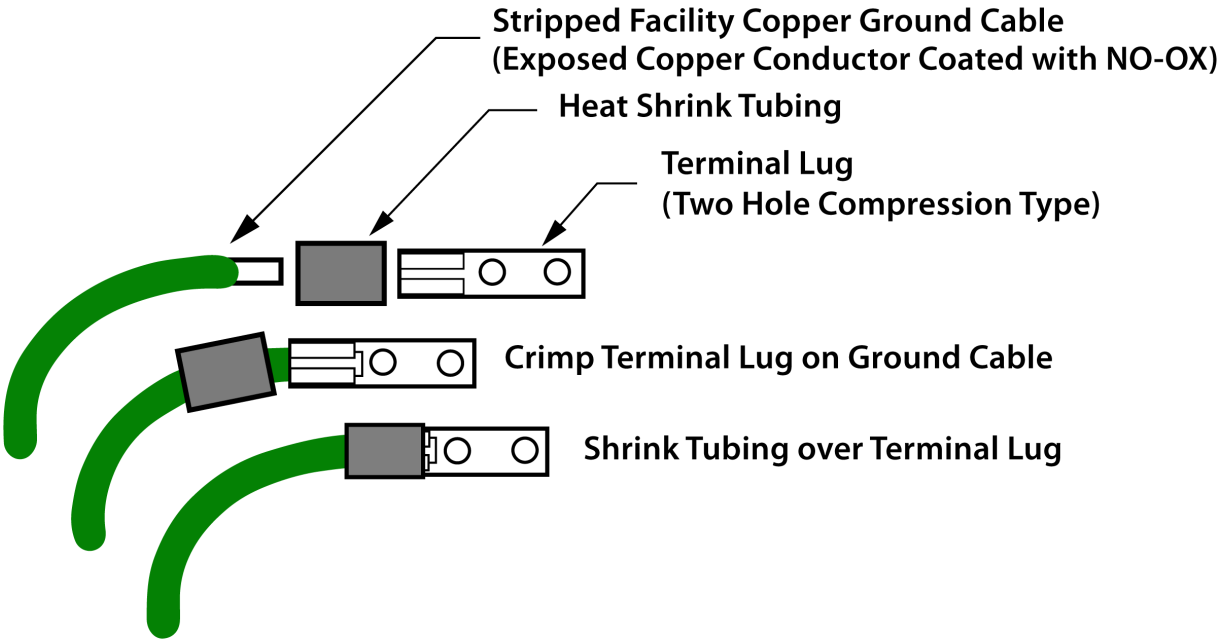


Figure 24 External ground cable preparation



Note: Ensure that there are no sharp bends in the copper grounding cable and do not expose the ground cable to sharp edges during installation.

3 Cut a 2 in. (51 mm) length of heat-shrink tubing.

4 Slide the tubing over the end of the ground cable.

Note: The heat-shrink tubing must extend to the access hole where the wire is crimped; however, it must not cover the hole.

5 Apply corrosion-preventing compound to exposed copper surface if required by site grounding guidelines.

6 Crimp the terminal lug on the grounding cable.

7 Use a heat gun to shrink each sleeve.

Connect and verify ground cable

8 Remove and retain the two screws from the grounding location on the chassis.

9 Apply corrosion-preventing compound to the mating surfaces of the ground lug and to the chassis grounding location.

10 Secure the terminal lug to the grounding location on the chassis using the provided screws.

11 Connect the other end of the grounding cable to the grounded location on the rack.

12 Turn on the analog or digital multimeter and select the lowest resistance range available.

13 Touch the leads together to ensure that the meter is working properly. The meter reads zero ohms when it is working. Adjust meter if necessary.

14 Measure resistance between the ground terminal lug on the chassis and the central office ground or facility ground.

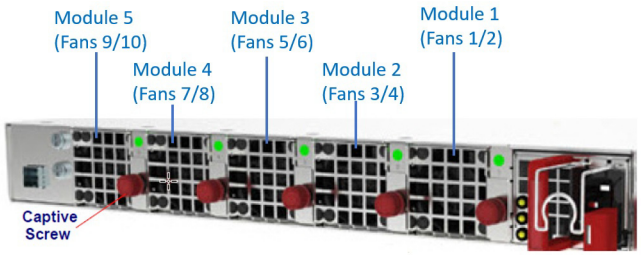
15 Read the display and note the value. The reading must be less than one ohm. A resistance greater than one ohm indicates an improperly grounded device that must be corrected.

CHAPTER 7
Fan module installation

The chassis contains five hot-swappable, field-replaceable, dual impeller fan modules. Each fan module contains two fans.

The following figure shows the location of the fan modules.

Figure 25 Location of the fan modules



The following image shows the connector end of a fan module.

Figure 26 Fan module

The system can tolerate the failure of one fan and maintain operation until a maintenance action can be scheduled. The maintenance action to replace the unit must be scheduled as soon as possible.

CAUTION
Risk of damage to equipment
Incorrect alignment of a module during installation can cause equipment damage. Never force a module into position. If resistance is encountered, check the module and the slot for damage or obstructions, and then try inserting the module again.

ATTENTION
Risque de dommages à l'équipement
Un mauvais alignement d'un module lors de l'installation peut endommager l'équipement. Il ne faut jamais utiliser de force pour mettre le module en place. S'il y a résistance, vérifiez si le module et l'emplacement sont endommagés ou obstrués, puis essayez d'insérer le module à nouveau.

List of procedures

The following task flow summarizes the major steps of installing a cooling fan unit into the 5162

- “Installing fan modules” on page 47

Procedure 10 Installing fan modules

This procedure installs a fan module.

Overview

CAUTION
Risk of ESD Damage
To prevent ESD damage to electronic components, always use an ESD wrist strap when handling modules.

ATTENTION
Risque de dommage par DES
Pour éviter que les décharges électrostatiques (DES) n'endommagent les composants électroniques, utilisez toujours un bracelet antistatique lorsque vous manipulez les modules.

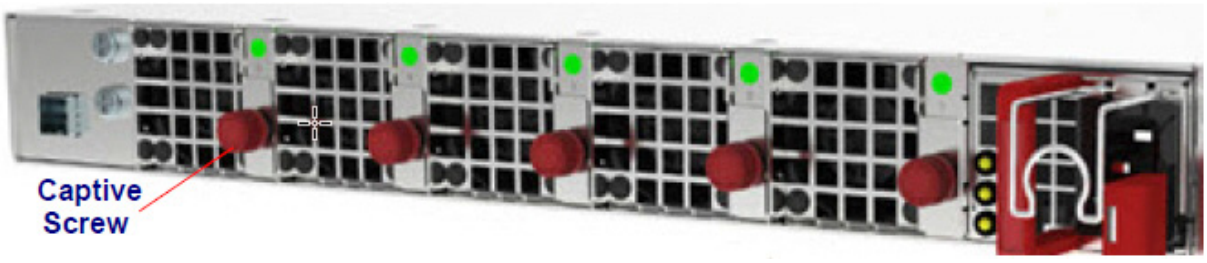
CAUTION
Risk of damage to equipment
Incorrect alignment of a fan module during installation can cause equipment damage. Never force a module into position. If resistance is encountered, check the module and the slot for damage or obstructions, and then try inserting again.

ATTENTION
Risque de dommages à l'équipement
Un mauvais alignement du module de ventilateur lors de l'installation peut endommager l'équipement. Il ne faut jamais utiliser de force pour mettre le module en place. S'il y a résistance, vérifiez si le module et l'emplacement sont endommagés ou obstrués, puis essayez d'insérer le module à nouveau.

Steps

1 At the rear of the chassis, loosen the captive screw by turning it by hand 1/4 turn counter-clockwise.

Figure 27 Fan unit location



2 Remove the fan module by pulling on the captive screw and guiding the unit straight out of the slot.

3 Remove the new fan module from the protective packaging.

4 Slide the new fan module into the slot, then gently press to make sure the connector is seated into the board.

Figure 28 Seating the fan

5 Finish installing the fan module by tightening the captive screw by hand until secure.

CHAPTER 8
Power installation

The chassis supports redundant power units, available in either AC or DC, which are accessed from the rear. The combination of AC and DC units in the same chassis is not supported.

