Acme Packet 4500

Hardware Installation and Maintenance Guide

Formerly Net-Net 4500

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ORACLE

Contents

About This Guide

Overview

The Acme Packet 4500 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 compact single unit 1U design the Acme Packet 4500 provides exceptional functionality in a tightly integrated system. This chapter provides an introduction and overview of the main components of the Acme Packet 4500.

This *Acme Packet 4500 Hardware Installation and Maintenance Guide* describes:

- Component Overview
- Graphic Display and its Usage
- System Installation
- Start up
- Maintenance
- Safety
- Specifications
- Glossary

Audience

This guide is written for network administrators, and telecommunications equipment installers and technicians. It provides information related to the hardware components, features, installation, start-up, operation, and maintenance of the Acme Packet 4500. Only experienced and authorized personnel should perform installation, configuration, and maintenance tasks.

Revision History

This section contains a revision history for this document.

Date	Revision Number	Description
August 07, 2008	Revision 1.01	• Added section about power cycling to Maintenance chapter.
November 12, 2008	Revision 1.10	• Updated available NIU configurations. • Clarified how NIU removal starts an Out-of-Service state. • Added procedure for replacing NIU in standby HA node. • Added warm swap terminology in Maintenance chapter.
April 16, 2009	Revision 1.12	• Clarified NIU management port connector specification. • Updated the Shipped Parts list

Date	Revision Number	Description
May 26, 2009	Revision 1.13	• Updates AC and DC circuit fuse size recommendation.
June 26, 2009	Revision 1.14	• Updates Battery Warning section
August 10, 2009	Revision 1.15	• Adds Power Supply Input Circuit Fuse Requirements and removes Power Supply specifications
June 30, 2010	Revision 1.20	• Adds System Processor section
January 31, 2011	Revision 1.25	• Updates DC fuse size to match more commonly available fuses • Highlights that front console port is default • Adds content about presence of dust cover on the NIU console port • Clarified that USB-port is software dependent
February 10, 2011	Revision 1.26	• Adds warning about mixed SFPs being unsupported
March 03, 2011	Revision 1.30	• Adds description of slide extenders where necessary • Adds procedure for installing slide extenders
August 10, 2011	Revision 1.40	• edited the Overview section to match up with the sections 1-8. • add SFP section • HW environment alarm severity
February 14, 2012	Revision 1.50	• Added SFP section • Corrected the Temp alarms threshold • Added notes about mixed power supplies • Added note about Restricted Access Location
April 25, 2012	Revision 1.51	• Temp minor, critical
May 7, 2012	Revision 1.52	• Added some text on removing a power supply
May 21, 2012	Revision 1.53	• Added the Ethernet LED section
September 7, 2012	Revision 1.54	• Added caution to the power supply section
October 16, 2012	Revision 1.55	• Added DC power cable length • Added update to weight
January 17, 2013	Revision 1.56	• Added Korea to the specifications
May 9, 2013	Revision 1.57	• Updated Optical Specification section
June 18, 2013	Revision 1.58	• Adds direction about running the halt command before system shut down in Maintenance chapter.
November 11, 2013	Revision 1.59	• Removed all instances of Net-Net
March 17, 2014	Revision 1.60	• Edit and standardize formatting of content

Date	Revision Number	Description
January 15, 2015	Revision 1.61	• Updated book title to *Acme Packet 4500 Hardware Installation and Maintenance Guide* to reflect that the installation and maintenance guides have been combined. • Changed the term for 1 Gigabit ports from GigE the standard GbE to agree with other Oracle networking documentation. • Changed the copyright page to Oracle standards for 2015. • Inserted a paragraph referring the reader to the Safety and Compliance Guide for details on the topic.
April 20, 2015	Revision 1.62	• Inserted caveats to confirm that Acme Packet 4500 hardware installation documentation satisfies NEBS (Network Equipment-Building System) requirements.

1 Safety

Introduction

This chapter provides an overview of the recommended safety precautions for installing the Acme Packet 4500.

Before you install your Acme Packet 4500, we recommend that you review the contents of this chapter and the *System Installation* chapter. Both chapters provide information intended to protect you and your Acme Packet 4500 from experiencing any harm during the installation process. These chapters also provide information that helps to keep your Acme Packet 4500 functioning properly and keep it from damage.

Safety and Regulatory Certifications

For information regarding safety and regulatory certifications applicable to the Acme Packet 4500, refer to the *Acme Packet Platforms Safety and Compliance Guide* in addition to this chapter.

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 4500 clean and clutter-free.

System Maintenance

Aside from the fan module, power supply, and NIUs, there are no user-serviceable parts inside the Acme Packet 4500 chassis. Only professionals trained to maintain, adjust, or repair the Acme Packet 4500 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 4500 documentation. These warnings and cautions are designed to keep you safe and protect the Acme Packet 4500 from damage.

Electrical Safety Precautions

To protect yourself from harm and the Acme Packet 4500 from damage, follow these electrical safety precautions:

Precautions

- Note the locations of the power supply switches on the Acme Packet 4500, and the location of the emergency power-off switch for the room where the Acme Packet 4500 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 4500 from its rack.
- When disconnecting power:
  - Turn the power supply switches to the OFF position.
  - 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.
- Never use extension cords to power an Acme Packet 4500.
- 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 4500 in an equipment rack, always make the ground connection first and disconnect it last upon un-installation.
- Use shielded Category 5e or 6, RJ45 cables for all 10/100/1000 Ethernet connections to protect the Acme Packet 4500 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 4500.
- Remove all jewelry before working on the Acme Packet 4500.

Battery Warning

Caution: Risk of an explosion is possible if the battery is replaced by an incorrect type. dispose of used batteries according to the instructions.

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

ESD Safety

To protect the delicate Acme Packet 4500 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 4500 hardware and while performing any Acme Packet 4500 hardware procedures.

Precautions

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

- Ensure that the Acme Packet 4500 is properly grounded.
- If you are grounding your Acme Packet 4500 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 4500 to prevent static discharge.
- To avoid damaging ESD-sensitive hardware, discharge all static electricity from your body before working directly with the Acme Packet 4500 chassis 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 4500, refer to the *Environmental, Safety, and Regulatory Certifications* section included in the *Specifications* chapter of this guide.

2 Component Overview

Chassis

The Acme Packet 4500 is contained in a 1U rack-mounted chassis. It can be front- or center mounted in standard 19″ wide racks (up to 28″ deep), with options for 23″ wide racks.

The front view of the Acme Packet 4500 chassis looks like this:

Figure 2 - 1. Acme Packet 4500 Front Panel

The rear view of the Acme Packet 4500 chassis looks like this:

Figure 2 - 2. Acme Packet 4500 Rear Panel

Mounting Hardware without Locking Mechanism

The Acme Packet 4500 is supported by a pair of cabinet slides that are affixed to an equipment rack by front and rear mounting flanges. The cabinet slides are adjustable for equipment racks of various depths. Slide extenders are also included with the Acme Packet 4500 for installations requiring up to an extra 4″ (10.16 cm) of depth.

> **Note:** There are 2 different types of mounting hardware. If your 3820 shipped before September 2013 you will have the mounting hardware without the Locking Mechanism.

Equipment Rack Installation Hardware

For equipment rack installations, the system chassis is outfitted with left and right chassis-mounted slides that fit into stationary slides. The stationary slides are secured to the equipment rack. This two-piece mounting system simplifies chassis installation and removal. Once inserted into the equipment rack, the Acme Packet 4500 is secured in place with two quick disconnect thumb screws.

- The chassis section slides are shipped inserted into the stationary section slides as shown in the following image:

Figure 2 - 3. Assembled Acme Packet 4500 Slide Rail

- You screw the chassis section slides in place on both sides of the Acme Packet 4500. These slides are reversible and can be used on either side of the system chassis. The following image is a chassis section slide.

Figure 2 - 4. Chassis Section Slides

- The stationary slides are mounted in the equipment rack and are secured in the front and rear. These slides are reversible and can be used on either side of the equipment rack. The following image shows a stationary slide, with its front rack rail mounting point on the left.

Figure 2 - 5. Stationary Slide (front mounting point at left)

- The following image shows a stationary slide with the rear rack rail mounting point on the left.

Figure 2 - 6. Stationary Slide (rear mounting point at left)

- For installations where the Acme Packet 4500 is installed in 4-post cabinet style racks with distances ranging from 28″ to 32″ between the rail flanges, the following slide extenders are used:

Figure 2 - 7. Slide Extender

Mounting Hardware with Locking Mechanism

The Acme Packet 4500 is supported by a pair of cabinet slides that are affixed to an equipment rack by front and rear mounting flanges. The cabinet slides are adjustable for equipment racks of various depths. Slide extenders are also included with the Acme Packet 4500 for installations requiring up to an extra 4″ (10.16 cm) of depth.

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Equipment Rack Installation Hardware

For equipment rack installations, the system chassis is outfitted with left and right chassis-mounted slides that fit into stationary slides. The stationary slides are secured to the equipment rack. This two-piece mounting system simplifies chassis installation and removal. Once inserted into the equipment rack, the Acme Packet 4500 is secured in place with two quick disconnect thumb screws.

- When installing the chassis, the user can easily slide the chassis along the slide rails until a locking clip on each chassis-mounted rail locks the chassis into the slide rails. Pressing this clip will then allow the chassis to be fully installed into the equipment rack. Once inserted into the equipment rack, the Acme Packet 6100 is secured in place with two captive thumbscrews. The locking clip is also a safety mechanism for removing the chassis from the equipment rack. When removing the chassis, the locking clip engages to prevent the chassis from being

overextended and requiring the user to unlock the clip to intentionally remove the chassis.

Figure 2 - 8. Assembled Chassis Slides

- The slide rails that are bolted to either side of the chassis or equipment rack are reversible and can be used on either side of the Acme Packet 4500.

Figure 2 - 9. Locking Clip

- The rack-mounted slide rail (rear mounting point at left) is mounted to the chassis. The slide rail fits into the rack mounted slide rail.

Figure 2 - 10. Rack Mounted Slide Rail (rear mounting point at left)

- Once the slide rails are installed on the chassis and on the equipment rack, the chassis can be installed in the rack by inserting the chassis slide rails into the tracks of the slide rails already mounted on the equipment rack. When the locking clip pin on the chassis slide rail meets the hole in the rack slide rail, the rails lock together. Push the locking clip pin in to continue to slide the chassis into the rack rails.

Figure 2 - 11. Locking Clip

- The locking clip connects the slide rail to the rack mounted slide rail.

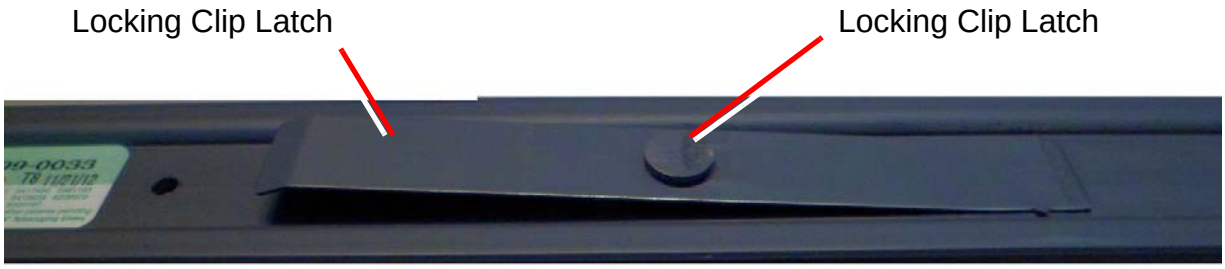


Figure 2 - 12. Latch and Locking Clip PIn

- Locking the clip fastens the chassis and rack side rails.

Figure 2 - 13. Locked Slide Rails

- Once the chassis has been fully inserted into the rack, turning the captive thumbscrews clockwise will lock the chassis into the rack.

Figure 2 - 14. Securing the Chassis to the Rack

System Processor

Processor Module (CPU)

The Acme Packet 4500 processor module (CPU) is located on the main board of the Acme Packet 4500. The CPU is a (FRU) and is attached to the main board as a daughter card. This processor module handles both the management and signal processing within the system. The CPU interacts with the Network Processor (NP) to perform call and media control.

System Control Panels

This section describes the Acme Packet 4500's front and rear control panels.

Front Panel

The Acme Packet 4500's front panel looks like this:

Figure 2 - 15. Acme Packet 4500 Front Panel

Front Control Panel

The Acme Packet 4500's front control panel provides easy access to several system components. You can access the graphic display, navigation buttons, reset button, alarm LED, alarm silence button, console port, and the USB port. The following is a close up of the front control panel.

Figure 2 - 16. Acme Packet 4500 Front Control Panel

> **Note:** The front control panel on the Acme Packet 4500 does not flip down. Attempting to flip down the front control panel will break it.

In addition, the system fan pack and fan filter are located behind the front panel of the Acme Packet 4500.

Reset

You reset the Acme Packet 4500 by pressing the front panel's reset button. This button is recessed, and can only be pressed by inserting a thin wire, such as a paperclip, through the reset button channel. Accidentally pressing the reset button can result in the loss of software data or your configuration.

Pressing the reset button causes a hard reset, immediately rebooting the Acme Packet 4500. After the reset button is released, the Acme Packet 4500 begins its boot sequence and loads the configured software file.

Alarm Active LED

The alarm LED on the front control panel indicates if any alarms are active on the Acme Packet 4500. The LED can be three different colors 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.

Alarm Silence Button

The alarm silence button clears the alarm table internally and opens the alarm circuits connected to the network interface unit's alarm port.

Graphic Display

The graphic display is a four-line VFD display window on the Acme Packet 4500's front control panel that reports real-time status, alarms, and general system information.

Navigation Buttons

You use the navigation buttons to navigate through the menus and information visible on the graphic display.

Console Port

The console port provides console access to the Acme Packet 4500 over a RS-232C serial connection. It is logically identical to the rear console port; however only one of the two console ports can be active at a time. See this chapter's later "Console Port (17)" section for more information.

USB Port

The USB port is reserved for software-enabled applications.

Intake Fans

Four intake fans keep the Acme Packet 4500 cool by blowing air through the system chassis. They are a part of the hot-pluggable fan module and are covered by a filter that prevents excess dust and contaminants from entering the system. See this chapter's "Fan Module" section for more information.

Figure 2 - 17. Intake Fans (behind front bezel)

Rear Panel

Power supplies and the network interface unit (NIU) are located on the rear chassis panel, which looks like this:

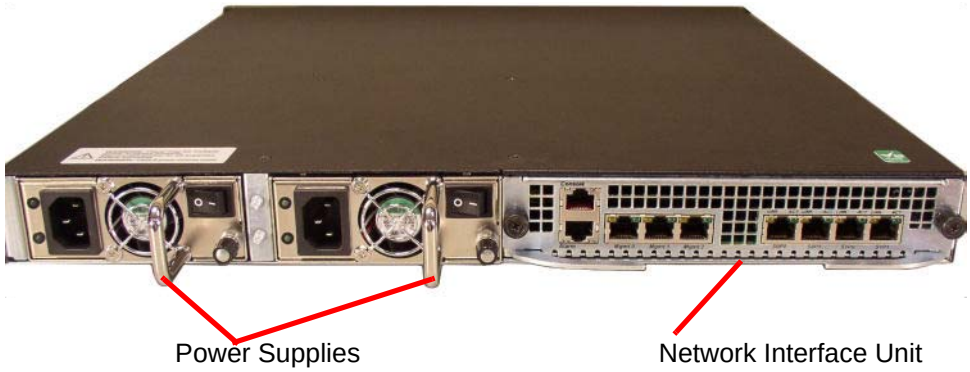


Figure 2 - 18. Main Rear Panel Components

Each of these two system components are described in subsequent sections of this chapter.

Network Interface Unit

The Acme Packet 4500's network interface unit (NIU) is located on the right side of the chassis's rear. The single, hot-pluggable NIU contains all media and management interfaces. Media interfaces are located on the right side of the card, while management interfaces are located on the left side of the card. A 4-port GbE Copper (RJ45) NIU is shown below.

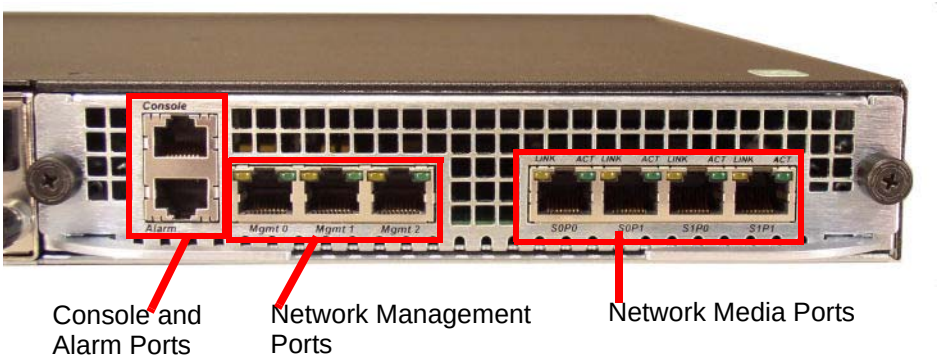


Figure 2 - 19. Rear Panel Ports

Small form-factor pluggable (SFP) network ports on an SFP NIU are in the same position as in the network media ports in the previous image.

When facing the NIU, refer to the following diagram to determine slot and port numbering.

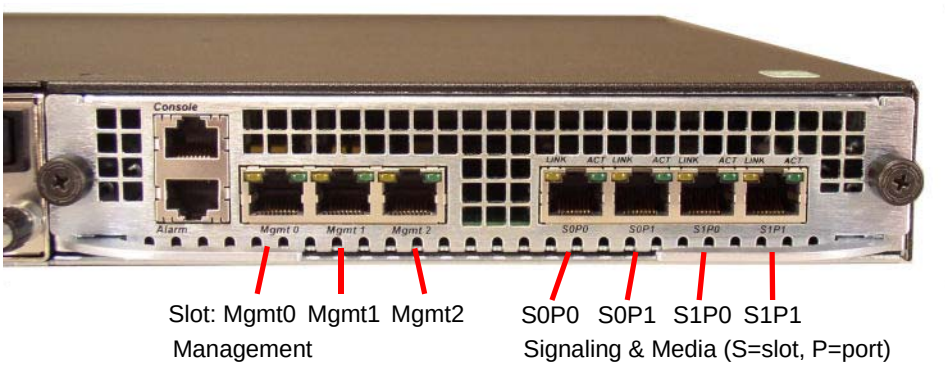


Figure 2 - 20. Management, Signaling and Media Port Assignments

Without powering down the Acme Packet 4500, you can exchange an NIU (for the same type of card) by removing and replacing it. Upon NIU removal, the Acme Packet 4500 enters an Out-of-Service state. After you reinsert the NIU and connect to the ACLI, you must reboot the system to return to service. This causes a soft-reboot rather than a system power cycle.

