Oracle® Acme Packet 6400

Hardware Installation and Maintenance Guide

Release 1.0
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Oracle Acme Packet 6400 Hardware Installation and Maintenance Guide, Release 1.0

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About This Guide

The Acme Packet 6400 is a high performance, high capacity Session Border Controller that optimally delivers interactive communications — voice, video, and multimedia sessions — across wireline, wireless, and cable IP network borders. With its 1U design the Acme Packet 6400 provides exceptional functionality in a tightly integrated system.

Revision History

This section contains a revision history for this document.

Date	Description
January 2025	• Initial release

1
Safety

Follow the saftey precautions in this chapter.

This chapter provides information to protect you and your Acme Packet 6400 during the installation process. This chapter also provides information to keep your Acme Packet 6400 functioning properly and protect it from damage.

General Safety Precautions

To ensure general safety, follow the safety precautions listed in this section.

Fan Module

To avoid overheating the system, do not block the air inlets or the fan module, or otherwise obstruct airflow to the system. Keep the area around the Acme Packet 6400 clean and clutter-free.

System Maintenance

Customers may service or replace the following parts:

- the front indicator module
- the air filter
- the fans
- the transcoding modules
- power supplies
- the SFP+ ports

Only professionals trained to maintain, adjust, or repair the Acme Packet 6400 may provide these services.

Fiber Optic Cable

Looking into a fiber optic cable can cause eye damage. Never look directly into the end of the fiber optic cables. Instead, use a fiber optic power meter to determine if power is present.

Environmental Specifications

Adhere to the Environmental Specifications section in the Specifications chapter of this guide.

Using This Guide

Read and understand all notes of warning and caution included in the Acme Packet 6400 documentation. These warnings and cautions are designed to keep you safe and protect the Acme Packet 6400 from damage.

Electrical Safety Precautions

Follow the electrical safety precautions listed in the following subsections.

- Note the location of the emergency power-off switch for the room where the Acme Packet 6400 is located.
- If an electrical accident occurs, remove power from the system immediately by unplugging the chassis.
- Always disconnect the power from the system when removing a Acme Packet 6400 from its rack.
- When disconnecting power:
  - Disconnect the circuit breaker at the rack.
  - Unplug or unscrew the power cords from the power supplies.
- Use grounded AC power cords that are plugged into grounded electrical outlets.
- Ensure that the installation facilities have proper grounding systems and include a grounded rack structure or local grounding bus bar.
- When installing the Acme Packet 6400 in an equipment rack, always make the ground connection first and disconnect it last upon uninstallation.
- Use shielded Category 5e or 6, RJ45 cables for all 10/100/1000 Ethernet connections to protect the Acme Packet 6400 from potential damage.
- To avoid making a complete circuit (which causes electrical shock), use only one hand when working with powered-on electrical equipment.
- Use caution when using electrically conductive tools around the Acme Packet 6400.
- Remove jewelry before working on the Acme Packet 6400.

Battery Warning

WARNING:

BATTERIES MAY EXPLODE IF REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERY ACCORDING TO THE INSTRUCTIONS.

Note:

Perchlorate Material — Special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate.

ESD Safety Precautions

To protect the delicate electronic components from damage from static electricity, always follow the appropriate ESD procedures and wear the proper protective devices (such as an ESD wrist strap) when handling any and all Acme Packet 6400 hardware and while performing any Acme

Packet 6400 hardware procedures. There is an ESD receptacle in the top left corner in the rear of the Acme Packet 6400.

To protect your equipment from ESD, follow these ESD safety precautions:

- Ensure that the Acme Packet 6400 is properly grounded.
- If you are grounding your Acme Packet 6400 to an electrically conductive, grounded rack, check to see whether or not the rack is painted. Paint can hinder proper grounding. If your equipment rack is painted, you should ground the system to some other reliable place or remove a small portion of paint for proper grounding.
- Use a grounded ESD wrist strap when working on the Acme Packet 6400 to prevent static discharge.
- To avoid damaging ESD sensitive hardware, discharge all static electricity from your body before working directly with the Acme Packet 6400 by touching a grounded object.

Environmental, Safety, and Regulatory Certifications

For specific information regarding the environmental, safety, and regulatory certifications applicable to the Acme Packet 6400 refer to the Environmental, Safety, and Regulatory Certifications section included in this guide's Specifications chapter.

2
Component Overview

Chassis

The Acme Packet 6400 is contained in a 1U rack-mounted chassis. It can be front- or center mounted in standard 19” wide racks (up to 32” deep), with options for 23” wide racks.

Figure 2-1 Front View

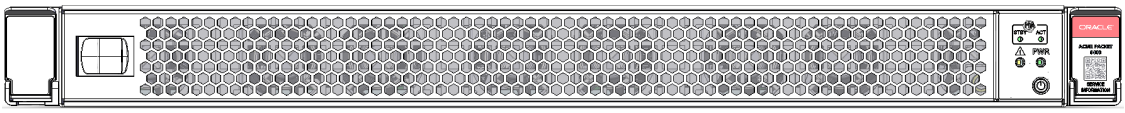
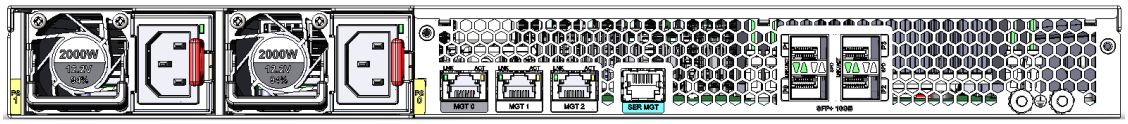


Figure 2-2 Rear View

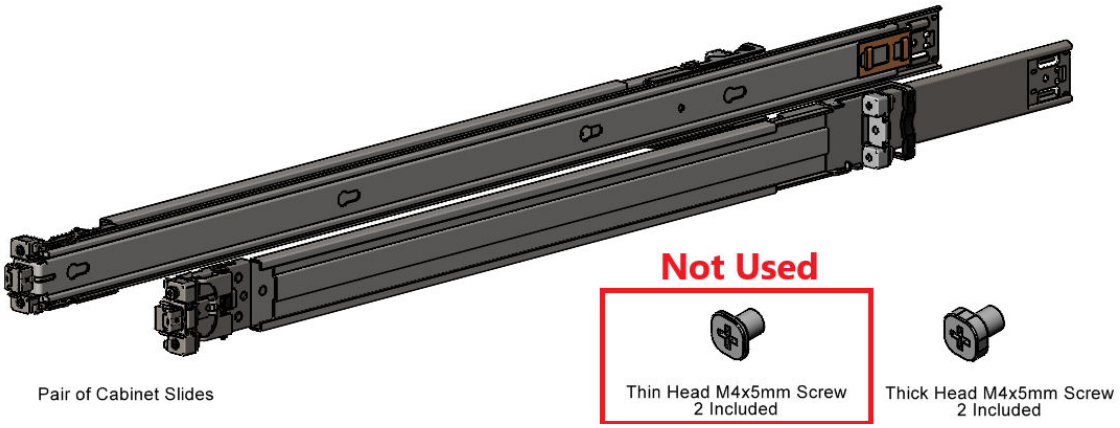


Mounting Hardware

The Acme Packet 6400 is supported by a pair of slide rails that are affixed to an equipment rack by front and rear mounting flanges. The slide rails are adjustable for equipment racks of various depths.

Slide Rails

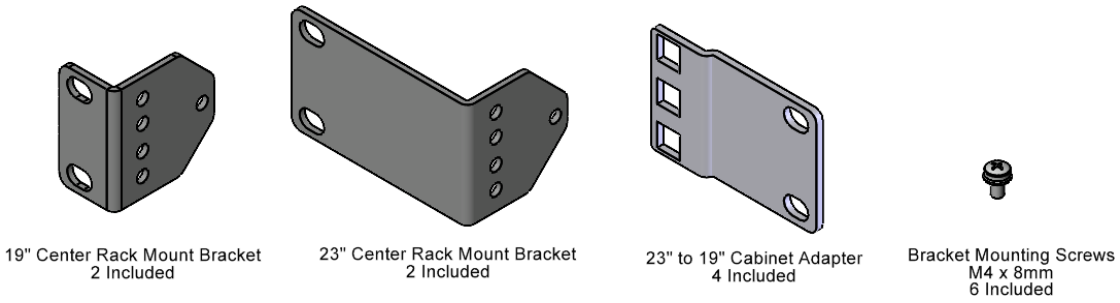
The following figure shows the slides rails.



- Pair of Cabinet Slides
- Thin Head M4x5mm Screws
- Thick Head M4x5mm Screws

Optional Mounting Brackets and Hardware

The following diagram shows the mounting hardware that ships with the system. These brackets are not required if you will mount the Acme Packet 6400 into a 19" server rack.



- 19" Center Rack Mount Bracket
- 23" Center Rack Mount Bracket
- 23" to 19" Cabinet Adapter
- Bracket Mounting Screws

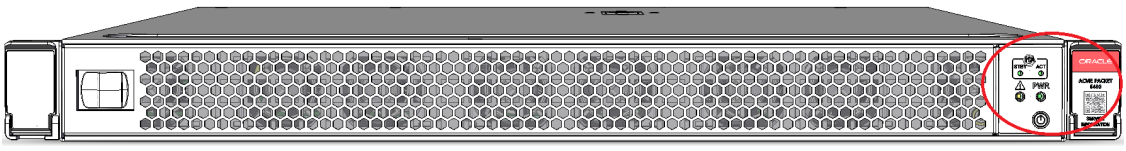
Processor Module

The Acme Packet 6400 processor module (CPU) is located on the main board of the Acme Packet 6400. This processor module handles both the management and signal processing within the system.

Front Panel

The Acme Packet 6400 front control panel provides easy access to several system components. On the control panel you can access the HA standby LED, the HA active LED, the alarm LED, the power LED, and the service information QR code.

Figure 2-3 Front Panel



HA LEDs

The front panel contains two LEDs that indicate HA role.

The ACT LED indicates the system is the active node. The STBY LED indicates the system is the standby node.

Alarm LED

The alarm LED on the front control panel indicates if any alarms are active on the Acme Packet 6400. The LED has three different states to indicate the severity of the alarms.

- Unlit: system is fully functional without any faults
- Amber: major alarm has been generated
- Red: critical alarm has been generated.

Power LED

When illuminated, the green power LED indicates the power is on.

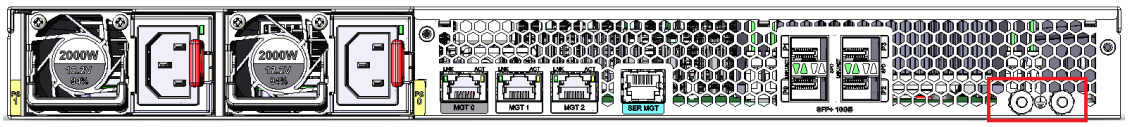
Power Components

Oracle offers AC or DC power options for the Acme Packet 6400. The power supplies are user-replaceable, hot swappable components. Each power supply is accessed from the rear panel of the Acme Packet 6400. The power supply located at right is designated as power supply 0 (PS0) while the power supply located at left is designated as power supply 1 (PS1).

Redundant Power Supplies

During normal operation, the Acme Packet 6400 is load-balanced and draws power from both supplies. The two power supplies also provide hardware redundancy. If a power supply fails, the Acme Packet 6400 can rely on only one functional power supply to sustain normal operation. A malfunctioning power supply must be removed and replaced as soon as possible. If the Acme Packet 6400 starts up with only one power supply, the alarm LED will blink continuously.

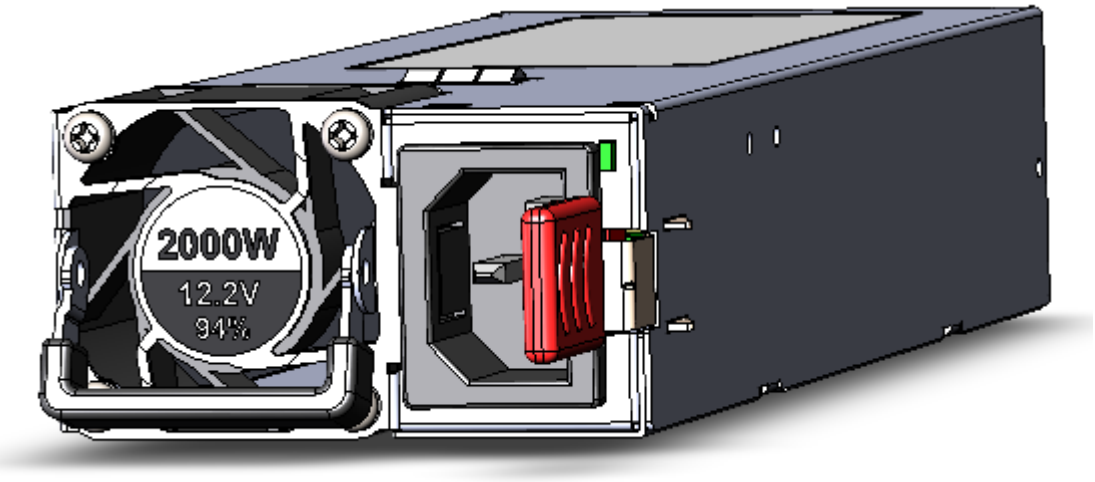
Figure 2-4 Rear Panel



The grounding terminals are used to attach the Acme Packet 6400 chassis to a local earth ground. The terminals are located to the right of the media ports. The Acme Packet 6400 is shipped with nuts attached to the terminals along with a pre-made ground cable.

AC Power

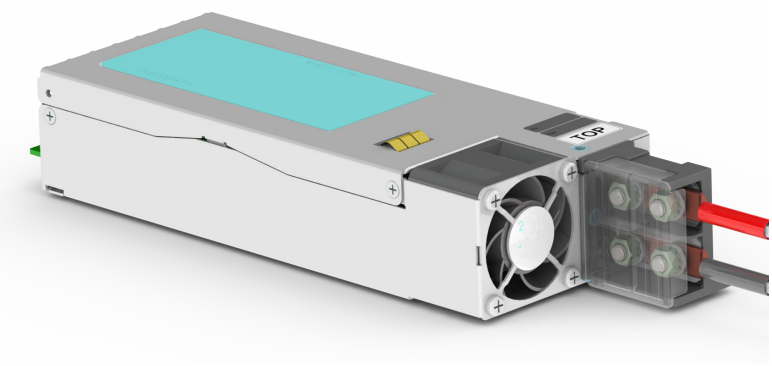
The auto-sensing AC power supply is rated at 110-240 VAC, 50-60 Hz, and is supplied with an IEC connector. The handle on the power supply is used to remove the power supply from the chassis. The locking handle, when moved from right to left, unlocks the power supply from the chassis.



Oracle ships one region-specific power cord with each AC-power supply.

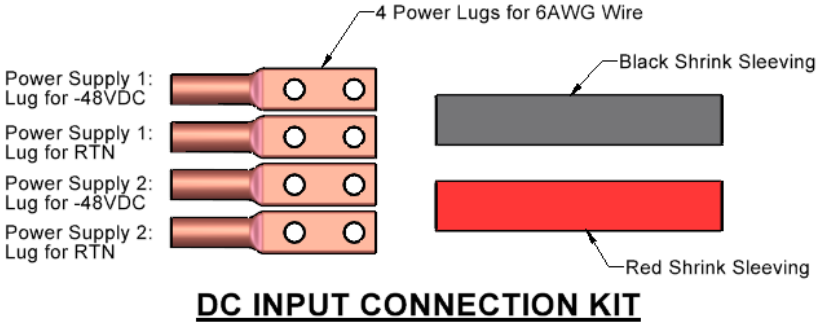
DC Power

The Acme Packet 6400 can be powered by central office –48 VDC operations with a DC-DC supply. The handle on the power supply is used to remove the power supply from the chassis. Move the locking handle from right to left to unlock the power supply. A removable terminal block on the DC power supply serves as the DC power interconnect. The terminal block must be removed before the locking handle can be moved to free the power supply.



DC Power Cords

The mating connector kit only includes the components shown below. You must supply both the wire and the termination hardware for your rack level or facility level power supply.



DC INPUT CONNECTION KIT

Lug	Power Supply Designation	Suggested Wire Color (10AWG)
Power Supply 1: -48VDC	"-" (-48VDC)	Black
Power Supply 1: RTN	"+" (RTN)	Red
Power Supply 2: -48VDC	"-" (-48VDC)	Black
Power Supply 2: RTN	"+" (RTN)	Red

For each Lug, use a piece of corresponding color shrink sleeving to protect the wire connections.

Cooling Components

The Acme Packet 6400 must remain well ventilated for reliable and continuous operation. The cooling features of the chassis include:

- 4 replaceable Fan Modules each containing two fans
- 1 fan filter

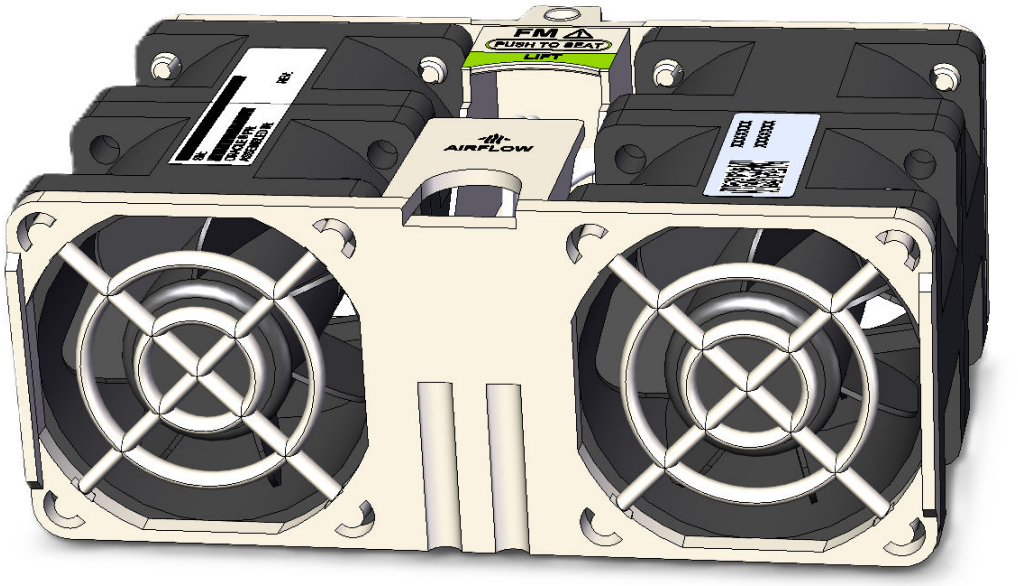
Fan

The Acme Packet 6400 chassis draws cool ambient air through the chassis through intake fans and is exhausted through perforated air outlets located along the rear of the chassis. To avoid overheating the system, do not block the air intake or exhaust ways or otherwise obstruct airflow to the system in any way.

The Acme Packet 6400 automatically adjusts fan speed based on the current operational status and environmental conditions. Fan speed regulation is an automated process that requires no user intervention.

If the Acme Packet 6400 experiences a fan module malfunction and generates an alarm, you must remove the existing fan module and replace it with a fully functioning fan module.

The following figure shows the Acme Packet 6400 fan module.



Air Filter

The Acme Packet 6400 air filter removes airborne particles before they are drawn into the system chassis.

Oracle sells replacement air filters.

3
System Installation

This chapter provides information about how to install the Acme Packet 6400 and its associated components, includes cabling information.

Shipped Parts

Each Acme Packet 6400 ships in one box. Inside this box is the Acme Packet 6400 chassis and the accessory kit. The ordered power supplies are already installed in the chassis.

The following table lists the contents of one Acme Packet 6400 order.

Table 3-1 Acme Packet 6400 Shipping Contents

Location	Item
Main Shipping Box	Acme Packet 6400 chassis
Accessory Kit	• Slide rail kit • Cable management arm kit • Bag of accessories and optional mounting brackets • AC power cords or DC kit

Installation Tools and Parts

The following tools and parts are required to install the Acme Packet 6400 into your equipment rack:

- #2 Phillips-head screwdriver
- Rack and associated mounting hardware
- Shielded Ethernet CAT5e or CAT6 RJ45 cables
- 11/32" nut driver
- T15 Torx tip screwdriver
- T25 Torx tip screwdriver
- 8mm nut driver

Keep the two Torx tip screwdrivers for later maintanence. The T15 Torx is used for openning the cover and replacing the FIM. The T25 Torx is used for removing the main board.

Recommended Tools and Parts

Oracle recommends that you have the following parts on hand:

- Cable labels
- UPS for AC installations
- ESD wrist or heel straps

- ESD-safe location

Rack System Instructions

The following or similar rack-mount instructions are included with the installation instructions:

- **Elevated Operating Ambient** - If installed in a closed or multi-unit rack assembly, the operating temperature of the rack environment may be greater than the ambient room temperature.
- **Reduced Air Flow** - Installation of the equipment in a rack should be placed such that the amount of air flow required for safe operation of the equipment is not compromised.
- **Circuit Overloading** - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- **Reliable Earthing** - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (for example, use of power strips).

Pre installation

> **Note:**
>
> The Acme Packet 6400 shall only be installed in a restricted access location. The Acme Packet 6400 must have access to reliable power and cooling. When choosing a location for your Acme Packet 6400, follow the guidelines listed in this section.

Environmental Guidelines

When preparing to install your Acme Packet 6400:

- Locate the Acme Packet 6400 in a clean and well-ventilated room. This location should also be far from areas where heat, electrical noise, and electromagnetic fields are present.