The chassis can be deployed with one or two power units connected to power. The power provided by one power unit is sufficient to run the chassis. The second power unit provides redundancy.

The chassis ships with a blank cover installed on the bay labeled PSB. The bay labeled PSA is uncovered. When installing only one power unit, install it in the slot labeled PSA. The second power unit slot must be covered with a filler plate for safety and to ensure proper airflow.

DANGER

Risk of injury to personnel

A readily accessible disconnect device must be installed, external to the equipment, for each power feed, for safely removing the power while servicing.

DANGER

Risque de blessures personnelles

Un dispositif de coupure de l'alimentation facilement accessible et externe à l'équipement doit être installé pour chaque alimentation électrique pour permettre de couper l'alimentation en toute sécurité pendant l'entretien.

CAUTION

Risk of damage to equipment

When connecting to power sources, ensure that external power cables used are rated appropriately to safely carry the full current load under all relevant environmental conditions. Refer to "Technical specifications" on page 7 for load specifications.

ATTENTION

Risque de dommages à l'équipement

En raccordant les sources d'alimentation, assurez-vous que les câbles d'alimentation externes utilisés ont une puissance nominale appropriée pour supporter la pleine charge de courant en toute sécurité dans toutes les conditions environnementales pertinentes. Reportez-vous à la section « Spécifications techniques » pour connaître les spécifications de charge.

Dying gasp

The system supports dying gasp functionality. In the event of a power failure, a dying gasp notification is sent to the network. If syslog is enabled, the notification also contains a syslog entry.

When a system is powered by redundant power units, a dying gasp message is only sent when both units lose power.

Possible causes of a dying gasp signal are:

- power failure in the power source
- disconnection of the power source
- failure of the PSU or PDU

AC power installation

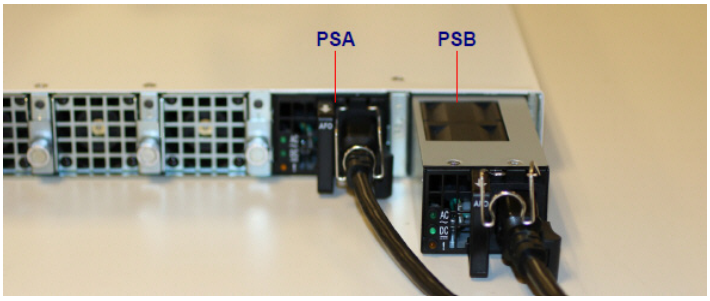
The hot-swappable AC power supplies are installed into the rear of the chassis.

The AC power cords are ordered separately. The AC power cords come with an auto lock feature that prevents accidental disconnections from the power supplies. To remove the cord, press both red tabs simultaneously, and pull out. As cable configurations vary around the world, ensure that you order a cord with a connector that matches the local requirements for your installation site.

When two PSUs are used, each PSU should be connected to separate power feeds. This allows for the removal and replacement of one PSU while the router is still operating.

The following figure shows the location of the AC power supply units.

Figure 29 Power supply unit location



DANGER
Risk of injury to personnel
A readily accessible disconnect device must be installed, external to the equipment, for each power feed, for safely removing the power while servicing.

DANGER
Risque de blessures personnelles
Un dispositif de coupure de l'alimentation facilement accessible et externe à l'équipement doit être installé pour chaque alimentation électrique pour permettre de couper l'alimentation en toute sécurité pendant l'entretien.

CAUTION
Risk of damage to equipment
To satisfy the requirements defined in GR-1089, an external Surge Protective Device (SPD) is required at the AC input for the chassis to protect against voltage spikes.

ATTENTION
Risque de dommages à l'équipement
Pour satisfaire aux exigences définies dans la norme GR-1089, un dispositif externe de protection contre les surtensions (SPD) est nécessaire à l'entrée c.a. du bâti pour le protéger contre les pointes de tension.

DANGER
Electrical hazard
This chassis has dual power connections, which supply hazardous energy levels. Remove power from both A and B power feeds to de-energize this equipment.

DANGER

Risque de secousse électrique

Ce bâti dispose de deux connexions électriques qui fournissent des niveaux de charge électrique dangereux. Coupez l'alimentation aux entrées A et B pour mettre cet équipement hors tension.

List of procedures

The procedures for AC power installation are:

- Procedure 11, "Installing an AC power supply unit"
- Procedure 12, "Installing the AC power feed"
- Procedure 13, "Verifying power"
- Procedure 14, "Removing an AC power supply"

Procedure 11 Installing an AC power supply unit

Install AC power supply units (PSUs) at the rear of the chassis.

Requirements

Before you begin, ensure you have met the following requirements:

- The chassis must be grounded, positioned, and secured.
- The cooling fans must be installed.
- The individuals involved in installation must be trained in and have experience with chassis installations.

Overview

The chassis ships with a blank cover installed on slot PS B. The slot PS A is uncovered.

Steps

1. Remove the PSU from the packaging and inspect it for damage.
2. Review and follow the chassis caution labels. Align the PSU to the correct installation orientation and gently slide it into slot PS A until it seats completely.

   Note: The PSUs are universal and fit into either slot.
3. If you are installing a second PSU, then remove the blank cover from slot PS B and repeat step 1 and step 2.

Procedure 12 Installing the AC power feed

Install the AC power feed to provide power to the chassis.

Requirements

- Chassis grounding must be completed in accordance with “Chassis ground installation” on page 1 before it is connected to the power source.
- Ensure that the AC socket outlet is installed near the equipment and is easily accessible.
- Order power cables with connectors that match site requirements.
- All AC power cables must meet the requirements of the local and national electrical codes prior to installation.

Overview

All cables must run in accordance with cabling plans. Pay particular attention to site requirements.

As cable configurations vary around the world, ensure that you order a cord with a connector that matches the local requirements for your installation site.

Steps

Route power cables

1. Route the first AC power cable to the IEC C13 AC power connector on PSA
2. Route the second AC power cable to the IEC C13 AC power connector on PSB.
3. Tag all power cables in accordance with the engineering plan.

Terminate cables

4. Terminate the power source end of the cable with a connector that conforms with local site regulations.

Dress the power cord

5. Dress the power cord towards the left side of the rack or cabinet. Ensure that the power cord is not dressed across the ports.

Procedure 13 Verifying power

Apply power to the PSUs to verify power.

Requirements

This procedure requires the following tool:

- analog multimeter (Simpson 260 or equivalent) or digital multimeter (DMM) with test leads

Overview

The following table describes possible states for the PSU LEDs when applying power to the chassis. For more information about LED states, refer to “LEDs” on page 83.

Table 3 Possible PSU LED states

LED state	Description
AC LED on PSU A or B is off	The correct level of power is not present at the supply, the PSU has failed, or a PSU is not installed.
AC LED on PSU A or B is blinking green	The chassis is powering up and performing a self test.
AC LED on PSU A or B is solid green	The chassis is fully booted.

Steps

1. Measure the voltage at the AC outlet using a multimeter. Ensure that it is appropriate based on the standard voltage for your region.
2. Connect the power cable to the AC socket outlet.
3. Observe that the AC LEDs blink green and then change to solid green.
4. Remove the power cable from the power source. The final connection is made in “Cable installation” on page 77.

Procedure 14 Removing an AC power supply

This procedure removes an AC power supply unit (PSU).

Overview

PSUs are hot swappable, allowing one PSU to be removed and replaced while the remaining PSU compensates to maintain uninterrupted system operation.

CAUTION
Risk of damage to modules and backplanes
This equipment contains Electrostatic Discharge (ESD) sensitive devices. Wear grounding straps when handling equipment and follow ESD procedures.

ATTENTION
Risque de dommages aux modules et aux fonds de panier
Cet équipement contient des dispositifs sensibles aux décharges électrostatiques (DES). Portez des sangles de mise à la terre si vous devez manipuler l'équipement et suivez les procédures relatives aux DES.

警告
有損害電路的風險

此設備含靜電放電 (ESD) 敏感元件。接觸該設備時，請佩戴接地帶，並遵循 ESD 程序。

DANGER
Risk of electric shock
Disconnect all power sources before servicing to avoid shock hazard.