Console Port

The console port on the NIU provides console access to the Acme Packet 4500 over a RS-232C serial connection. The Acme Packet 4500 supports only one active serial console connection at a time. The rear console port is useful for customers who want permanent console access; the front console port provides easy access to the Acme Packet 4500 for a temporary connection.

Console port communication is used for administration and maintenance purposes from a central office (CO) location. Tasks conducted over a console port include:

- Creating the initial connection to the Acme Packet 4500
- Accessing and using all functionality available via the ACLI
- Performing in-lab system maintenance

Console Port Pin-out

Acme Packet 4500 console ports are accessed through one of the two RJ45 jacks on the system console. Because the Acme Packet 4500 does not employ any type of flow control on its RS-232 ports, only the RX, TX, and GND pins are used. The following table identifies the pin assignments and signal names/descriptions for the console connector.

Table 2 - 1.

Pin Number	Signal Name/Description
3	Receive Data (RX)
4	Ground (GND)
6	Transmit Data (TX)

Console Adapter

A standard RJ45 to DB-9 serial console adapter is shipped with your Acme Packet 4500. This adapter converts from an Ethernet cable's RJ45 plug to a standard DB-9

serial port jack, found on a PC or laptop. Any standard Ethernet cable can be used between the Acme Packet 4500 and the console adapter.

Figure 2 - 21. Console Adapter

Alarm Port

The alarm port on the NIU is a flexible interface that closes a circuit when a specific alarm level becomes active on the Acme Packet 4500. The Acme Packet 4500 features an alarm control signal interface that can be used in a CO location to indicate when internal alarms are generated. The Acme Packet 4500 uses alarm levels that correspond to three levels of service-disrupting incidents. When any of the three alarm levels is generated, the corresponding circuit for that level on the alarm port is closed.

Alarm Levels

The following table lists the three alarm levels:

Table 2 - 2. Alarm Severity Levels

Alarm Type	Description
Minor	Functionality has been impaired to a small degree (e.g., a single fan has failed).
Major	Pending failures or unexpected events (e.g., a loss of signal).
Critical	Catastrophic condition has occurred (e.g., the system is overheating).

The alarm port uses a standard RJ45 connector. Refer to the image of the Acme Packet 4500's rear panel in the "Rear Panel" section to see the location of the alarm port.

Alarm Port Pin-out

The following table lists the pin assignments for the alarm port using a RJ45 connector.

Table 2 - 3. Alarm Port Pin-Outs

Pin Number	Signal Name/Description
1	Minor Alarm (Pin 1)
2	Minor Alarm (Pin 2)
3	Major Alarm (Pin 1)
4	Major Alarm (Pin 2)
5	Critical Alarm (Pin 1)
6	Critical Alarm (Pin 2)

Table 2 - 3. Alarm Port Pin-Outs

Pin Number	Signal Name/Description
7	Ground
8	Ground

Network Management Ports

The Acme Packet 4500 has three 10/100/1000 Base-T Ethernet ports located on the NIU. These ports are used for EMS control, RADIUS accounting, CLI management, SNMP queries and traps, and other management functions. Refer to the following image of the Acme Packet 4500's NIU to see the location of these Ethernet ports.

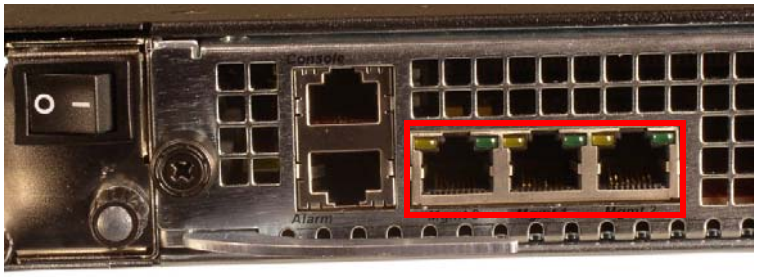


Figure 2 - 22. Ethernet Ports

Ethernet LED

Each Ethernet jack has two integrated LEDs: one to indicate Link, and one to indicate Activity. The LED pair is located directly above its associated port.

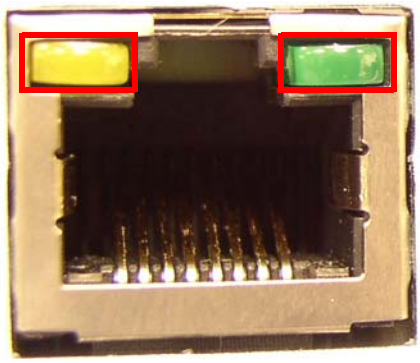


Figure 2 - 23. Ethernet LEDs (LNK at left and ACT at right)

Link LED

The link LED is located to the top left side of the Ethernet port. This LED illuminates orange when link has been established between the link partner device and the SBC.

Activity LED

The activity LED is located to the top right side of the Ethernet port. It illuminates green when an Ethernet connection has either transmit or receive packet activity.

Upon initial bootup, these Ethernet ports are not configured. You must first connect to the Acme Packet 4500 over a serial connection before you can configure the management Ethernet ports for use. You set up the management interfaces using

the physical and network interface configuration elements. Refer to the *System Configuration* chapter of the *Acme Packet Configuration Guide* for details.

Once the management network interface is configured, it should be reserved for the following:

- Maintenance activities
- Application log retrieval
- Software upgrades
- System configuration
- Telnet, SSH, SNMP, FTP, and SFTP connections
- RADIUS CDR transmission

It is recommended that you use shielded CAT5e or CAT6 Ethernet cables with RJ45 plugs for connecting to the rear-panel Acme Packet 4500 Ethernet interfaces. These Ethernet interfaces have a distance limitation of 328 feet (100 m), as defined by the FAST Ethernet standard, IEEE 802.3.

Signaling and Media Interfaces

The signaling and media interfaces provide network connectivity for signaling and media traffic. Each interface can connect to a network at GbE speeds. Network interface and hardware options differentiate the available NIU cards for order.

NIUs are available in the following configurations:

- 4-port 10/100/1000Mbps Copper (RJ45)
- 4-port GbE SFP (LX, SX, or Copper) [1000Mbps for SX, LX; 10/100/1000Mbps CX]
- 4-port GbE SFP with QoS and IPsec (LX, SX, or Copper)
- 4-port GbE SFP with IPsec (LX, SX, or Copper)

The optical GbE cards can accept an LC fiber connector using either single mode or multimode cable.

Mixed transceiver types are unsupported on SFP-based NIUs; all 4 ports are required to be populated with identical SFPs, based on compliance testing.

Power Components

The Acme Packet 4500 offers AC or DC power options for the Acme Packet 4500. The power supplies are user-replaceable, hot swappable components.

Power supplies are accessed from the rear panel of the system chassis. The right power supply is designated as power supply A, and the left power supply is designated as power supply B.

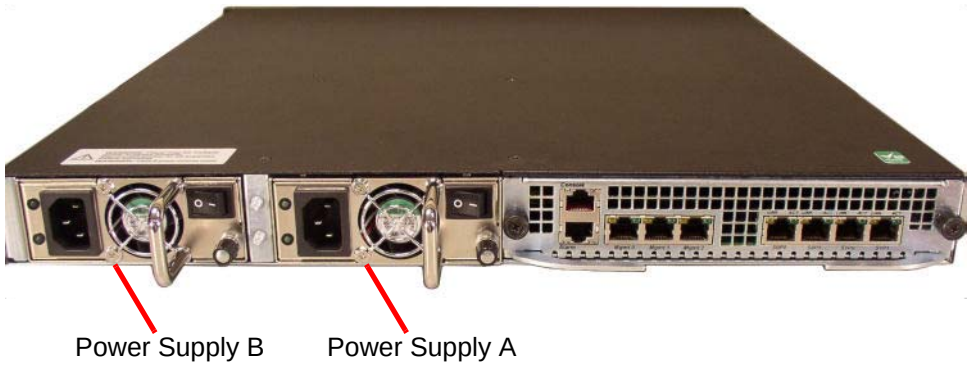


Figure 2 - 24. Power Supply Designations

Power Supply Redundancy

During normal operation, the Acme Packet 4500 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 4500 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 4500 starts up with only one power supply, it will not generate an alarm.

AC Power

The auto-sensing AC power supply is rated at 110-240 VAC, 50-60 Hz, and comes with an IEC connector. You insert and remove the power supply from the system chassis by its handle. Use the locking screw to lock the power supply into the chassis.

Figure 2 - 25. AC Power Supply Interface Components

AC Power Cords

Acme Packet ships all AC-powered Acme Packet 4500s with one 2 meter, 3-conductor 18 AWG power cord for each power supply. The power cord connects to the IEC-320 receptacle on the power supply.

DC Power

Acme Packet ships all DC-powered Acme Packet 4500s with one 8′ power cable with each power supply. The Acme Packet 4500 can be powered by central office –48 VDC operations with a DC-DC supply. You insert and remove the power supply from the

system chassis by its handle. Use the locking screw to lock the power supply into the chassis. A terminal block on the DC power supply serves as the DC power interconnect.

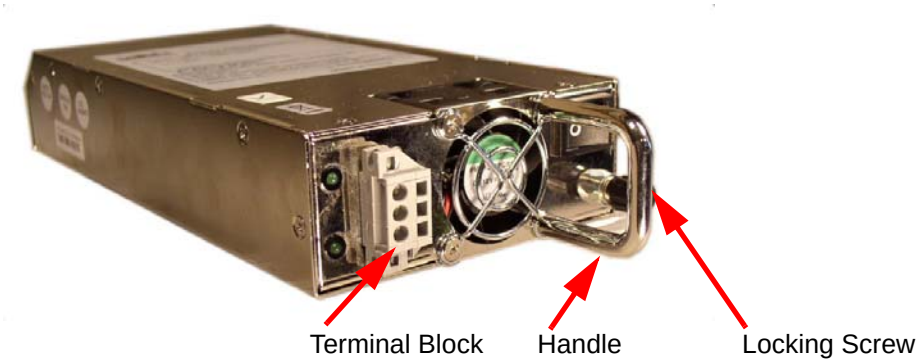


Figure 2 - 26. DC Power Supply Interface Components

DC Power Cords

A DC power cord ships with each DC power supply. A DC power cord must be 3-conductor, 18 AWG minimum rated for at least 140° F (60° C). The 3-conductor jacketed cable's DC power leads have are stripped (0.38″ / 10 mm) and tinned on each end that connect to the 3-position terminal block on the power supply. The supply end of each wire is stripped and tinned for attachment to your rack's circuit breaker or power supply.

The following table lists the DC power cord wire markings:

Table 2 - 4. DC Power Cord Wire Markings

Wire Color	Lead Designation (style-A DC Power Supply)	Lead Designation (style-B DC Power Supply)
Red	Return	+
White	Frame Ground	
Black	-48 VDC	-

Power Supply Switch

Power switches are located on the system's power supplies and face rearward from the Acme Packet 4500. The Acme Packet 4500 has no other power switches. For normal operation, the switches on each power supply should be in the ON position. Flipping both switches to the OFF position immediately powers down the Acme Packet 4500. The side of the switch labeled with a 1 is *on* and 0 side is *off*.

Caution

Both power switches should remain in the ON position at all times. Do not touch a power supply switch unless specifically instructed to do so by your Acme Packet customer support representative.

Grounding Terminals

The grounding terminals are used to attach the Acme Packet 4500 chassis to a local earth ground. The terminals are located between the two power supplies on the chassis rear.

Cooling Components

The Acme Packet 4500 must remain well ventilated for reliable and continuous operation. The cooling features of the chassis include:

- Fan module
- Fan Filter

Fan Module

The Acme Packet 4500 chassis pulls cool ambient air into its 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 following figure shows the Acme Packet 4500's fan module. The fan module attaches to the chassis with two captive screws, and is powered by a connector that joins to the motherboard when screwed into the chassis. The air filter is not shown in this image.

Figure 2 - 27. Fan Module

The Acme Packet 4500 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. You can monitor the status of the fan speed from the Environment menu of the graphic display.

The fan module is a user-replaceable, hot-swappable component. If the Acme Packet 4500 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.

Air Filter

The Acme Packet 4500's foam air filter removes airborne particles before they are drawn into the system chassis.

Acme Packet4000 Series Hardware Architecture

The hardware architecture of the Acme Packet4000 series hardware architecture is depicted below. The Acme Packet4000 series hardware is purpose built for SBC applications and relies on state-of-the-art network processing and traffic management components to deliver the necessary platform for delivering security and scalable media processing.

The Network Processing (nP) subsystem is comprised of the network processors, traffic management, and content addressable memory (CAM). This subsystem hosts the media control module and is completely hardware based. Adjunct to the network processing components are the QoS engine for monitoring bearer QoS metrics.

The signaling processor subsystem is comprised of the host subsystem and associated memory (noted in red in the diagram). The session control functions including the session signaling layer, call routing and management elements are hosted on the signaling processor subsystem.

The separation of signaling and media processing is absolutely necessary for the following reasons:

- Guarantee media processing will never overwhelm signaling processing. Signaling processing performance is not impacted by media processing load as it is with single more monolithic solutions based on general purpose computing platforms.
- Protection of the signaling processing subsystem for overload and DoS attacks. When DoS attacks are detected, these attacks are policed and isolated in hardware.

  The following architectural diagram is a logical representation of the Acme Packet 4500. The Acme Packet 4500's Network Processor is physically one device.

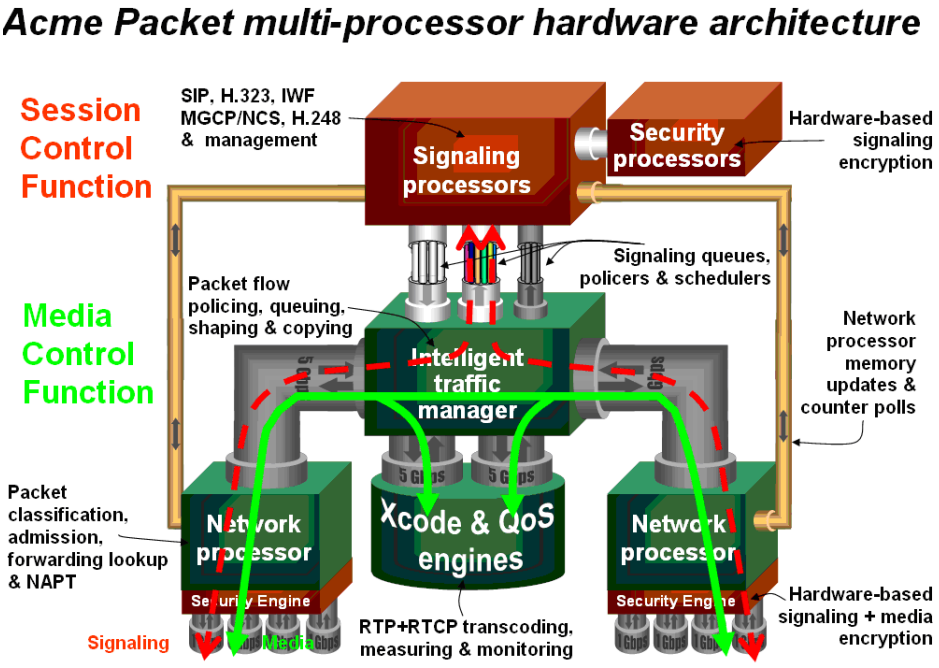


Figure 2 - 28. Acme Packet 4500 Hardware Architecture

3 Graphic Display

Graphic Display

The four-line graphic display on the Acme Packet 4500 front control panel is visible at all times. The buttons used to navigate the display are accessible as well. The graphic display reports real-time status, alarms, and general system information. You can view this information without using a console, Telnet, or SSH connection into the Acme Packet 4500.

Graphic Display Navigation

Three navigation buttons are located to the right of the display. These are used to scroll through display menus and select the information to view on the graphic display.

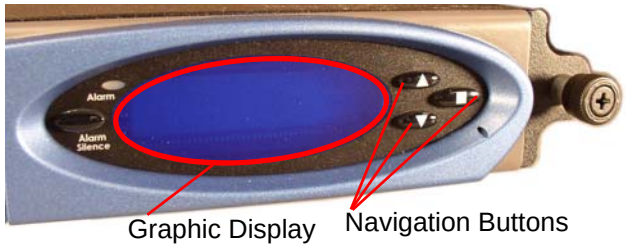


Figure 3 - 29. Graphic Display and Navigation Controls

The following table lists the function of each graphic display button.

Table 3 - 5. Navigation Buttons

Button		Description
	Up	Scrolls up through the previous menu or display items, one line at a time.
	Down	Scrolls down through the next menu or display items, one line at a time.
	Enter	Selects the menu or display item that appears in the graphic display window.

Display Modes

The Acme Packet 4500 graphic display defaults to one of two display modes:

- Base display is the default and indicates a properly-functioning Acme Packet 4500.
- Alarm mode becomes the default display mode when any alarms are active on the Acme Packet 4500. Active fault information is continuously displayed on the graphic display.

Base Display

The base display shows the type of Acme Packet 4500 running. This information appears when the system first starts up and when the graphic display times out at any menu level.

NET - NET
SESSION DIRECTOR

The base display of an Acme Packet 4500 in an HA node includes additional information applicable to its HA state. See the *Graphic Display Output for HA Nodes* section in this chapter.