Power Guidelines

When preparing to install your Acme Packet 6400:

- Ensure that the installation location has access to adequate power and grounding. Separate circuits should be available for each of the two Acme Packet 6400 power supplies.
- Never use extension cords when powering an Acme Packet 6400.
- Use grounded, 3-conductor circuits.
- A local earth ground must be available.
- A service disconnect must be provided for each power supply that is clearly marked and is nearby the equipment.

Mounting Guidelines

When preparing to install your Acme Packet 6400, please follow these guidelines:

- Leave enough clearance (approximately 8” (20 cm)) in the rear of the equipment rack to allow for sufficient airflow and for ease in cabling and/or servicing the rear panel.
- Do not block the air inlets or the fan module, or obstruct airflow to the system in any way.
- Position equipment to allow for serviceability. This will aid in chassis removal, and prevent the need to remove or loosen other equipment in the rack.
- Ethernet interfaces are limited to 328 feet/ 100 meters as defined by the FAST Ethernet standard, IEEE 802.3.

Other Safety Guidelines

When preparing to install your Acme Packet 6400:

- Ensure that the equipment rack is securely bolted to the floor, and that the equipment rack and components are properly grounded.
- For AC power installations, use a regulating UPS to protect the Acme Packet 6400 from power surges, voltage spikes, and power failures.
- For AC power installations, ensure that your UPS can supply power for enough time to save your system data and shut down the system gracefully.

Rack Mounting the Acme Packet 6400

To rack mount the Acme Packet 6400, secure the rack to the floor, stabilize the rack, and install the mounting brackets and slide rails. Then, install the Acme Packet 6400 into the rack.

Stabilize the Rack

> **Caution:**
>
> To reduce the risk of personal injury, stabilize the rack cabinet, and extend the anti-tilt bar before you install the Acme Packet 6400.

Refer to your rack documentation for detailed instructions for the following steps.

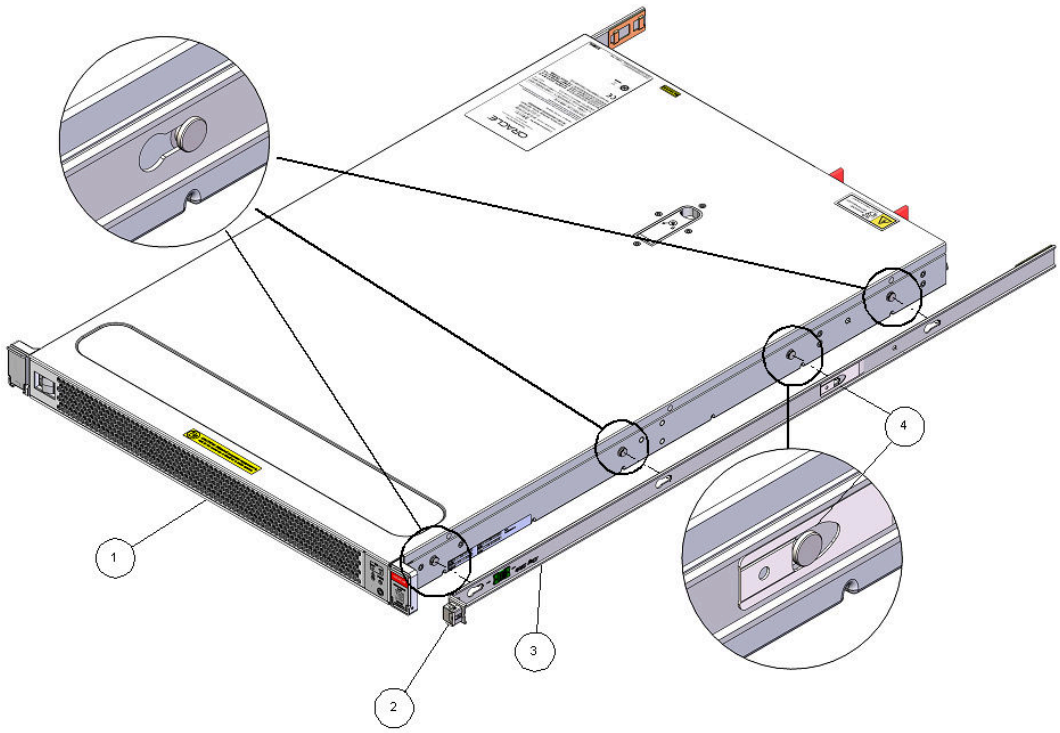
1. Open and remove the front and back doors from the rack cabinet, only if they impinge on the mounting bay.
2. To prevent the rack cabinet from tipping during the installation, fully extend the rack cabinet anti-tilt bar, which is located at the bottom front of the rack cabinet.
3. If the rack includes leveling feet beneath the rack cabinet to prevent the rack from rolling, extend these leveling feet fully downward to the floor.

> **Caution:**
>
> When moving the rack cabinet to a new location, verify that the leveling feet are up before moving the rack.

Install Mounting Brackets

To install the mounting brackets on the sides of the Acme Packet 6400:

1. Position a mounting bracket against the chassis so that the slide-rail lock is at the Acme Packet 6400 front, and the keyhole openings on the mounting bracket are aligned with the locating pins on the side of the chassis.



Call Out	Description
1	Chassis front
2	Slide-rail lock
3	Mounting bracket
4	Mounting bracket clip

2. When the heads of the chassis locating pins protrude through the keyhole openings in the mounting bracket, pull the mounting bracket toward the front of the chassis until the mounting bracket clip locks into place with an audible click.
3. Verify that the back locating pin is engaged with the mounting bracket clip.
4. Repeat Step 1 through Step 3 to install the other mounting bracket on the other side of the Acme Packet 6400.

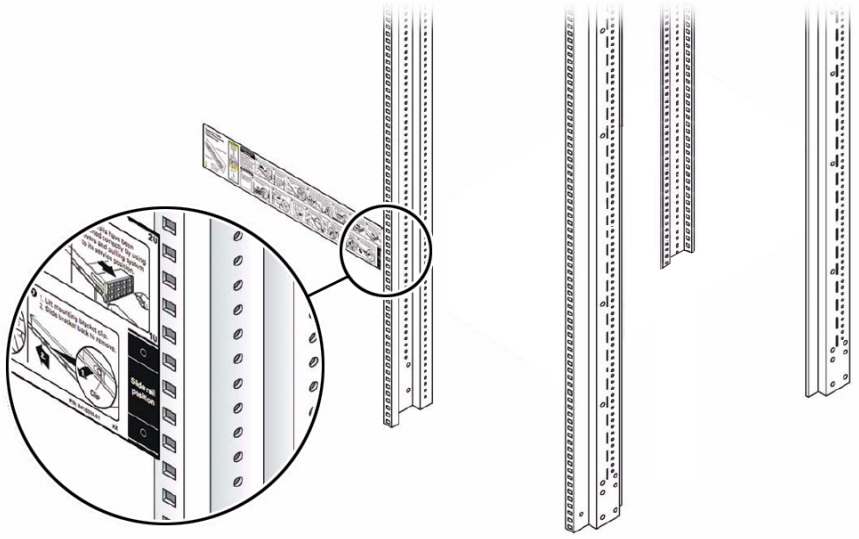
Mark the Rackmount Location

Identify the location in the rack where you want to place the Acme Packet 6400. The Acme Packet 6400 requires one rack unit (1U). Use the Rackmounting Template to identify the correct mounting holes for the slide-rails.

> **Caution:**
>
> Always load equipment into a rack from the bottom up so that the rack does not become top-heavy and tip over. Extend the rack anti-tilt bar to prevent the rack from tipping during equipment installation.

1. Ensure that there is at least 1 rack unit (1U) of vertical space in the rack cabinet to install the Acme Packet 6400.
2. Place the Rackmounting Template against the front rails, and measure up from the bottom of the Rackmounting Template.

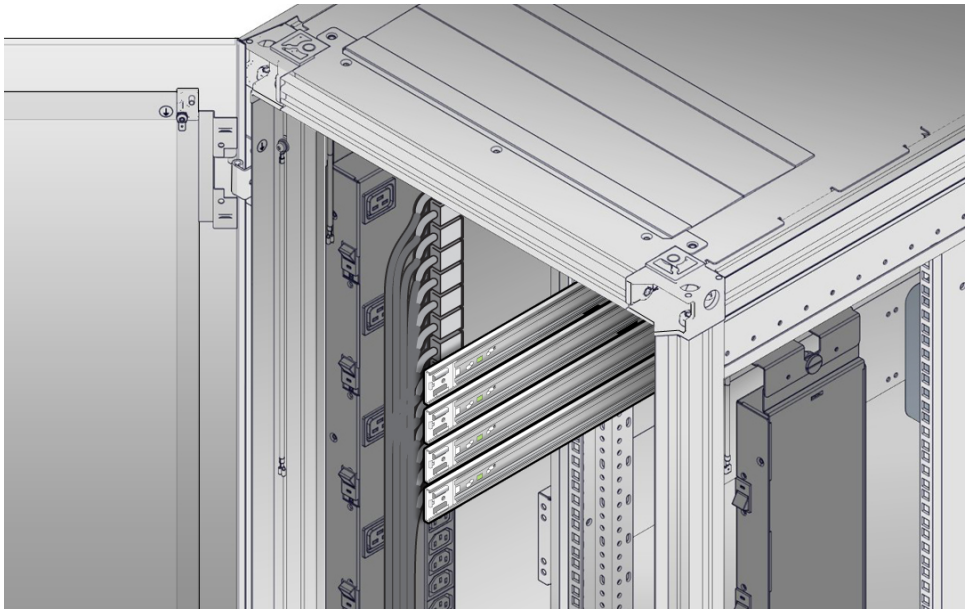
   The bottom edge of the Rackmounting Template card corresponds to the bottom edge of the Acme Packet 6400.



3. Mark the mounting holes for the front slide-rails.
4. Mark the mounting holes for the back slide-rails.

Install Slide Rails into Rack

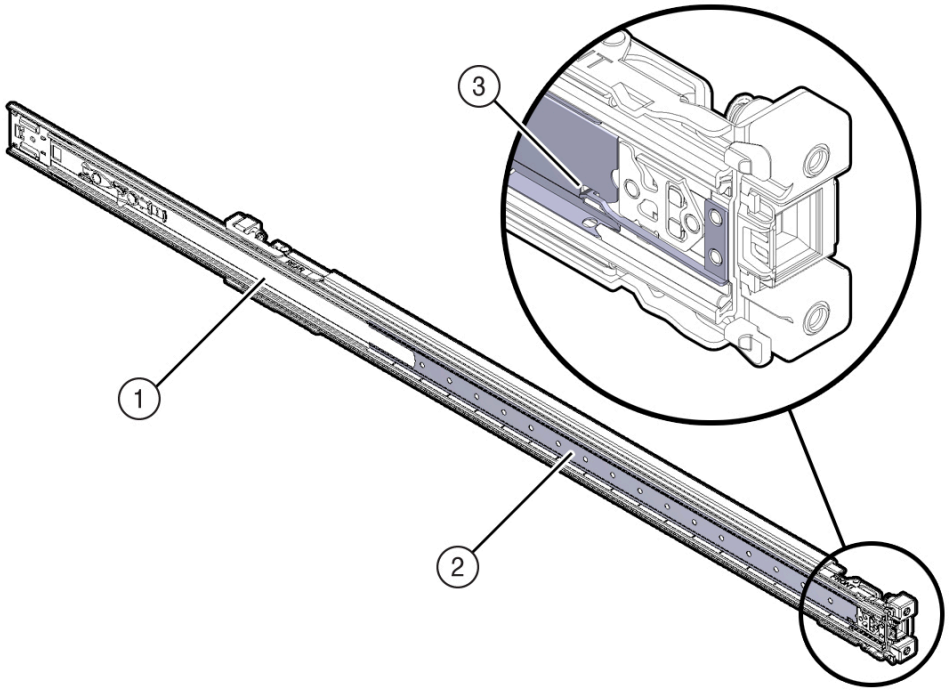
- Install the slide-rails into the rack.



Attach the Slide-Rails

Use this procedure to attach slide-rail assemblies to the rack.

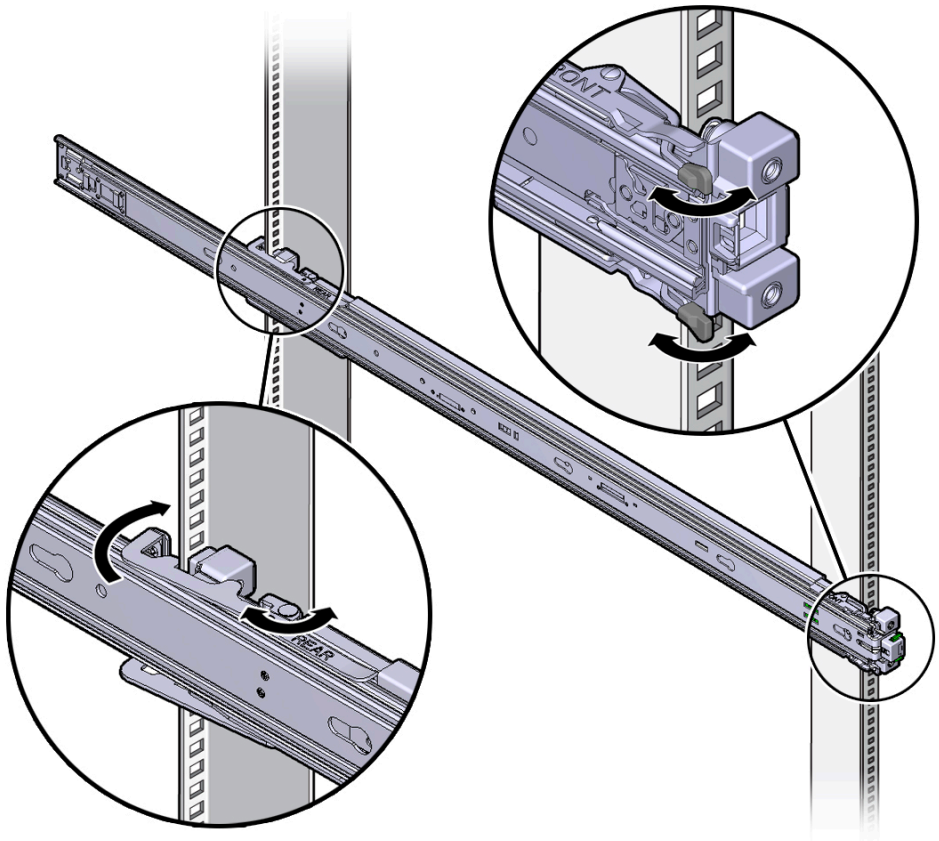
1. Orient the slide-rail assembly so that the ball-bearing track is forward and locked in place.



Call Out	Description
1	Slide-rail

Call Out	Description
2	Ball-bearing track
3	Ball-bearing locking mechanism

2. Starting with either the left or right side of the rack, align the back of the slide-rail assembly against the inside of the back rack rail, and push until the assembly locks into place with an audible click.



3. Align the front of the slide-rail assembly against the outside of the front rack rail, and push until the assembly locks into place with an audible click.
4. Repeat Step 1 through Step 3 to attach the slide-rail assembly to the other side of the rack.

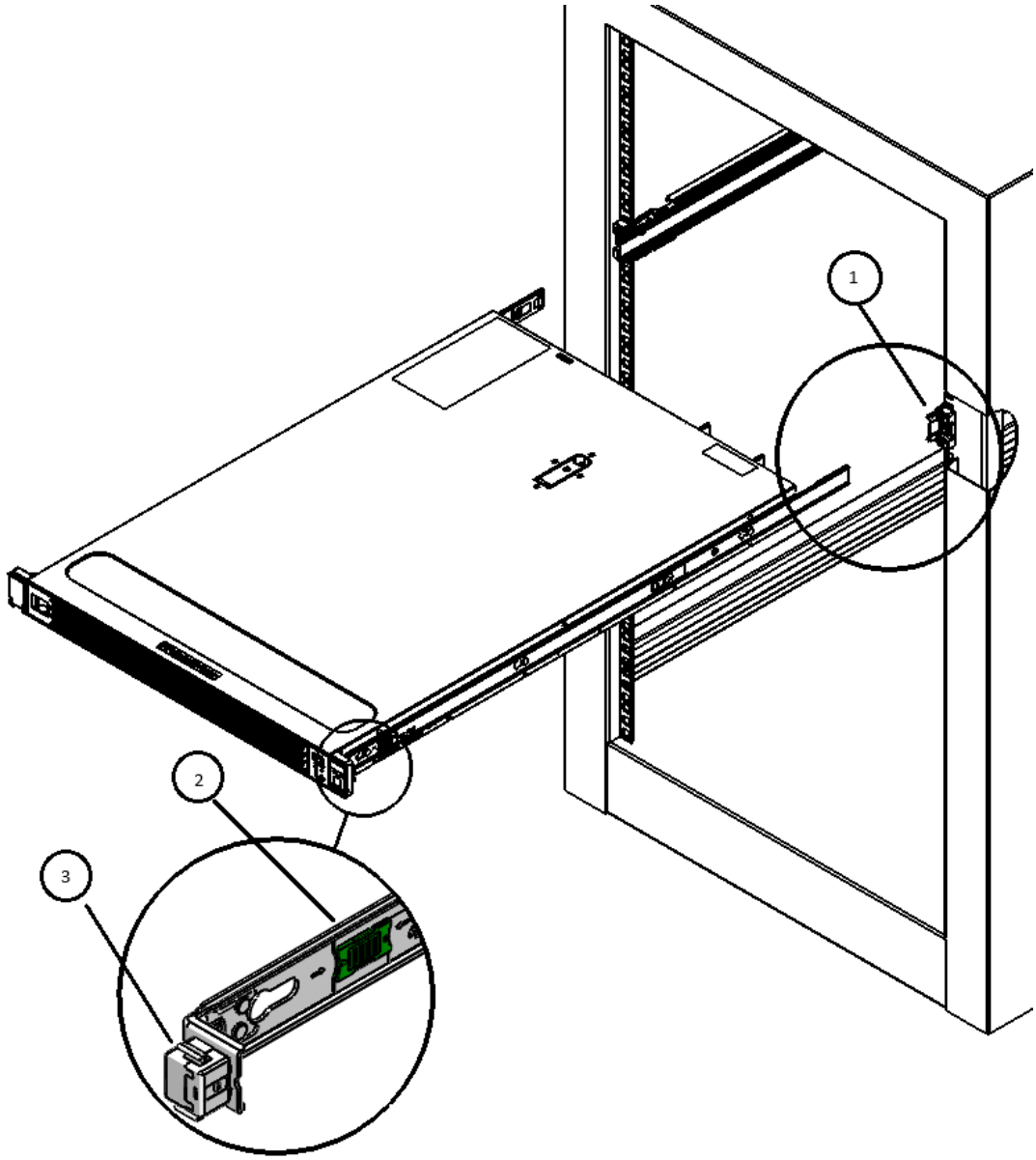
Install the Acme Packet 6400 into the Slide-Rail Assemblies

Use this procedure to install the Acme Packet 6400 chassis with mounting brackets into the slide-rail assemblies that are mounted to the rack.

> **Caution:**
>
> **Personal Injury or Equipment Damage**: This procedure requires a minimum of two people because of the weight of the Acme Packet 6400. Attempting this procedure alone could result in equipment damage or personal injury.

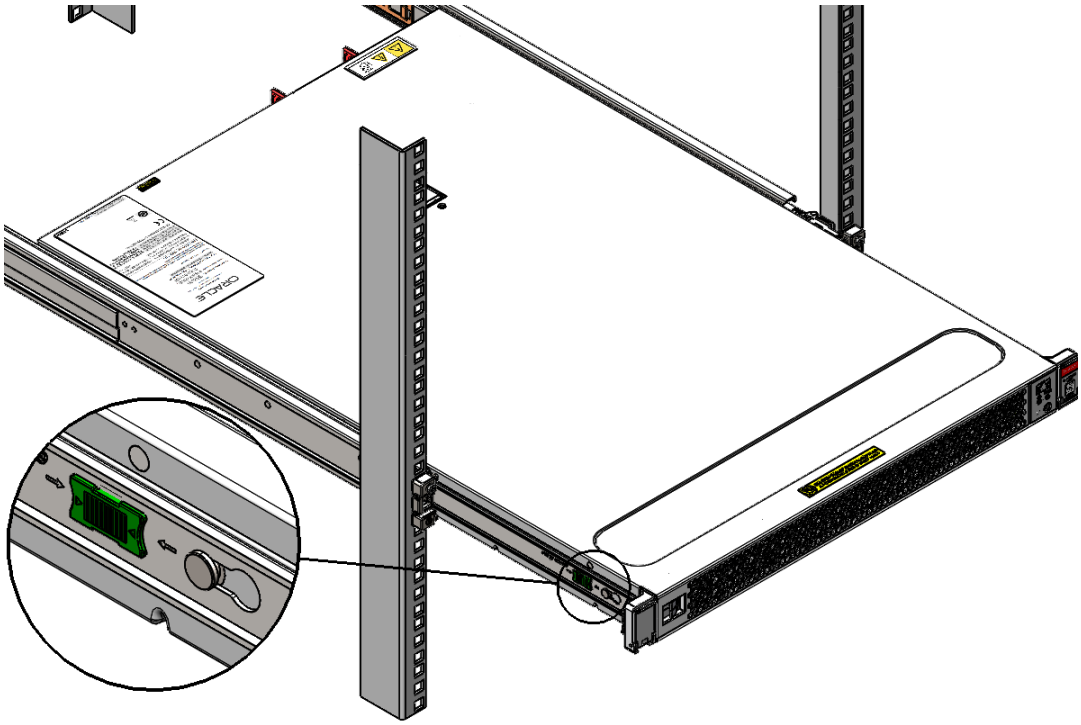
> **Caution:**
>
> **Personal Injury or Equipment Damage**: Always load equipment into a rack from the bottom up so that the rack does not become top-heavy and tip over. Extend the rack anti-tilt bar to prevent the rack from tipping during equipment installation.