DANGER
Risque de choc électrique
Débranchez toutes les sources d'alimentation avant l'entretien afin d'éviter tout risque de choc.

危險
觸電風險

請在維修之前斷開所有電源，以免觸電。

Steps

1. Disconnect the power cord from the power source.
2. Raise the cord-retaining bail, press both red tabs simultaneously, and disconnect the power cord from the power supply.
3. Press the PSU release tab fully then use the handle to remove the PSU from the bay.
4. Next, do one of the following:
   a. Install a replacement PSU immediately.
   b. If the slot is to remain empty for any length of time, install a power supply cover plate.

DC power installation

The hot-swappable DC power distribution units (PDUs) are installed into the rear of the chassis.

When two PDUs are used, each PDU should be connected to separate power feeds. This allows for the removal and replacement of one PDU while the router is still operating.

DANGER
Risk of injury to personnel
A readily accessible disconnect device must be installed, external to the equipment, for each power feed, for safely removing the power while servicing.

DANGER
Risque de blessures personnelles
Un dispositif de coupure de l'alimentation facilement accessible et externe à l'équipement doit être installé pour chaque alimentation électrique pour permettre de couper l'alimentation en toute sécurité pendant l'entretien.

DANGER
Electrical hazard
This chassis has dual power connections, which supply hazardous energy levels. Remove power from both A and B power feeds to de-energize this equipment.

DANGER
Risque de secousse électrique
Ce bâti dispose de deux connexions électriques qui fournissent des niveaux de charge électrique dangereux. Coupez l'alimentation aux entrées A et B pour mettre cet équipement hors tension.

List of procedures

Procedures for DC power installation are:

- Procedure 15, "Installing a DC power distribution unit"
- Procedure 16, "Installing the PDU power feed from a Battery Distribution Fuse Bay (BDFB)"
- Procedure 17, "Verifying the power and return cables"
- Procedure 18, "Removing a DC power distribution unit"

Procedure 15 Installing a DC power distribution unit

This procedure installs DC power distribution units (PDUs) at the rear of the chassis.

Requirements

Before you begin, ensure you have met the following requirements:

- The chassis must be grounded, positioned, and secured.
- The cooling fan must be installed.
- The individuals involved in installation must be trained in and have experience with chassis installations.
- Power feed

Overview

The chassis ships with a blank cover installed on slot PS B. The slot PS A is uncovered.

Steps

1. Remove the PDU from the packaging and inspect it for damage.
2. Review and follow the chassis caution labels. Align the PDU to the correct installation orientation and gently slide it into slot PS A until it seats completely.

   Note: The PDUs are universal and fit into either slot. Refer to the following diagram for the installation orientation.
3. Remove the protective cover from the input connector.
4. If you are installing a second PDU, then remove the blank cover from slot PS B and repeat step 1 through step 3.

Procedure 16 Installing the PDU power feed from a Battery Distribution Fuse Bay (BDFB)

Install the power feed from a BDFB to route DC power to the chassis.

Requirements

- Chassis grounding must be completed in accordance with “Chassis ground installation” on page 39 before it is connected to the power source.
- All DC power cables must meet the requirements of the local and national electrical codes prior to installation.
- The DC power cord should be 14 AWG (2.08 mm2) wire. You will need to install two-hole terminal lugs on the power cord to ensure a proper connection with the input connector of the power distribution unit.

This procedure requires the following tools and equipment:

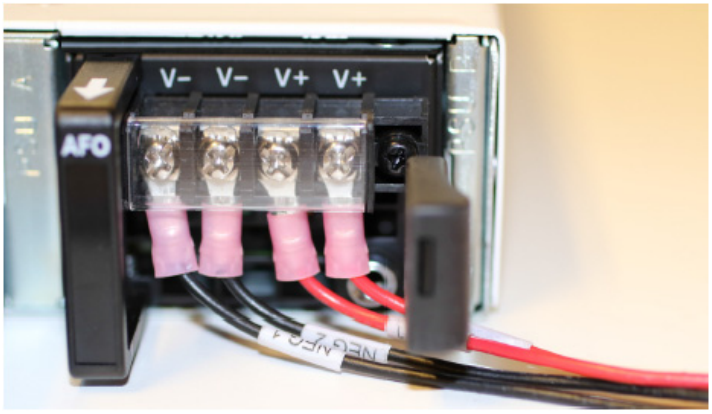
- Torque wrench/driver capable of torquing No. 10 Kept nuts to 35 inch-pounds (3.95 Nm)
- Spade compression-type terminal lug. Panduit PV14-6FF-C (16-14 AWG) or equivalent is recommended.
- Corrosion-preventing compound such as NO-OX
- Heat-shrink tubing
- Heat gun suitable for heat-shrink tubing
- Stripping and crimping tools that accommodate AWG gauges used
- Analog meter (Simpson 260 or equivalent) or a Digital Multimeter (DMM) with test leads

Overview

All cables must run in accordance with cabling plans. Pay particular attention to site requirements.

The following image shows the faceplate of the DC power supply with the plastic terminal block cover. Make sure the cover is replaced after installing the input wiring.

Figure 30 DC terminal block



The DC power cord should be 14 AWG (2.08 mm2) wire. You will need to install fork terminal spade lugs on the power cord to ensure a proper connection with the terminal block of the power supply. The following contains a summary of the recommended locking fork terminal lugs.

Table 4 DC lug summary

Wire Size	Stud	Maximum Lug Width	Recommended Lug
14 AWG	#6	0.31”	Panduit PV14-6FF-C (16-14 AWG)
Note: Use the recommended lug or a close equivalent. If a ring lug is used, you will need to remove and reinstall the screw. Take care not to lose the screw during this process.			

Steps

Verify integrity of the power supply

1. De-energize the source power and lockout/tagout according to local practices.
2. Remove the terminal block protective cover by carefully snapping it free.
3. Loosen the stud screws from the + and - terminals on one of the power supplies (A or B).

   Note: If a ring connector is used instead of a spade, you will need to remove and reinstall the screw. Take care not to lose the screw during this process.
4. Turn on the analog multimeter (use a DMM if an analog meter is not available) and set it to the lowest resistance range available.
5. Touch the leads of the meter together to ensure that the meter is working properly. The meter should read less than 100 milliohms.
6. Measure the resistance between the - terminal to the chassis GRD.

Read meter display and note the value. The reading must indicate infinity (open). A resistance less than infinity indicates a problem with the power supply.

7 If installing a redundant power connection, repeat step 3 through step 6 for the second power supply.

Route power cables

8 At the power source, ensure that the circuit breakers that supply power to the 5162 are OFF and tagged **Out of Service**.

9 Route the power cables (load, return, and common) to the left side of the 5162 as appropriate for your site.

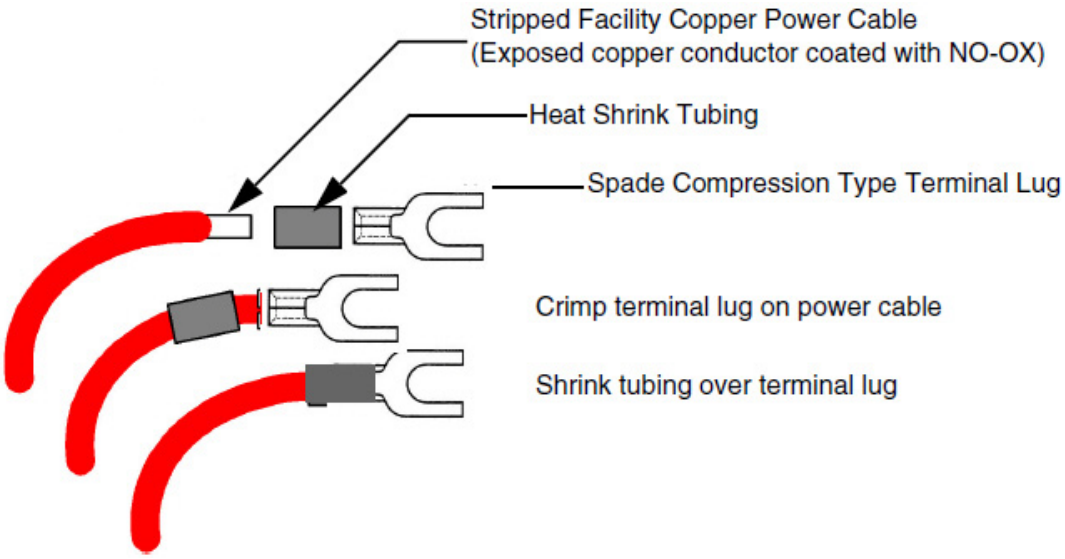
Note: Take care not to expose the cables to sharp edges during installation.