Alarm Display

The alarm display replaces the base display during an alarm condition. The alarm display informs you of what symptoms are currently causing alarms. The number and type of alarms appear on the Acme Packet 4500 graphic display, which indicates either a link alarm or a hardware alarm. For example, if there are two link alarms present on the Acme Packet 4500, the display appears like this:

2 LINK ALARMS

If the graphic display indicates an alarm condition, you can use the ACLI **display-alarms** command to display the details of the alarm. When an alarm condition is cleared, the base display replaces the alarm display. To clear an alarm, you must execute the ACLI **clear-alarm** command or resolve the cause of the alarm.

Graphic Display Menus

The Acme Packet 4500 graphic display lets you access the five display menus for quick access to the system current status.

Top Menu

The top menu provides top-level access to information in distinct categories of system functionality.

To access the top menu from the base display or alarm display:

1. Press the **Enter** button. The first entry in the top menu appears.
2. Press the **Up** and **Down** buttons to scroll through the top menu categories. The top menu rolls over when you reach the top or bottom of the menu.

The top menu displays only one category at a time. You press the **Enter** button to select a displayed category and show its submenu information.

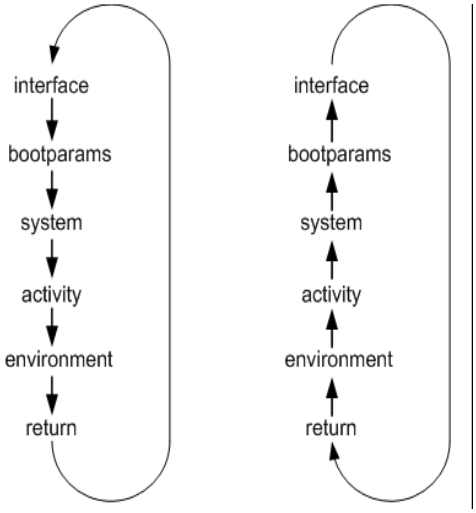


Figure 3 - 30. Navigating the Menus

After 30 seconds of displaying a menu option or submenu information without any user input, the system automatically returns to the base display during normal operating conditions or to the alarm display during an alarm condition.

The following diagram shows the complete menu of options available from the graphic display. Lines in black indicate results from pressing the **Up** or **Down** buttons. Lines in blue indicate results from pressing the **Enter** button.

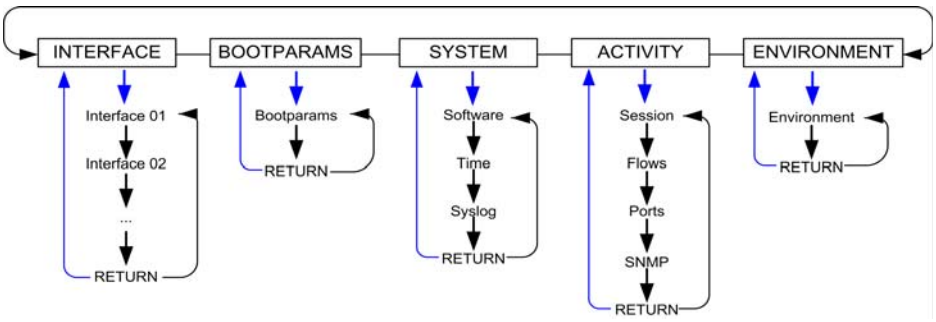


Figure 3 - 31. Available Global Menu Options

INTERFACE

The INTERFACE menu allows you to scroll through a list of all configured physical interfaces. The management and media physical interfaces appear in the list, as does the loopback interface.

The following information is displayed for each configured interface you scroll to:

- Interface slot and port: interface status
- Input packets, output packets
- Input error packets, output error packets

```
Slot 1: Port0 UP
PKT IN: 1,001K OUT: 223K
ERR IN: 0 OUT: 0
```

To use the INTERFACE menu in the graphic display:

1. From the top menu of the graphic display, press the **Enter** button.
2. Press the **Up** or **Down** button to scroll to the INTERFACE selection.
3. Press the **Enter** button.
4. Press the **Up** or **Down** button to scroll through the list of configured physical interfaces.
5. Press the **Enter** button to refresh the display.
6. Press the **Up** or **Down** button to scroll to the RETURN selection.
7. Press the **Enter** button to return to the Top Menu.

BOOT PARAMS

The BOOT PARAMS display allows you to view the same information configured in the **bootparam** ACLI configuration. The BOOT PARAMS selection displays the IP information necessary to connect to the first Ethernet interface, *eth0*, located on the rear of the Acme Packet 4500. This interface is used primarily for maintenance, configuration, and downloading software images.

The following information for eth0 is displayed under the BOOT PARAMS menu:

- IP address
- Netmask in hexadecimal format
- Gateway IP address

```
inet: 192.168.0.2
mask: ffff0000
gw: 192.168.0.1
```

To use the BOOT PARAMS menu in the graphic display:

1. From the top menu of the graphic display, press the **Enter** button.
2. Press the **Up** or **Down** button to scroll to the BOOT PARAMS selection.
3. Press the **Enter** button. The BOOT PARAMS information is displayed.
4. Press the **Up** or **Down** button to scroll to the RETURN selection.
5. Press the **Enter** button to return to the Top Menu.

SYSTEM

The SYSTEM display allows viewing system software, current time, and syslog information. The following information displays over three screens in the graphic display in the order listed:

- Screen 1 — Acme Packet 4500 software version and creation date:

  Software:
  ACME OS 6.0.0
  01/01/2008

- Screen 2 — Current time of day, uptime, memory utilization:

  Time 18:33:21
  UPTIME 10, 10:23:20
  MEMORY 65%

- Screen 3 — Syslog information (IP address:port of the syslog server and the netmask in dotted decimal notation):

  Syslog:
  192.168.121.12:514
  255.255.255.0

To use the SYSTEM menu in the graphic display:

1. From the top menu of the graphic display, press the **Enter** button.
2. Press the **Up** or **Down** button to scroll to the SYSTEM selection.
3. Press the **Enter** button. The first screen in the SYSTEM menu is displayed.
4. Press the **Up** or **Down** button to scroll through the three SYSTEM screens. You can press the **Enter** button on the Time screen to update its display.
5. Press the **Up** or **Down** button to scroll to the RETURN selection.
6. Press the **Enter** button to return to the Top Menu.

ACTIVITY

The ACTIVITY display allows you to scroll through current Acme Packet 4500 traffic statistics. These statistics provide a real-time snapshot of the capacity at which the system is operating.

The following information is displayed on the Acme Packet 4500 ACTIVITY display in the order listed:

- Screen 1 — Number of sessions, sessions per minute, sessions per hour:

  200 Sessions
  40 Sessions/Minute
  180 Sessions/Hour

- Screen 2 — Number of flows, flows per minute, flows per hour:

  400 Flows
  80 Flows/Minute
  360 Flows/Hour

- Screen 3 — Number of used ports, number of free ports:

  1000 Used Ports
  2000 Free Ports

- Screen 4 — SNMP information: number of SNMP packets received, number of SNMP traps sent out:

  SNMP:
  PKTs in :20
  TRAPs out :10

To use the ACTIVITY menu in the graphic display:

1. From the top menu of the graphic display, press the **Enter** button.
2. Press the **Up** or **Down** button to scroll to the ACTIVITY selection.
3. Press the **Enter** button. The first screen in the ACTIVITY menu is displayed.
4. Press the **Up** or **Down** button to scroll through the three ACTIVITY screens. You can press the **Enter** button on any of the screen to update the display with the most recent statistics.
5. Press the **Up** or **Down** button to scroll to the RETURN selection.
6. Press the **Enter** button to return to the Top Menu

ENVIRONMENT

The ENVIRONMENT display allows you to view information about the hardware operational status. The graphic display presents the following information in the order listed:

- Screen 1 — Hardware alarms and link Alarms:

  HW ALARM: 0
  LINK ALARM: 2

- Screen 2 — System temperature and fan speeds:

  TEMPERATURE: 38.00 C
  FAN SPEEDS:
  100% 100% 100% 100%

- Screen 3 — System voltages:

  VOLTAGES (V):
  1.099, 1.186
  1.488, 1.790
  2.458, 3.278, 4.982

To use the ENVIRONMENT menu in the graphic display:

1. From the top menu of the graphic display, press the **Enter** button.
2. Press the **Up** or **Down** buttons to scroll to the ENVIRONMENT selection.
3. Press the **Enter** button. The ENVIRONMENT information is displayed.
4. Press the **Up** or **Down** button to scroll to the RETURN selection.
5. Press the **Enter** button to return to the Top Menu

RETURN

Pressing the **Enter** button for the RETURN selection returns you to the base display during normal operating conditions or to the alarm display during an alarm condition.

Graphic Display Output for HA Nodes

The information included in this section only applies to high availability Acme Packet 4500 nodes. The graphic display on a Acme Packet 4500 in an HA node indicates the current HA state. Five state indications can be displayed on the graphic display. Only the Standby and Active state indications appear in the graphic display for more than a few seconds. An explanation and example of each HA state follows.

Initial State Displays

The following example shows the output in the graphic display window of an Acme Packet 4500 in the initial state:

NET - NET
SESSION DIRECTOR (I)

Out Of Service State Displays

The following example shows the output in the graphic display window of an out-of-service Acme Packet 4500:

NET - NET
SESSION DIRECTOR (O/S)

Becoming Standby State Displays

The following example shows the output in the graphic display window of a becoming standby Acme Packet 4500:

NET - NET
SESSION DIRECTOR (B/S)

Standby State Displays

The following example shows the output in the graphic display window of a standby Acme Packet 4500:

NET - NET
SESSION DIRECTOR (S)

Active State Displays

Acme Packet 4500s in the active state use the default graphic display. The following example shows the display of an active Acme Packet 4500:

NET - NET
SESSION DIRECTOR

4 System Installation

Introduction

This chapter provides information about how to install the Acme Packet 4500 and its associated components, includes cabling information.

Shipped Parts

Each Acme Packet 4500 ships in one box. Inside this box is the Acme Packet 4500 chassis and the accessory kit. The ordered NIU and power supplies are already installed in the chassis.

The following table lists the contents of one Acme Packet 4500 order.

Table 4 - 6. Acme Packet 4500 Shipping Container Contents

Location	Item
Main Shipping Box	Acme Packet chassis
Accessory Kit	• Console adapter • AC or DC power cords, one per power supply • Grounding cable with lug • Documentation CD • Hardware installation guide • Slide extender kit

Installation Tools and Parts

The following tools and parts are required to install the Acme Packet 4500 into your equipment rack.

- #1 Phillips-head screwdriver
- #2 Phillips-head screwdriver
- 2.5 mm flat-head screwdriver (DC power option)
- ESD wrist strap
- Rack and associated mounting hardware
- Shielded Ethernet CAT5e or CAT6 RJ45 cables

Recommended Tools and Parts

It is recommended that you have the following parts on hand:

- Cable labels
- UPS for AC installations

Pre-Installation

Caution

The Acme Packet 4500 shall only be installed in a restricted access location.

The Acme Packet 4500 must have access to reliable power and cooling. When choosing a location for your Acme Packet 4500, follow the guidelines listed in this section.

Environmental Guidelines

When preparing to install your Acme Packet 4500:

- Ensure that the equipment rack location complies with the specifications detailed in the *Environmental Specifications* section of the *Specifications* chapter of this guide.
- Locate the Acme Packet 4500 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 4500:

- Ensure that the installation location has access to adequate power and grounding. Separate circuits should be available for each of the Acme Packet 4500 power supplies.
- Acme Packet 4500s may only be powered by AC or DC circuits at one time; mixed power configurations are unsupported.
- Never use extension cords when powering a Acme Packet 4500.
- Use grounded, three-conductor circuits.
- A local earth ground must be available.

Caution

Connect each of the Acme Packet 4500 power supplies to a separate circuit. If both supplies are connected to outlets on the same circuit, the Acme Packet 4500 will lose power to both supplies if that circuit loses power. In that case, the whole Acme Packet 4500 would lose power.

Mounting Guidelines

When preparing to install the Acme Packet 4500, follow these mounting guidelines:

- Leave enough clearance (approximately 8" (20 cm)) in front of the equipment rack to allow access to the console connector, reset button, graphic display buttons, and physical interface card slots.
- Leave enough clearance (approximately 4" (10 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.
- Remember that the Ethernet interfaces are limited to 328 feet/100 meters as defined by the FAST Ethernet standard, IEEE 802.3.
- Use the contents of the Slide Extender Kit for cabinet-style, 4-post equipment racks that range in depth from 28" - 32".

Other Safety Guidelines

When preparing to install your Acme Packet 4500:

- Review the precautions detailed in the *Safety* chapter of this guide *before* beginning installation.
- 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 4500 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.

Mounting Installation

Overview

This section explains how to unpack and install your Acme Packet 4500 in a telecommunications or server equipment rack. The Acme Packet 4500 standard mounting hardware is used for installation in a 19" 4-post, cabinet-style equipment rack. Mounting hardware for a 23" equipment rack is available by special order.

Mounting Options

The Acme Packet 4500 ships with hardware for mounting in 4-post tapped-hole equipment rack or square-hole equipment rack. The Acme Packet 4500 also ships with hardware for mounting in a 2-post center-mount equipment rack. This section explains the procedures for each mounting option.

Caution

Failure to follow the instructions outlined in this section might compromise the proper functioning of the Acme Packet 4500. To prevent personal injury, it is recommended that two people lift and install the chassis into the equipment rack.

Unpacking the Acme Packet 4500

To unpack the Acme Packet 4500:

1. Inspect the external packing materials and note if they are damaged in any way.
2. Open the exterior box.
3. Unpack the contents of the Acme Packet 4500 shipment.
4. Locate the packing list that comes with the Acme Packet 4500 shipment, located outside of shipment box #1.
5. Confirm that all of the components listed in the shipping box contents tables are present and in good condition.

   If you discover that any of the parts are missing or were damaged in shipment, send an email to tac@acmepacket.com to request assistance.

Mounting Hardware

The following are images of hardware used for the Acme Packet 4500 mounting procedures.

- Front mounting ears (2 x shipped) are for use win fastening the chassis to the equipment rack.

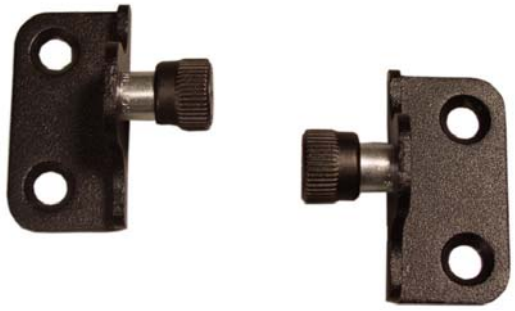


Figure 4 - 32. Front Mounting Ears

- The mounting slide assembly (2 x shipped), as shipped, with chassis slide inserted into stationary slide holds each side of the chassis to the equipment rack.

Figure 4 - 33. Mounting Slide Assembly

- Stationary Slide only (2 x shipped) are mounted on the equipment rack and are used to slide a chassis into place along the chassis slides.

Figure 4 - 34. Stationary Slide

- The chassis slide (2 x shipped) is installed onto the side of the chassis and slides into the stationary slide to hold the chassis in an equipment rack.

Figure 4 - 35. Chassis Slide

- The Slide Extender Kit (2 x shipped) is used to extend the length of the stationary slide.

Figure 4 - 36. Slide Extender Kit

- The nut bar is for use in attaching the chassis slide rail to the equipment rack.

Figure 4 - 37. Nut Bar

- The mounting spacer (2 x shipped) is for use in attaching the chassis slide rail to the equipment rack.

Figure 4 - 38. Mounting Spacer

- Assorted screws are for use in installing the chassis with the noted mounting hardware.

Phillips Screw 10-32 x 5/8” (8 x shipped):

Phillips Screw 6-32 x 5/16” (6 x shipped)

Flat Head Screw 10-32 x 5/16" (6 x shipped)

Figure 4 - 39. Assorted Screws

- Center mounting ears (2 x shipped) are used for mounting the chassis to a center-mount equipment rack.

Figure 4 - 40. Center Mounting Ears

Cabinet-Style 4-Post Chassis Installation

The following sections explain how to mount your Acme Packet 4500 in a cabinet-style, 4-post equipment rack.

Mounting System

Acme Packet provides flexible mounting options for your Acme Packet 4500 equipment rack installation.

Stationary slides are mounted on each side of the equipment rack. Complimentary chassis slides are mounted on each side of the Acme Packet 4500 chassis. Once the equipment rack and chassis hardware is in place, the chassis can be inserted along its slide rails into the equipment rack. When the Acme Packet 4500 is fully inserted into the equipment rack, it is secured in place with two thumbscrews.

Installing the Stationary Slides

In this first stage of system installation, secure the stationary slide to the equipment rack. The painted end of the stationary rail is attached to the front of the equipment rack and the bare steel side is attached to the rear of the equipment rack. The stationary rail can expand and contract to accommodate equipment racks of various depths.

The stationary rail is mounted to both tapped hole rack rails and square rack rails. Follow the appropriate procedure below according to your rack type.

Slide Extender Installation

This section applies to both tapped- and square-hole installations. If the distance between the front and rear rails of the equipment rack is between 28″ and 32″ (71.1 cm and 81.3 cm), the slide extenders are required for mounting the system. Attach these slide extenders to the stationary slides as a preliminary step in the Acme Packet 4500 installation.

To install a slide extender on a stationary slide:

1. Locate the following components in the slide extender bag:
   - 2 x slide extenders
   - 4 x 10-32 x 3/8″ screws with square cone washer

2. Align the threaded clinch nuts on the slide extender to the unpainted flange of the stationary slide.

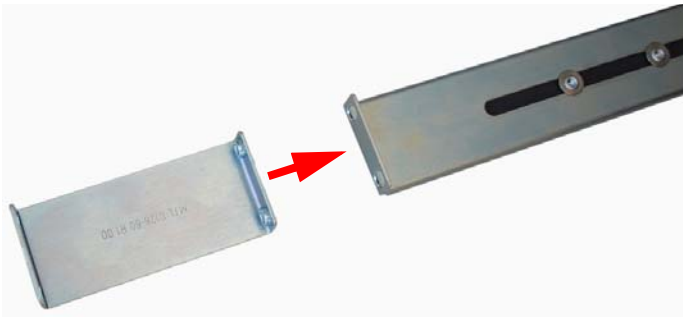


Figure 4 - 41. Attaching the Slide Extender

3. Insert and secure both of the screws through the stationary rail flange into the slide extender. Be sure to torque these screws generously for a secure mounting.