1. Push the slide-rails as far as possible into the slide-rail assemblies in the rack.
2. Position the Acme Packet 6400 so that the back ends of the mounting brackets are aligned with the slide-rail assemblies that are mounted in the rack.
3. Insert the mounting brackets into the slide-rails, and then push the Acme Packet 6400 into the rack until the mounting brackets are flush with the slide-rail stops (approximately 30 cm or 12 inches).



Call Out	Description
1	Inserting mounting bracket into slide-rail
2	Slide-rail release button
3	Slide-rail lock

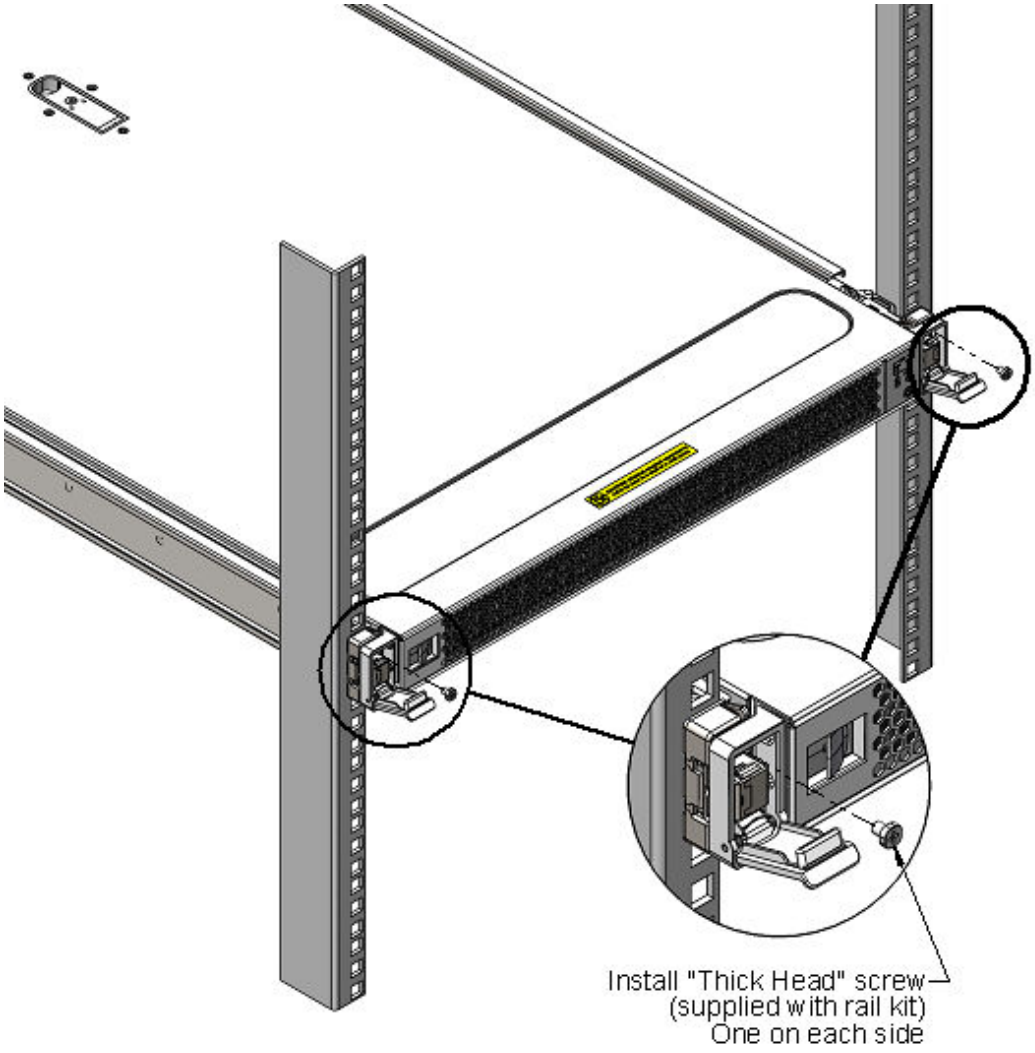
4. Simultaneously push and hold the green slide-rail release buttons on each mounting bracket while you push the Acme Packet 6400 into the rack. Continue pushing the Acme Packet 6400 into the rack until the slide-rail locks (on the front of the mounting brackets) engage the slide-rail assemblies with an audible click.



Caution:

Before you install the optional cable management arm verify that the Acme Packet 6400 is securely mounted in the rack and that the slide-rail locks are engaged with the mounting brackets.

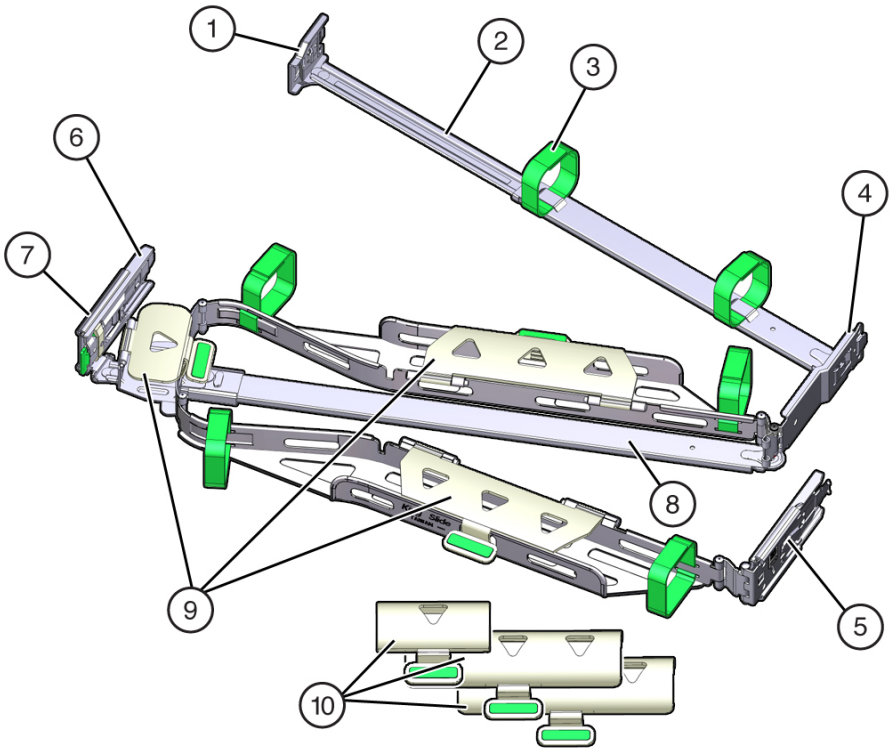
If NEBS compliance (earthquake) is required, use the thick head screws to secure the Acme Packet 6400.



Install the Cable Management Arm (Optional)

Follow this procedure to install the cable management arm (CMA), which you can use to manage cables connected to the back of the Acme Packet 6400.

1. Unpack the CMA, which contains the following components.



Call Out	Description
1	Connector A
2	Front slide bar
3	Velcro straps (6)
4	Connector B
5	Connector C
6	Connector D
7	Slide-rail latching bracket (used with connector D)
8	Back slide bar
9	Flat cable covers
10	Round cable covers (optional)

2. Prepare the CMA for installation.

   a. Ensure that you install the flat cable covers for your Acme Packet 6400 on the CMA.

   b. Ensure that the six Velcro straps are threaded into the CMA.

> **Note:**
>
> Ensure that the two Velcro straps located on the front slide bar are threaded through the opening in the top of the slide bar, as shown in the illustration in Step 1. This prevents the Velcro straps from interfering with the expansion and contraction of the slide bar when the Acme Packet 6400 is extended out of the rack and returned to the rack.

c. To make it easier to install the CMA, extend the Acme Packet 6400 approximately 13 cm (5 inches) out of the front of the rack.

d. Take the CMA to the back of the equipment rack, and ensure that you have adequate room to work at the back of the Acme Packet 6400.

> **Note:**
>
> References to "left" or "right" in this procedure assume that you are facing the back of the equipment rack.

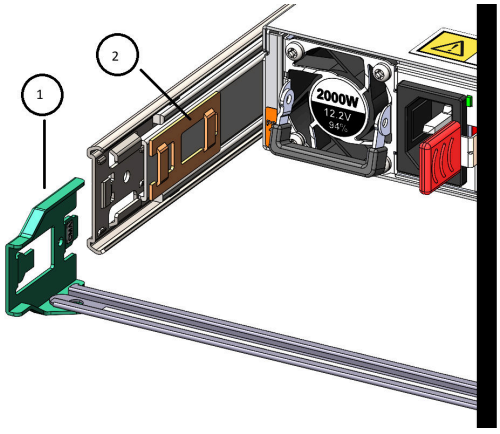
> **Note:**
>
> Throughout this installation procedure, support the CMA and do not allow it to hang under its own weight until it is secured at all four attachment points.

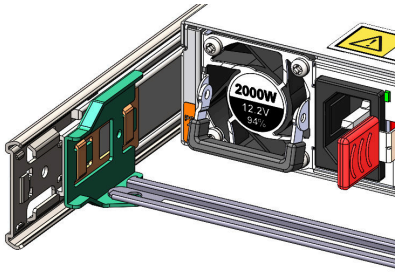
3. To install CMA connector A into the left slide-rail:

   a. Insert CMA connector A into the front slot on the left slide-rail until it locks into place with an audible click [1 and 2].

      The connector A tab (callout 1) goes into the slide-rail front slot (callout 2).

   b. Gently tug on the left side of the front slide bar to verify that connector A is properly seated.



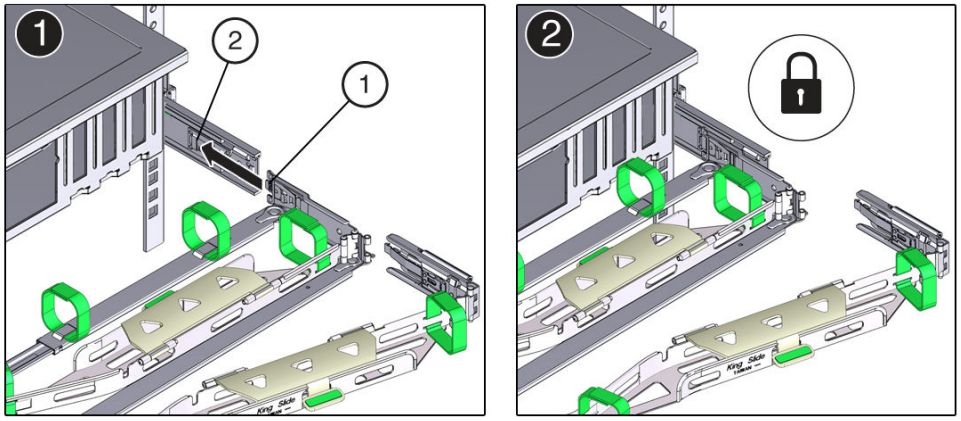


Call Out	Description
1	Connector A tab
2	Left slide-rail front slot

4. To install CMA connector B into the right slide-rail:
   a. Insert CMA connector B into the front slot on the right slide-rail until it locks into place with an audible click [1 and 2].

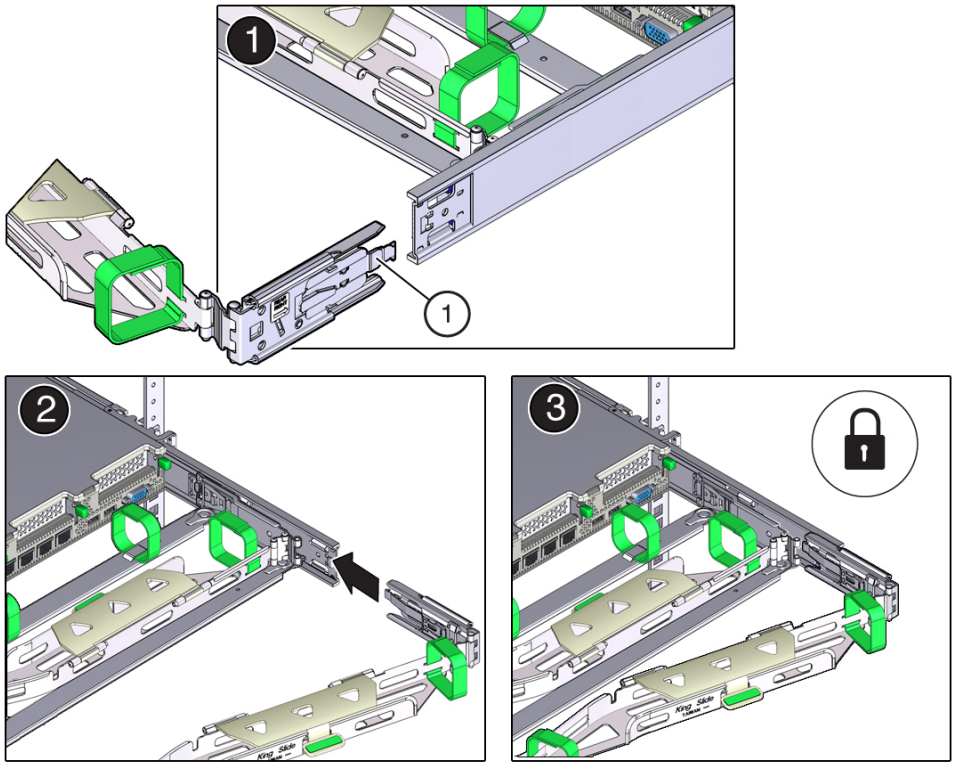
      The connector B tab (callout 1) goes into the slide-rail front slot (callout 2).

   b. Gently tug on the right side of the front slide bar to verify that connector B is properly seated.



Call Out	Description
1	Connector B tab
2	Right slide-rail front slot

5. To install CMA connector C into the right slide-rail:
   a. Align connector C with the slide-rail so that the locking spring (callout 1) is positioned inside (server side) of the right slide-rail [1].



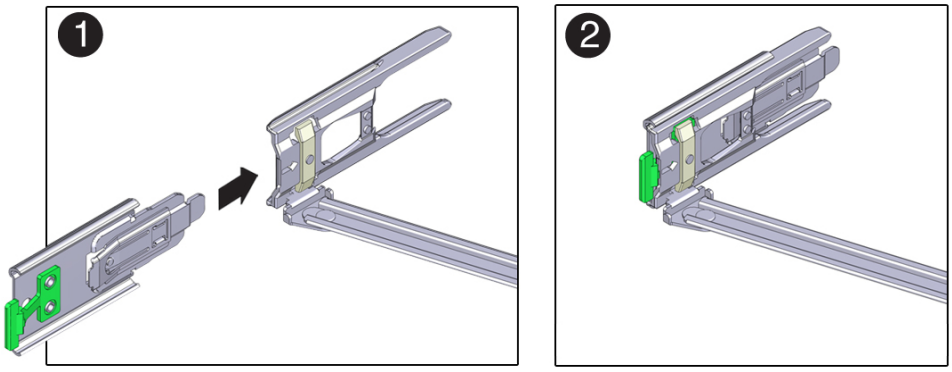
Call Out	Description
1	Connector C locking spring

b. Insert connector C into the right slide-rail until it locks into place with an audible click [2 and 3].

c. Gently tug on the right side of the CMA back slide bar to verify that connector C is properly seated.

6. To prepare CMA connector D for installation, remove the tape that secures the slide-rail latching bracket to connector D, and ensure that the latching bracket is properly aligned with connector D [1 and 2].

> **Note:**
>
> The CMA is shipped with the slide-rail latching bracket taped to connector D. You must remove the tape before you install this connector.



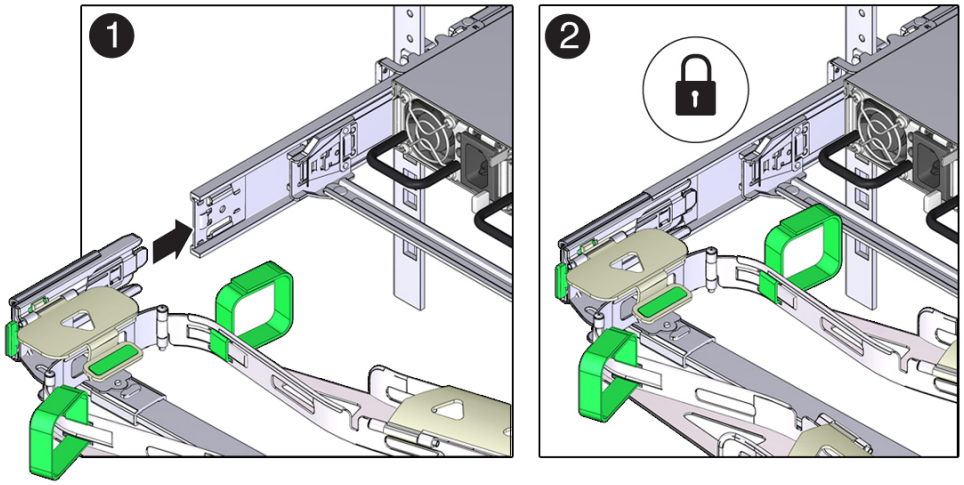
7. To install CMA connector D into the left slide-rail:

   a. While holding the slide-rail latching bracket in place, insert connector D and its associated slide-rail latching bracket into the left slide-rail until connector D locks into place with an audible click [1 and 2].

> **Note:**
>
> When inserting connector D into the slide-rail, the preferred and easier method is to install connector D and the latching bracket as one assembly into the slide-rail.

   b. Gently tug on the left side of the CMA back slide bar to verify that connector D is properly seated.

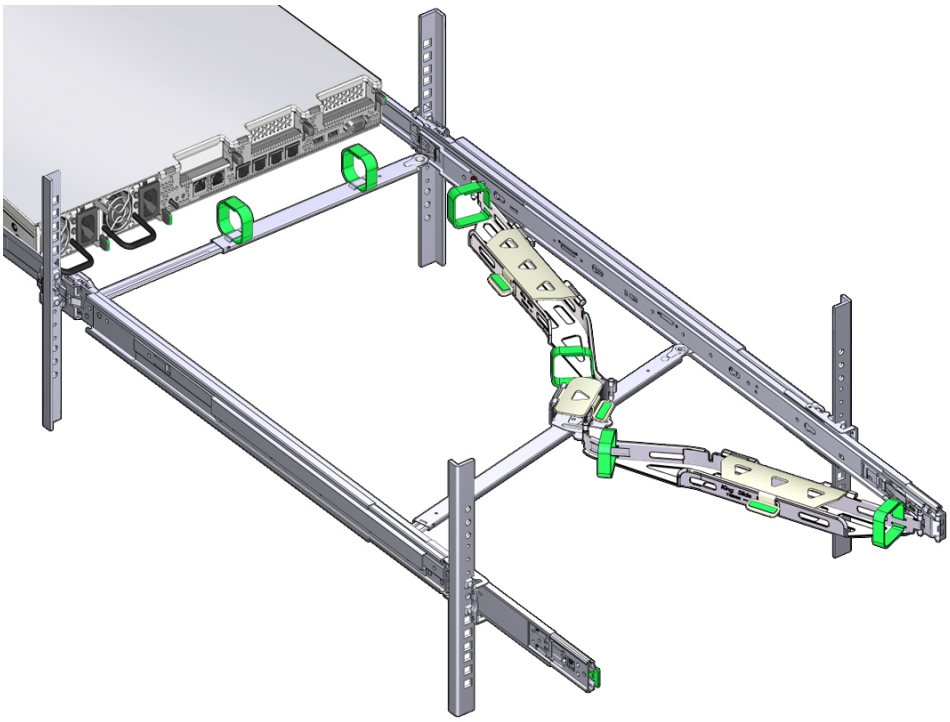
> **Note:**
>
> The slide-rail latching bracket has a green release tab. Use the tab to release and remove the latching bracket so that you can remove connector D.