10 Tag all power cables in accordance with the engineering plan.

Prepare power cables

11 Strip the cable insulation back 5/16 in. (8 mm) and prepare the power cables to accept a spade, compression-type terminal lug.

Figure 31 Facility power cable preparation



12 Cut a 2 in. (51 mm) length of clear 0.5 in. (12.7 mm) heat-shrink tubing.

13 Slide the tubing over the end of the power cables.

Note: The heat-shrink tubing must extend to the access hole where the wire is crimped; however, it must not cover the hole.

14 Apply corrosion-preventing compound to exposed portion of the wire.

15 Crimp terminal lugs on the power cables then use a heat gun to shrink each sleeve. Refer to the DC lug summary table for more information.

Connect power cables

16 Attach the lugs to the appropriate terminal block connector.

17 Reinstall and/or torque each connection to 12 inch-pounds (1.36 newton-meters).

18 If installing a redundant power connection, repeat step 16 and step 17 for the second power supply.

19 Replace the terminal block protective cover that was removed in step 2.

20 Dress the power cables to the right and use cable ties to secure the cables to the rack to help relieve the cord weight from the connectors and avoid the inadvertent disconnection of the power supply cords.

Procedure 17 Verifying the power and return cables

Apply power to the PDUs to verify power and return cables.

Requirements

- The circuit breakers at the BDFB that supply -48 V DC power to the chassis are opened and tagged Out of Service.
- The multimeter is set to the DC voltage setting.

This procedure requires the following tool:

- analog multimeter (Simpson 260 or equivalent) or digital multimeter (DMM) with test leads

Overview

The following table describes possible states for the PDU LEDs when applying power to the chassis. For more information about LED states, refer to “LEDs” on page 83.

Table 5 Possible PDU LED states

LED state	Description
DC LED on PSU A or B is not green	The correct level of power is not present at the supply, the PDU has failed, or the PDU is not installed.
DC LED on PSU A or B is blinking green	The chassis is powering up and performing a self test.
DC LED on PSU A or B is solid green	The chassis is fully booted.

Steps

1. Measure the voltage at the BDFB site using a multimeter. Verify that the voltage is within the range of -42.5 VDC to -72 VDC.
2. Close the BDFB circuit breakers, thereby providing DC power to the PDUs.
3. Confirm that the PSU A and B DC LEDs blink green and change to solid green.
4. Open the BDFB circuit breakers removing DC power from the PDUs.
5. Do not close the BDFB circuit breakers. The final connection is made in “Cable installation” on page 77.

Procedure 18 Removing a DC power distribution unit

This procedure removes and replaces a PDU.

Overview

PDUs are hot-swappable, allowing one PDU to be removed and replaced while the remaining PDU maintains uninterrupted system operation.

CAUTION
Risk of damage to modules and backplanes
This equipment contains Electrostatic Discharge (ESD) sensitive devices. Wear grounding straps when handling equipment and follow ESD procedures.

ATTENTION
Risque de dommages aux modules et aux fonds de panier
Cet équipement contient des dispositifs sensibles aux décharges électrostatiques (DES). Portez des sangles de mise à la terre si vous devez manipuler l'équipement et suivez les procédures relatives aux DES.

警告
有損害電路的風險

此設備含靜電放電 (ESD) 敏感元件。接觸該設備時，請佩戴接地帶，並遵循 ESD 程序。

DANGER
Risk of electric shock
Disconnect all power sources before servicing to avoid shock hazard.

DANGER
Risque de choc électrique
Débranchez toutes les sources d'alimentation avant l'entretien afin d'éviter tout risque de choc.

危險
觸電風險

請在維修之前斷開所有電源，以免觸電。

WARNING
Before performing the procedure, ensure that all power is off to the DC circuit. Locate the circuit breaker on the panel board that services the DC circuit and switch it to the OFF position. Tape the circuit breaker switch handle in the OFF position to prevent accidental closing of the circuit.

AVERTISSEMENT
Avant d'effectuer la procédure, assurez-vous que le circuit de courant continu (c.c.) est hors tension. Repérez le disjoncteur dans le panneau de distribution qui dessert le circuit c.c. et mettez-le en position fermée (OFF). Avec du ruban adhésif, bloquez l'interrupteur du disjoncteur en position OFF pour éviter la fermeture accidentelle du circuit.

Steps

1. At the fuse panel, ensure that the circuit breakers that supply -48 VDC power to the chassis are OFF and tagged Out of Service.
2. At the front of the chassis, loosen the screws securing the terminal block protective cover and carefully remove the cover.
3. Remove and set aside the stud screws from the +, -, and (optionally) ground terminals.
4. Grasp the PDU handle. Then, press the release latch and pull straight out of the slot.
5. Do one of the following:
   - **a.** Install a replacement PDU immediately.
   - **b.** If the slot is to remain empty for any length of time, install the power unit cover plate that was removed when the second PDU was installed over the empty power slot.
6. Replace the terminal block cover. Orient the cover so the cable openings are pointed down.
7. Reapply power to the PDU.

CHAPTER 9
Optics installation

The chassis has 42 ports that accept pluggable transceivers. Each transceiver is hot-swappable and can be removed without impacting traffic running on the adjacent interfaces.

> ***Note:*** Port 40 may be re-purposed for use with frame I/O. Refer to *Base, Advanced Ethernet and OAM Configuration* for further information.

The chassis supports multiple transceiver types to accommodate different needs for wavelengths and reach. For more information about supported transceivers, refer to the Transceiver Reference.

DANGER
Risk of injury
Supported optics for this product have been demonstrated to meet class 1 and class 1M requirements. Failure to use laser transceivers which meet these standards could result in eye damage.

DANGER
Risque de blessures
Il a été démontré que le matériel optique pris en charge par ce produit répond aux exigences des classes 1 et 1M. L'utilisation d'émetteurs-récepteurs laser non conformes à ces normes pourrait causer des lésions oculaires.

CAUTION
Optical power range limit
The optical power at the end of the receive fiber entering an optical port of the chassis must be within the range of allowed receive power for that optical module type. Received power which is above that range may cause permanent damage to the optical module.

ATTENTION

Limite de la plage de puissance optique

La puissance optique à l'extrémité de la fibre de réception entrant dans un port optique du bâti doit être dans la plage de puissance de réception autorisée pour ce type de module optique. Une puissance de réception supérieure à cette plage peut endommager le module optique de façon permanente.

List of procedures

Procedures for transceiver installation are:

- Procedure 19, "Handling pluggable transceivers"
- Procedure 20, "Installing pluggable transceivers"
- Procedure 21, "Removing a pluggable transeiver"

Procedure 19 Handling pluggable transceivers

Transceivers are shipped in protective boxes. Follow this procedure when removing the transceiver from its protective packaging.

Requirements

Ensure the chassis is properly grounded.

Steps

1. Join the connector of an ESD wrist strap to the ESD jack on the equipment rack. Ensure that the retractable cable is connected to the wrist strap.
2. Place the wrist strap over your wrist.
3. Remove the transceiver from its packaging.

Procedure 20 Installing pluggable transceivers

Install pluggable transceivers as required by the network plan.