Figure 4 - 42. Slide Extender Attached

4. Repeat steps 2 and 3 on the other stationary slide. A completed slide should resemble the following image.

Figure 4 - 43. Completed Chassis Slide with Extender Attached

Tapped Hole Rack Installation

This section explains how to mount the Acme Packet 4500 mounting rail assembly in a tapped hole equipment rack.

To install the stationary rails on the front of a tapped hole equipment rack:

1. Locate the following components:
   - 2 x stationary rail sections
   - 4 x 10-32 x 5/8″ screws
   - 2 x mounting spacers

2. Align the painted side of the stationary rail with an appropriate mount point on the front of the equipment rack.

Figure 4 - 44. Aligning the Stationary Rail with the Equipment Rack Holes

3. Place 2 x 10-32 screws through the mounting spacer and through the stationary rail ear.
4. Screw in and secure the stationary rail to the equipment rack. Refer to the following exploded view of the procedure.

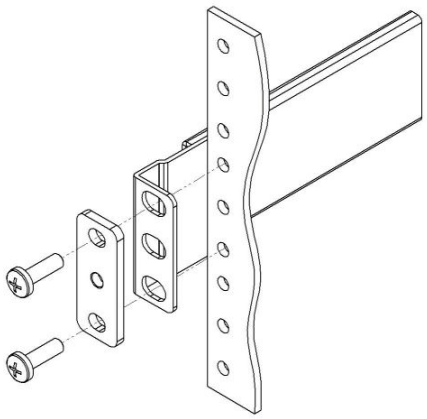


Figure 4 - 45. Exploded View of Assembly Detail

Do not completely torque the screws; leave a small amount of play at this point.

5. Repeat Steps 3 and 4 for the other mounting point.

Figure 4 - 46. Stationary Rail Attached to Equipment Rack

6. Repeat this procedure for the other stationary slide. Your rack should resemble the following image.

Figure 4 - 47. Rack with Stationary Rails Installed

To install the stationary rails on the rear of a tapped hole equipment rack:

1. Locate the following components:
   - 4 x 10-32 x 5/8″ screws

2. Expand and align the unpainted side of the stationary rail on the outside of the rear rack rail at the same height used for the front mount point.

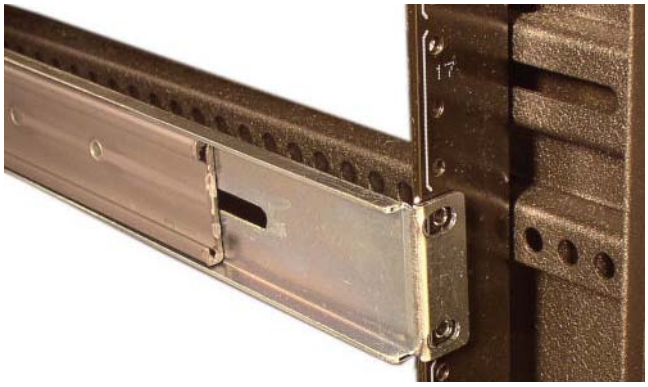


Figure 4 - 48. Aligning the Stationary Rail with the Equipment Rack

3. Place one 10-32 screw through the stationary rail ear and screw it in place.
4. Repeat Step 3 for the other mounting point.

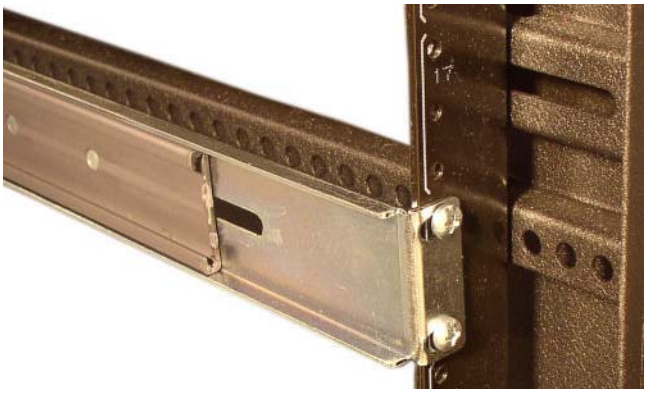


Figure 4 - 49. Attached Stationary Rail

5. Repeat this procedure for the rear of the other stationary slide.

   A stationary rail with slide extender installed in an equipment rack is shown below.

Figure 4 - 50. Stationary Slide with Slide Extender Attached to Rack

Your rack should resemble the following image.

Figure 4 - 51. Stationary Slides and Extenders Installed in Equipment Rack

Square Hole Rack Installation

This section explains how to mount the Acme Packet 4500 mounting rail assembly in a square hole equipment rack. You can use 10-32 cage nuts as an alternative to the provided nut bars, but they must be mounted prior to this procedure.

To install the stationary rails on the front of a square hole equipment rack:

1. Locate the following components:
   - 2 x stationary rail sections
   - 4 x 10-32 x 5/8″ screws
   - 2 x mounting spacers
   - 2 x nut bars
2. Align the painted side of the stationary rail with an appropriate mount point on the front of the equipment rack.

Figure 4 - 52. Aligning the Stationary Rail with the Equipment Rack

3. Place 2 x 10-32 screws through the mounting spacer, through the stationary rail ear, and through the square rack rail.
4. Hold the nut bar behind the front rack rail.

5. Secure the 10-32 screw to the nut bar you are holding in place. Refer to the following exploded view of the procedure.

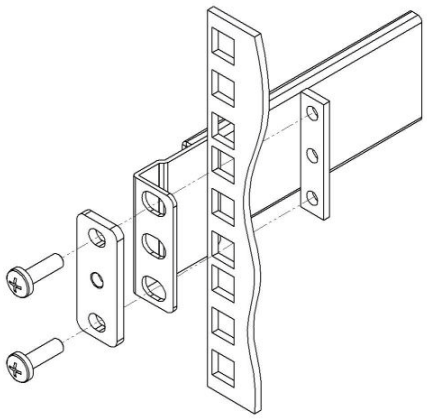


Figure 4 - 53. Securing the Screws and Nut Bar to the Stationary Rail and Rack

Do not completely torque the screws; leave a small amount of play at this point.

6. Repeat Steps 3 - 5 for the other mounting point.

Figure 4 - 54. Stationary Slide Securely Attached to the Equipment Rack

7. Repeat this procedure for the other stationary slide

To install the stationary rails on the rear of a square-hole equipment rack:

Note: The images used in this procedure refer to the stationary slide without slide extenders installed. The procedure is essentially the same with the slide extender flange placed on the outside of the rear rack rail.

1. Locate the following components:
   - 4 x 10-32 x 5/8″ screws
   - 2 x nut bar

2. Expand and align the unpainted side of the stationary rail ear on the outside of the rear rack rail at the height used for the front mount point.

Figure 4 - 55. Aligning the Stationary Rail with the Equipment Rack

3. Hold the nut bar behind the rear rack rail.
4. Place 2 x 10-32 screws through the stationary rail ear and screw in place.
5. Repeat this procedure for the rear of the other stationary slide.

Installing the Chassis Ears and Slides

In this second portion of system installation, two chassis ears and two chassis slides are secured to the Acme Packet 4500 chassis.

To install the chassis rails on the Acme Packet 4500 chassis:

1. Locate the following components:
   - 4 x 10-32 x 5/16" flat head (black) screws
   - 2 x front mounting ears
   - 6 x 6-32 x 5/16″ screws
   - 2 x chassis slides
2. Align one chassis ear with the tapped holes as shown in the following image. Position the chassis ear spring-loaded thumbscrew toward the front panel of the system.

Figure 4 - 56. Tapped Holes on Side of Chassis for Attachment of Chassis Slide

3. Use 2 x 10-32 x 5/16" flat head screws to secure the chassis ear to the chassis. The final installation resembles the image below.

Figure 4 - 57. Chassis Ear Secured to the Chassis

4. Align the chassis slide with the Acme Packet 4500 side panel. Position the large marker hole at the front of the slide with the Acme Packet 4500 chassis. The remaining three tapped holes will align with the holes in the slide. The following image points out the tapped holes used for mounting the chassis slide.

Figure 4 - 58. Mount Points for Installing the Chassis Slide

5. Use 3 x 6-32 x 5/16″ screws to secure the chassis slide to the chassis. Notice that the large hole in the slide (at right) is positioned toward the front of the Acme Packet 4500 chassis.

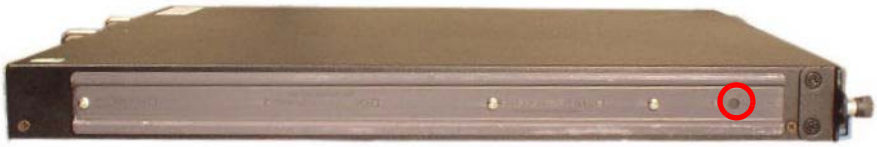


Figure 4 - 59. Chassis Slide Installed on Chassis

6. Repeat this procedure for the other side of the Acme Packet 4500 chassis.

Installing the Chassis in the Rack

You now lift the Acme Packet 4500 and install it into the rack. To prevent personal injury or damage to the Acme Packet 4500, follow these guidelines:

- This installation requires two people and should not be attempted otherwise.
- Follow your organization's best practices for lifting and installing heavy components into an equipment rack.
- Ensure that the Acme Packet 4500 chassis remains supported until you have completely installed it into the equipment rack.

To install the Acme Packet 4500 chassis in the equipment rack:

1. Lift the Acme Packet 4500 into the correct position in the equipment rack.
2. Insert the chassis slides into the stationary slides.

Figure 4 - 60. Chassis Slide Mount Points

3. Push the Acme Packet 4500 fully into the equipment rack.

Figure 4 - 61. Installing the Chassis into the Equipment Rack

4. Align the chassis-mounted thumbscrews with the threads on the mounting spacer. You may have to adjust the spacer locations before they align with the Acme Packet 4500 captive screws.
5. Once correctly positioned, screw the thumbscrews into the mounting spacer and secure the chassis in the rack.
6. Fully tighten all 4, 10-32 x 5/8" front screws that hold the stationary rails to the rack.

Center-Mount 2-Post Chassis Installation

The following sections explain how to mount your Acme Packet 4500 in a center-mount, 2-post equipment rack. The Acme Packet 4500 in a center mount installation is pictured below.

Figure 4 - 62. Center-Mounted Chassis

Installing the Center-mount Hardware

Center mounting ears are attached to each side of the Acme Packet 4500. These mounting ears are reversible, and are not mated to a specific side of the chassis. While the Acme Packet 4500 is shipped with all mounting hardware for attaching the rack ears to the chassis, you must obtain and use the appropriate hardware recommended by the equipment rack manufacturer for mounting the system in the rack.

To install your Acme Packet 4500 in a center-mount configuration:

1. Locate the following components:
   - 2 x center-mounting ears
   - 6 x 10-32 x 5/16" flat head (black) screws

2. Line up one chassis ear with the tapped holes as shown in the following image. The three screw holes will only align with the ear in one direction.

Figure 4 - 63. Tapped Holes in Chassis for Center Mounting the Chassis

3. Use 3 x 10-32 x 5/16" flat head (black) screws to secure the chassis ear to the chassis. Final installation resembles the image below.

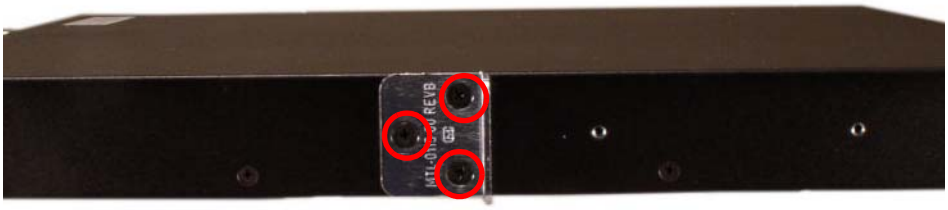


Figure 4 - 64. Center Mounting Ears Attached to the Acme Packet 4500

4. Repeat this procedure for the other side of the Acme Packet 4500 chassis.

Installing the Chassis in the Rack

Lift the Acme Packet 4500 and install it into the rack according to the following procedure. To prevent personal injury or damage to the Acme Packet 4500, follow these guidelines:

- This installation requires two people and should not be attempted otherwise.
- Follow your organization's best practices for lifting and installing heavy components into an equipment rack.
- Ensure that the Acme Packet 4500 chassis remains supported until you have completely installed it into the equipment rack.

To install the Acme Packet 4500 chassis into an equipment rack:

1. Locate the following components:
   - 4 x equipment rack screws
2. Lift the Acme Packet 4500 into the correct position in the equipment rack.

3. Screw the mounting ears on the Acme Packet 4500 into the equipment rack using four rack screws. One person should hold the Acme Packet 4500 in the correct position, and another person should screw the Acme Packet 4500 in place.

Figure 4 - 65. Acme Packet 4500 Center-Mounted in a Two-Post Equipment Rack

Be sure that the Acme Packet 4500 chassis remains supported until you have completely installed it into the equipment rack.

Fan Module Installation

The fan module is pre-installed in the Acme Packet 4500 chassis when it ships. There is no need to remove the fan module prior to installation. In case this part needs service or replacement, you can remove and replace it with a functioning one.

To learn how to remove and replace the fan module, refer to the *Fan Module and Filter Maintenance* section in the *Maintenance* chapter of this guide.

Ground and Power Cable Installation

The Acme Packet 4500 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. Physical harm or problems with system functionality may occur on Acme Packet 4500s that are not properly grounded. If your Acme Packet 4500 chassis is not properly grounded, it can exhibit unpredictable problems such as:

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

Caution

Failure to ground the chassis properly can result in permanent damage to the Acme Packet 4500 and its components. Bodily harm may also result under some circumstances.

Caution

The Acme Packet 4500 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 between the two power supplies on the rear of the chassis. The Acme Packet 4500 ships with two 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 4500.

Important: Acme Packet 4500 equipment is suitable for installation as part of a Common Bonding Network (CBN).

> **Note:** The Common Bonding Network (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.

To install the grounding cable on the Acme Packet 4500:

1. Unscrew and remove the two kep nuts from the grounding posts located on the rear of the Acme Packet 4500. Place them aside.

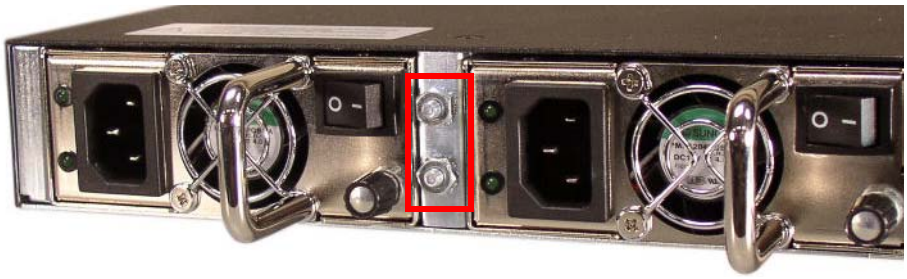


Figure 4 - 66. Kep Nuts on the Power Supply Ground Posts

2. Place the lug on the end of the grounding cable onto the grounding posts in the orientation shown in the following image.

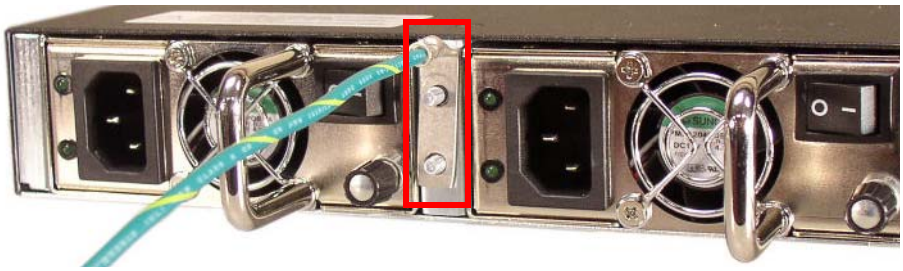


Figure 4 - 67. Aligning the Ground Cable on the Grounding Posts

3. Screw the two kep nuts onto the grounding post, securing the grounding lug in place. When attached correctly, the grounding lug fits snugly between the

chassis rear panel and the kep nuts.

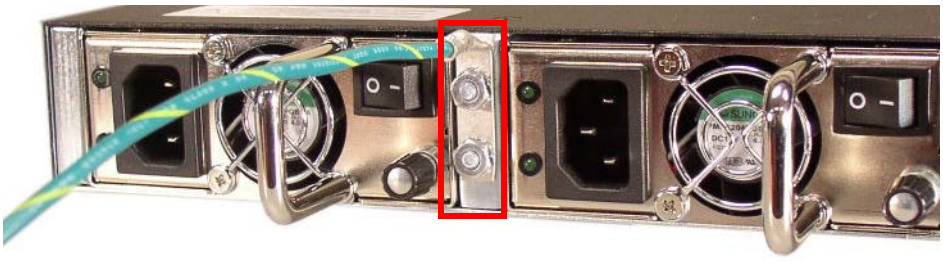


Figure 4 - 68. Ground Cables Secured to the Ground Posts

4. Connect the other end of the grounding wire to a suitable grounding point at your site.

Caution

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 shows you how to install an AC power cord.

Caution

Use a 5 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 AC power cords in the Acme Packet 4500:

1. Locate the two AC power cords shipped with your Acme Packet 4500. Choose one power supply to work on first.
2. Connect one power cord to the power supply by inserting the 3-lead IEC-320 plug into the IEC connector located on the power supply.

Figure 4 - 69. Connecting the Power Cord to Power Supply B

3. Connect the other power cord to the power supply by inserting the 3-lead IEC-320 plug into the IEC connector located on the power supply.