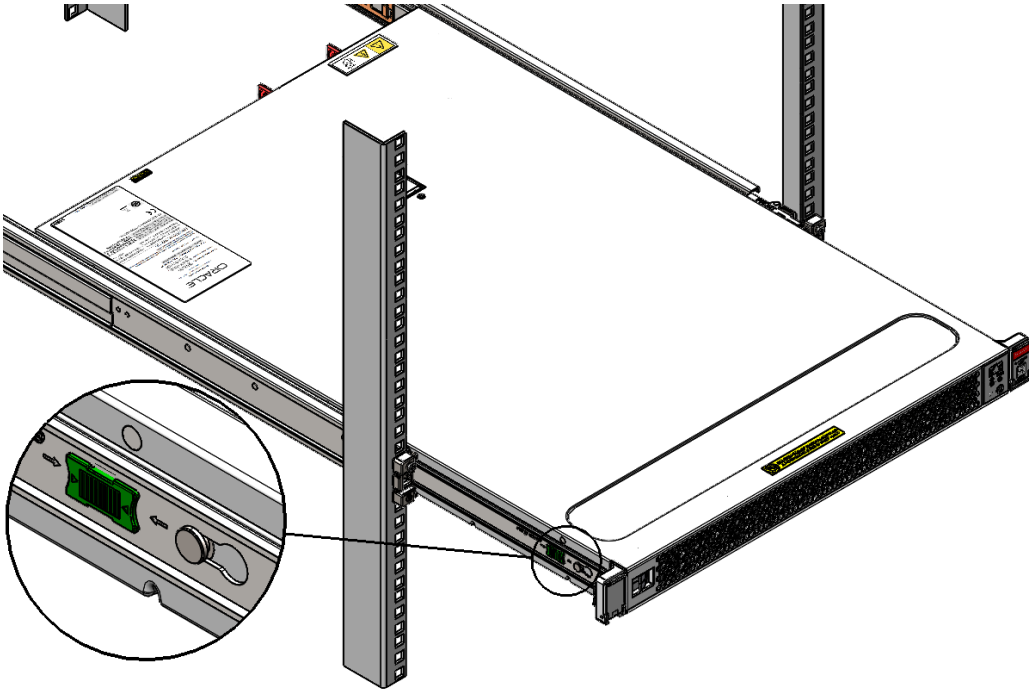
8. Gently tug on the four CMA connection points to ensure that the CMA connectors are fully seated before you allow the CMA to hang by its own weight.
9. To verify that the slide-rails and the CMA are operating properly before routing cables through the CMA:
   a. Ensure that the rack anti-tilt bar is extended to prevent the rack from tipping forward when the is extended.

      > **Caution:**
      >
      > To reduce the risk of personal injury, stabilize the rack cabinet and extend the anti-tilt bar before extending the Acme Packet 6400 from the rack.

      For instructions to stabilize the rack, see Stabilize the Rack.
   b. Slowly pull the Acme Packet 6400 out of the rack until the slide-rails reach their stops.
   c. Inspect the attached cables for any binding or kinks.
   d. Verify that the CMA extends fully with the slide-rails.



10. To return the Acme Packet 6400 to the rack:
    a. Simultaneously pull and hold the two green release tabs (one on each side of the Acme Packet 6400) toward the front of the Acme Packet 6400 while you push the Acme Packet 6400 into the rack. As you push the Acme Packet 6400 into the rack, verify that the CMA retracts without binding.
    b. To pull the green release tabs, place your finger in the center of each tab, not on the end, and apply pressure as you pull the tab toward the front of the Acme Packet 6400.

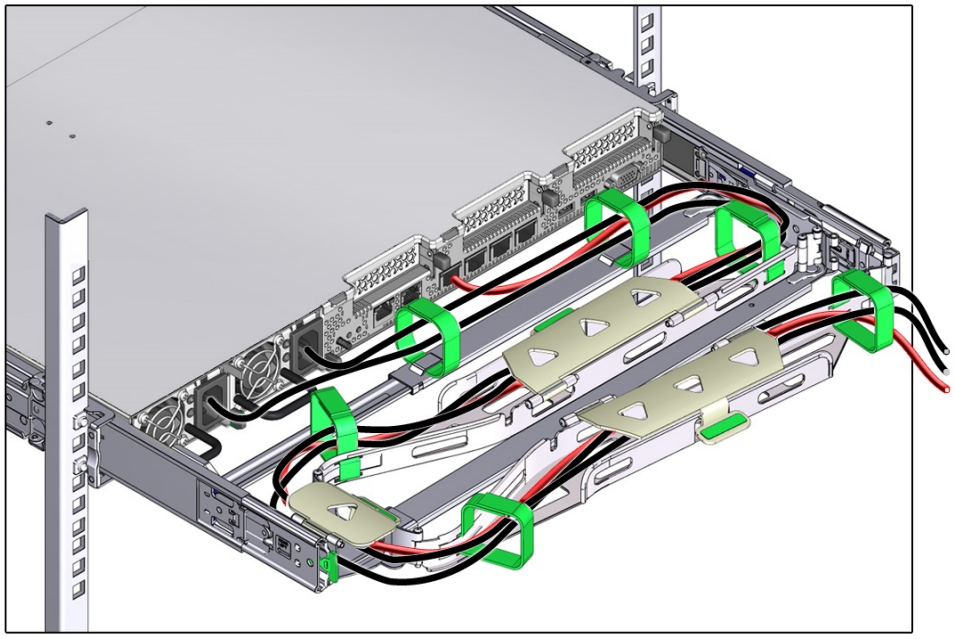


c. Continue pushing the Acme Packet 6400 into the rack until the slide-rail locks (on the front of the Acme Packet 6400) engage the slide-rail assemblies.

   You hear a click when the Acme Packet 6400 is in the normal rack position.

11. Connect cables to the Acme Packet 6400, as required.
12. Open the CMA cable covers, route the Acme Packet 6400 cables through the CMA cable troughs (in the order specified in the following steps), close the cable covers, and secure the cables with the six Velcro straps.
    a. First through the front-most cable trough.
    b. Then through the small cable trough.
    c. Then through the back-most cable trough.

> **Caution:**
>
> When securing the cables with the Velcro straps located on the front slide bar, ensure that the Velcro straps do not wrap around the bottom of the slide bar. Otherwise, expansion and contraction of the slide bar might be hindered when the Acme Packet 6400 is extended from the rack and returned to the rack.



13. Ensure that the secured cables do not extend above the top or below the bottom of the Acme Packet 6400 to which they are attached.

    Otherwise, the cables might snag on other equipment installed in the rack when the Acme Packet 6400 is extended from the rack or returned to the rack.

14. If necessary, bundle the cables with additional Velcro straps to ensure that they stay clear of other equipment.

> **Note:**
>
> If you need to install additional Velcro straps, wrap the straps around the cables only, not around any of the CMA components. Otherwise, expansion and contraction of the CMA slide bars might be hindered when the Acme Packet 6400 is extended from the rack and returned to the rack.

Remove the Cable Management Arm

Follow this procedure to remove the cable management arm (CMA).

Before you begin this procedure, refer to the illustration provided in the procedure "Install the Cable Management Arm (Optional)" to identify CMA connectors A, B, C, and D. Disconnect the CMA connectors in the reverse order in which you installed them, that is, disconnect connector D first, followed by C, B, and A.

Throughout this procedure, after you disconnect any of the CMA four connectors, do not allow the CMA to hang under its own weight.

> **Note:**
>
> References to “left” or “right” in this procedure assume that you are facing the back of the equipment rack.

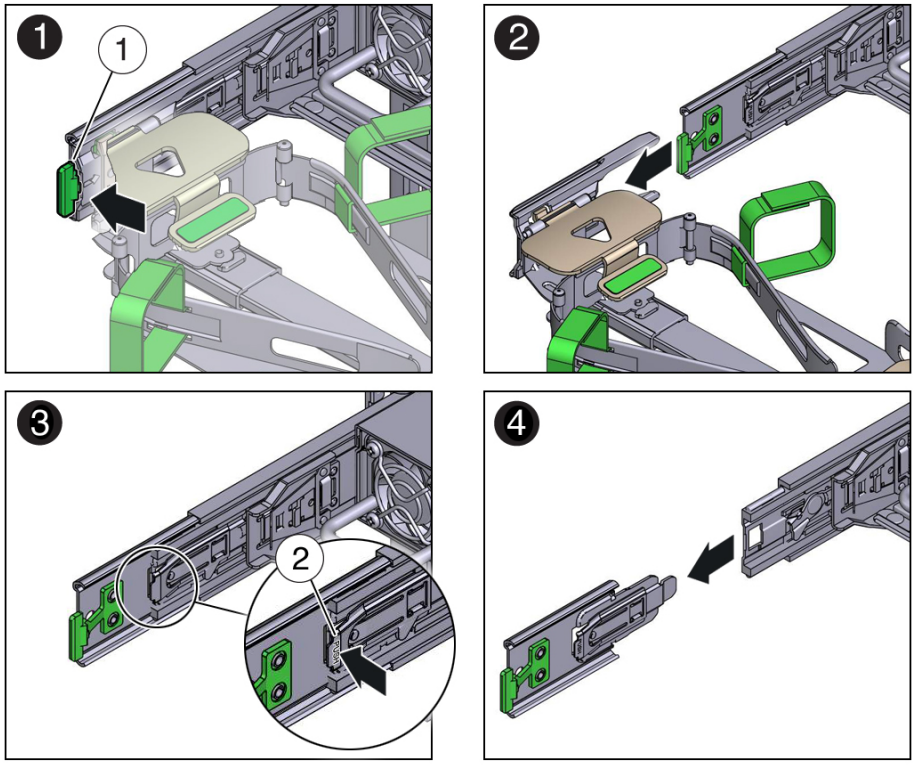
1. To prevent the rack from tipping forward when the Acme Packet 6400 is extended, ensure that the rack anti-tilt bar is extended.

   > **Caution:**
   >
   > To reduce the risk of personal injury, stabilize the rack cabinet and extend the anti-tilt bar before extending the Acme Packet 6400 from the rack.

2. To make it easier to remove the CMA, extend the Acme Packet 6400 approximately 13 cm (5 inches) out of the front of the rack.
3. To remove the cables from the CMA:
   a. Disconnect all cables from the back of the Acme Packet 6400.
   b. If applicable, remove any additional Velcro straps that were installed to bundle the cables.
   c. Unwrap the six Velcro straps that are securing the cables.
   d. Open the three cable covers to the fully opened position.
   e. Remove the cables from the CMA and set them aside.
4. To disconnect connector D:
   a. Press the green release tab (callout 1) on the slide-rail latching bracket toward the left and slide the connector D out of the left slide-rail [1 and 2].

      When you slide connector D out of the left slide-rail, the slide-rail latching bracket portion of the connector remains in place. You disconnect connector D in the next step.

      > **Note:**
      >
      > After you disconnect connector D, do not allow the CMA to hang under its own weight. Throughout the remainder of this procedure, the CMA must be supported until all the remaining connectors are disconnected and the CMA can be placed on a flat surface.



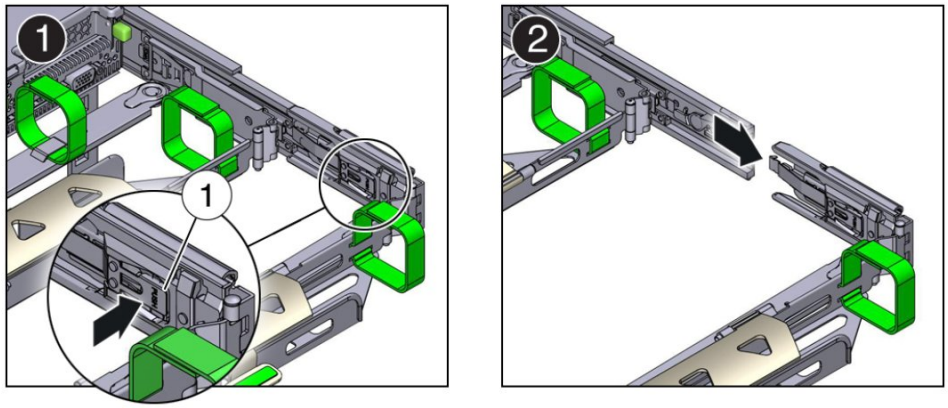
Call Out	Description
1	Connector D release tab (green)
2	Slide-rail latching bracket release tab (labeled PUSH)

b. Use your right hand to support the CMA and use your left thumb to push in (toward the left) on the slide-rail latching bracket release tab labeled PUSH (callout 2), and pull the latching bracket out of the left slide-rail and put it aside [3 and 4].

5. To disconnect connector C:

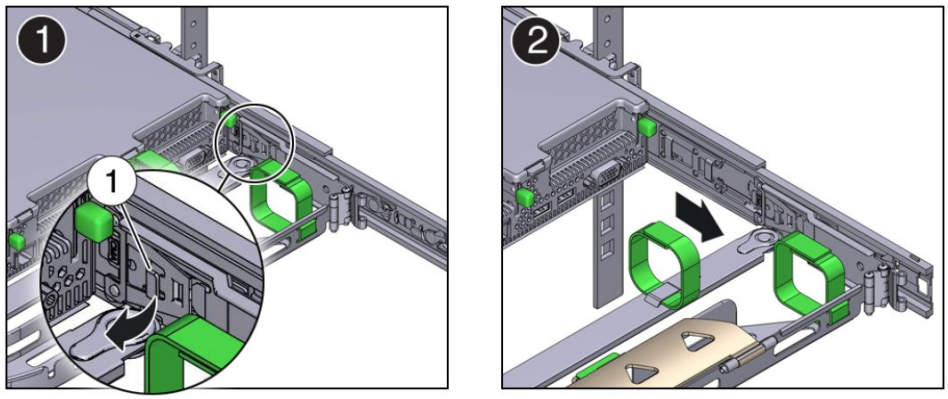
a. Place your left arm under the CMA to support it.

b. Use your right thumb to push in (toward the right) on the connector C release tab labeled PUSH (callout 1), and pull connector C out of the right slide-rail [1 and 2].



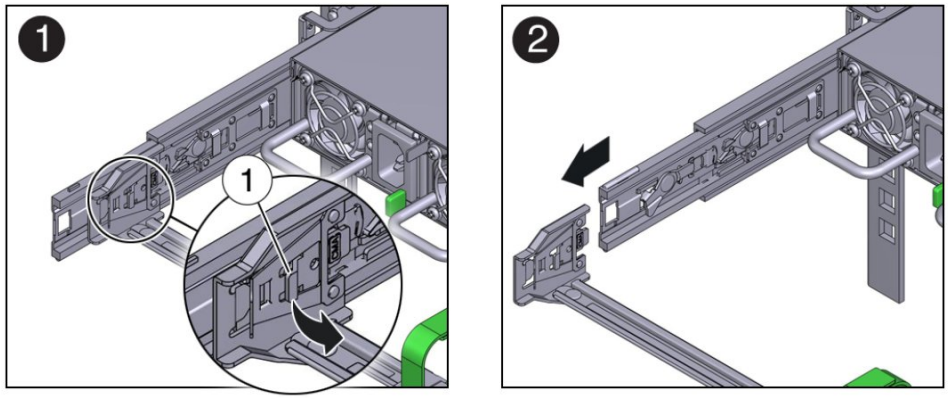
Call Out	Description
1	Connector C release tab (labeled PUSH)

6. To disconnect connector B:
   a. Place your right arm under the CMA to support it and grasp the back end of connector B with your right hand.
   b. Use your left thumb to pull the connector B release lever to the left, away from the right slide-rail (callout 1), and use your right hand to pull the connector out of the slide-rail [1 and 2].



Call Out	Description
1	Connector B release lever

7. To disconnect connector A:
   a. Place your left arm under the CMA to support it and grasp the back end of connector A with your left hand.
   b. Use your right thumb to pull the connector A release lever to the right, away from the left slide-rail (callout 1), and use your left hand to pull the connector out of the slide-rail [1 and 2].



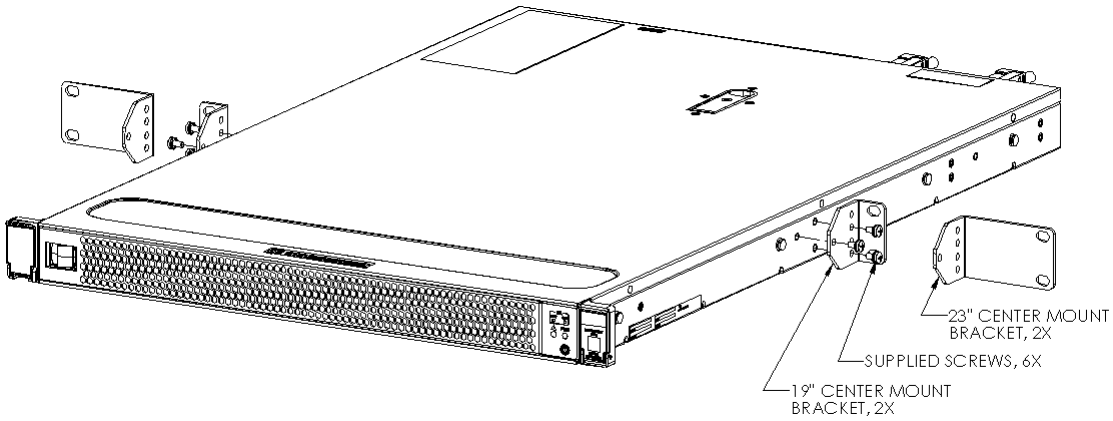
Call Out	Description
1	Connector A release lever

8. Remove the CMA from the rack and place it on a flat surface.
9. Go to the front of the Acme Packet 6400 and push it back into the rack.

Install Mounting Bracket Extenders (Optional)

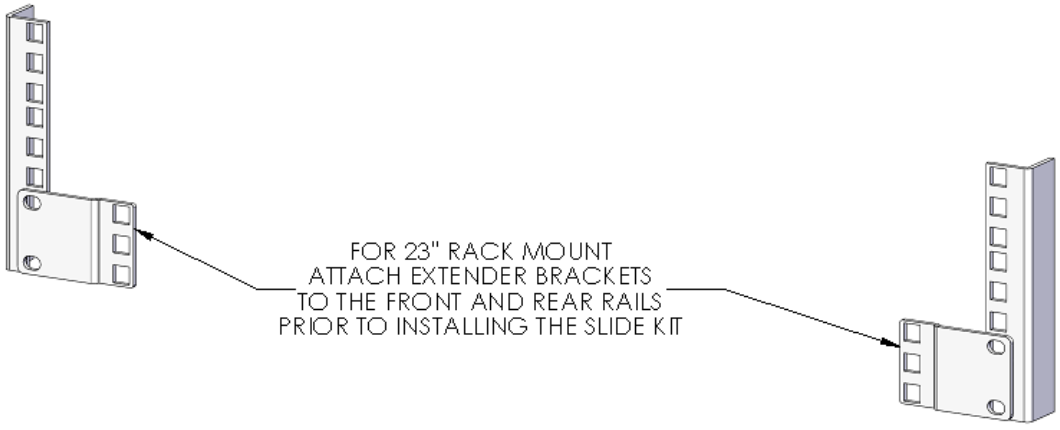
If you want to install the 19" Acme Packet 6400 into a 23" rack, use the 19"-to-23" adaptor mounting brackets.

> **Caution:**
>
> Extension and mid-mount brackets shall not be used for NEBS installations.

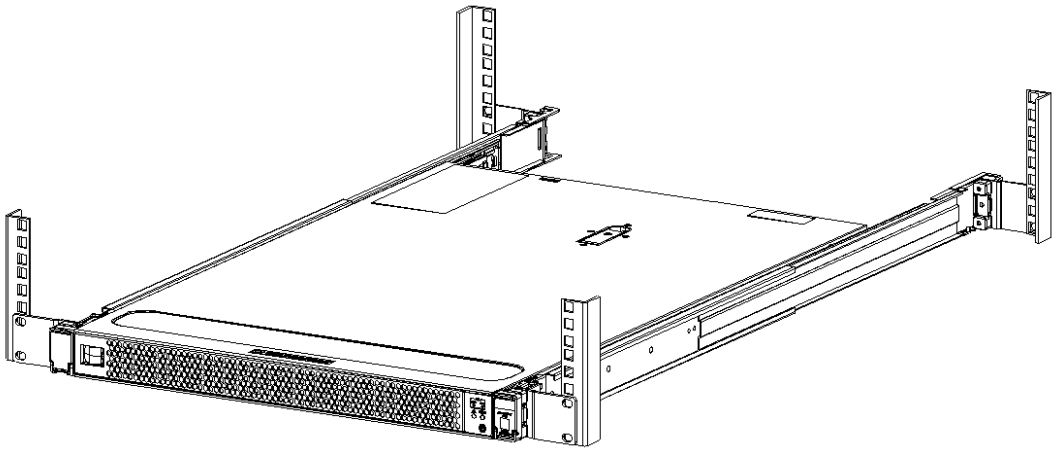


To install the adaptors:

1. Attach the 19" to 23" adapters to the rack.



2. Attach the 23" Center Mount Brackets to the Acme Packet 6400.
3. Attach the slides, the Acme Packet 6400, and the cable management as previously shown.



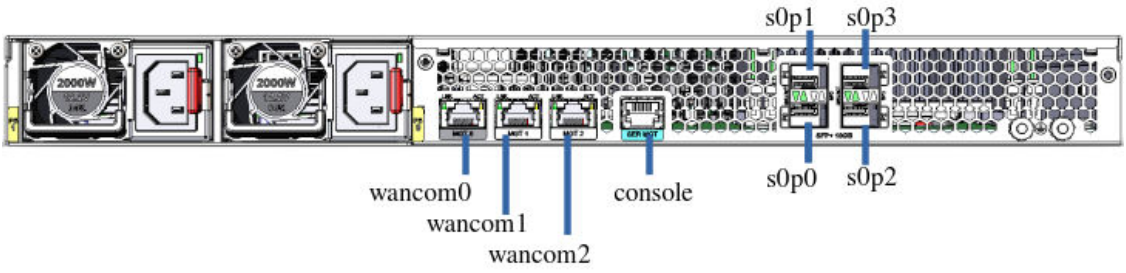
Cabling the Acme Packet 6400

After mounting the Acme Packet 6400 in an equipment rack and installing all components into the chassis, connect all appropriate data cables to the ports before powering up and configuring the system.

Oracle recommends using fully shielded CAT5e or CAT6 Ethernet cables for management connections to protect the Acme Packet 6400 from potential damage.