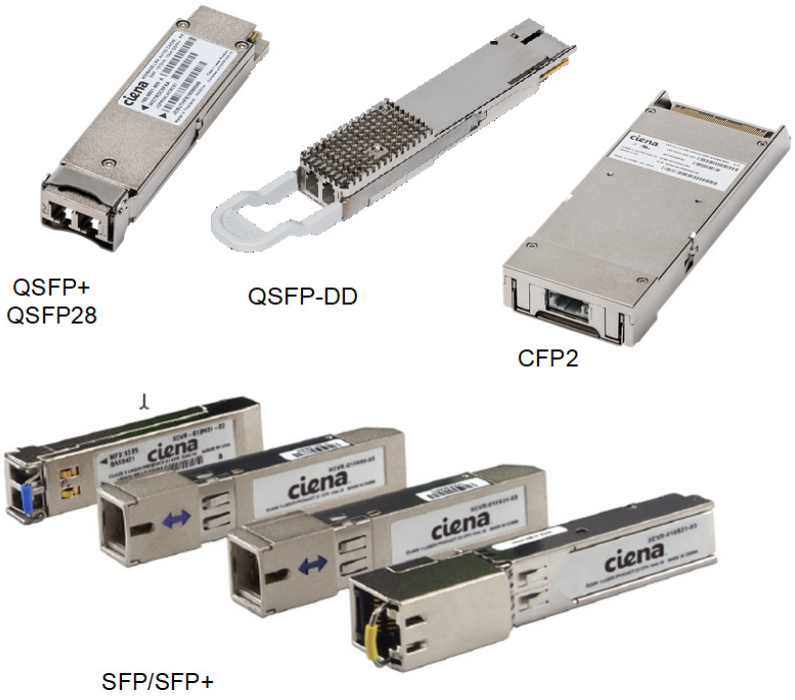
Overview

The pluggable transceivers provide the media-specific portion of an interface, allowing it to support Ethernet using different media types. One transceiver module can be installed into each available port and can be hot-swapped.

Note: If the transceiver does not install easily, reorient the transceiver and try again.

The following figure shows examples of various types of Ciena pluggable transceiver modules. Different chassis models support different types of transceiver modules. Refer to the ports on the chassis for the supported transceiver formats.

Figure 32 Pluggable transceivers modules



CAUTION
Risk of ESD damage
To prevent ESD damage to electronic components, always use an ESD wrist strap when handling optics.

ATTENTION
Risque de dommage par DES
Pour éviter que les décharges électriques (DES) n'endommagent les composants électroniques, utilisez toujours un bracelet antistatique lorsque vous manipulez du matériel optique.

警告
ESD 損壞風險

為避免電子元件出現 ESD 損壞，請務必在處理光學裝置時配戴 ESD 腕帶。

Steps

1. Remove the dust cover from the port and remove the transceiver from the protective packaging.
2. Hold the transceiver by the sides and position it so that the connector card (rear of the transceiver) is facing the empty transceiver slot.

   Note: If installed upside down, the optic will insert only halfway into the slot. Remove the transceiver, turn it over, and reinstall. Do not forcibly insert an transceiver.
3. Gently insert the transceiver into the available slot until it seats completely. Take care not to crush the side clips, if present.

   Note: Certain types of transceivers have small springs/clips on each side, near the front (connector) end. These springs may catch on the SFP cage during insertion, and prevent the full insertion of the transceiver. Take extra care when installing these types of transceivers: do not force the transceiver into the slot if any resistance is felt. Bent springs may be carefully reformed with needle nose pliers.
4. Gently pull the transceiver to make sure that it has seated properly.

CAUTION
Risk of injury
Check the LEDs to ensure that optics are operating. Do not look into the laser.

ATTENTION
Risque de blessures
Vérifiez les DEL pour vous assurer que le matériel optique est en bon état de fonctionnement. Ne regardez pas dans le faisceau laser.

危险
受傷風險

請檢查 LED 以確認光學裝置運作正常。請勿直視雷射光。

5 Install another transceiver or proceed to installing cabling.

Procedure 21 Removing a pluggable transeiver

Remove a pluggable transceiver when it is damaged or no longer required.

Requirements

Before you begin, ensure that:

- the traffic is removed from the port. Once the traffic is removed, the activity LED stops blinking.
- a safe container is available for the transceiver, if it is not immediately reinstalled.
- a dust cover is available for the port, if it is not immediately populated with another transceiver.

Overview

Pluggable transceivers are hot-swappable and can be removed while the system is powered. Removing an installed transceiver does not impact the traffic running on adjacent ports.

CAUTION
Risk of Injury
Invisible radiation may be emitted from the aperture of the port when no fiber is connected. Avoid exposure to radiation and do not stare into open apertures.

ATTENTION
Risque de blessures
Des rayonnements invisibles peuvent être émis par l'ouverture du port lorsqu'aucune fibre n'est connectée. Évitez l'exposition aux rayonnements et ne fixez pas du regard les ouvertures libres.

危險
受傷風險

未連接光纖時，端口孔徑可能會散發不可見輻射。請避免暴露在輻射中，並避免凝視開口。

CAUTION
Risk of damage to modules and backplanes
This equipment contains Electrostatic Discharge (ESD) sensitive devices. Wear grounding straps when handling equipment and follow ESD procedures.

ATTENTION
Risque de dommages aux modules et aux fonds de panier
Cet équipement contient des dispositifs sensibles aux décharges électrostatiques (DES). Portez des sangles de mise à la terre si vous devez manipuler l'équipement et suivez les procédures relatives aux DES.

警告
有損害電路的風險

此設備含靜電放電 (ESD) 敏感元件。接觸該設備時，請佩戴接地帶，並遵循 ESD 程序。

Steps

1. Protect/disable customer traffic for the port.
2. Disconnect the optical cable, if present.
3. Open the bail and gently pull the transceiver out of the slot.
4. Determine the placement of the transceiver.

If you are	**Then**
installing the transceiver into a different port	install the transceiver
not installing the transceiver into a different port	place the transceiver into a safe container for storage

5. Fill any empty ports with a dust cover.
6. Reconnect cabling, if required.

CHAPTER 10
Cable installation

When connecting cables to the 5162, always make only one connection at a time.

Ciena recommends that cables be connected in the following order:

1 Fiber cables

2 Ethernet cables

Note: All copper Ethernet cables, both intra-system and those connecting to the system should be shielded Cat 5e type minimum and terminated at both ends.

Figure 33 5162 faceplate

The following table summarizes the ports on the 5162 that accept some type of cabling.

Table 6 Ports

Port label	Description
1 - 40 (SFP+ or SFP)	40 ports of 10 Gigabit Ethernet (GbE) or 1 GbE using standard SFP+ or SFP optical modules.
41 - 42 (QSFP)	2 ports of 100 GbE over QSFP28 optical modules
CLK	1 mini SMB GPS (10 MHz) coax connector, in or out, (SW selectable)

Port label	Description
1 PPS	1 mini SMB 1PPS/ToD coax interface in or out (SW selectable)
BITS	1 RJ45 BITS in or out, ToD in or out, or 1PPS in or out (SW selectable)
SYNC	1 RJ45 BITS in or out, ToD in or out, or 1PPS in or out (SW selectable)
MGMT	10/100/1000 MbE RJ45 Management port
CONSOLE	Serial EIA-561 (RJ45) port. The serial console port

CAUTION

Intra-building ports suitable for connection to intra-building or unexposed wiring or cabling only

The intra-building ports of the equipment or subassembly is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building ports of the equipment or subassembly must not be metallically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 6) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.

ATTENTION

Ports intrabâtiment pour connexion au câblage intrabâtiment ou non exposé ou au câblage seulement

Les ports intrabâtiment de l'équipement ou du sous-ensemble conviennent uniquement pour la connexion à un câblage intrabâtiment ou non exposé ou au câblage seulement. Les ports intrabâtiment de l'équipement ou du sous-ensemble ne doivent pas avoir de connexion métallique aux interfaces connectées à l'installation extérieure (OSP) ou à son câblage. Ces interfaces sont conçues pour être utilisées uniquement comme interfaces intrabâtiment (ports de type 2 ou de type 4 comme décrits dans la norme GR-1089-CORE, version 6) et doivent être isolées du câblage exposé de l'installation extérieure (OSP). L'ajout de protecteurs primaires ne constitue pas une protection suffisante pour une connexion métallique de ces interfaces au câblage de l'installation extérieure.

List of procedures

The following task flow summarizes the major steps for installing cables on the 5162.

- Procedure 22, “Routing fiber”
- Procedure 23, “Routing Ethernet cables”
- Procedure 24, “Connecting power cables”

Procedure 22 Routing fiber

Route fiber to ensure that they are safe from damage and do not interfere with the operation of the chassis.