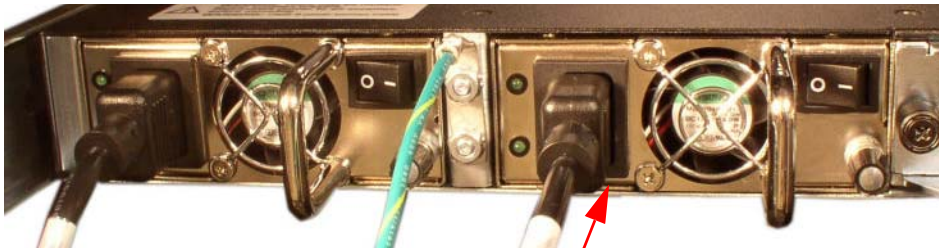


Figure 4 - 70. Connecting the Power Cord to Power Supply A

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.

Note: To remove AC power cables from the Acme Packet 4500, reverse the previous procedure.

DC Power Cord Installation

One DC 3-conductor power cable ships with each power supply. The DC power cable has three leads:

- black -48 VDC lead
- red return lead
- white frame ground lead

All leads are tinned on both ends. One end of each wire connects to the system DC power supply, and the other end of each wire is secured to a DC fuse panel.

You can cable the DC power supply out-of-chassis, and then insert the power supply and cable assembly into the Acme Packet 4500 chassis in one step. This method is easier than cabling the DC power supplies once they have been inserted into the chassis. Please refer to the *AC or DC Power Supply Removal* section for more information.

Note: A 2.5 mm flat-head screwdriver is required for this procedure.

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

Caution

Refer to the power supply polarity label when connecting it to a power source. Failure to do so can result in equipment damage or serious injury.

DC Power Terminal

The following shows the service panel of a DC power supply. Note that the terminal release slots are on the right side of the terminal unit, and the power terminals are on the left side of the terminal unit.

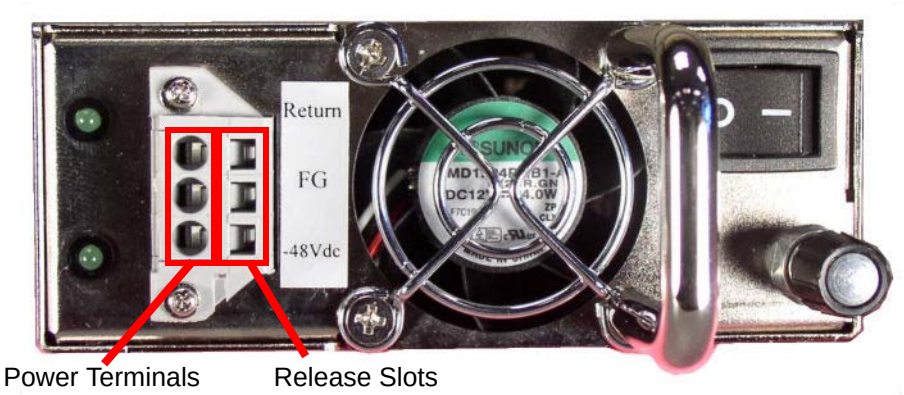


Figure 4 - 71. Power Terminals and Release Slots

Caution

Use a 10 Amp fused circuit for each DC power supply.

To install the DC power cable on a DC power supply:

1. Locate the two DC power cables shipped with your Acme Packet 4500.
2. Press the tip of a flat screwdriver into the terminal release slot, and push the screwdriver to the right to open the cage clamp.

Figure 4 - 72. Opening the Cage Clamp

3. While holding the cage clamp open with the screwdriver, insert the red lead into the topmost power terminal until only the insulation shows.

Figure 4 - 73. Inserting the Red Lead

4. Repeat Steps 2 and 3, with the white lead inserted into the middle terminal and the black lead inserted into the lower terminal.

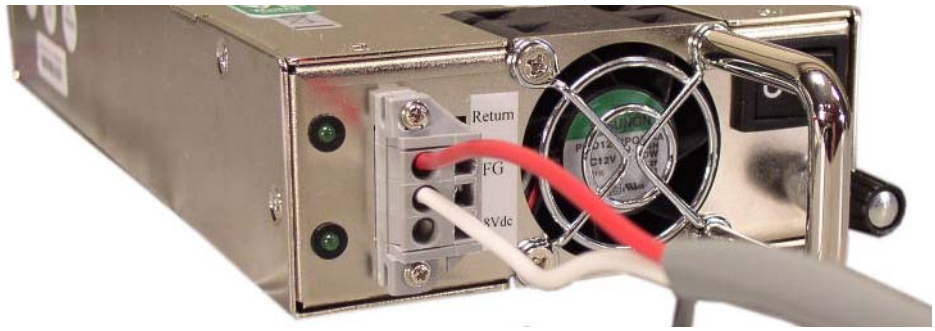


Figure 4 - 74. Inserting the Red and White Leads

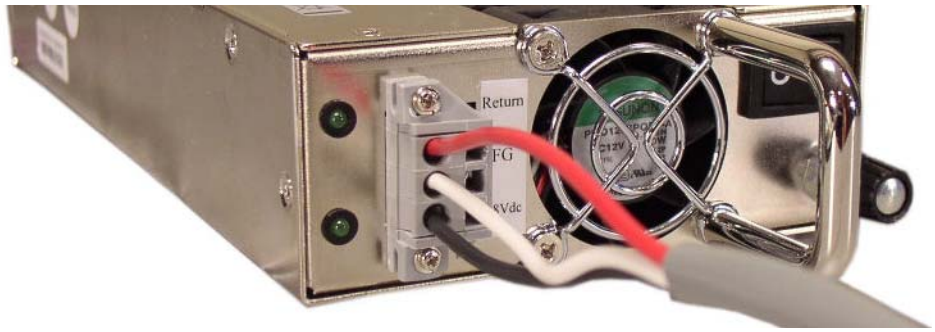


Figure 4 - 75. Red, White and Black Leads Inserted

5. Once the DC power supply is inserted into the chassis, route the DC power cord through your rack and cabling system to the -48 VDC power supply.
6. Connect the supply leads of the DC power cord to the DC power supply.

Cabling the Acme Packet 4500

After mounting the Acme Packet 4500 in an equipment rack and installing all components into the chassis, connect all appropriate data cables to the ports before powering the system up and configuring it.

It is recommended that you use fully shielded CAT5e or CAT6 Ethernet cables for NIU media and management Ethernet connections to protect the Acme Packet 4500 from potential damage.

You can install and remove Ethernet and GbE optical cables while the Acme Packet 4500 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.

Warning: The intra-building ports of this 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.

Note: Intra-building ports include Media and Signaling Network Interfaces, Network Management Ports, Alarm Ports, and Console Port.

Console Port

Note: Intra-building ports include Media and Signaling Network Interfaces, Network Management Ports, Alarm Ports, and Console Port.

The Acme Packet 4500 has two console ports, one mounted on the chassis front control panel and the other mounted on the rear-facing NIU. The Acme Packet 4500 ships with a console adapter that allows you to connect a standard DB-9 serial port to the Acme Packet 4500 RJ45 console port. Only one console port on the Acme Packet 4500 can be used at a time.

The console port located on the front panel is the default. This may be changed by configuration. Only one console port on the Acme Packet 4500 can be used at a time. Some text may be output to the non-active console port. This is normal. However, only input from the active console port can be recognized by the Acme Packet 3820.

Note: For bootloaders dated November 10, 2010 and later, on initial boot, if the rear console port is connected, a message is displayed instructing you to reconnect to the front console port.

The following image shows that all NIUs ship with a dust cover inserted in the console port. This is meant to direct the installer to use the front panel console port for initial configuration.

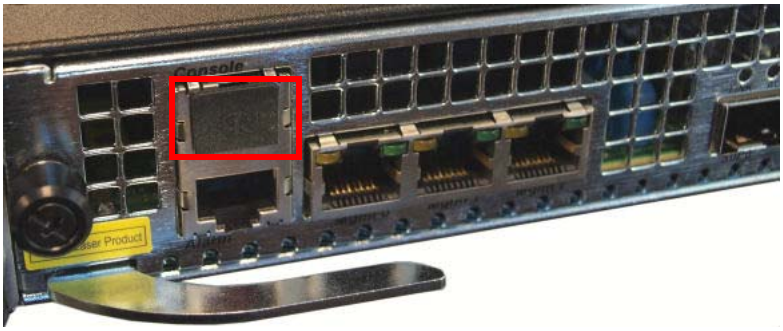


Figure 4 - 76. Dust Cover

NIU Console Cabling Procedure

This section explains how to create a serial connection to the Acme Packet 4500 NIU console port. Use the rear panel console port primarily for permanent connections to a terminal server or other serial device.

Refer to the *Startup* chapter of this guide for information on how to configure your terminal application to connect to the console.

To connect a console cable to the NIU console port:

1. Locate a shielded CAT5e or CAT6 console cable to connect to the Acme Packet 4500.
2. Remove the rubber dust cap from the NIU console port if present.

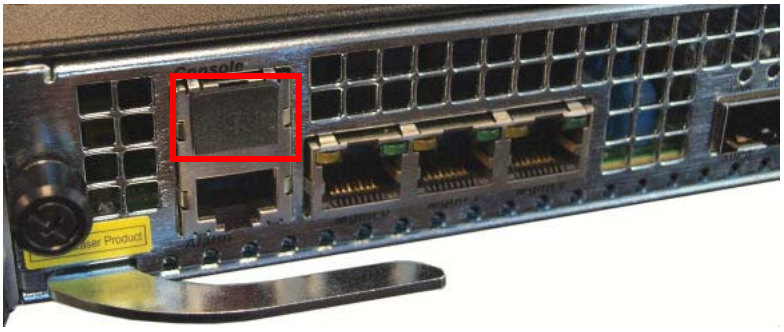


Figure 4 - 77. Console Port Dust Cap

3. Insert the RJ45 connector on the end of the console cable into the console port labeled *Console*. The release tab on the RJ45 jack clicks into place when you insert it properly.

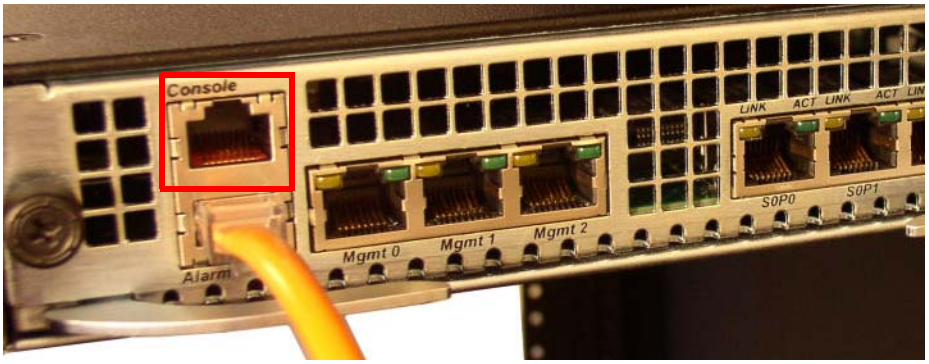


Figure 4 - 78. Rear Panel Console Port

4. Lead the console cable neatly away from the rear panel toward a terminal server or other component where this serial connection terminates.

   The following figure shows a Acme Packet 4500 with a console cable properly connected (in addition to the Alarm cable).

Figure 4 - 79. Console Cable Connected

Front Panel Console Cabling Procedure

This section explains how to create a serial connection to the Acme Packet 4500 front panel console port.

Refer to the *Startup* chapter of this guide for information on how to configure your terminal application to connect to the console.

To connect a console cable to the front panel console port:

1. Locate the console cable you plan to connect to the Acme Packet 4500.
2. Insert the RJ45 connector on the end of the console cable into the console port. The release tab on the RJ45 jack will click into place when you insert it properly.

Figure 4 - 80. Front Panel Console Port

Alarm Port Cabling

You can use the alarm port to indicate electrically when an alarm has been generated on the Acme Packet 4500. The alarm port contains leads for three circuits, each of which closes to signify a corresponding alarm. Refer to the *Component Overview* chapter in this document for a description of how to build an alarm cable and interface it with your monitoring system.

Cabling Procedure

To connect the alarm port cable to the NIU alarm port:

1. Locate the alarm contact cable you plan to connect to the Acme Packet 4500.
2. Insert the RJ45 connector on the end of the alarm port cable into the alarm port labeled *Alarm*. The release tab on the RJ45 jack clicks into place when you insert it properly.

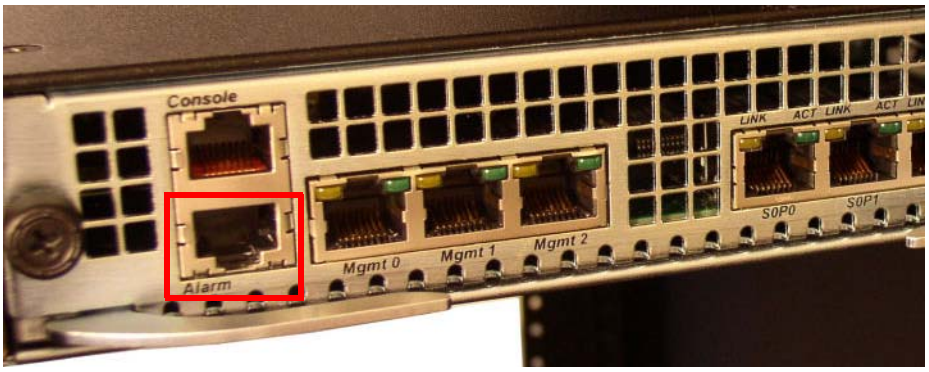


Figure 4 - 81. Alarm Port

3. Lead the alarm cable neatly away from the rear panel toward any alarm monitoring equipment.

The following figure shows a Acme Packet 4500 with an alarm cable properly connected.

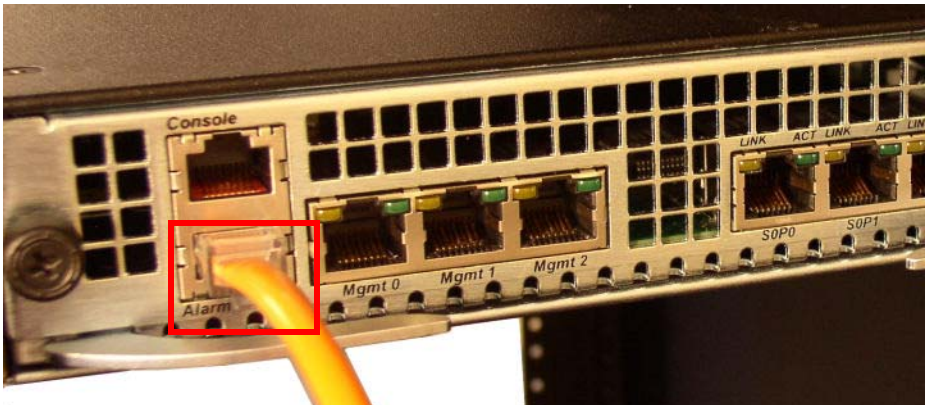


Figure 4 - 82. Connected Alarm Cable

Management Network Ports

Standard shielded CAT5e or CAT6 (or higher) Ethernet cables with RJ45 jacks are used for connecting the Acme Packet 4500 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.

Cabling Procedure

To connect Ethernet cables to the rear panel Ethernet ports:

1. Locate the Ethernet cables you plan to connect to the Acme Packet 4500.
2. Insert the RJ45 connector on the end of the Ethernet cable into one of the NIU management Ethernet ports. These ports are labeled *Mgmt0, Mgmt1,* and *Mgmt2*. The release tab on the RJ45 jack will click into place when you insert it properly.

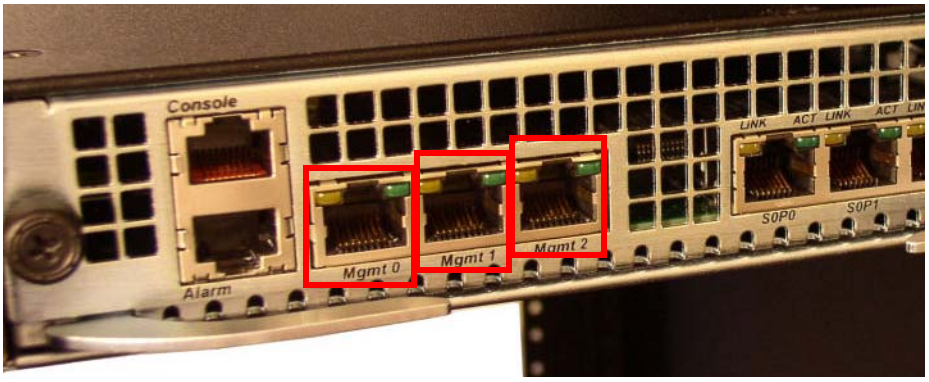


Figure 4 - 83. Rear Panel Ethernet Cable Ports

Route the cable away from the Acme Packet 4500 chassis. Make sure that the Ethernet cables are not stretched tightly or subject to extreme stress. The following figure shows a Acme Packet 4500 with a network management cable

properly connected and inserted in *Mgmt0* (in addition to the Alarm and Console cables).

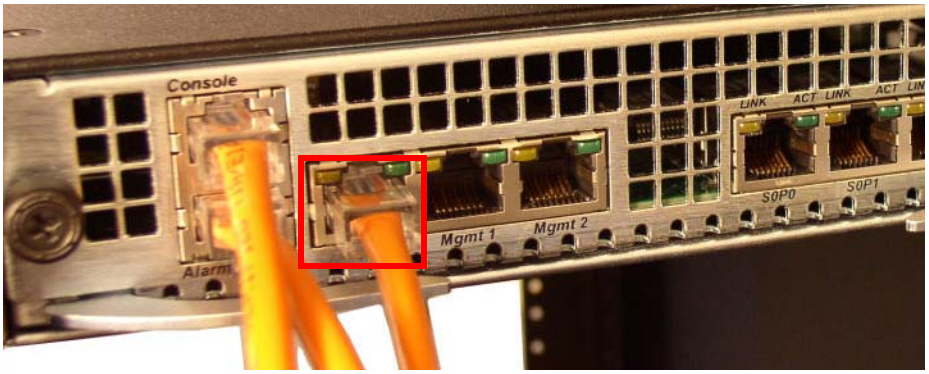


Figure 4 - 84. Connected Network Management Cable (Mgmt0)

3. Repeat Steps 1 through 2 for each additional management Ethernet cable you will connect to your Acme Packet 4500.

Media and Signaling Network Interfaces

This section explains how to cable the NIU for media and signaling. The NIU is available with either GbE copper or optical SFP Ethernet connectors.