You can install and remove Ethernet and 10GbE optical cables while the Acme Packet 6400 is operational. Not every port needs to be utilized for proper operation. However, when a cable is disconnected and the link is lost, an alarm is generated.

> **Note:**
>
> The intra-building ports of the equipment are suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building ports of the equipment must not be metallically connected to interfaces that connect to the Outside Plant (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 requires isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection to connect these interfaces metallically to OSP wiring. Intra-building ports include Media and Signaling Network Interfaces, Network Management Ports, and Console Port.



Console Port

The Acme Packet 6400 has one console port in the rear of the chassis. The Acme Packet 6400 ships with a console adapter, which allows you to connect a standard DB-9 serial port to the RJ45 console port.

Insert the RJ45 connector into the console port labeled SER MGT.

Network Management Ports

Standard shielded CAT5e or CAT6 (or higher) Ethernet cables with RJ45 jacks are used for connecting the Acme Packet 6400 management Ethernet ports to your network. These ports support 10/100/1000 Mbps speeds.

> **Note:**
>
> Keep Ethernet cables separated from power cables by at least 60mm where possible and never run them in the same channel of a trunking system without segregation.

1. Insert the RJ45 connector on the end of the Ethernet cable into one of the management Ethernet ports. These ports are labeled MGT0, MGT1, and MGT2. The release tab on the RJ45 jack will click into place when inserted properly.
2. Route the cable away from the Acme Packet 6400. Make sure that the Ethernet cables are not stretched tightly or subject to extreme stress.

Media and Signaling Network Interfaces

The media and signaling uses optical SFP+ connectors. Either 10-gigabit single mode or multimode fiber optic cabling with duplex LC connectors are used to connect the SFP+ ports.

Fiber Optic Cable Handling

When handling a fiber optic cable, please take these precautions:

1. Never touch the polished end of the fiber cable.
2. To prevent serious eye damage, never look directly into a fiber optic cable connector or mating adapter.
3. Clean all fiber optics before installing them into your network according to prescribed procedures.
4. Ensure that the bend radius of your fiber cables is kept to a minimum of 3” or that specified by the fiber cable manufacturer.
5. Perform all cabling procedures according to the established standards for your organization.

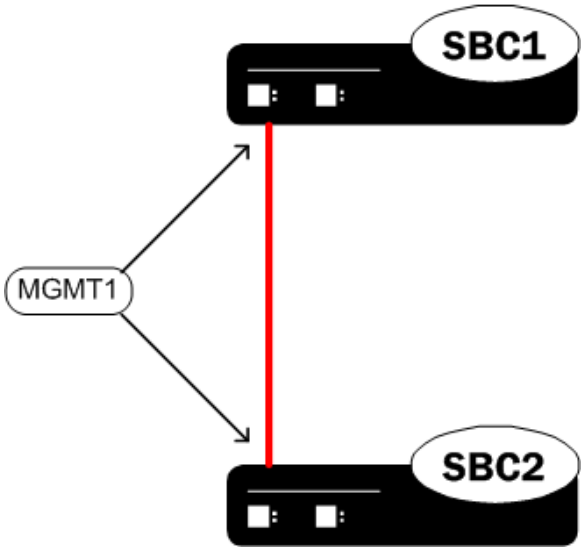
1. Insert the duplex LC connector on the end of the fiber cable into one of the SFP+ optical transceivers. The connector should click and lock in place when you insert it properly.
2. Route the cable away from the system. Make sure that the fiber optic cables are not stretched tightly or subjected to extreme stress.

High Availability

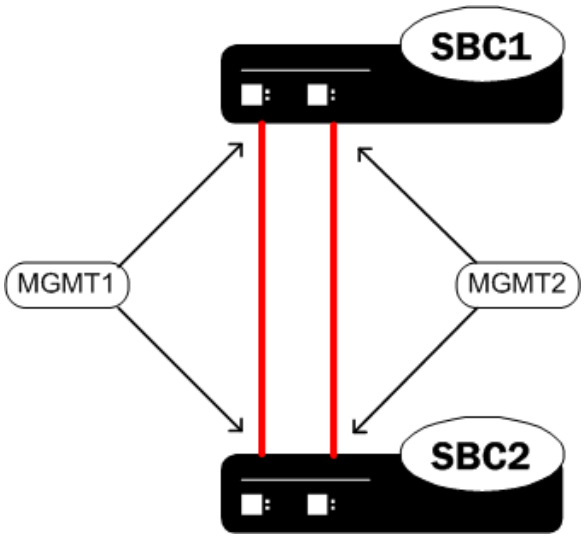
You can use one or two connections for HA redundancy support between the two members of an HA node. Using two rear interfaces for sharing redundancy information provides a high level of reliability. As a rule, MGT0 should be reserved as the boot/maintenance interface. This leaves MGT1 and MGT2 available for sharing HA information.

Management network ports feature automatic crossover negotiation so that a crossover cable is not necessary for HA cabling.

1. Insert one end of an Ethernet cable into MGT1 on the rear panel of SBC1.
2. Insert the other end of the Ethernet cable into the MGT1 on the rear panel of SBC2.



3. If you are setting up a dual connection, insert one end of the second Ethernet cable into MGT2 on the rear panel of SBC1.
4. Insert the other end of the cable into MGT2 on the rear panel of SBC2.



5. Refer to the configuration procedures located in the HA Nodes chapter of the *Configuration Guide*.

Ground and Power Cable Installation

The Acme Packet 6400 must be properly grounded to ensure efficient system performance. Grounding your Acme Packet chassis is an extremely important part of the installation and maintenance procedures. If the Acme Packet 6400 is not properly grounded, it can result in physical harm, problems with system functionality, and it can exhibit the following unpredictable problems:

- Garbled output on the console display
- Sudden crashes
- Physical damage to the Acme Packet chassis and its hardware components

> **Note:**
>
> Failure to ground the chassis properly can result in bodily harm (in certain circumstances) and permanent damage to the Acme Packet 6400 and its components.
> The Acme Packet 6400 does not support mixing AC and DC power supplies in the same chassis. A mixed power configuration is prohibited.

Your equipment rack location must have a local earth ground. This ground can be either an unpainted spot on the grounded equipment rack frame or a grounded bus bar in the equipment room.

Grounding Cable Installation

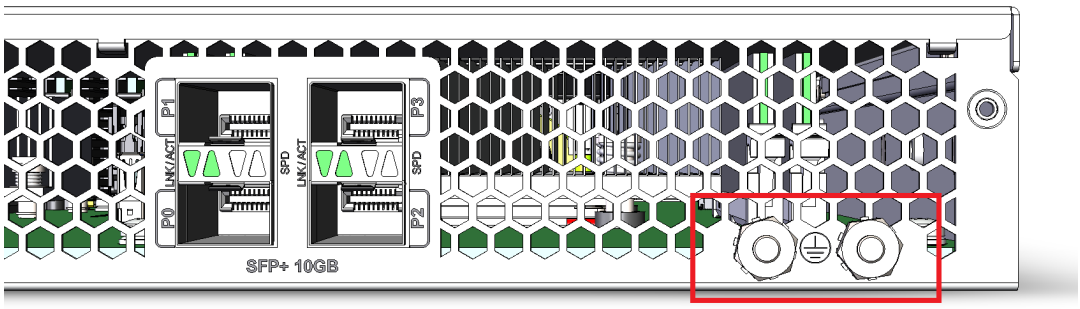
The ground terminals are located on the right side of the rear chassis. The Acme Packet 6400 ships with 2 kep nuts screwed onto the ground terminals. Use an 11/32” nut driver to remove and install these kep nuts.

This section shows you how to install the grounding cable on your Acme Packet 6400.

Important: Acme Packet 6400 equipment is suitable for installation as part of a Common Bonding Network (CBN).

> **Note:**
>
> The CBN is a term used for the connection of building steel, water pipes, cable racks, vertical and horizontal equalizer conductors, bonding conductors and electrical metallic raceways within a building, when they are bonded together by either deliberate or incidental connections. The CBN is also connected to the building’s grounding electrode system. Connections to the CBN are usually made from equipment frames to reduce voltage differences to acceptable levels when current flows through these frames, either during fault occurrences in the AC or DC power systems, or when lightning strikes.

1. Using the 11/32 nut driver, loosen and remove the two kep nuts from the grounding posts located on the rear of the Acme Packet 6400. Place them aside.



2. Place the lug on the end of the grounding cable onto the grounding posts.
3. Screw the two kep nuts onto the grounding post and secure the grounding lug in place using the 11/32 nut driver. When attached correctly, the grounding lug fits snugly between the chassis's rear panel and the kep nuts. Connect the other end of the grounding wire to a suitable grounding point at your site.

> **Note:**
>
> Always make the ground connection first and disconnect it last when installing or removing the system from an equipment rack.

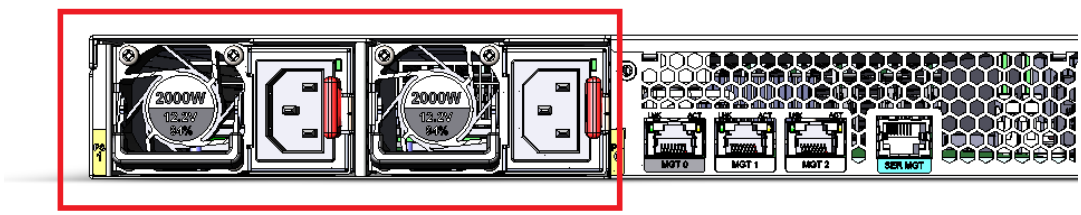
AC Power Cord Installation

This section describes how to install an AC power cord.

> **Note:**
>
> Use a 15 Amp fused circuit for each AC power supply.
> Important: This equipment is intended for installation in locations where National Electrical Code (NEC) applies.

To install the two AC powers cords in the Acme Packet 6400:

1. Locate the two AC power cords shipped with your Acme Packet 6400. Choose one power supply to work on first.
2. Connect one power cord to the AC power supply by inserting the 3-lead IEC-320 plug into the IEC connector located on the power supply.



3. Connect the other power cord to the AC power supply by inserting the 3-lead IEC-320 plug into the IEC connector located on the power supply.
4. Route the AC power cords through your rack and cabling system to the power outlets.

5. Plug the supply end of each power cord into its own circuit.
6. There is no ON/OFF switch on these power supplies. When you plug them in the power is on and the system will start to boot.

> **Note:**
>
> To remove AC power cables from the Acme Packet 6400 reverse the previous procedure.

DC Power Cord Installation

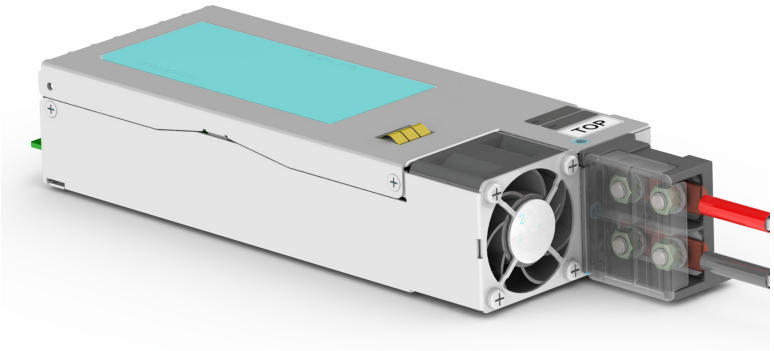
This section describes how to install a DC power cord.

Important: This equipment is intended for installation in Network Telecommunication Facilities.

> **Note:**
>
> Use a 30 Amp min fused circuit for each DC power supply.

To install the DC power cords in the Acme Packet 6400 System:

1. Locate the DC Connector Kit supplied with the Acme Packet 6400.
2. Fabricate the two DC Cables (one 6AWG red wire and one 6AWG black wire per cable) using the supplied power lugs and shrink sleeving. Customers determine the wire length.
3. Attach the power cable to the DC power supplies using the nuts supplied on the power supply terminals.



4. Route the DC power cords through your rack and cabling system to the power outlets.
5. Plug the power supply end of each power cord into its own circuit.
6. There is no ON/OFF switch on these power supplies. When you plug them in the power is on and the system will start to boot.

> **Note:**
>
> To remove DC power cables from the Acme Packet 6400, reverse the previous procedure.

4
Startup

This chapter describes the Acme Packet 6400 startup; this includes the following tasks:

- Powering on the Acme Packet 6400.
- Creating the first console connection to the Acme Packet 6400.

You can perform these actions in any order. However, if your console connection is configured first, you can observe the booting processes as your Acme Packet 6400 goes online.

The last section of this chapter explains how to login to your system.

Creating a Console Connection

This section explains how to create a console connection.

Prerequisites

In order to create a console connection to the Acme Packet 6400 you need to configure the terminal hardware and software appropriately. The following table lists your terminal application's serial configurations.

Table 4-1 Serial Connection Settings

Serial Connection Parameter	Setting
Baud Rate	115,200 bps
Date Bits	8
Parity	No
Stop Bit	1
Flow Control	None

> **Note:**
>
> Your terminal application and serial port MUST be capable of operating at 115.2 Kbps for creating a console session.

Creating a Console Connection

To create a console connection:

1. Set the terminal application's parameters to match the Acme Packet 6400 default parameters listed in the table above.
2. You must connect to the console port on initial booting of the Acme Packet 6400.

3. If the Acme Packet 6400 is already powered on, press the Enter key a few times to activate the console connection. When ACLI text is displayed on the screen, the console connection has been successfully created.
4. If you have created the console connection before powering up the Acme Packet 6400, you can watch the boot process as it displays on your screen.

Powering On the Acme Packet 6400

To power on the Acme Packet 6400:

1. Plug in the power cord. The power turns on and the system starts to boot.
2. When operating with redundant power supplies, both power supplies must be plugged in either simultaneously or within a few seconds of each other. Otherwise, an alarm is generated.

Initial Login

Once you have established the console connection, powered on the Acme Packet 6400, and loaded a runtime image, you are ready to log in and begin configuring the system. After the Acme Packet 6400 has been initialized, the ACLI login prompt appears in your terminal application as follows:

```
Password:
```

If the Acme Packet 6400 completed booting before you connected to the console port, press the Enter key on the console keyboard a few times to activate the console connection.

1. Enter the initial temporary user password `acme`.

   The system forces you to set the password.

   ```
   Password:
   %
   % Only alphabetic (upper or lower case), numeric and punctuation
   % characters are allowed in the password.
   % Password must be 8 - 64 characters,
   % and have 3 of the 4 following character classes :
   %     - lower case alpha
   %     - upper case alpha
   %     - numerals
   %     - punctuation
   %
   Enter New Password:
   ```

   From the User prompt you can view various configuration states and operating statistics on the Acme Packet 6400 System, but you cannot perform configuration tasks.

2. To enter Superuser mode, type **enable** and enter the default admin password `packet`.

   The system forces you to set the password.

   ```
   ORACLE> enable
   Password:
   %
   ```

```
% Only alphabetic (upper or lower case), numeric and punctuation
% characters are allowed in the password.
% Password must be 8 - 64 characters,
% and have 3 of the 4 following character classes :
%     - lower case alpha
%     - upper case alpha
%     - numerals
%     - punctuation
%
Enter New Password:
```

3. You can now begin configuring your Acme Packet 6400 System. Refer to the Configuration Guide to learn how to establish an IP address for your Acme Packet 6400.

   If you have any questions about booting or powering on your system, contact your Oracle customer support representative directly.

Formatting the Solid State Drive

After the initial log on to the device, you must format the Solid State Drive. Details on file system designs and the formatting procedure may be found in the *File System Maintenance* chapter of the Maintenance and Troubleshooting Guide.

5
Maintenance

ESD

When removing and replacing a power supply, remember to first ground yourself using appropriate ESD grounding equipment such as an ESD wrist strap.

Standby Mode for HA Nodes

When performing hardware maintenance on the Acme Packet 6400, you should minimize the risk of interrupting network traffic or losing data. If the Acme Packet 6400 is configured as an HA node, you should only work on the Acme Packet 6400 that is in standby mode.

Use the **show health** command to determine the state of your Acme Packet 6400. If the Acme Packet 6400 due for maintenance is in standby mode, you can continue with the appropriate procedures to replace a part.

If the Acme Packet 6400 due for maintenance is in active mode, you must manually force a switchover. Performing a switchover forces the currently active Acme Packet 6400 to standby mode while the current standby Acme Packet 6400 will assume all traffic processing and forwarding as the active system.

> **Note:**
>
> This procedure is only applicable to Acme Packet 6400 in an HA deployment.

1. Use the **show health** command to identify which system is the active and which is the standby.

```
SBC1# show health
          Media Synchronized           false
          SIP Synchronized             false
          REC Synchronized             false
          XSERV Synchronized           disabled
          Config Synchronized          disabled
          Collect Synchronized         false
          RADIUS CDR Synchronized      false
          Rotated CDRs Synchronized    false
          IPSEC Synchronized           disabled
          Iked Synchronized            false
          Lbpd Synchronized            disabled
          tCCD Synchronized            disabled
          Service Health Synchronized  false
          License Monitor Synchronized disabled
          Active Peer Address

Redundancy Protocol Process (v3):
          State                         Active
          Health                        100
          Lowest Local Address          169.254.1.2:9090
          1 peer(s) on 2 socket(s):
          system-2: v3, Standby, health=100, max silence=1050
              last received from 169.254.1.1 on wancom1:0


SBC2# show health
          Media Synchronized           false
          SIP Synchronized             false
          REC Synchronized             false
          XSERV Synchronized           disabled
          Config Synchronized          disabled
          Collect Synchronized         false
          RADIUS CDR Synchronized      false
          Rotated CDRs Synchronized    false
          IPSEC Synchronized           disabled
          Iked Synchronized            false
          Lbpd Synchronized            disabled
          tCCD Synchronized            disabled
          Service Health Synchronized  false
          License Monitor Synchronized disabled
          Active Peer Address          169.254.2.2

Redundancy Protocol Process (v3):
          State                         Standby
          Health                        100
          Lowest Local Address          169.254.1.1:9090
          1 peer(s) on 2 socket(s):
          system-1: v3, Active, health=100, max silence=1050
              last received from 169.254.2.2 on wancom2:0
```

2. Confirm that SBC1 and SBC2's current configurations match by typing **display-current-cfg-version** and press Enter at the ACLI prompt.

```
SBC1# display-current-cfg-version
Current configuration version is 5
SBC1#


SBC2# display-current-cfg-version
Current configuration version is 5
SBC2#
```

> **Note:**
>
> While the two current configuration version numbers on the two systems MUST match each other, they do not have to match the shared running configuration version.

3. Confirm that the running configuration of SBC1 and SBC2 match by typing **display-running-cfg-version** and pressing Enter at the ACLI prompt.

```
SBC1# display-running-cfg-version
Running configuration version is 5
SBC1#


SBC2# display-running-cfg-version
Running configuration version is 5
SBC2#
```

> **Note:**
>
> While the two running configuration version numbers on the two systems MUST match each other, they do not have to match the shared current configuration version.

4. Initiate a switchover on SBC1 by typing **notify berpd force** and pressing Enter at the ACLI prompt.

```
SBC1# notify berpd force
```

5. Wait for SBC2 to transition to the standby state. Confirm that SBC2 is in the standby state by typing **show health** and pressing Enter at the ACLI prompt.

```
SBC2# show health
```

Refer to the Software Upgrade section of the *Platform Preparation and Installation Guide* for more information.

System Shut Down

This chapter explains Acme Packet 6400 hardware maintenance procedures and provides hardware alarm information. Although several user-replaceable components of the Acme Packet 6400 are hot-pluggable, some Acme Packet 6400 maintenance procedures require that you shut down the system.

Before you shut down or restart the Acme Packet 6400, ensure that there are no active calls in progress. Procedures to reroute call and network traffic around the Acme Packet 6400 are outside the scope of this guide.

You can set the Acme Packet 6400 to reject all incoming calls from your system with the **set-system-state** command. When set to offline, this command lets calls in progress continue uninterrupted, but no new calls are admitted.

After all call processing has stopped, you must halt the operating system before you power off your Acme Packet 6400. Shutting down the system is appropriate when you are replacing a physical interface card, transcoding module, power supply, or are removing the Acme Packet 6400 from the equipment rack.

Halt the Operating System

- In Superuser mode, type **halt** and then press Enter. Then, at the halt confirmation prompt, answer **y** followed by Enter.

```
ORACLE# halt
-------------------------------------------------------------------------
WARNING: you are about to halt the SD!
-------------------------------------------------------------------------
Halt this SD [y/n] ? : y
Preparing for system shutdown
Syncing and unmounting filesystems
Flushing sd devices
Powering off.......
Sent SIGKILL to all processes
Requesting system power off
Disabling non-boot CPU's........
Power down.
```

Reject Incoming Calls

To reject all incoming calls on the Acme Packet 6400:

- In Superuser mode, type **set-system-state offline** and press Enter.

```
ORACLE# set-system-state offline
Setting system state to going-offline, process will complete when all
current calls have completed
ORACLE#
```

Shut Down the Acme Packet 6400

To shut down the Acme Packet 6400 hardware:

1. Exit the ACLI and close your console or network connection.
2. Unplug the AC power cords from the power supplies on the rear panel of the Acme Packet 6400.
3. Confirm that all fans are off.

Power Cycling

Power cycling the Acme Packet 6400 is the process of turning the system off by unplugging the power cords and then turning it on by plugging in the power cords. It is imperative that you wait at least 10 seconds between power down and power up to ensure that all components are completely powered down before restart.