Requirements

- The individuals involved in installation must be trained in and have experience with Ciena installations.
- As much as possible, it is recommended that copper Ethernet cables, fiber, and power cables remain separated using the cable manager.

The following tools and equipment must be available at the installation site:

- utility knife
- Phillips screwdriver
- Hook and loop tape for securing fibers

Overview

Cables can be routed to the chassis:

- above the racks of equipment at the site to the chassis, typically along some type of overhead raceway
- in a raised floor environment, through under-floor raceways to the chassis

Steps

1 Route the fiber through the cable support bracket on either side of the chassis.

Procedure 23 Routing Ethernet cables

Route Ethernet cables to the chassis to provide Ethernet connectivity.

Steps

1 Route Ethernet cabling from the demarcation point to the chassis.

If	Then
the Ethernet cabling is located overhead	route the cable(s) down to the rack
the Ethernet cabling is located under the floor	route the cable(s) up the rack

2 Connect the Ethernet cable(s) to the appropriate port(s).

3 Dress the cable(s) through either the left or the right cable support bracket. It is recommended to route the Ethernet cable(s) out of the right cable support bracket.

Procedure 24 Connecting power cables

Connect power cables to apply power to the chassis.

Overview

The power LEDs are solid green when the chassis is powered up and operating correctly.

Steps

1 Apply power to the chassis.

If the chassis is	**Then**
AC-powered	Ensure the source end of the AC power cable(s) is not connected. Go to step 2.
DC-powered	Remove the Out of Service tag and close the circuit breakers at the BDFB that supply DC power to the chassis. The hardware installation is complete.

2 Connect the power cable to PSU A.

3 Connect the PSU A power cable to the AC socket outlet.

4 Dress the power cable to the right (while facing rear of the chassis), and use a cable tie or lacing to secure the power cord to the rack.

5 If using a redundant power supply, connect the PSU B power cable and repeat step 2 through step 4, dressing the power cable to the right (while facing rear of the chassis).

The hardware installation is complete.

CHAPTER 11
LEDs

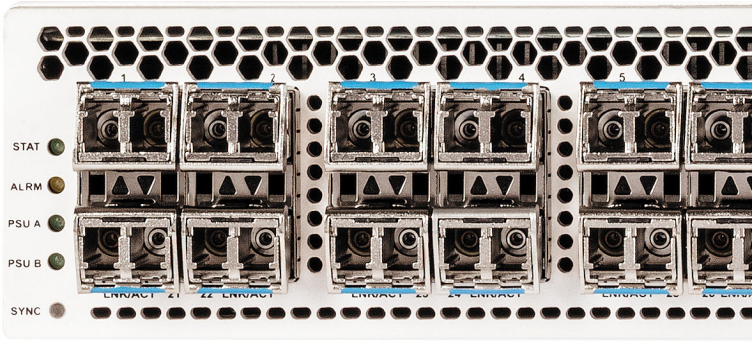
Most interfaces have integrated LEDs which provide status information for the port.

System status LEDs

The status LEDs communicate system operational status. There are four LEDs for system information. They are located to the far left of the router.

The following figure shows the location of the status LEDs.

Figure 34 Status LEDs location



The following table describes the operating states for the system status LEDs

Table 7 Status LEDs operating states

LED	Indication	Description
STAT	off	Indicates an alarm condition.
	green	Indicates that the status is normal and the system is ready.
	blinking green	System is initializing and performing self tests.

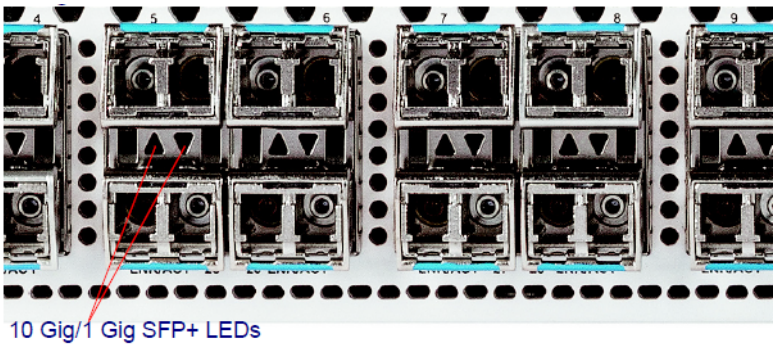
LED	Indication	Description
ALRM	off	Indicates normal operation condition.
	yellow or blinking yellow	Indicates power-on self-test (POST) failure, port failure, or other error condition.
PS A	off	System is not powered or a failure has occurred on power supply A.
	green	Indicates power is on and power supply A is operating normally.
PS B	off	System is not powered or a failure has occurred on power supply B.
	green	Indicates power is on and power supply B is operating normally.
SYNC	off	Indicates the system is in Free-Run mode.
	green	Normal operation. The system is locked to a synchronization source, for example, SyncE.
	blinking green	System is acquiring synchronization
	yellow	System is in holdover timing mode. For example, phase locked loop (PLL) is holding the system within frequency drift tolerance.

10/1 GbE SFP+ port LEDs

The 10 GbE SFP+ optical ports have two LEDs associated with each port for link status, activity, and speed (ports 1 - 40). These LEDs are located between the upper and lower port connectors and are shaped like arrows to indicate which port they apply to. The left arrows indicate link/activity while the right arrows indicate speed.

The following figure shows the location of the 10 GbE SFP+ port LEDs.

Figure 35 10 GbE SFP+ port LEDs location



The following table describes the operating states for the 10 GbE SFP+ port LEDs.

Table 8 10 GbE SFP+ port LEDs operating states

LED	Indication	Description
LNK/ACT	off	The port is not operational.
	green	Indicates a valid network connection.
	blinking green	The port is currently receiving or transmitting Ethernet packets.
SPD	yellow	Port speed is 1 GbE.
	off	Port speed is 100 MbE.

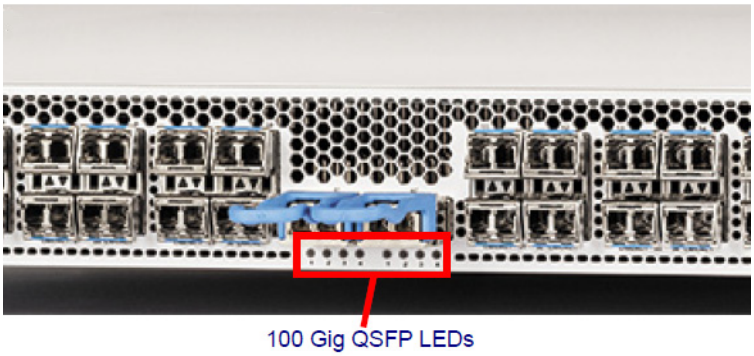
100 GbE QSFP port LEDs

The 100/40 GbE QSFP optical ports have four LEDs associated with each port for link status, activity, and speed (ports 41 - 42). These LEDs are located directly below the QSFP28 ports.

Note: Currently, only the LED labeled 1 is active. The LEDs labeled 2-4 are for future functionality.

The following figure shows the location of the 100/40 GbE QSFP port LEDs.

Figure 36 100 GbE QSFP port LEDs location



The following table describes the operating states for the 100 GbE QSFP port LEDs.

Table 9 100 GbE QSFP port LEDs

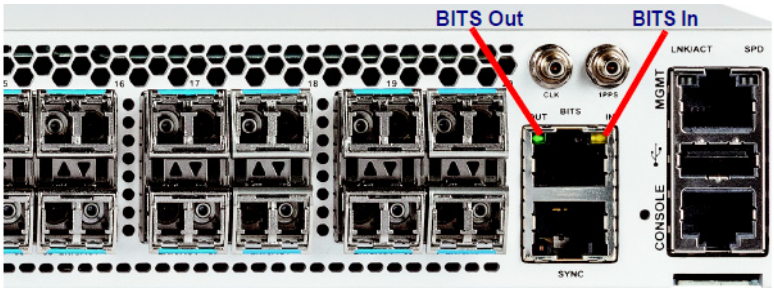
LED	Indication	Description
LNK/ACT/SPD	off	The port is not operational/no link.
	green	Indicates a valid network connection.
	blinking green	The port is currently receiving or transmitting Ethernet packets.
	red	Port is in a failed condition.
	yellow	Indicates a line failure or maintenance state.