Note: Perform all cabling procedures according to the established standards for your organization.

GbE Copper Cabling Procedure

Shielded CAT5e or CAT6 (or higher) Ethernet cables with RJ45 jacks are used for connecting the Acme Packet 4500 GbE copper NIUs to your production network.

To connect Ethernet cables to the GbE copper ports on the NIU:

1. Locate the Ethernet cables you plan to connect to the Acme Packet 4500.
2. Insert the RJ45 connector on the end of the Ethernet cable into one of the GbE copper NIU media and signaling ports. The release tab on the RJ45 jack will click into place when you insert it properly. These media and signaling ports from left to right are labeled: *S0P0*, *S0P1*, *S1P0*, *S1P1*.

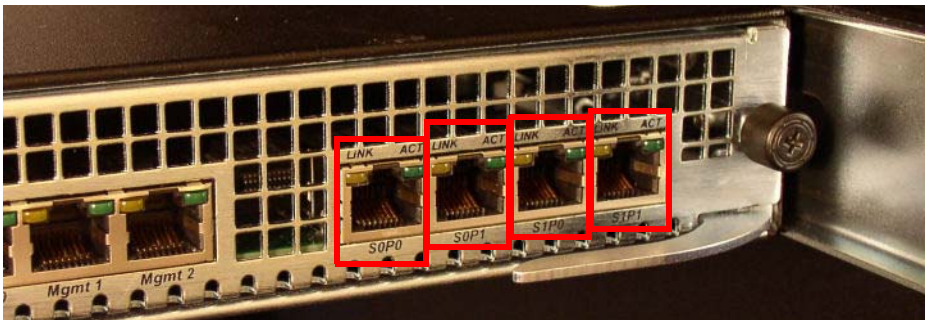


Figure 4 - 85. Media and Signaling Ports

Route the cable away from the Acme Packet 4500. Make sure that the Ethernet cables are not stretched tightly or subjected to extreme stress.

The following figure shows a Acme Packet 4500 with media network cable properly connected and inserted in *S0P0*.

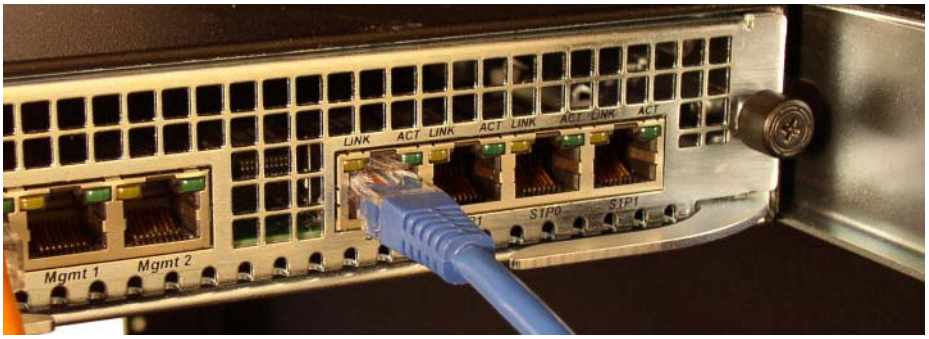


Figure 4 - 86. Connected S0P0 Port

3. Repeat Steps 1 through 2 for each additional Ethernet cable you connect to your Acme Packet 4500.

GbE SFP Optical Cabling Procedure

This section explains how to cable an Acme Packet 4500 configured with GbE optical NIUs. Standard single mode or multimode fiber optic cabling with duplex LC connectors are used to connect the SFP-based NIUs to your network.

Fiber Optic Cable Handling

When handling a fiber optic cable:

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

To connect network GbE optical cabling to the GbE optical physical interface cards:

1. Locate the GbE fiber optic cables you plan to connect to the Acme Packet 4500.
2. Insert the duplex LC connector on the end of the fiber cable into one of the NIU SFP optical transceivers. The connector should click and lock in place when you insert it properly. These media and signaling ports from left to right are labeled: *S0P0*, *S0P1*, *S1P0*, *S1P1*.

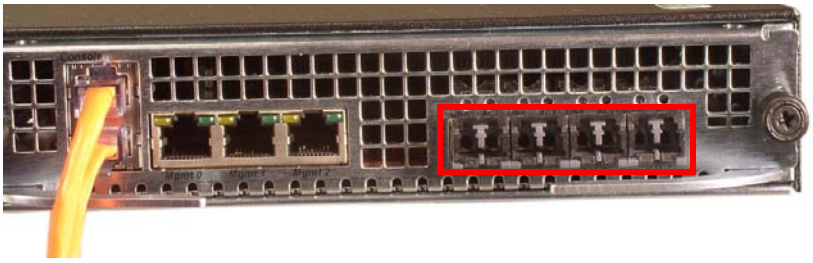


Figure 4 - 87. Optical Transceivers

3. Route the cable away from the Acme Packet 4500. Make sure that the fiber optic cables are not stretched tightly or subjected to extreme stress.

   The following figure shows a Acme Packet 4500 with media network cable properly connected and inserted in *S0P0*.

Figure 4 - 88. Connected S0P0 Optical Transceiver Connected

4. Repeat Steps 1 through 2 for each additional fiber optic cable you connect to your Acme Packet 4500.

Cabling for HA Deployments

The information and instructions in this section explain how to cable an HA node.

HA Cabling

Category 5 (or higher) shielded Ethernet cables are required for cabling two HA nodes together.

Rear Panel Cabling

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, Mgmt0 should be reserved as the boot/maintenance interface. This leaves Mgmt1 and Mgmt2 available for sharing HA information.

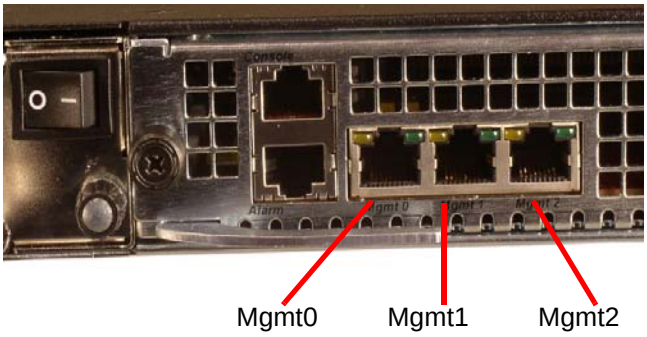


Figure 4 - 89.

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

To cable Acme Packet 4500s in an HA configuration using single rear interface support:

1. Insert one end of an Ethernet cable into either Mgmt1 or Mgmt2 on the rear panel of the SBC1. The release tab on the RJ45 jack clicks into place when you insert it properly

2. Insert the other end of the Ethernet cable into the corresponding mgmt interface on the rear panel of the SBC2. The release tab on the RJ45 jack clicks into place when you insert it properly. If you use mgmt1 on SBC2, then you will connect it to mgmt1 on SBC2.

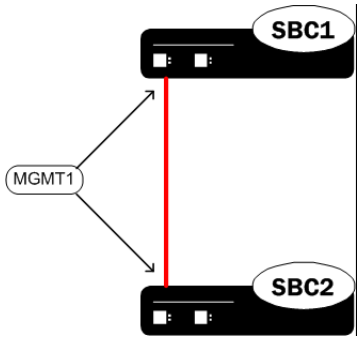


Figure 4 - 90. HA Configuration Using Single Rear Interface

3. Refer to the configuration procedures located in the *HA Nodes* chapter of the *Acme Packet Configuration Guide*.

To cable Acme Packet 4500s in an HA configuration using dual rear interface support:

1. Insert one end of an Ethernet cable into Mgmt1 on the rear panel of SBC1. The release tab on the RJ45 jack clicks into place when you insert it properly.
2. Insert the other end of the cable into the Mgmt1 port on the rear panel of SBC2. The release tab on the RJ45 jack clicks into place when you insert it properly.
3. Insert one end of a second Ethernet cable into Mgmt2 on the rear panel of SBC1. The release tab on the RJ45 jack clicks into place when you insert it properly.
4. Insert the other end of the cable into Mgmt2 on the rear panel of SBC2. The release tab on the RJ45 jack clicks into place when you insert it properly.

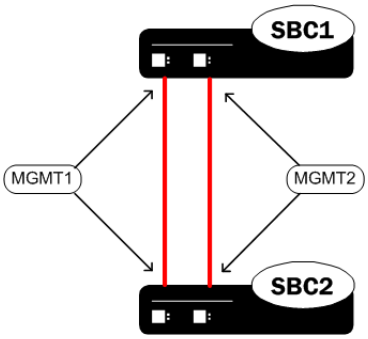


Figure 4 - 91. HA Configuration Using Dual Rear Interfaces

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

Media Cabling for HA Nodes

NIU media port cabling in an HA node depends on network topology. After a switchover between the two Acme Packet 4500s in an HA node, the standby system sends out an ARP message using a configured virtual MAC address, establishing that MAC on another physical port on the same Ethernet switch.

5 Startup

Introduction

This chapter describes Acme Packet 4500 startup which involves two tasks:

- Powering on the Acme Packet 4500.
- Creating the first console connection to the Acme Packet 4500.

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 4500 goes online.

The last section of this chapter explains how to log in 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 4500, you need to configure the terminal hardware/software appropriately. The following table lists your terminal application serial configurations.

Table 5 - 7. Required Serial Configuration of the Console Port Terminal

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 parameters to match the default parameters of the Acme Packet 4500 listed in the table above.
2. Refer the *Front Panel Console Cabling Procedure* section for how to connect your PC or terminal server to the Acme Packet 4500 console port. **You must connect to the front console port on initial boot.**

3. If the Acme Packet 4500 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 4500, you can watch the boot process as it displays on your screen.

Powering On the Acme Packet 4500

This section explains how to power on your Acme Packet 4500.

To power on the Acme Packet 4500 hardware:

1. Refer to the *Component Overview* chapter of this guide to learn how to connect your Acme Packet 4500 to either AC or DC power.
2. Flip the power supply switches on the rear panel of the Acme Packet 4500 to the ON position by pressing the 1 side of the switch. When operating with redundant power supplies, both power switches must be switched to the ON position either simultaneously or within a few seconds of each other. If the second power supply is switched on long enough after the first, an alarm is generated.

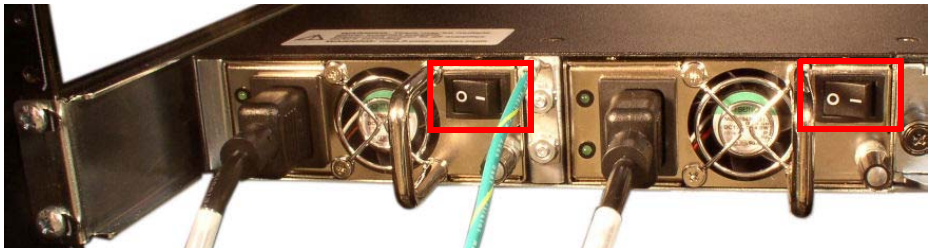


Figure 5 - 92. Power Switches (OFF Position)

3. The graphic display on the front control panel will begin to display information.

Initial Log on

Once you have established the console connection, powered on the Acme Packet 4500, and a runtime image has been loaded, you are ready to log in and begin configuring the system. After the Acme Packet 4500 has initialized, the ACLI login prompt appears in your terminal application as follows:

```
User Access Verification
Password:
```

If the Acme Packet 4500 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.

System access in the following procedure uses the default user and superuser passwords. If you do not have the default passwords, please send an E-mail to tac@acmepacket.com.

1. At the ACLI Password prompt, enter the default system User password and press <return>. Your entries are not echoed on the screen.

   ```
   User Access Verification

   Password:
   ACMEPACKET>
   ```

   From the User prompt you can view various configuration states and operating statistics on the Acme Packet 4500, but you perform configuration tasks.

2. Type **enable** and press <return> to enter superuser mode. The prompt to enter the superuser password appears.

   ```
   ACMEPACKET> enable
   Password:
   ```

3. Enter the superuser password and press <return>. The system prompt will ends with a pound sign instead of a closed-angle-bracket to let you know are in superuser mode.

   ```
   Password:
   ACMEPACKET#
   ```

4. You can now begin configuring your Acme Packet 4500. Refer to the *Acme Packet Configuration Guide* to learn how to establish an IP address for your Acme Packet 4500.

6 Maintenance

Introduction

This chapter explains Acme Packet 4500 hardware maintenance procedures. This chapter also provides hardware alarm information.

System Shut Down

Although several user-replaceable components of the Acme Packet 4500 are hot-swappable, some Acme Packet 4500 maintenance procedures require that you shut down the system.

Before you shut down or restart the Acme Packet 4500, ensure that there are no active calls in progress. Procedures to reroute call and network traffic around the Acme Packet 4500 are outside the scope of this guide.

You can set the Acme Packet 4500 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 can power off your Acme Packet 4500. Shutting down the system is appropriate when you are replacing a physical interface card, power supply, or are removing the Acme Packet 4500 from the equipment rack.

Rejecting Incoming Calls

To reject all incoming calls on the Acme Packet 4500:

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

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

After all call processing has stopped, you must halt the operating system before you power off your Acme Packet 4500 when running S-CZ software images. Shutting down the system is appropriate when you are replacing a physical interface card, storage device, power supply, or are removing the Acme Packet 6300 from the equipment rack.

Shutting down the Acme Packet 4500

1. In superuser mode, type **halt** and then press <Enter>, then answer **y** followed by <Enter> at the halt confirmation prompt.

```
ACMEPACKET# 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.
```

To shut down the Acme Packet 4500 hardware:

1. Exit the ACLI and close your console or network connection.
2. Turn off the power supply switches on the rear panel of the Acme Packet 4500 by pressing the 0 side of the switch.

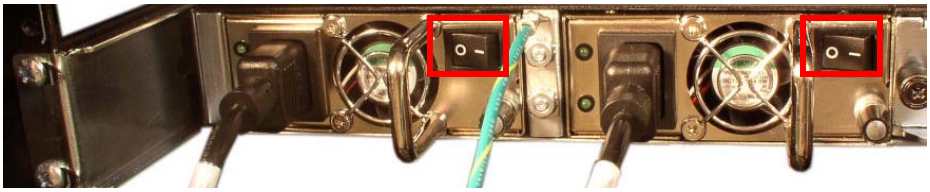


Figure 6 - 93. Power Supply Switches (highlighted in red)

Confirm that the graphic display is dark and all fans are off. You can now unplug the Acme Packet 4500 from its power supply and continue with maintenance procedures.

Rebooting, Resetting, and Power Cycling

Reboot

Rebooting the Acme Packet 4500 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 4500 is required every time you upgrade with a new version of the Acme Packet 4500 software.

Before rebooting the Acme Packet 4500, save your configurations. Refer to the *Maintenance and Troubleshooting Guide* for a full explanation of this procedure. 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 4500:

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
```

System Reset

Resetting the Acme Packet 4500 via the front of the chassis performs a cold reboot. This is the equivalent to disconnecting the power from the system and then reconnecting it. There is no orderly termination of tasks, and the system shuts down abruptly. You should only reset the Acme Packet 4500 when it becomes unstable and no other means of gaining administrative control is possible.

During a system reset, certain files are not closed properly, and they may become corrupted. Depending on what files become damaged, the system might become completely unusable.

Caution

Always try to first reboot the Acme Packet 4500 from the ACLI before performing a cold reset. Only reset the system as a last resort.

To reset the Acme Packet 4500:

1. Insert a rigid paperclip-sized tool into the small hole on the front of the chassis beneath the graphic display.

Figure 6 - 94. Reset Button

The system immediately resets and begins its initialization and boot sequence.

Power Cycling

Power Cycling the Acme Packet 4500 is the process of turning the chassis off then on from the switches on the power supplies or by equivalent means to remove power

from the system. 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.

Power cycling the Acme Packet 4500 without performing a **halt** operation can lead to data loss to the Storage Device when running S-CZ software images. 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.

Standby Mode for HA Nodes

When performing hardware maintenance on the Acme Packet 4500, it is best to minimize any risk of interrupting network traffic or losing data. If the Acme Packet 4500s are configured as an HA node, you should only work on the Acme Packet 4500 that is in standby mode.

There are two ways to determine the HA state of each Acme Packet 4500 in an HA pair.

1. If you are in the same physical location as the Acme Packet 4500s, you can view the graphic display on the front panel. The display will indicate HA state as explained in the Graphic Display Output for HA Nodes section of the *Graphic Display* chapter of this guide. There is no (S) designation for an active system, but there is for a standby system.
2. If you are not in the same physical location as the Acme Packet 4500s, you can use the ACLI **show health** command. The output of this command indicates the current HA state of the Acme Packet 4500.

Once you have determined that the Acme Packet 4500 due for maintenance is in standby mode, you can continue with the appropriate procedures to replace a part.

If you need to perform maintenance on the active Acme Packet 4500, you need to manually force the two Acme Packet 4500s to switch HA states. Forcing a switchover renders the currently active Acme Packet 4500 standby, and the currently standby Acme Packet 4500 will assume all traffic processing and forwarding as the active system.

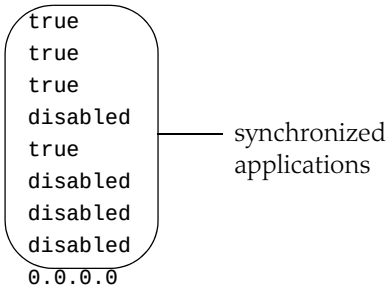
Caution

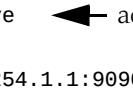
This procedure is only applicable to Acme Packet 4500s in an HA deployment.

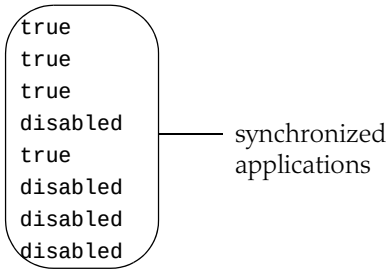
To force a Acme Packet 4500 into the standby HA state:

1. Confirm that the relevant systems on SBC1 and SBC2 are synchronized with the **show health** command. Type **show health** and press <Enter> on each system.