> **Note:**
>
> Power cycling the Acme Packet 6400 without performing a halt operation can lead to data loss to the storage device. To ensure stable operation a file system check will be performed on the next power up. This check may take several minutes to complete, and should not be interrupted.

Reboot

Rebooting the Acme Packet 6400 shuts down the system in an orderly fashion and then starts it up again. The operating system gracefully shuts down as processes are terminated and the file system is stopped. While the system and its processes are stopped, all call processing is immediately halted. You may therefore wish to perform tasks that call for a reboot during off-peak maintenance hours.

Rebooting the Acme Packet 6400 is required every time you upgrade with a new version of the Acme Packet 6400 software.

Before rebooting the Acme Packet 6400, save your configurations. The **save-config** command is used to save the configuration in the example below.

For a full explanation and all options for the **reboot** command used in the example below, refer to the ACLI Reference Guide.

To reboot the Acme Packet 6400:

1. Save any configuration changes you have made in the ACLI by typing **save-config** Enter in Superuser mode.

```
ACMEPACKET# save-config
Save-Config received, processing.
waiting 1200 for request to finish
Request to 'SAVE-CONFIG' has Finished,
Save complete
Currently active and saved configurations do not match!
```

```
To sync & activate, run 'activate-config' or 'reboot activate'.
ACMEPACKET#
```

2. Execute the **reboot** command at the Superuser prompt by typing **reboot and** then pressing Enter.

```
ACMEPACKET# reboot
----------------------------------------
WARNING: you are about to reboot this SD!
----------------------------------------
```

3. Type **Y** and then press Enter at the confirmation prompt to proceed with the reboot.

```
Reboot this SD [y/n]?: y
```

Chassis Removal

This section explains how to remove the Acme Packet 6400 from an equipment rack. To prevent injury, we recommend that any time an Acme Packet 6400 is installed or removed from an equipment rack, two people complete the procedure.

> **Note:**
>
> Always disconnect the Acme Packet 6400 power supplies from the power source when removing a chassis from an equipment rack.

Removing the Acme Packet 6400 from an Equipment Rack

To remove the Acme Packet 6400 from an equipment rack:

1. Disable the two power sources to the Acme Packet 6400.
2. Remove the two AC/DC power cords from the power supplies in the back of the system. (There are no ON/OFF switches on these power supplies).
3. Remove all power cables from the Acme Packet 6400.
4. Remove and label all attached cables from their respective ports on the chassis.
5. Remove ground cable from the rear of the Acme Packet 6400. Save the hex nuts for later re-installation.
6. Pull the Acme Packet 6400 forward and out of the equipment rack.

> **Note:**
>
> The slides have a mechanical safety stop about halfway down the slide. To fully remove the chassis, you must depress the release latch points on the chassis slides.

7. Lift the Acme Packet 6400 out of the equipment rack, and move it to an ESD safe location.

Power Supply Removal and Replacement

This section explains how to remove and replace the power supplies in the Acme Packet 6400. This section is for both AC and DC power supplies.

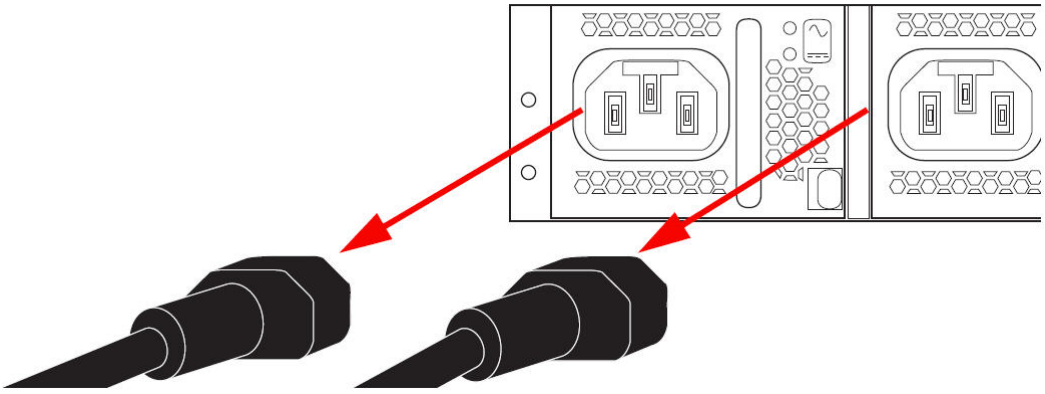
> **Note:**
>
> There is an ESD receptacle in the top left corner in the rear of the Acme Packet 6400.

Removing a Power Supply

To remove a power supply from the Acme Packet 6400:

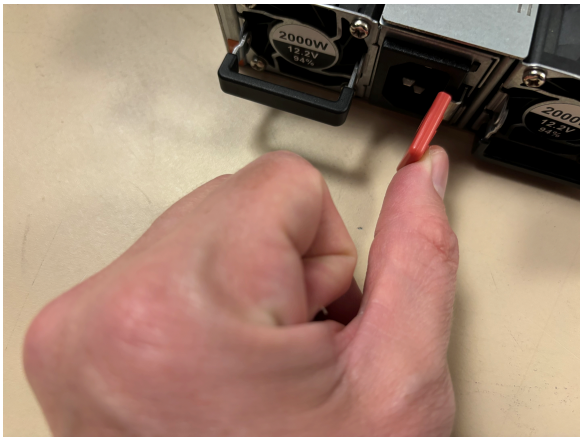
1. Remove the AC or DC power cables from the power supplies.

Figure 5-1 Removing the Power Cords



2. With your thumb, push the red locking tab to the left to unlock the power supply from the chassis.

Figure 5-2 Releasing the Locking Tab



3. Holding the handle, pull the power supply towards you. This will disengage the power supply from the chassis.

4. Continue pulling the power supply towards you until it is completely removed from the chassis.

5. Move the power supply to an ESD-safe location.

Installing a Power Supply

> **Note:**
>
> NEVER power up a power supply before it is installed in the Acme Packet 6400 chassis.

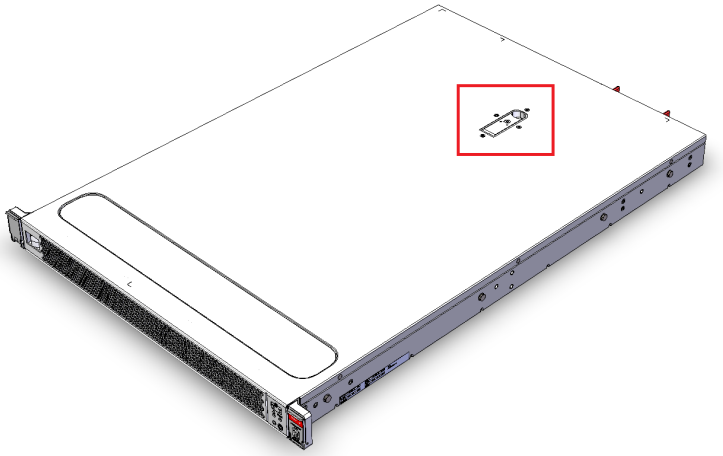
To install a power supply in the Acme Packet 6400 chassis:

1. Ground yourself with an ESD wrist strap.
2. Locate the power supply to be installed.
3. Locate the empty power supply slot on the rear of the chassis.
4. Insert the power supply into the empty power supply slot.
5. Push the power supply handle until the power supply engages with the chassis.
6. Connect the power cord to the power supply.

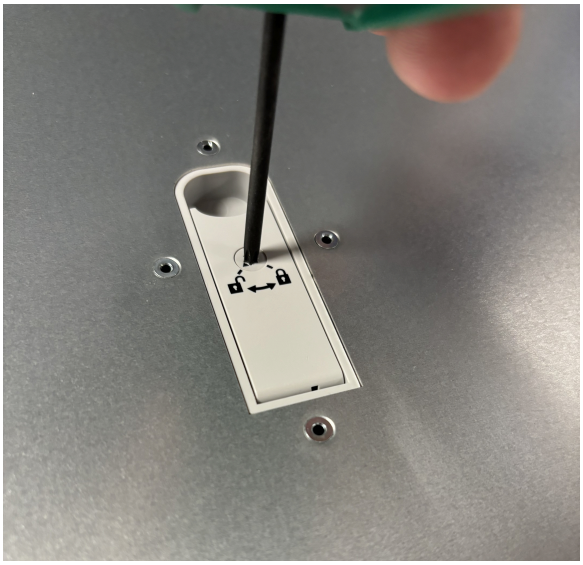
Remove the Cover

Remove the top cover to access the internal components.

1. Identify the latch for the top cover.



2. Use a T15 Torx tip screwdriver to unlock the latch.



3. Pull the latch up.
4. Remove the cover.

Replacing Transcoding Modules

The Acme Packet 6400 supports up to 72 transcoding modules (TM) for transcoding functionality. The TMs are installed in slots 0 through 17, and each slot takes a four unit TM. TMs must be installed consecutively in numerical order, starting with slot 0. Slot numbering starts at the lower left slot with 0.

Installation and Removal Guidelines

Please read and follow these guidelines prior to installing or removing the Transcoding Module (TM):

- Always load the TMs sequentially, starting with position 0 (the slot labelled TM0).
- Ground yourself and follow proper ESD grounding procedures.

> **Note:**
>
> Failure to follow the proper ESD grounding procedures could damage the Acme Packet 6400.

- When installing or removing a TCU, move the card to an ESD-safe location.
- Upgrade during low-traffic periods or during a scheduled maintenance.

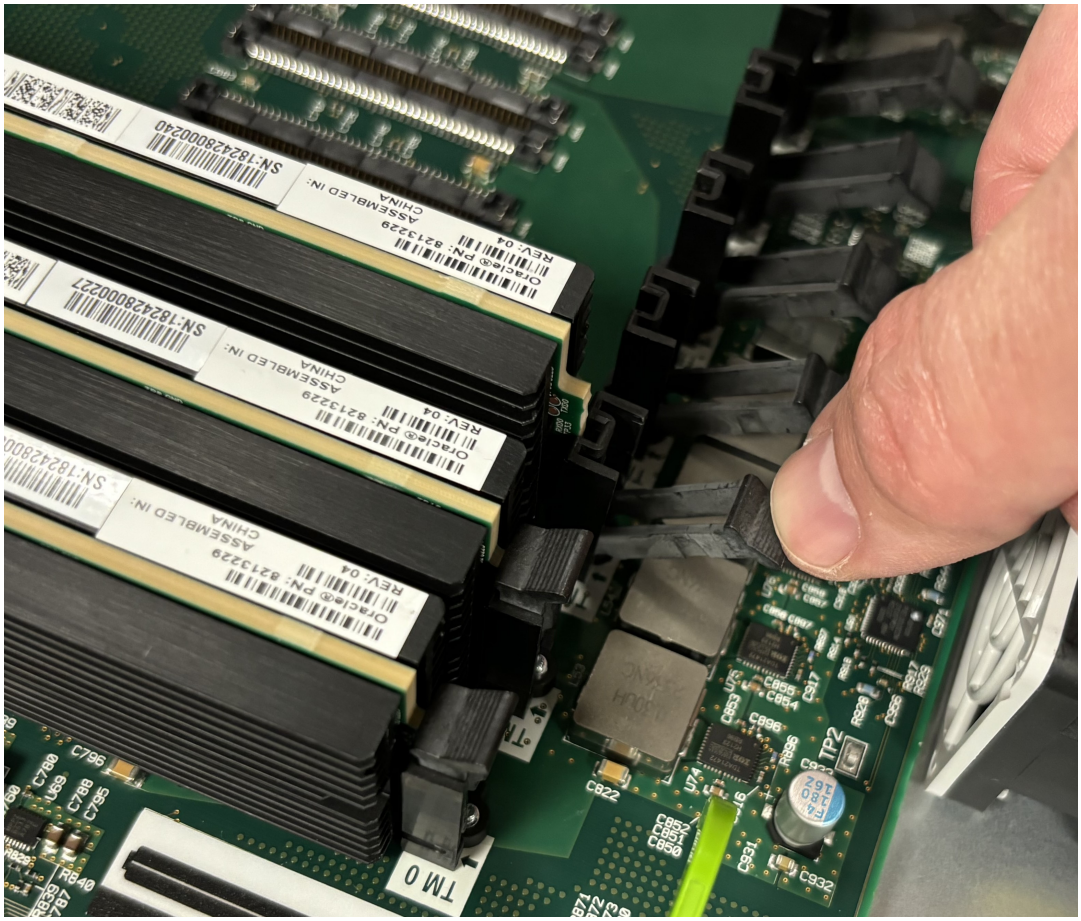
Removing the Transcoding Module

The following procedure describes how to remove the Transcoding Module (TM) from the mainboard.

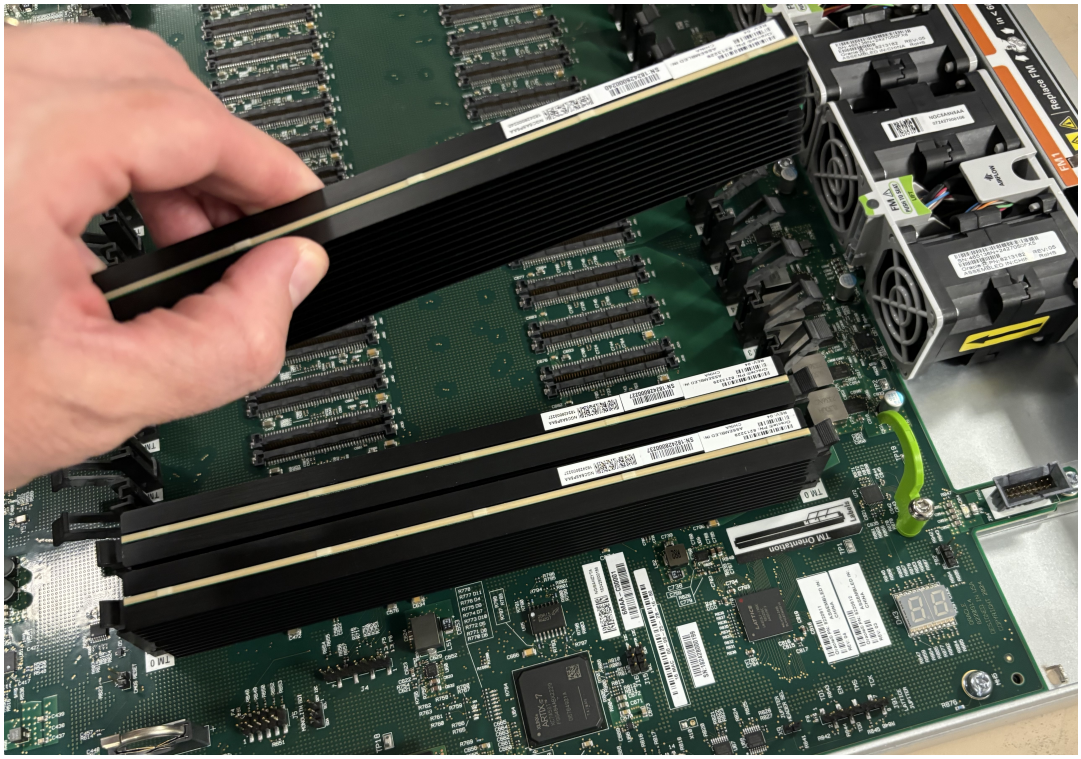
Prerequisites:

- Provide an ESD-safe location to place the TM and mainboard.
- Wear an ESD wrist strap or take similar equivalent actions to prevent static damage to the mainboard or other ESD-sensitive components.
- Note the location of the TM connector on the mainboard.

1. Extend the chassis out of the cabinet to the full extension of the slides.
2. Remove the Acme Packet 6400 chassis cover.
3. On both sides of each transcoding module, press the side latch down to release the latch.



4. When both sides are free of the latch, hold the center of the module between your finger and thumb and slowly remove the module. Be careful to keep the module level while removing it and guide it smoothly through the guide slots on either side.



5. Place the TM on an ESD-safe antistatic surface.

Installing the Transcoding Module

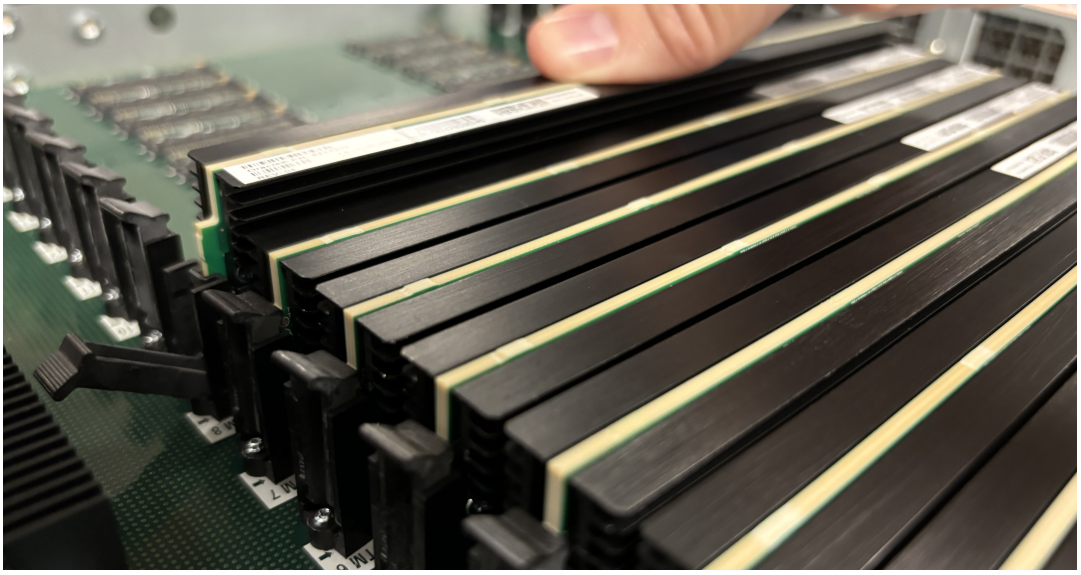
The following procedure describes how to install the Transcoding Module (TM) onto the mainboard.

Prerequisites:

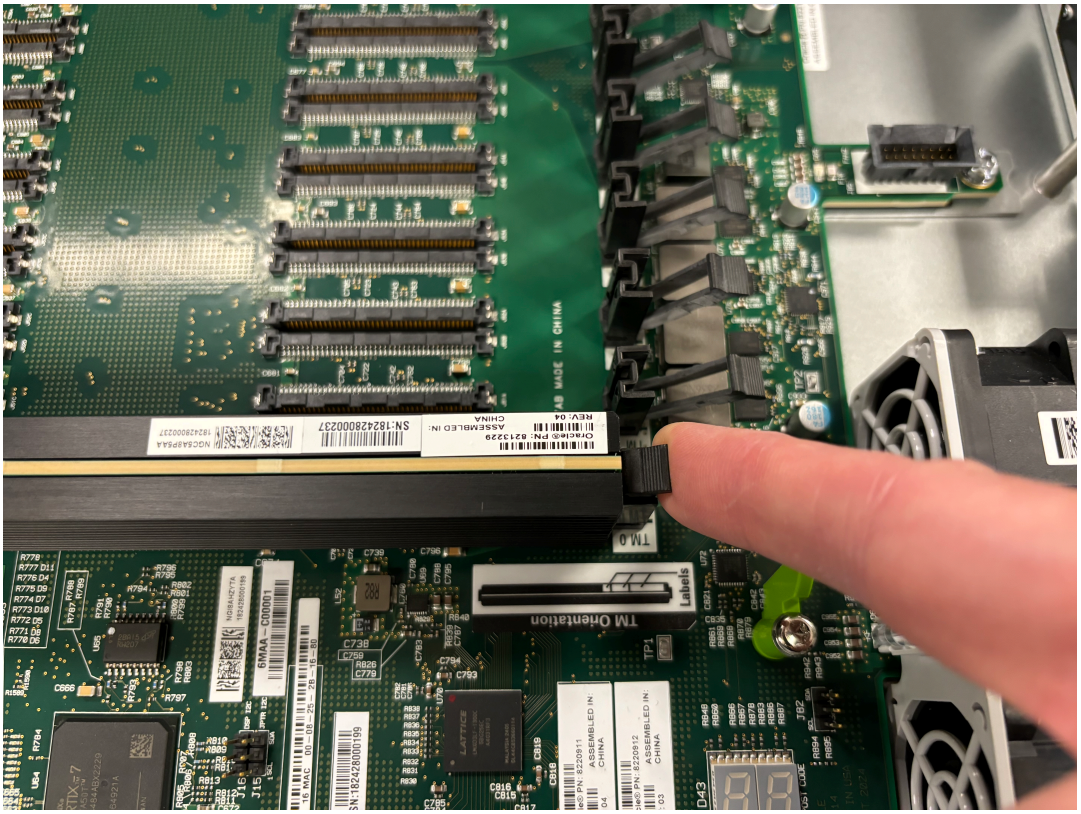
- Always load the TMs sequentially, starting with position 0 (the slot labelled TM0).
- The labels identify the orientation of the TM.
- Place the new TM in an ESD-safe location.
- Wear an ESD wrist strap or take similar equivalent actions to prevent static damage to the mainboard or other ESD-sensitive components.

To install the TM:

1. Grasp the TM between your thumb and index finger of each hand and line up both sides of the module with the slot guides attached to the mainboard.
2. Slide the TM into place in the TM0 slot.
3. Press evenly across the top of the connector to fully seat the TM.