BITS RJ45 port LEDs

The RJ45 Building Integrated Timing Supply (BITS) port has two LEDs. They are located at the top of the port and indicate BITS OUT and BITS IN status.

The following figure shows the location of the BITS port LEDs.

Figure 37 BITS port LEDs location



The following table describes the operating states for the BITS port LEDs.

Table 10 BITS port LEDs operating states

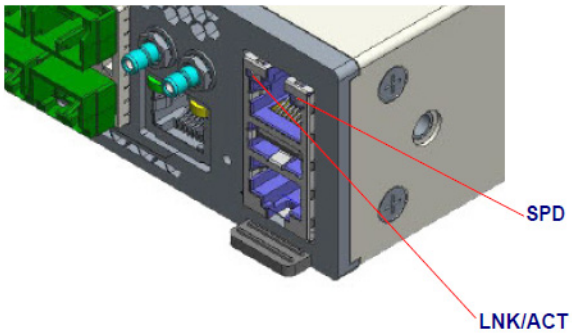
LED	Indication	Description
BITS Out	off	Port is not active or not provisioned.
	green	BITS-Out is provisioned and enabled.
	blinking green	Port is in a maintenance state (loopback).
BITS In	off	LOS is detected on the receive signal or no signal is present.
	yellow	Input signal is being received.

MGMT RJ45 port LEDs

The management (MGMT) port uses an RJ45 connector. The two LEDs located at the top of the MGMT port indicate port status and speed.

The following figure shows the location of the MGMT port LEDs.

Figure 38 MGMT port LEDs location



The following table describes the operating states for the MGMT port LEDs.

Table 11 MGMT port LEDs operating states

LED	Indication	Description
LNK/ACT	off	The port is not operational.
	green	Indicates a valid network connection.
	blinking green	Indicates transmit and receive activity.
SPD	off	Port speed is 10 or 100 MbE.
	yellow	Port speed is 1000 MbE.

CHAPTER 12
Regulatory compliance

Regulatory compliance lists agency approval declarations and installation safety notes.

Health and safety

The health, safety and welfare of engineers and support staff is of paramount importance to Ciena. Implementing a safe system of work with safe people is an integral component of our procedures and an absolute requirement under the provisions of the Health & Safety at Work Act 1974.

Ciena recognizes the importance of all matters of Health & Safety. By suitably addressing Health & Safety issues from the outset, engineers and operatives are able to implement installation contract safely, smoothly and efficiently.

A comprehensive set of procedures exist to control our activities and define our Health and Safety requirements. These are rigorously adhered to by all Ciena employees.

Reference statements re H&SWA 1974 and Management of H&SWA Regulations 1998. Prior to commencement of installation, Supplier representatives need to be aware of any site specific risk assessments / processes / evacuation procedures etc.

Standards compliance

The following table lists the standards that the router complies with.

Table 12 Regulatory approval declarations

Issue	Approval or declaration
Agency Marks	Anatel (Brazil)
	CE (Europe)
	RCM (Australia and New Zealand)
	NOM (Mexico)
	NRTL Listed
	SCC Listed (Canada)
	VCCI (Japan)
Emissions and Immunity (EMC)	CISPR 22 Class A
	CISPR 24
	CISPR 32 Class A
	EN 55024
	EN55032
	ETSI EN 300 132-2
	ETSI EN 300 132-3
	ETSI EN 300 386
	FCC Part 15 B Class A (US)GR-1089 Issue 6
	GR-1089 Issue 6 – NEBS Level 3
	ICES-003 Class A (Canada)
	VCCI Class A (Japan)
Environmental	RoHS 2011/65/EU
	WEEE 2012/19/EU2
	ETSI 300 019 Class 1.2, 2.2, 3.2
Laser Safety	ANSI Z136
	EN 60825-1
	FDA 21 CFR subpart (J) (Safety of Laser Products)
	IEC 60825-1

Issue	Approval or declaration
Safety	CAN/CSA 22.2 No. 60950-1-07 (Canada)
	EN 60950-1
	UL 60950-1
Seismic protection	GR-63-CORE, Issue 4 – NEBS Level 3
	Zone 4 Earthquake

Compliance information

Bonding and grounding

This product is intended for isolated DC return (DC-I) installations. The DC return terminal is not and shall not be connected to the equipment frame or the grounding means of the equipment.

This equipment is suitable for installation as part of the Common Bonding Network.

WARNING

Chassis Ground Connection

For AC systems, the safety ground is the supply cord.

AVERTISSEMENT

Raccordement du bâti à la terre

Pour les systèmes à courant alternatif, le raccordement à la terre de sécurité est assuré par le cordon d'alimentation.

WARNING

Intra-building connections

The intra-building ports of this equipment or subassembly are suitable for connection to intra-building or unexposed cabling or wiring only. The intra-building ports of the equipment or subassembly MUST NOT be metallically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.

AVERTISSEMENT

Connexions intrabâtiment

Les ports intrabâtiment de cet équipement ou de ce sous-ensemble ne conviennent que pour le raccordement au câblage intrabâtiment ou non exposé ou au câblage seulement. Les ports intrabâtiment de l'équipement ou du sous-ensemble NE DOIVENT PAS avoir de connexion métallique aux interfaces connectées à l'installation extérieure (OSP) ou à son câblage. Ces interfaces sont conçues pour être utilisées uniquement comme interfaces intrabâtiment (ports de type 2 ou de type 4 comme décrits dans la norme GR-1089-CORE) et doivent être isolées du câblage exposé de l'installation extérieure (OSP). L'ajout de protecteurs primaires ne constitue pas une protection suffisante pour une connexion métallique de ces interfaces au câblage de l'installation extérieure.

警告

建築物內端口僅適用於連接建築物內或未暴露的電線或電纜

設備或子組件的建築物內部端口僅適用於連接建築物內部或未暴露的佈線或電纜 . 設備或子組件的建築物內部端口不得金屬連接至連接到 OSP 或其佈線的接 . 這些接口僅設計為用作建築物內接口 （如 GR-1089-CORE，第 6 期中所述，類型 2 或類型 4 端口），並且要求與暴露的 OSP 電纜隔離。為了將這些接口金屬連接到 OSP 佈線，添加主保護器不足以提供足夠的保護。

CAUTION

Intra-Building Lightning

To comply with intrabuilding lightning and surge requirements, intrabuilding wiring must be shielded, and the shield for the wiring must be grounded at both ends.

ATTENTION

Protection intrabâtiment contre la foudre

Pour se conformer aux exigences en matière de protection contre la foudre et les surtensions intrabâtiment, le câblage intrabâtiment doit être blindé et le blindage du câblage doit être mis à la terre aux deux extrémités.

Class 1M laser product notice

The chassis, when operating normally with all doors and access covers installed, all energized fiber cabling connected, and protective caps/covers installed on all unused optical connectors, is a Class 1 laser product.

EN55022 Class A notice

This equipment is compliant with Class A of EN 55022. In a residential environment, this equipment may cause radio interference.

Environmental impact statement

Ciena equipment contains no hazardous materials as defined by the United States Environmental Protection Agency (USEPA). Ciena recommends that all failed products be returned to Ciena for failure analysis and proper disposal.

Federal Communications Commission: Interference

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the of the of the Federal Communications Commission (FCC) rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses and can radiate unintentional radio frequency (RF) energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

Note: This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CAUTION
If the device is changed or modified without permission from Ciena, the user may void their authority to operate the equipment.

ATTENTION
Aucune modification ne doit être apportée à l'appareil sans avoir obtenu l'autorisation de Ciena. Le non-respect de cette consigne pourrait annuler le droit de l'utilisateur d'utiliser l'équipement.

警告
如果在未經 Ciena 許可的情況下更改或修改裝置，可能會讓使用者操作設備的許可權失效。

Industry Canada notice

This product is a class A digital apparatus that complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Food and Drug Administration (FDA) laser safety warning

This product contains a laser diode.