```
NETNETSBC1# show health

        Media Synchronized          true
        SIP Synchronized            true
        MGCP Synchronized           true
        H248 Synchronized           disabled
        Config Synchronized         true
        Collect Synchronized        disabled
        Radius CDR Synchronized     disabled
        Rotated CDRs Synchronized   disabled
        Active Peer Address         0.0.0.0

Redundancy Protocol Process (v3):
        State                         Active
        Health                        100
        Lowest Local Address          169.254.1.1:9090
        1 peer(s) on 2 socket(s):
        SML-STIC-45002: v3, Standby, health=100, max silence=1050
                       last received from 169.254.1.2 on wancom1:0

        Switchover log:
        Jun 25 19:03:02.029: Active to BecomingStandby
        Jun 25 19:04:54.684: Standby to BecomingActive
NETNETSBC1#

NETNETSBC2# show health

        Media Synchronized          true
        SIP Synchronized            true
        MGCP Synchronized           true
        H248 Synchronized           disabled
        Config Synchronized         true
        Collect Synchronized        disabled
        Radius CDR Synchronized     disabled
        Rotated CDRs Synchronized   disabled
        Active Peer Address         169.254.2.1

Redundancy Protocol Process (v3):
        State                         Standby
        Health                        100
        Lowest Local Address          169.254.1.2:9090
        1 peer(s) on 2 socket(s):
        SML-STIC-45001: v3, Active, health=100, max silence=1050
                       last received from 169.254.2.1 on wancom2:0

        Switchover log:
```







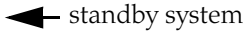


Figure 6 - 95. show health Command Output

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

```
NETNETSBC1# display-current-cfg-version
Current configuration version is 5
NETNETSBC1#

NETNETSBC2# display-current-cfg-version
Current configuration version is 5
NETNETSBC2#
```

   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 SBC1 and SBC2 running configurations match by typing **display-running-cfg-version** and pressing <Enter> at the ACLI prompt.

```
NETNETSBC1# display-running-cfg-version
Running configuration version is 5
NETNETSBC1#

NETNETSBC2# display-running-cfg-version
Running configuration version is 5
NETNETSBC2#
```

   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.

```
NETNETSBC1# notify berpd force
```

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