4. Press on the latches on both sides to secure the TM to the mainboard.



5. As necessary, repeat for slots TM1, TM2, and others, making sure to install the TMs sequentially.

Fan and Filter Maintenance

This section explains how to remove and replace a fan and filter on your Acme Packet 6400.

> **Note:**
>
> Before handling the Acme Packet 6400, follow the proper ESD grounding procedures. Failure to do so could damage components.

Remove a Fan Module

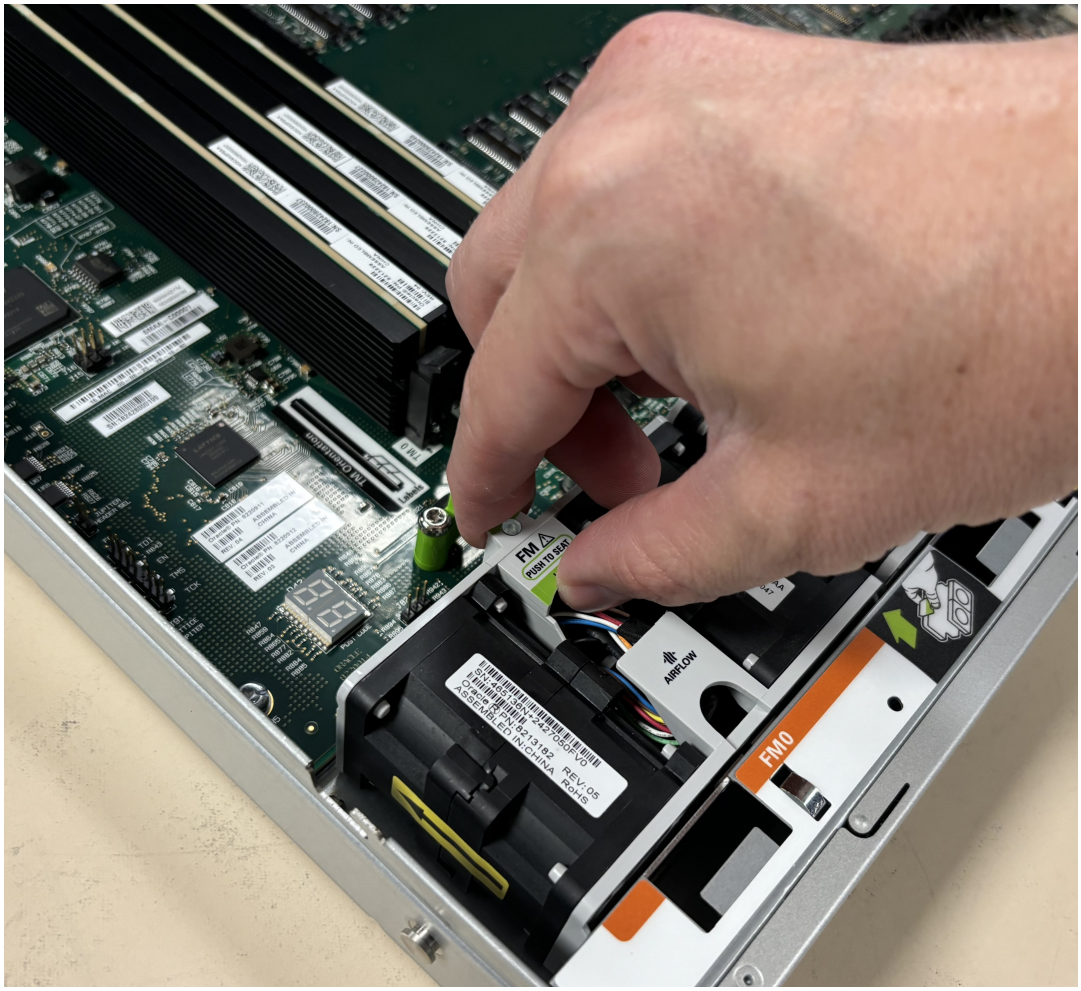
The 4 fan modules are user-serviceable, hot-pluggable components. Each module has 2 fans. In normal circumstances, you should shutdown the system near the fan's end of life and replace it with a new fan. However, if a fan malfunctions while the system is running, remove the fan and quickly replace it with a functional fan to prevent overheating.

> **WARNING:**
>
> Overheating can stop packet processing.

If you do not have a replacement fan on hand, shut down the system and disconnect the power before removing the malfunctioning fan.

> **Note:**
>
> When removing and replacing a fan, remember to first ground yourself using appropriate ESD grounding equipment such as a wrist or heel strap.

1. Remove the top cover.
2. Grasp the fan module by its center handle and pull it out.

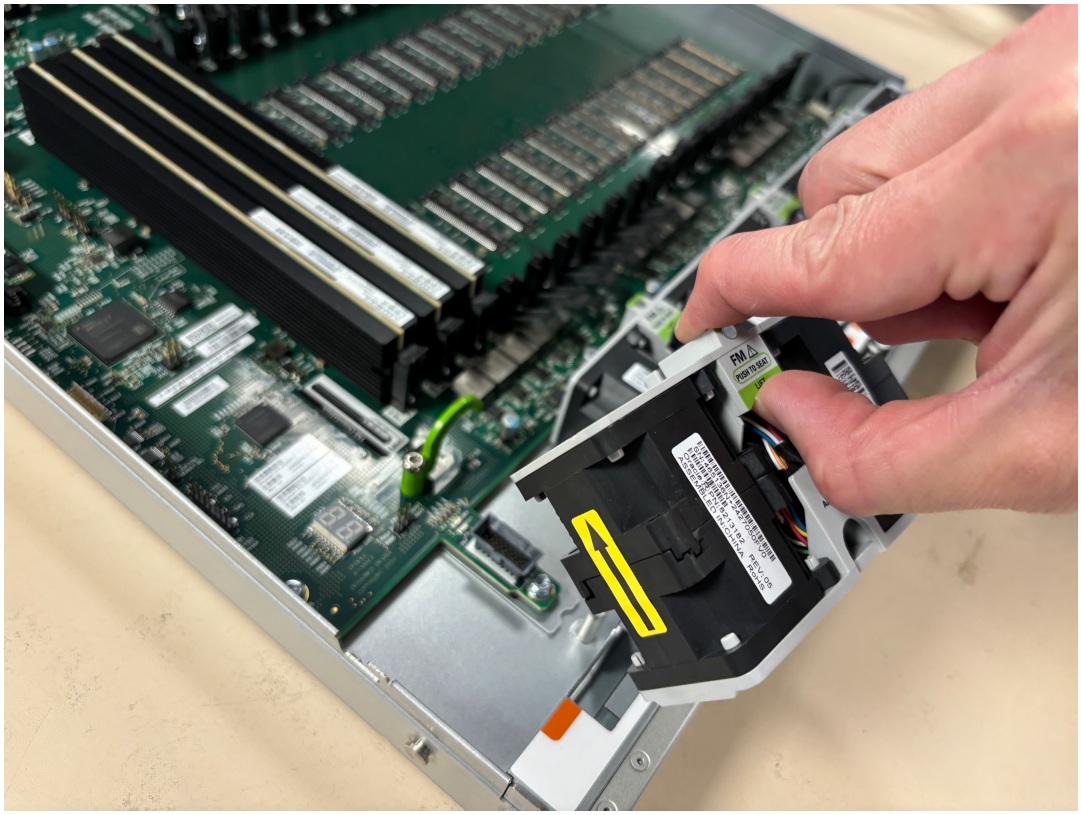


3. Move the fan to an ESD safe location.

Install a Fan Module

Install your replacement fan module within 60 seconds of removing your malfunctioning fan module.

1. Put your new fan module into the empty fan module slot.



2. Press down to secure and attach the fan module.

Maintaining the Cooling Components

The Acme Packet 6400 Air Filter removes airborne particles before they are drawn into the Acme Packet 6400. To prevent system malfunction and prolong the life of the system's cooling components:

- Clean or replace the fan filter every three months
- Clean the air inlets once a week.

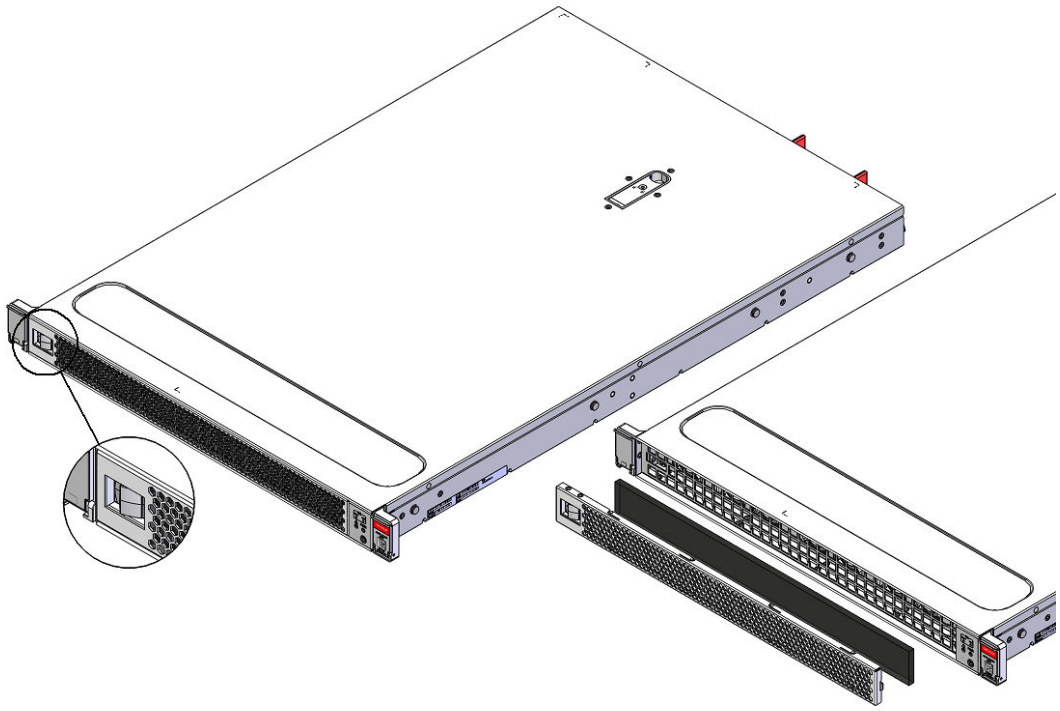
Cooling maintenance encompasses cleaning the fan module and cleaning the air inlets on the front of the Acme Packet 6400. Cleaning the fan module requires that you remove the module itself. If you are not shutting down the Acme Packet 6400 this procedure must be performed quickly or else the system may overheat and cause packet processing to stop.

This maintenance should be performed alongside other preventive maintenance to take place within a planned maintenance or downtime window, during off-peak hours.

Cleaning the Cooling Components

After removing a fan, you may spray compressed air into the fan to clean the fan. In addition, you should periodically clean the air intake.

1. Remove the front bezel from the chassis.



2. Gently wipe the front fan bezel that contains the perforated air inlets with a clean, dry cloth. Alternatively, use compressed air to clean out the perforated air inlets.

> **Note:**
>
> Only the removable fan bezel has vent holes that require cleaning.
> To prevent damage to the painted finish, do not use any solvents or liquids to clean the perforated air inlets on the front of the chassis.

3. Blow compressed air through the air filter to remove any dust.
4. Replace the air filter and then the front bezel.

Replace the Front Indicator Module

Follow these steps to replace the Front Indicator Module (FIM).

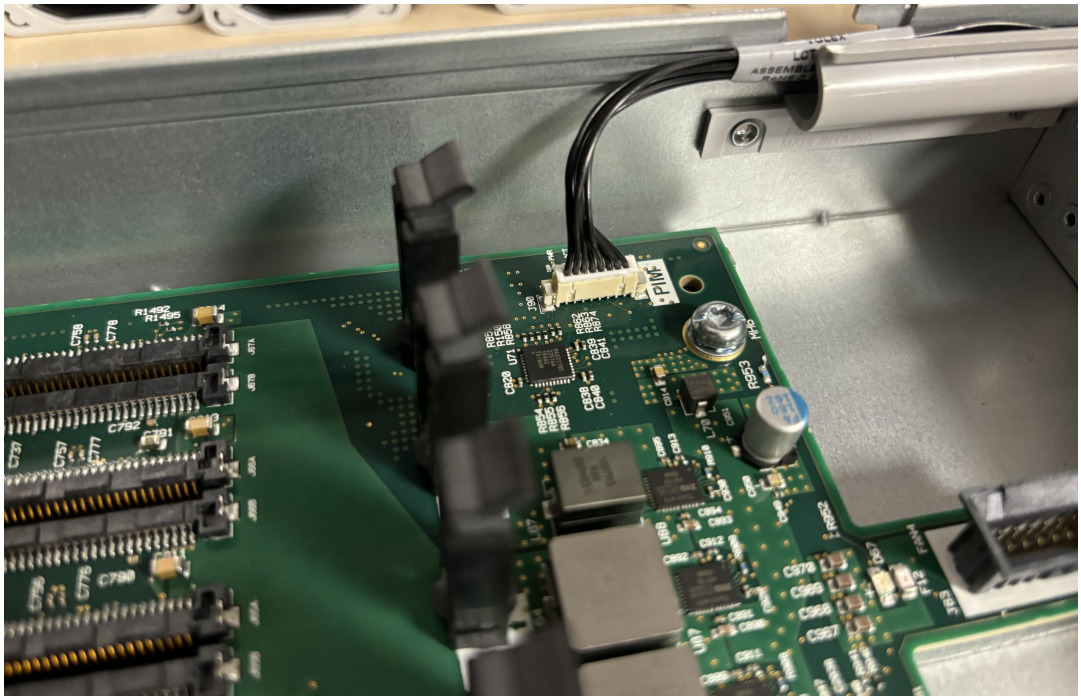
> **Note:**
>
> Before handling the Acme Packet 6400, follow the proper ESD grounding procedures. Failure to do so could damage components.

Remove the FIM

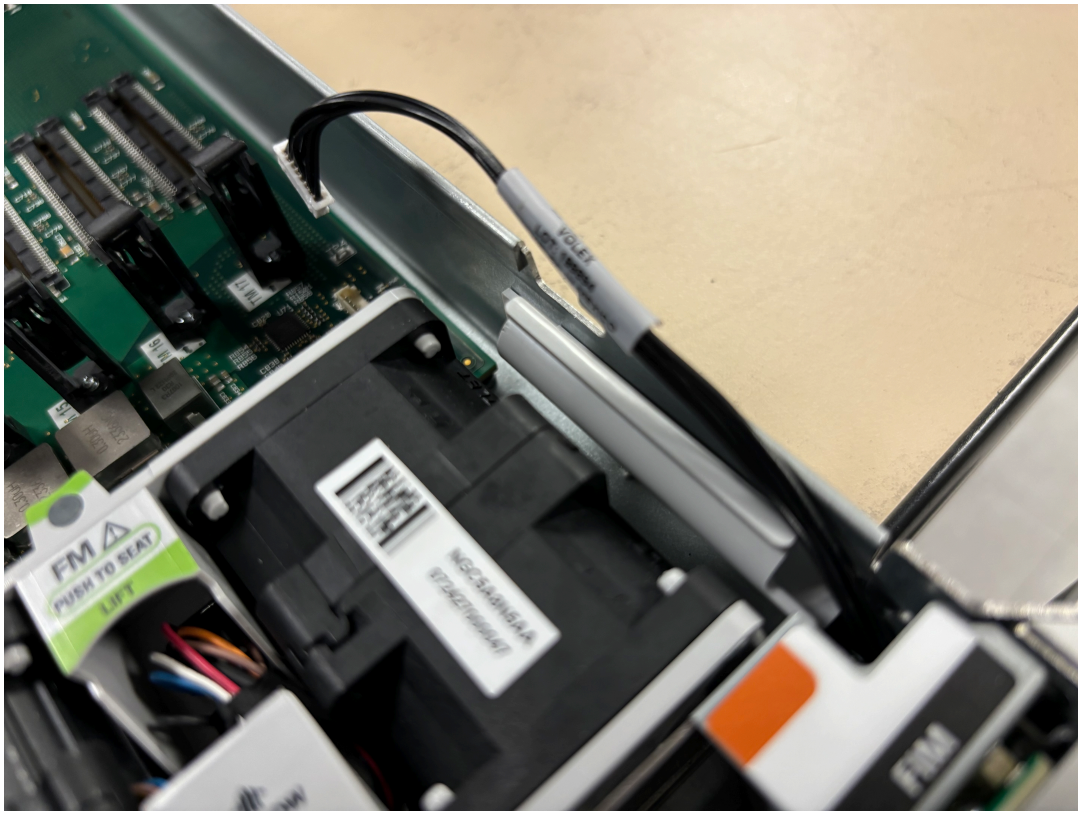
1. Remove the chassis cover.
2. Remove the front air filter.

3. Unscrew the green screw to the left of the FIM.

4. Disconnect the FIM connector.



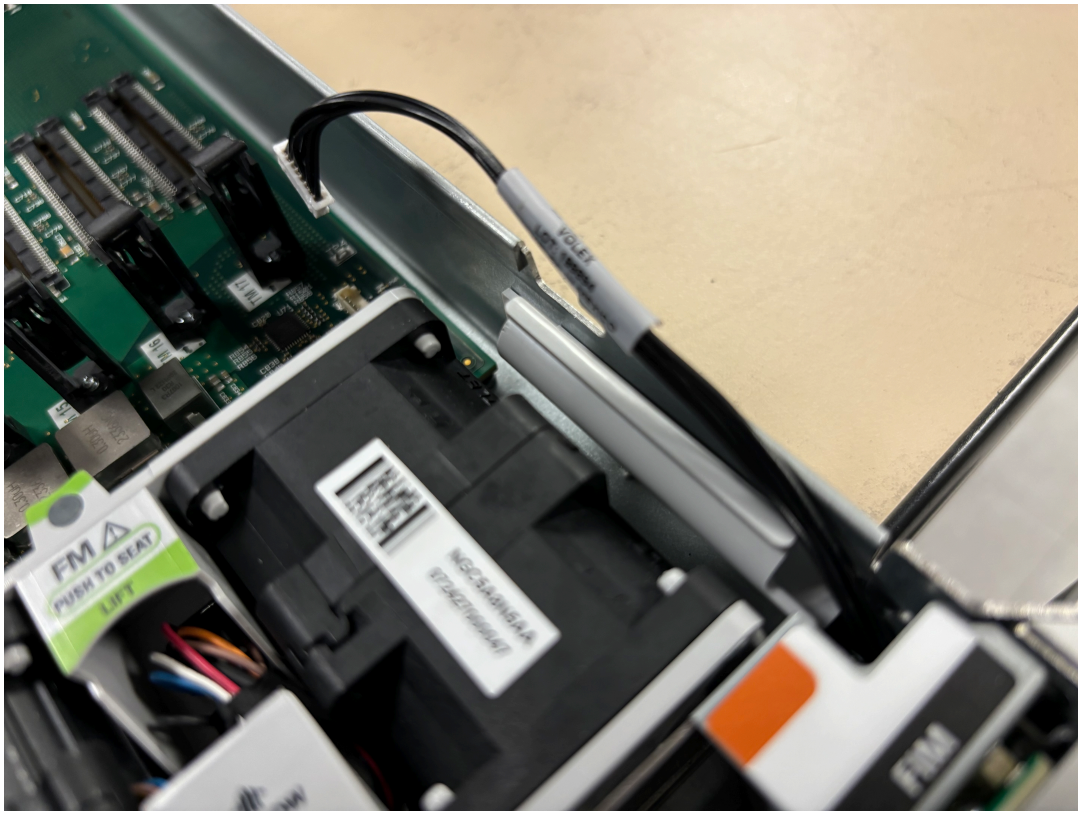
5. Remove the FIM cord from its cord holder.



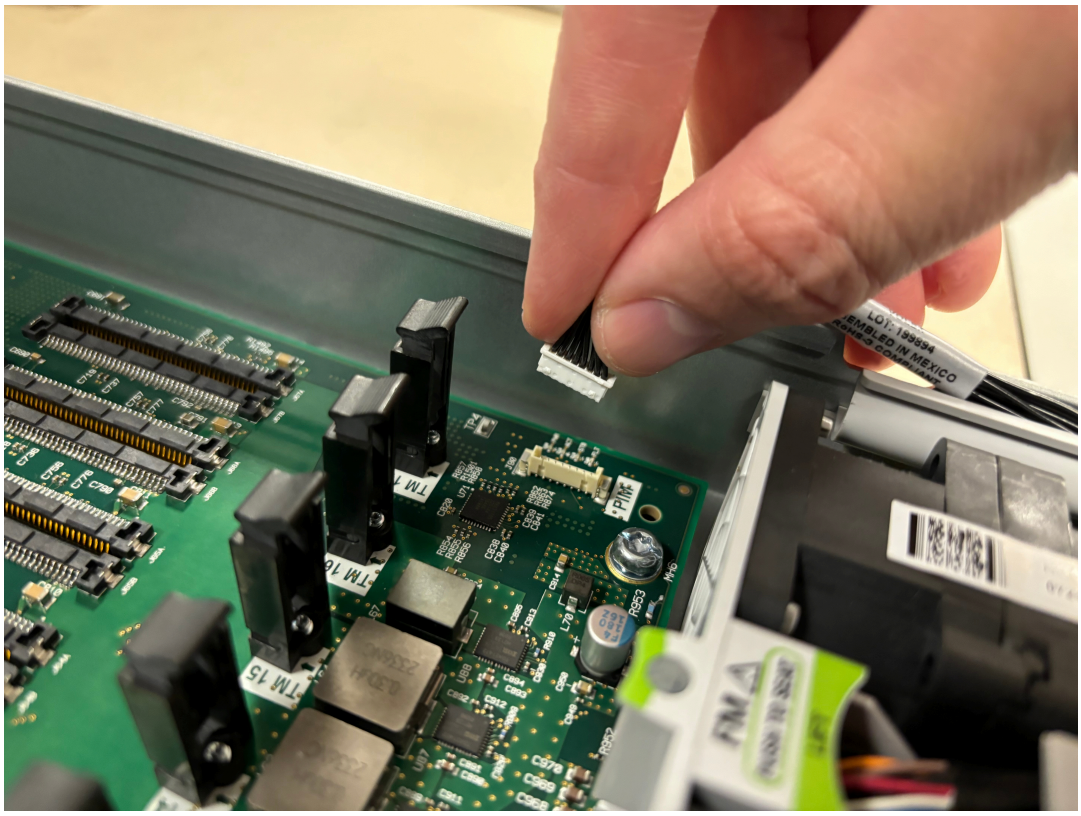
6. Remove the FIM.