Ciena Corporation strongly recommends that users and maintenance and service personnel comply with the standards and regulations in the design, modification, operation, maintenance, and service of lasers and fiber-optic devices.

It is further recommended that the owner of this equipment determine and ensure conformance with any specific and applicable local regulations.

Restricted access location

This equipment is intended for installation in a restricted access location.

System boot time

If lightning, power faults, or short circuits (on twisted pair) occur in field deployments, the system approximately takes 4 minutes to boot. The time for the Ethernet to be retrained, in such a case, is approximately 2 minutes after the system boots successfully.

Telcordia document standards

The format and structure of this document is derived from the Telcordia Generic Requirements for Supplier-Provided Documentation, GR-454-CORE.

Toxic emissions

Ciena equipment releases no toxic emissions.

VCCI Class A statement

この装置は、クラスＡ機器です。この装置を住宅環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

VCCI ー A

Safety information and instructions

This manual is intended for customers, certified system installation technicians, test engineers, technical support technicians, and other personnel responsible for installing the chassis.

The procedures in this manual require the user to understand and follow the safety practices at your site as well as those identified in this manual. Before applying power and turning up any hardware, check the installation location for adequate temperature, humidity and electrical requirements. This manual describes the electrical, physical and environmental specifications for the chassis. Turn-up and test personnel should work closely with systems integration personnel to ensure a functional installation.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product. When installing, operating, or maintaining this equipment, basic safety precautions should always be followed to reduce the risk of fire, electrical shock and injury to persons:

- Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous laser radiation exposure.
- Read and understand all instructions before executing any activity.
- Follow all warnings and instructions marked on this product.
- For information on proper mounting instructions, read the appropriate section of this manual.
- The metallic telecommunications interface should not leave the building premises unless connected to telecommunication devices providing primary and secondary protection as applicable.
- This product should only be operated from the type of power source indicated on the marking label.
- Do not install telecommunications wiring during a lightning storm.
- Do not touch un-insulated wiring or terminals carrying direct current or leave this wiring exposed. Protect and tape wiring and terminals to avoid risk of fire, electric shock, and injury to service personnel.

- Do not touch un-insulated wires or terminals unless the line has been disconnected at the network interface.
- To reduce the risk of electrical shock, do not disassemble this product. Trained personnel should only perform service. Opening or removing covers and/or circuit boards can expose dangerous voltages or other risks. Incorrect re-assembly can cause electric shock or fire when the system is subsequently used.
- Ensure that there is no exposed wire when the input power cables are connected to the sytem.
- Installation must include an independent frame ground drop to building ground.
- This equipment is to be installed only in Restricted Access Areas on business and customer premises in accordance with Articles 110-16, 110-18 of the National Electrical Code, ANSI/NFPA No. 70. Other installations exempt from the enforcement of the National Electrical Code may be engineered according to the accepted practices of the local telecommunications utility.
- Do not stack anything on top of the system. The mounting brackets are designed to support only the weight of the system. If they fail due to excess weight, it can cause bodily injury and damage the equipment.
- At the end of life of the system, it shall be disposed of according to local laws.

CAUTION
Non-Field Replaceable
The chassis should never be opened under any circumstances. Opening the chassis voids the warranty.

ATTENTION
Non remplaçable sur le site
Le bâti ne doit jamais et en aucun cas être ouvert. L’ouverture du bâti entraîne l’annulation de la garantie.

警告
不可現場更換

在任何情況下都不可打開底盤。擅自打開底盤會導致保固失效。

CE compliance

The CE mark on the chassis signifies that the system meets all relevant European directives and standards requirements.

FCC statement

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

If this equipment does cause interference to radio or television reception, the user is encouraged to try to correct the interference using the following measures:

- Reorient the receiving antenna.
- Relocate the equipment with respect to the receiver.
- Move the equipment away from the receiver.
- Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/ television technician for additional suggestions.

Modifications to this product not authorized by Ciena could void the FCC approval and negate your authority to operate the product.

Fiber break and damaged fiber precautions

If a fiber break occurs or a damaged fiber is seen, observe the following precautions:

- Power off all laser sources to the fiber or disconnect the fiber end from the laser source.
- Notify the facility manager or supervisor about the damaged or broken fiber.
- Identify where the fiber is damaged or broken.

- Be careful when handling damaged or broken optical fibers to avoid eye injuries caused by invisible fiber fragments.

General static electricity precautions

A damaging static electrical charge can be generated by the rubbing and sliding of materials against each other.

CAUTION
Risk of damage to circuit packs and backplanes
This equipment contains Electrostatic Discharge (ESD) sensitive devices. Wear grounding straps when handling equipment or making connections to the equipment and follow ESD procedures.

ATTENTION
Risque d'endommager les blocs de circuits et les fonds de panier
Cet équipement contient des dispositifs sensibles aux décharges électrostatiques (DES). Portez des sangles de mise à la terre si vous devez manipuler l'équipement ou établir des connexions à l'équipement et suivez les procédures relatives aux DES.

警告
迴路組及背板損壞風險

此設備含有對靜電放電 (ESD) 敏感的裝置。請在處理或連接設備時，配戴接地帶並依照 ESD 程序執行作業。

Different materials have different potentials of generating and holding a static electric charge. Plastic materials similar to nylon and polyester are capable of generating and holding a potentially large damaging static electricity charge. Materials similar to cotton do not typically have the potential to generate and hold a charge. The buildup of static electricity can be of a sufficient potential to damage electronic circuitry. When working on Ciena equipment or any interconnecting electrical/optical cabling, always wear an approved personnel ground device.

Industry experience has shown that all devices containing integrated circuits can be damaged by static electricity that builds up on work surfaces and personnel. The effect of ESD damage may be immediate failure or it may manifest itself as a latent failure affecting the reliability of the equipment.

The static charges and discharges are produced by various charging effects of movement and contact with other objects. Dry air allows greater static charges to accumulate on a body.

Observe the following precautions to avoid static charges and discharges:

- Assume that all modules contain solid state electronic components that can be damaged by ESD.
- Handle all modules by the faceplate or latch and by the top and bottom outermost edges. Never touch the components, conductors, or connector pins.
- When handling modules (that is, storing, installing, removing, and so forth) or when working on the backplane, always wear a grounded wrist strap or wear a heel strap and stand on a grounded, static-dissipating floor mat.
- Observe all warning labels on bags and cartons.
- If possible, do not remove modules from antistatic packaging until they are ready for use.
- If possible, open all module packaging at a static-safe work station using properly grounded wrist straps and static-dissipating table mats.
- Always store and transport modules in static-safe packaging.
- Keep all static-generating material, such as food wrappers, plastics, and styrofoam containers, away from all modules.
- When removing modules from an enclosure, immediately place them in static-safe packages.
- Whenever possible, maintain relative humidity above 20 percent.

Optical fiber handling precautions

When handling or connecting optical fibers, observe the following precautions:

- Always wear safety glasses when handling fibers.
- Avoid indirect eye or direct skin exposure to the ends of optical connectors and fibers, because laser energy may be present.
- Install protective covers or caps on all fiber optical connectors when they are not in use.

Precautions for handling and storing the chassis

When handling, installing, or removing a chassis, observe the following precautions:

- Wear wrist straps or other suitable ESD-grounding devices before touching and/or removing a chassis from the equipment shelf or ESD-protective packaging.

- Ensure the protective covers or caps are installed on all optical connectors when the connectors are not in use.
- Store all chassis in suitable ESD-protective packaging when they are not installed in an equipment shelf.

Voltage precaution

Personnel should exercise safety precautions when connecting, measuring, and disconnecting all voltage supply lines.

Observe the following precautions to avoid voltage shock:

- Never use both hands when working on or near a voltage source.
- Use the buddy system when working around voltage sources.
- Ensure that rescue and first aid equipment is available and accessible.
- Remove watches, rings, necklaces, and other conductive devices that might come in contact with live voltages or high energy sources.
- Before activating circuits, ensure that other personnel are not in contact with voltage sources.
- Deactivate power whenever possible before performing maintenance on system components.

5162 Router

Installation

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CONTACT CIENA
For additional information, office locations, and phone numbers, please visit the Ciena web site at **www.ciena.com**