Install the FIM

1. Thread the cord of the new FIM through the front right of the chassis.
2. Press the cord into the FIM cord holder.



3. Attach the cord to the mainboard.



4. Tighten the FIM screw on the front of the chassis.
5. Reattach the front air filter.

6. Reattach the chassis cover.

SFP+ Removal and Replacement

Your troubleshooting and diagnostics might reveal that the SFP+ component of an NIU card needs to be replaced. The SFP+ serves two functions:

- Converts electrical signals into optical signals used to communicate with other optical networking equipment.
- Serves as the receptacle for the LC duplex fiber optic connectors.

The SFP+ is hot swappable; it may be replaced while the Acme Packet 6400 is powered on. Leave the NIU in the Acme Packet 6400 as you extract the SFP+.

To obtain an SFP+, contact your Acme Packet sales representative directly.

SFP+ Media Signaling Interfaces

This section describes the media signaling interfaces, small form factor pluggable+ (SFP+). The signaling and media interface provides network connectivity for the signaling and media traffic. Each interface can connect to a network at 10-gigabit Ethernet speeds.

SFP+ Information

Only transceivers qualified by Acme Packet can be used in the Acme Packet 6400. Mixed transceiver types are unsupported. Both transceiver locations must be populated with the same SFP+ type.

The SFP+s are inserted into the NIU card. These SFP+ types can be used:

- 850nm LASER PROD — check the label on the back of the SFP+ for this information to make sure you have the right mode transceiver. This multi mode SFP+ features a black bale clasp latch.
- 1310nm LASER PROD — check the label on the back of the SFP+ for this information to make sure you have the right mode transceiver. This single mode SFP+ features a blue bale clasp latch.

SFP+ Identification

The following image shows the 10-gigabit SFP+ multi mode transceiver used in the Acme Packet 6400.

The following image shows the single mode 10 gigabit SFP+ transceiver used in the Acme Packet 6400.

Media Cables

This section describes the media signaling interface, fiber optic cable, used in the NIU card that goes with the Acme Packet 6400. The fiber optic cables only ship from Acme Packet if you order them.

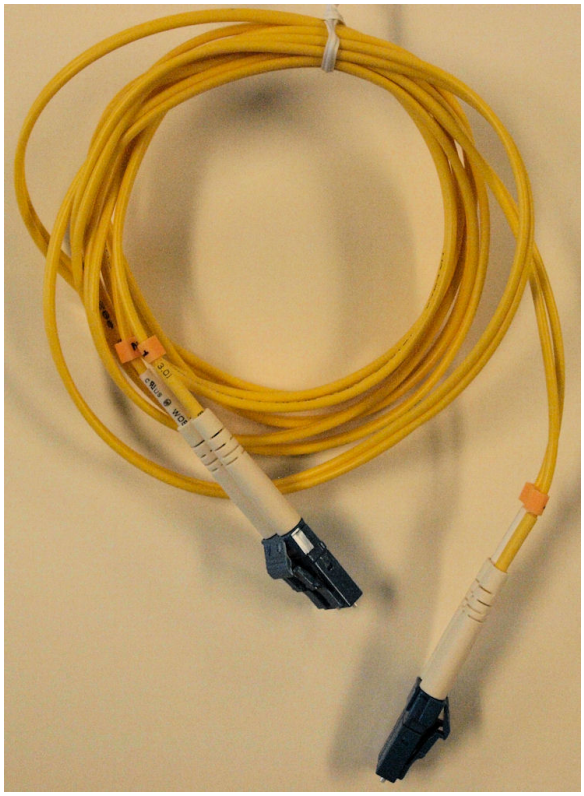
Cable Information

- The fiber optic cable used on the Acme Packet 6400 media cards is a 10 gigabit cable that connects to the NIU cards.

Cable Identification

The fiber optic cables used to connect to the NIU are shown in this section.

10 Gigabit Fiber Optic Cable (Aqua .50/125)



10 Gigabit Fiber Optic Cable (Yellow .9/125)

> **Note:**
>
> To prevent damage to the optical lens, We recommend that the protective dust cover stay on the optical transceiver port when the 10GbE NIU card is not cabled.

Removing an SFP+

To remove the SFP+ from the NIU card:

1. Pull the bale SFP+ clasp latch out and down. It will pivot downwards on its hinge.
2. Holding the extended bale clasp latch, pull the optical transceiver fully out of its socket in the NIU card.

Replacing an SFP+

To replace the SFP+:

1. Slide the replacement optical transceiver into the SFP+ socket on the NIU.
2. Flip the bale clasp latch back up and in to the rest position.

Alarms

The Acme Packet 6400 generates internal alarms that correspond to internal hardware fault conditions. Hardware faults are divided into two types:

- Hardware and environmental
- Media link

Each alarm is assigned a severity level, depending on the details of the fault. Refer to the following table for information about these alarms.

Table 5-1 Alarm Severity Levels

Alarm Severity	Description
Minor	Functionality is impaired to a small degree (e.g., a single fan has failed).
Major	Pending failures or unexpected events are imminent (e.g., an LOS).
Critical	Catastrophic condition has occurred (e.g., the system is overheating).

The Acme Packet 6400 polls its hardware components to ensure they are functioning properly. If it encounters a fault condition, it will report alarms in these categories:

- Hardware temperature
- Fan speed
- Environmental sensor
- Power supply
- Voltage
- Physical interface cards

For each category, the following tables list the Acme Packet 6400 alarm name, hardware alarm ID, alarm severity, causes, log message, and graphic display window message, if any.

> **Important:**
>
> If different sensors report two or more events of the same severity with the same Alarm ID, only the first alarm gets reported.

Power Supply Alarms

The following table lists the voltage, power, and current alarms.

Alarm	Alarm Severity	Cause(s)
Power Supply X Vout Under Voltage Fault!	EMERGENCY	The voltage output dropped below the typical voltage by more than 30%.
Power Supply X Vout Over Voltage Fault!	EMERGENCY	The voltage output exceeded the typical voltage level by more than 30%.

Alarm	Alarm Severity	Cause(s)
Power Supply X Pout Over Power Warning!	MINOR	The power output exceeded the typical power by more than 10%.
Power Supply X Pout Over Power Fault!	EMERGENCY	The power output exceeded the typical power by more than 30%.
Power Supply X Iout Over Current Warning!	MINOR	The current output exceeds the typical current by more than 10%.
Power Supply X Iout Over Current Fault!	EMERGENCY	The current output exceeds the typical current by more than 30%.
Power Supply X Pin Over Power Warning!	MINOR	The power input exceeds the typical power input by more than 10%.
Power Supply X Iin Over Current Warning!	MINOR	The current input exceeds the typical current input by more than 10%.
Power Supply X Iin Over Current Fault!	EMERGENCY	The current input exceeds the typical current input by more than 30%.
Power Supply X Vin Under Voltage Fault!	EMERGENCY	The voltage input dropped below the typical voltage input by more than 30%.
Power Supply X Vin Under Voltage Warning!	MINOR	The voltage input dropped below the typical voltage input by more than 10%.
Power Supply X Vin Over Voltage Warning!	MINOR	The voltage input exceeded the typical voltage input by more than 10%.

Link and SDP Alarms

Link alarms are generated when a network cable is plugged into or unplugged from a configured network interface. For each possible network interface, an alarm exists that indicates whether the link goes up or down.

The following tables list detailed information about the Acme Packet 6400's link alarms.

Media Ethernet Link Alarms

The following table lists the 10GbE interface link up/link down alarms.

Table 5-2 Media Ethernet Link Alarms

Alarm Name	Alarm Severity	Cause(s)	Example Log Message
LINK UP ALARM GIGPORT	MINOR	10GbE S0P0 link up	Slot 0 port 0 UP
LINK DOWN ALARM GIGPORT	MAJOR	10GbE S0P0 link down	Slot 0 port 0 DOWN
LINK UP ALARM GIGPORT	MINOR	10GbE S0P1 link up	Slot 0 port 1 UP
LINK DOWN ALARM GIGPORT	MAJOR	10GbE S0P1 link down	Slot 0 port 1 DOWN
LINK UP ALARM GIGPORT	MINOR	10GbE S0P2 link up	Slot 0 port 2 UP
LINK DOWN ALARM GIGPORT	MAJOR	10GbE S0P2 link down	Slot 0 port 2 DOWN
LINK UP ALARM GIGPORT	MINOR	10GbE S0P3 link up	Slot 0 port 3 UP

Table 5-2 (Cont.) Media Ethernet Link Alarms

Alarm Name	Alarm Severity	Cause(s)	Example Log Message
LINK DOWN ALARM GIGPORT	MAJOR	10GbE S0P3 link down	Slot 0 port 3 DOWN

Management Ethernet Link Alarms

The following table lists the management Ethernet port alarms:

Table 5-3 Management Ethernet Link Alarms

Alarm Name	Alarm Severity	Cause(s)	Example Log Message
LINK UP ALARM VXINTF	MINOR	Mgmt0 link up	Port 0 UP
LINK UP ALARM VXINTF	MINOR	Mgmt1 link up	Port 1 UP
LINK UP ALARM VXINTF	MINOR	Mgmt2 link up	Port 2 UP
LINK DOWN ALARM VXINTF	MAJOR	Mgmt0 link down	Port 0 DOWN
LINK DOWN ALARM VXINTF	MAJOR	Mgmt1 link down	Port 1 DOWN
LINK DOWN ALARM VXINTF	MAJOR	Mgmt2 link down	Port 2 DOWN

SFP+ Presence Alarms

The following table lists the alarms that reflect when an SFP+ module is inserted or removed:

Table 5-4 SFP+ Presence Alarms

Alarm Name	Alarm Severity	Cause(s)	Example Log Message
SFP+ REMOVED GIGPORT 0	CRITICAL	S0P0 SFP+ Removed	Slot 0 Port 0 SFP+ Removed
SFP+ INSERTED GIGPORT 0	CRITICAL	S0P0 SFP+ Inserted	Slot 0 Port 0 SFP+ Inserted
SFP+ REMOVED GIGPORT 1	CRITICAL	S0P1 SFP+ Removed	Slot 0 Port 1 SFP+ Removed
SFP+ INSERTED GIGPORT 1	CRITICAL	S0P1 SFP+ Inserted	Slot 0 Port 1 SFP+ Inserted
SFP+ REMOVED GIGPORT 2	CRITICAL	S0P2 SFP+ Removed	Slot 0 Port 2 SFP+ Removed
SFP+ INSERTED GIGPORT 2	CRITICAL	S0P2 SFP+ Inserted	Slot 0 Port 2 SFP+ Inserted
SFP+ REMOVED GIGPORT 3	CRITICAL	S0P3 SFP+ Removed	Slot 0 Port 3 SFP+ Removed
SFP+ INSERTED GIGPORT 3	CRITICAL	S0P3 SFP+ Inserted	Slot 0 Port 3 SFP+ Inserted

When an SFP+ module is inserted or removed, there is no impact on system health.

6
Specifications

This chapter provides information regarding the physical, electrical, environmental, and connector specifications of the Acme Packet 6400.

Environmental, Safety, and Regulatory Certifications

For information regarding safety and regulatory certifications applicable to the Acme Packet 6400, refer to the Acme Packet Platforms Safety and Compliance Guide.

Physical Specifications

Acme Packet 6400 System Chassis Specifications

Table 6-1 Acme Packet 6400 Physical Specifications

Specification	Description
Height	5.22” (13.26 cm) (3U)
Width	17.10” (43.43 cm) (+ mounting ear width: 19” (48.26 cm)
Depth	26” (66.0 cm)
Weight	approximately 48.1 lbs (21.8 kg), fully loaded

AC Power Supply Physical Dimensions

Table 6-2 Acme Packet 6400 Physical Dimensions

Specification	Description
Height	1.575” (4.0 cm)
Width	2.89” (7.35 cm)
Depth	8.75” (22.20 cm)
Weight	2.21lbs (1.00 kg)
Electrical Rating	100-127/200-240VAC, 10.0/5.0A(X2)

Important: This equipment is intended for installation in locations where the National Electrical Code (NEC) applies.

DC Power Supply Physical Dimensions

Table 6-3 Acme Packet 6400 DC Power Supply Physical Dimensions (continued)

Specification	Description
Height	1.575” (4.0 cm)

Table 6-3 (Cont.) Acme Packet 6400 DC Power Supply Physical Dimensions (continued)

Specification	Description
Width	2.89” (7.35 cm)
Depth	8.75” (22.20 cm)
Weight	2.31lbs (1.05 kg)
Electrical Rating	-48-60VDC, 30A(X2)

Important: This equipment is intended for installation in Network Telecommunication Facilities.

Fan Module Specifications

Table 6-4 Acme Packet 6400 Fan Module Specifications

Specification	Description
Number of Fans	8
Total Maximum Airflow	182 CFM

Electrical Specifications

Refer to the following tables for information regarding the electrical specifications of the Acme Packet 6400.

Power Supply Input Circuit Fuse Requirements

Table 6-5 Acme Packet 6400 Power Supply Input Circuit Fuse Requirements

Power Circuit	Fuse Rating	Power cable size
120 VAC	15 AMP	18 AWG
240 VAC	7.5 AMP	18 AWG
-48 VDC	30 AMP min	10 AWG

Environmental Specifications

For the Acme Packet 6400 to function properly, Acme Packet recommends that you follow the environmental guidelines in the following table.

Table 6-6 Acme Packet 6400 Environmental Specifications

Specification	Description
Temperature	The Acme Packet 6400 System is required to operate within the temperature range of: * +0° C to +40° C, 32° F to 104° F (operating) * -20° C to +65° C, -4° F to 149° F (storage)
Relative Humidity	Operating conditions of 10% to 85% humidity under non-condensing operating conditions

Table 6-6 (Cont.) Acme Packet 6400 Environmental Specifications

Specification	Description
Maximum Altitude	The Acme Packet 6400 system is required to operate below the maximum altitude of 10,000 feet.
Air Flow	182 CFM
Power Dissipation	250W typical, 360W maximum (base Acme Packet 6400 without transcoding modules) Additional 25W for each transcoding module

Connector Specifications

Refer to the following table for information about the connector specifications for the Acme Packet 6400.

Table 6-7 Acme Packet 6400

Specification	Description
RJ45/Management Ethernet Ports	The 3 x 8-pin RJ45 10/100/1000BaseT Ethernet ports are compliant with IEEE's 802.3, 802.3u, and 802.3ab.
RS232/Serial Port	The RS232 serial port uses an 8-pin RJ45 connector that supports RS232-C protocol.
10GbE Port(s)	The 10GbE fiber optic connection ports use duplex LC connectors.
IEC Connector Ports	The IEC connector ports accept a 3-lead IEC-320 connector for AC power installations.

Optical Transceiver Interface Module Specification

Refer to the following table for information about the optical specifications of the 10GbE SFP+ optical transceivers for the Acme Packet 6400.

Table 6-8 (continued)Acme Packet 6400 Optical Transceiver Interface Module Specifications

Specification	Multimode (SX) Fiber Module	Singlemode (LX) Fiber Module
Wavelength λ	850 nm	1310 nm
Laser Type	VCSEL	DFB
Fiber type / Transmission Distance	-0.5 to 550 m -50 µm -0.5 to 550 m -62.5 µm	-0.5 m to 10 km

7

Acronyms, Definitions, and Terms

ACLI
Acme Command Line Interface is the command line interface used by Oracle to configure, maintain, and monitor SBCs and other Oracle products.

AC
Alternating Current refers to the 120-volt electricity delivered by power utilities to three-pin power outlets. This type of power is called alternating current because the polarity of the current alternates between plus and minus, 60 times per second.

AWG
American Wire Gauge is a United States standard set of non-ferrous wire conductor sizes. The gauge means the diameter.

BTU
British Thermal Unit

CSA
Canadian Standards Association is a non-profit, independent organization that operates a listing service for electrical and electronic materials and equipment.

DC
Direct Current refers to the flow of electrons in one direction within an electrical conductor, such as a wire.

EMC
Electromagnetic Compatibility is the ability of equipment or systems to be used in their intended environment within designed efficiency levels without causing or receiving degradation due to unintentional electromagnetic interference.

ESD
Electrostatic Discharge is the rapid discharge of static electricity from one conductor with an electrical charge to another of a different electrical charge.

CE
European Compliance

EN
European Norm

FCC
Federal Communications Commission

FG
Frame ground

FIM
Front Indicator Module

flash memory
Flash memory is a solid-state, non-volatile, re writable memory that functions like a combination of RAM and a hard disk drive.

FQME
Flow Quality Measurement Engine is responsible for monitoring, measuring, and maintaining statistics (e.g., latency, jitter, flow stoppage, flow creation, etc.) on a flow-by-flow basis.

10GbE
Gigabit Ethernet is an Ethernet type that supports data transfer rates of 10 gigabit per second.

IEEE
Institute of Electrical and Electronics Engineers is an organization composed of engineers, scientists, and students. The IEEE is best known for developing standards for the computer and electronics industry.

ICES
Interference-causing Equipment Standard

IEC
International Electrotechnical Commission

IETF
Internet Engineering Task Force is the main standards organization for the Internet.

IP
Internet Protocol is the method by which data is sent from one computer to another on the Internet.

LED
Light Emitting Diode is an electronic device that lights up when electricity is passed through it.

LAN
Local Area Network is a group of computers and associated devices that share a common communications line within a small geographic area.

LOS
Loss of Signal occurs when the signal level falls below an acceptable level. LOS is a physical layer error and typically results in an alarm.

NEBS
Network Equipment Building Standards defines a rigid and extensive set of performance, quality, environmental, and safety requirements developed by Bellcore.

NIC
Network Interface Card is an expansion board you insert into a computer so the computer can be connected to a network.

NIU
The NIU provides network connectivity for management, signaling, and media traffic to and from the Acme Packet 6400.

NVRAM
Non-volatile Random Access Memory is a type of memory that retains its contents when power is turned off.

optical transceiver
The fiber connection to the Acme Packet 6400 plugs into an optical transceiver. Through this connection, light energy is converted into electrical energy.

PCMCIA
Personal Computer Memory Card International Association is an organization consisting of approximately 500 companies that has developed a standard for small, credit-card sized devices (PC cards). This standard is designed for attaching input/output devices such as network adaptors, fax/modems, or hard drives to notebook computers.

physical interface card
The physical interface card is synonymous with the network interface cards on the Acme Packet 6400.

PROM
Programmable Read-only Memory is a memory chip on which data can only be written once. A PROM is non-volatile; it is a memory chip on which data can be written only once.

QoS
Quality of Service is a networking term that refers to the capability of a network to provide better service to selected network traffic over various technologies.

RAM
Random Access Memory is a type of computer memory that can be accessed randomly. RAM is the same as main memory.

RS-232
Recommended Standard 232 is a standard interface approved by the Electronic Industries Association for connecting serial devices.

RJ45
Registered Jack 45 is an eight-wire connector commonly used to connect computers onto a LAN.

SNMP
Simple Network Management Protocol is a set of protocols used for managing complex networks and network devices.

SDRAM
Synchronous Dynamic Random Access Memory is a type of DRAM that can run at much higher clock speeds than conventional memory.

Telnet
Telnet is a standard terminal emulation program that allows remote login and connection to systems/servers on a network. Telnet uses a single TCP/IP network connection to provide this remote login, control, and communication functionality.

TCP
Transmission Control Protocol provides a reliable stream delivery and virtual connection service to applications through the use of sequenced acknowledgment with the retransmission of packets when necessary.

TCU
Transcoding Carrier Unit.

UPS
Uninterruptible Power Supply is a power supply that can run off of a backup battery when primary power is lost.

UDP
User Datagram Protocol provides a simple, but unreliable message service for transaction-oriented services. Each UDP header carries both a source port identifier and a destination port identifier, allowing high-level protocols to target specific applications and services among hosts.

VFD
Vacuum Fluorescent Display is used on the graphic display window of the Acme Packet 6400 chassis's front control panel.

VLAN
Virtual Local Area Network refers to a network of computers are connected to a single physical segment of a wire but behave as if they are connected to the physically diverse LANs.

VAC
Volts Alternating Current

VDC
Volts Direct Current

VCCI
Voluntary Control Council for Information Technology Equipment (Japan)

WAN
Wide Area Network is a computer network that spans a relatively large geographical area. Typically, a WAN consists of two or more LANs.

WEEE
The directive by the European Parliament and the Council of the European Union concerning waste electrical and electronic equipment (WEEE).