```
NETNETSBC2# show health
```

Refer to the "Upgrade" section of the *Maintenance and Troubleshooting Guide* (400-0063-40A) for more information.

Replacing an NIU in an HA Node

When replacing the NIU in an HA node, refer to the following procedure:

1. Prepare all equipment connected to the NIU for its removal from the network.
2. Force the system to standby state as described in the previous section.
3. Follow the procedures in the *NIU Removal and Replacement* section of this chapter.
4. Log in to the ACLI via a console connection.
5. Reboot the system from the ACLI.

When this Acme Packet 4500 returns online, it will synchronize HA state with the active HA node using the new NIU. You can confirm system state by using the **show health** command. Please refer to the *HA Functionality* section in the *Fault Management Chapter* of the *Acme Packet 4000 Maintenance and Troubleshooting Guide* for more information.

Chassis Removal

This section explains how to remove the Acme Packet 4500 from an equipment rack. To prevent injury, we recommend that any time a Acme Packet 4500 is installed or removed from an equipment rack, two people complete the procedure.

Caution

Always disconnect the Acme Packet 4500 power supplies from the power source when removing a chassis from an equipment rack.

Removing the Acme Packet 4500 from an Equipment Rack

Review the precautions detailed in the *Safety* chapter of this guide before proceeding.

To remove the Acme Packet 4500 from an equipment rack:

1. Turn the power supply switches to the OFF position.
2. Remove all power cables from the Acme Packet 4500.
3. Remove and label all attached network cables, alarm cable, and console cables from their respective ports on the chassis.
4. Unscrew the thumbscrews that secure the Acme Packet 4500 chassis to the rack rails. This may require using a #2 Phillips screwdriver.

Figure 6 - 96. Thumbscrews

Caution

Beginning in this step, one person should support the Acme Packet 4500 from below while the other person removes the system chassis from the equipment rack.

5. Pull the Acme Packet 4500 forward.
6. Unlock the clip from the chassis slide.
7. Pull the chassis forward to fully remove the equipment rack.
8. Lift the Acme Packet 4500 out of the equipment rack, and set it on a flat and stable surface.

Power Supply Removal and Replacement

This section explains how to remove and replace the power supplies in the Acme Packet 4500 chassis.

Caution

When removing or replacing a single power supply in a running chassis, ensure that its power switch is turned off first. Failure to turn off the power supply switch before insertion or removal may damage the system.

After physically switching off a power supply, disconnect it from the power source before you remove or install it in the chassis.

Caution

Both power supplies must be the same type AC or DC. The power supplies must be populated with two identical power supplies made by the same vendor. The vendor is identified by the label on top of the power supply.

The power supply is a user-replaceable component. If a Acme Packet 4500 power supply malfunctions, you should remove the malfunctioning power supply and replace it. The power supply can be removed from the chassis while still installed in the rack and while the second power supply is providing system power; this is called a *warm swap*. When removing and replacing a power supply, remember to first ground yourself using appropriate ESD grounding equipment such as a wrist or heel strap.

> **Note:** See *Power Components* for an explanation about power supply numbering.

For information regarding how to obtain a replacement power supply, contact your Acme Packet customer support representative directly or E-mail tac@acmepacket.com.

AC or DC Power Supply Removal

You can remove AC and DC power supplies with the same procedure once they are disconnected from their power source. The images used in the procedure below use an AC power supply.

> **Note:** You can have the system up and running during this procedure if you are changing out a defective power supply.

1. The system is up and running.
2. Locate the defective power supply.
3. Turn the power switch to the OFF position on the defective power supply only.
4. Follow the procedure below.

To remove a power supply from the Acme Packet 4500 chassis:

1. Remove the AC or DC power cables (see: *Ground and Power Cable Installation*) from the power supplies.
2. Turn the locking screw fully counterclockwise to unlock the power supply from the chassis. This may require 4-6 full turns.

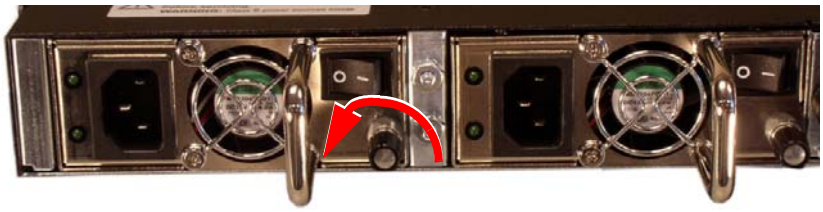


Figure 6 - 97. Unlocking the Locking Screw

3. Hold the removal handle and gently pull the power supply out of the power supply bay.

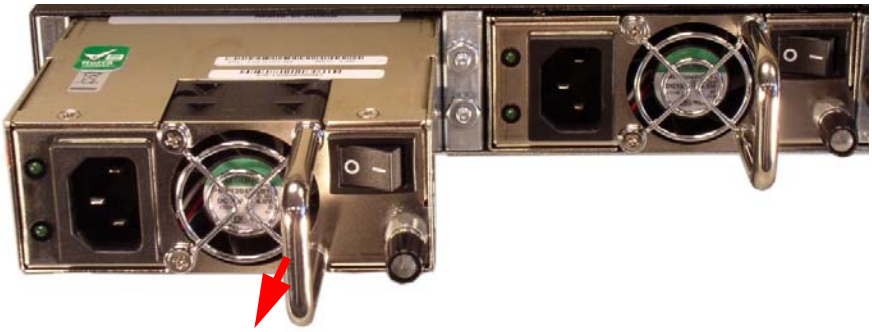


Figure 6 - 98. Removing the Power Supply

4. Continue to pull the power supply all the way out of the chassis until you have completely removed it.

Figure 6 - 99. Power Supply Removed

AC or DC Power Supply Replacement

You can replace AC and DC power supplies in the Acme Packet 4500 chassis by reversing the procedure to remove them. You can also install power supplies in the Acme Packet 4500 chassis before or after the chassis is mounted in an equipment rack. The images used in this section use an AC power supply for demonstration.

Caution

NEVER power up a power supply before it is installed in the Acme Packet 4500 chassis.

You can first perform the *DC Power Cord Installation* procedure prior to installing a DC power supply as extra leverage and space will be helpful for performing this task. If this ordering is used, DO NOT connect the supply end of the power cord to the power source before the power supply is installed in the Acme Packet 4500 chassis.

Ground yourself with an ESD wrist strap before installing a power supply.

To install a power supply in the Acme Packet 4500 chassis:

1. Locate the power supply.
2. Locate the empty power supply bay in the chassis.

Figure 6 - 100. Power Supply B Removed

3. Insert the power supply into the power supply bay located on the rear panel of the Acme Packet 4500 chassis in the orientation shown below.

Figure 6 - 101. Re-Installing Power Supply B

4. Turn the locking screw counterclockwise until it stops. This retracts the locking mechanism and the power supply can be completely inserted into the system chassis.

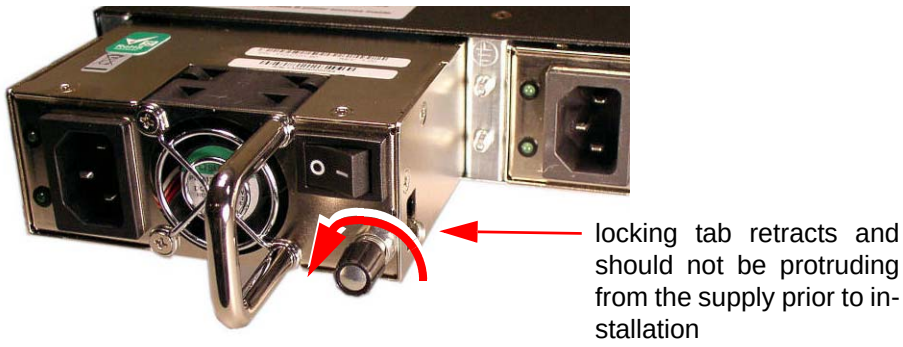


Figure 6 - 102. Unlocking Screw Position During Re-Installation

5. Continue pushing the power supply into the system chassis until it is fully inserted. It will be flush with the real panel.

Figure 6 - 103. Power Supply A and B Installed

6. Turn the locking screw fully clockwise until snug to lock the power supply into the chassis.

   Note: Connect the power cord to the inserted power supply as described in the *Ground and Power Cable Installation* section of the *System Installation* chapter of this guide.

Fan Module and Filter Maintenance

This section explains how to remove and replace the fan module and air filter on your Acme Packet 4500.

Removing and Replacing the Fan Module

The fan module is a user-serviceable, hot-swappable component. If the Acme Packet 4500 experiences a fan module malfunction, you must remove the existing fan module and replace it with a functional one.

The hot-swappable fan module removal and replacement procedures require that you have a replacement fan module on hand. In order to maintain system operations, you must be able to remove the malfunctioning fan module and quickly replace it with a functioning one to prevent the system from overheating.

Caution An over-temperature condition can stop packet processing.

If you do not have a replacement fan module nearby, always shut down the system and disconnect the power before removing the malfunctioning fan module to replace at a later time.

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

To remove the fan module:

1. Press two fingers against the left end of the plastic fan bezel and pull directly toward you. The fan bezel comes off of the chassis. Set the fan bezel aside.

Figure 6 - 104. Removing the Front Bezel

2. Pinch the black foam air filter at one of its corners and pull it directly away from the chassis. You will see the fan module.

Figure 6 - 105. Removing Air Filter from Chassis

3. Unscrew the two captive screws at each end of the fan module using a #2 Phillips screwdriver.

Figure 6 - 106. Air Filter Removed from Chassis

4. Holding the fan assembly pull tab, pull the module directly toward you, out of the chassis. This may require a firm tug.

Figure 6 - 107. Removing the Fan Module by the Pull Tab

5. Set the fan module aside on an ESD anti-static surface.

Replacing the Fan Module

To obtain a replacement fan module, contact your Acme Packet customer support representative directly or E-mail support@acmepacket.com.

Replacing the fan module is the reverse process as removing it.

To replace the fan module:

1. Note that the power connector should be on the lower side of the module when inserted into the Acme Packet 4500 chassis.

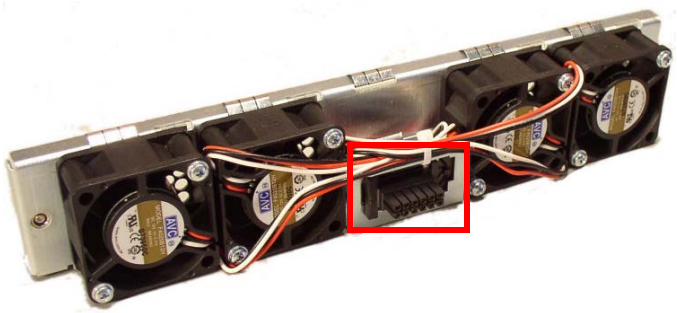


Figure 6 - 108. Fan Module Power Connector

2. Note the chassis-side power connector and threads where you will connect and secure the fan module.

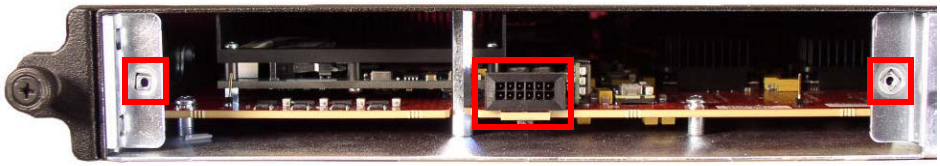


Figure 6 - 109. Attachment Points For Fan Module

3. Holding the pull tab on the fan module, insert the fan module squarely into the chassis. Continue to push the fan module into the Acme Packet 4500 until its panel lies flush with the Acme Packet 4500 rear panel. You will feel the module connector secure itself to the motherboard.

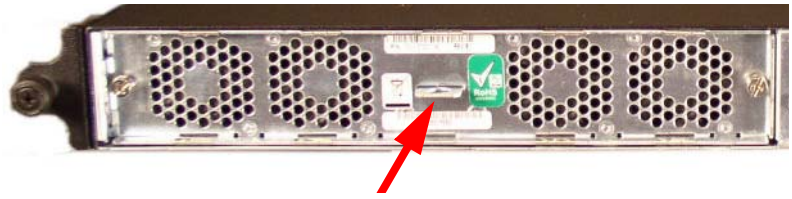


Figure 6 - 110. Re-Installing the Fan Module by Pushing on the Pull Tab

4. Screw the two captive screws through the fan module and into the chassis using a #2 Phillips screwdriver.

Figure 6 - 111. Tightening Thumbscrews

Note: Ensure that you hear the exhaust fans spinning and feel air exhausted through the rear of the chassis.

5. Place the black foam air filter onto the fan module, ensuring that the center slot in the air filter slides over the fan module pull tab.

Figure 6 - 112. Re-Installing the Air Filter

6. Insert the tab on the right-side of the fan bezel into the stationary control panel slot.
7. Pivot the fan bezel toward the chassis so that the left-side of the bezel clips snap into the chassis.

Figure 6 - 113. Re-Installing the Fan Bezel

Maintaining the Cooling Components

The Acme Packet 4500 air filter removes airborne particles before they are drawn into the Acme Packet 4500 chassis. To prevent system malfunction and prolong the life of the system cooling components, follow these guidelines:

- Clean or replace the air 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 4500 chassis. Cleaning the fan module requires that you remove the module itself. If you are not shutting down the Acme Packet 4500, this procedure must be performed quickly; otherwise, the system may overheat and cause packet processing to stop.

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

Cleaning the Cooling Components

To clean the fan module:

1. Refer to the instructions detailed in the section *Removing and Replacing the Fan Module* in this chapter to remove the fan module from the chassis.
2. Spray compressed air into the fan module to dislodge and blow away any contaminants and clean out the four fans.
3. Refer to the instruction detailed in the section *Removing and Replacing the Fan Module* in this chapter to replace the fan module.

To clean the perforated air inlets:

1. Remove the fan bezel from the chassis.
2. Gently wipe the front fan bezel that contains the perforated air inlets with a clean, dry cloth. You can alternatively remove the fan bezel from the system and use compressed air to clean out the perforated air inlets.

   Note: Only the removable fan bezel has vent holes that require cleaning.

Caution

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.

NIU Removal and Replacement

When possible, remove system power before removing and replacing an NIU. However, without powering down the Acme Packet 4500, you can exchange an NIU (for the same type of card) by removing and replacing it. Upon NIU removal, the Acme Packet 4500 enters an Out-of-Service state. After you reinsert the NIU and connect to the ACLI, you must reboot the system to return to service. This causes a soft-reboot rather than a system power cycle.

Caution

Make sure you are properly grounded with an ESD strap before removing the NIU.

NIU Removal

To remove an NIU:

1. Unplug all network and management cables from the NIU you plan to remove from the Acme Packet 4500 chassis.

   Note: This will cause a link loss on all connections.

2. Unscrew the two thumbscrews located on each side of the NIU with a #2 Phillips screwdriver. The screws are spring-loaded and will push forward, but they will not fall out of the NIU.

Figure 6 - 114. Loosening Thumbscrews

3. Pivot the two ejection levers outward at the same time, pulling the card out of its connection to the motherboard and away from the system chassis. This action disengages the NIU from the system, severing all electrical contact to the processing unit.

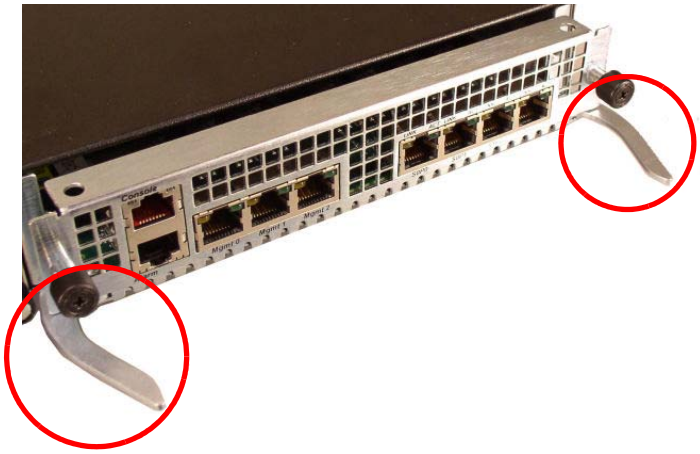


Figure 6 - 115. Pivoting Ejection Levers Outward

4. Pull the loosened NIU out of the Acme Packet 4500 chassis by holding each side of the NIU front panel.

Figure 6 - 116. Removing the NIU

5. Place the NIU in an antistatic bag while it remains outside of the Acme Packet 4500 chassis.

NIU Replacement

To install an NIU in the Acme Packet 4500 chassis:

1. Locate the NIU.
2. Ensure that the ejection levers on the front of the card are in the open and extended position.

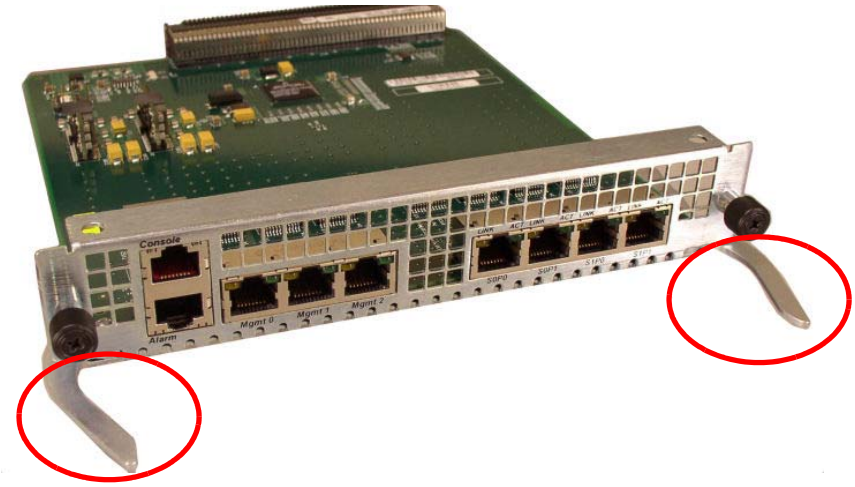


Figure 6 - 117. Ejection Levers in Open and Extended Position

3. Hold the NIU by its sides with the front panel bezel facing you.

4. Note the two flared guide rails that the NIU rides as it is inserted into the Acme Packet 4500 chassis. The guide rails guide the interface unit to engage the NIU bus connector squarely.

Figure 6 - 118. Guide Rails

5. Slide the card into the Acme Packet 4500 chassis. The physical interface card circuit board slides into the guide rails in the NIU bay of the system chassis.

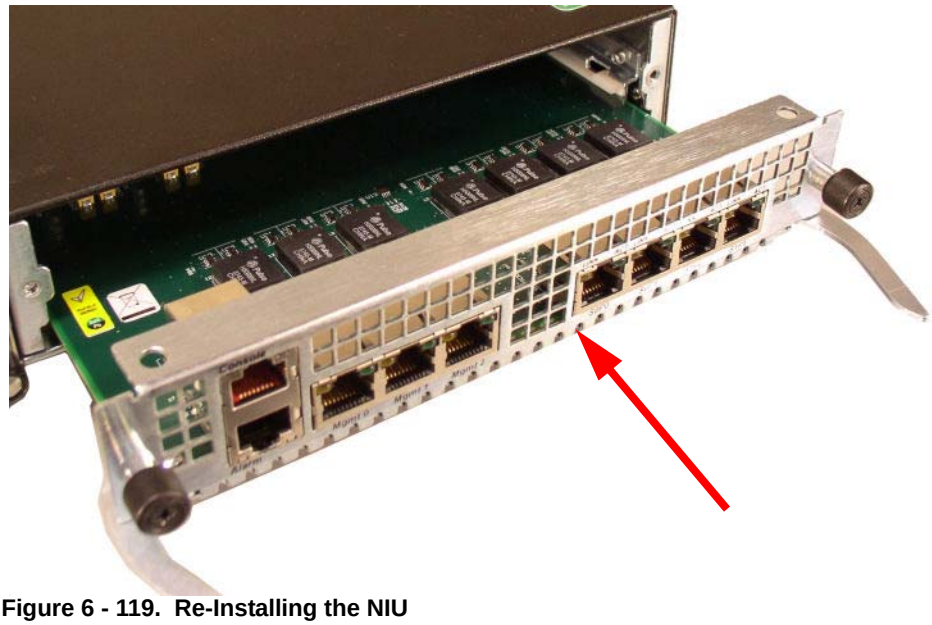


Figure 6 - 119. Re-Installing the NIU

6. Continue sliding the card into the chassis until the ejection levers catch the chassis. At this point, the ejection levers will start to fold inward as the NIU is inserted into the chassis.

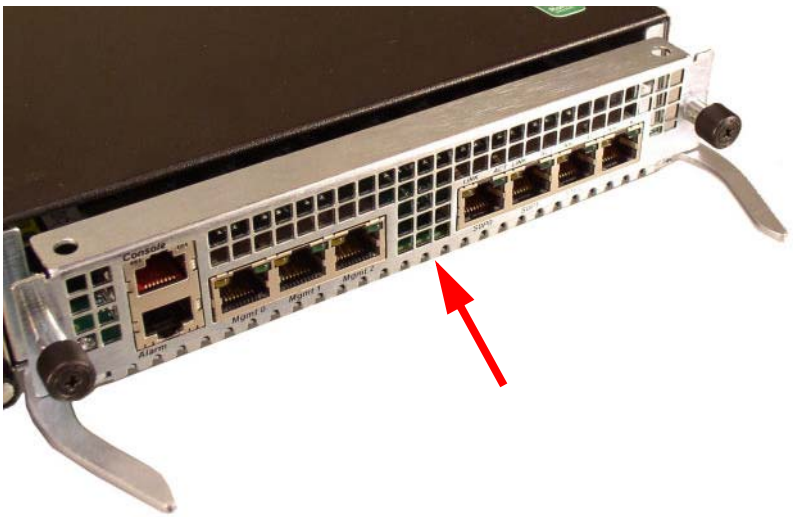


Figure 6 - 120. Installing the NIU

7. Fold both ejection levers inward toward the card to complete the connection to the motherboard. Pushing the ejection levers inward draws the physical interface card toward the system chassis and completes the connection.

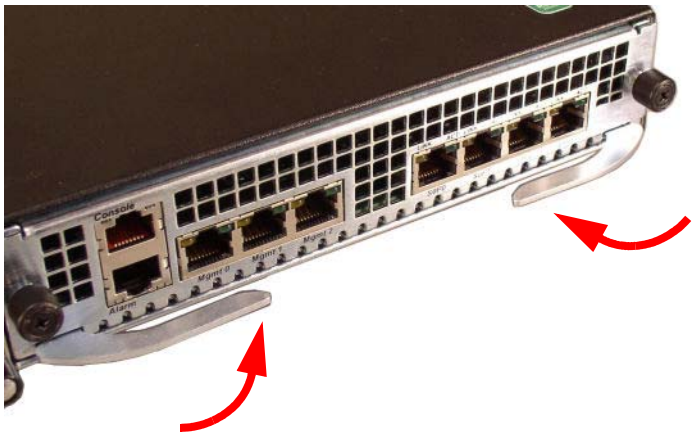


Figure 6 - 121. Securing Connection of NIU to Chassis

8. Screw the NIU into the chassis with a #2 Phillips screwdriver. This creates the final connection between the interface unit and the chassis.

Figure 6 - 122. Tightening Thumbscrews

9. Replace all network and management cabling.

Optical Transceiver Removal and Replacement

Your troubleshooting and diagnostics might reveal that the optical transceiver component of a GbE optical physical interface card needs to be replaced. The optical transceiver 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.

Optical transceivers are hot swappable and may be replaced while the Acme Packet 4500 is powered on. Leave the NIU in the Acme Packet 4500 as you extract the optical transceiver.

To obtain a replacement optical transceiver, contact your Acme Packet sales representative directly or by E-mail at tac@acmepacket.com.

SFP Media Signaling Interfaces

This section describes the media signaling interfaces, small form factor pluggable. The signaling and media interface, provide network connectivity for the signaling and media traffic. Each interface can connect to a network at gigabit Ethernet speeds.

NIU 4500 card information

- Copper RJ45 cable is inserted into the NIU4500 card.
- 4- port 10/100/1000Mbps card, the three different transceivers are inserted in to the NIU4500 card.

SFP Information

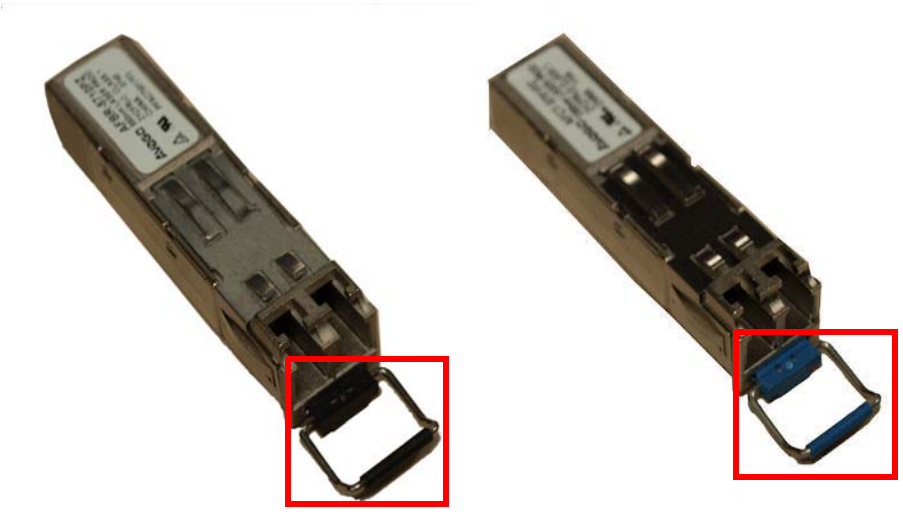
Only transceivers qualified by acme packet can be used in the Acme Packet 4500. Mixed transceiver types are unsupported. All four transceiver locations must be populated with the same SFP type based on compliance testing.

4-port gigabit Ethernet copper SFP LX, SX, or Copper [1000Mbps for SX, LX; 10/100/1000Mbps CX] These three transceiver types are inserted into the NIU4500 card.

- 850nm 550m multi-mode fiber SX. Check the label on the back of the SFP for this information to make sure you have the right mode transceiver.
- 1310nm 10km single-mode fiber LX. Check the label on the back of the SFP for this information to make sure you have the right mode transceiver.

SFP Identification

The following images show the multi mode and single mode SFP transceivers used in the Acme Packet 4500 NIU 4500 cards.



Black latch means the SFP is a multi mode transceiver. SX 850 nm 550 m multi-mode label is on the back.It uses an orange colored fiber optic cable.

Blue latch means the SFP is a single-mode transceiver. LX 1310 nm 10 km single-mode label is on the back. It uses a yellow colored fiber optic cable.

Figure 6 - 123. Identifying SFPs by Latch Color

SFP Identification

The following image shows a gigabit Ethernet copper SFP transceiver used in the Acme Packet 4500 NIU4500 cards and uses a cat 5 or 6 Ethernet cable.

Figure 6 - 124. GbE Copper SFP

Media Cables

This section describes the media signaling interface, fiber optic and copper cables used on the NIU4500 cards. Each transceiver type multi mode, single mode and copper take a different fiber optic cable. You must use the right fiber optic cable for the right transceiver. The fiber optic cables only ship from Acme Packet if you order them.

Cable Information

Three different fiber optic cables used on the Acme Packet 4500 media cards.

- Multi-mode transceivers take an orange fiber optic cable.
- Single-mode transceivers take a yellow fiber optic cable.
- Copper transceiver take cat 5 or 6 Ethernet cable.

Cable Identification

- SX Multi mode orange colored fiber optic cable 62.5/125

Figure 6 - 125. SX Multi Mode FIber Optic Cable

- LX Single mode yellow colored fiber optic cable 9/125

Figure 6 - 126. LX Single Mode Fiber Optic Cable

- Copper category 5 or 6 Ethernet cable

Figure 6 - 127. Cat 5/6 Ethernet Cable

Caution

To prevent damage to the optical lens, We recommend that the protective dust cover stay on the optical transceiver port when the GbE physical interface card is not cabled.

Removing an Optical Transceiver

To remove the optical transceiver on an NIU SFP port:

1. Unplug all GbE fiber optic cables from the optical transceiver to be replaced.

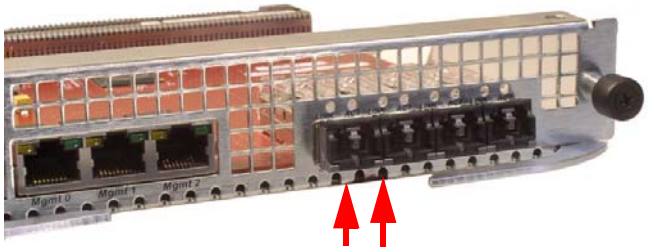


Figure 6 - 128. Bale Clasps in Rest Position

2. Pull the bale clasp latch out and down. It will pivot downwards on its hinge.

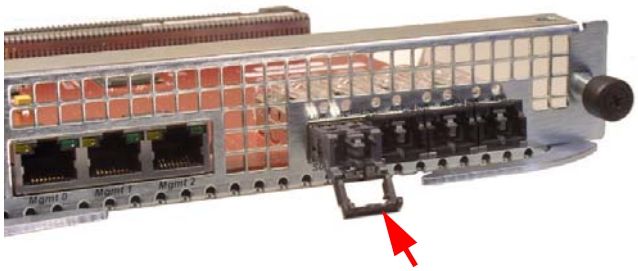


Figure 6 - 129. Bale Clasp Lowered

3. Holding the extended bale clasp latch, pull the optical transceiver fully out of its socket in the physical interface card.

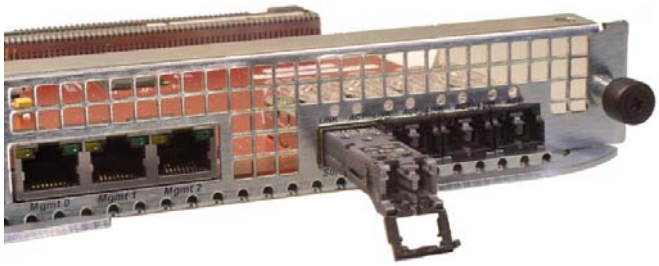


Figure 6 - 130. Removing the SFP

Replacing an Optical Transceiver

To replace the optical transceiver:

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

3. Reconnect the optical cables to their corresponding ports.

GbE Copper Transceivers

GbE copper transceivers are also available for the Acme Packet 4500. They are removed and replaced similarly to the optical transceivers.

Alarms

The Acme Packet 4500 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 6 - 8. Alarm Severity Levels Described

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 4500 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 4500 alarm name, hardware alarm ID, alarm severity, causes, log message, and graphic display window message, if any.

Hardware and Environmental Alarms

This section provides details about hardware and environmental alarms.

Hardware Temperature Alarm

The following table lists the hardware temperature alarm.

Table 6 - 9. Hardware Temperature Alarm

Alarm Name	Alarm ID	Alarm Severity	Causes	Example Log Message	Graphic Display Window Message
TEMPERATURE HIGH	65538	CRITICAL: ≥105°C MAJOR: ≥100°C MINOR: ≥95°C	Fans are obstructed or stopped. The room is abnormally hot.	Temperature: XX.XXC (where XX.XX is the temperature in degrees)	Temperature X C (where X is the temperature in degrees)
If this alarm occurs, the Acme Packet 4500 turns the fan speed up to the fastest possible speed.					

Fan Speed Alarm

The following table lists the fan speed alarm.

Table 6 - 10. Fan Speed Alarm

Alarm Name	Alarm ID	Alarm Severity	Causes	Example Log Message	Graphic Display Window Message
FAN STOPPED	65537	CRITICAL: any fan speed is <50%. Or speed of two or more fans is >50% and ≤75%. MAJOR: speed of two or more fans is > 75% and ≤ 90%. Or speed of one fan is >50% and ≤75% and the other two fans are at normal speed. MINOR: speed of one fan> 75% and ≤90%, the other two fans are at normal speed	Fan failure.	Fan speed: XXXX XXXX XXXX where xxxx xxxx xxxx is the Revolutions per Minute (RPM) of each fan on the fan module	Fan stopped
If this alarm occurs, the Acme Packet 4500 turns the fan speed up to the fastest possible speed.					

Environmental Sensor Alarm

The following table lists the environmental sensor alarm.

Table 6 - 11. Environmental Sensor Alarm

Alarm Name	Alarm ID	Alarm Severity	Cause(s)	Example Log Message	Graphic Display Window Message
ENVIRONMENTAL SENSOR FAILURE	65539	CRITICAL	The environmental sensor component cannot detect fan speed and temperature.	Hardware monitor failure! Unable to monitor fan speed and temperature!	HW Monitor Fail

Power Supply Alarms

The following table lists the power supply alarms.

Table 6 - 12. Power Supply Alarms

Alarm	Alarm ID	Alarm Severity	Causes	Log Message
PLD POWER A FAILURE	65540	MINOR	Power supply A has failed.	Back Power Supply A has failed!
PLD POWER A UP	65541	MINOR	Power supply A is now present and functioning.	Back Power Supply A is present!
PLD POWER B FAILURE	65542	MINOR	Power supply B has failed.	Back Power Supply B has failed!
PLD POWER B UP	65543	MINOR	Power supply B is now present and functioning.	Back Power Supply B is present!

Voltage Alarms

The following table lists the voltage alarms.

Table 6 - 13. Voltage Alarms

Alarm	Alarm ID	Alarm Severity	Log Message
PLD VOLTAGE ALARM 2P5V (2.5 Volt Rail)	65544	MINOR EMERGENCY	• Voltage 2.5V CPU has minor alarm • Voltage 2.5V CPU has emergency alarm, the system should shutdown
PLD VOLTAGE ALARM 3P3V (3.3 Volt Rail)	65545	MINOR EMERGENCY	• Voltage 3.3V has minor alarm • Voltage 3.3V has emergency alarm, the system should shutdown
PLD VOLTAGE ALARM 5V (5 Volt Rail)	65546	MINOR EMERGENCY	• Voltage 5V has minor alarm • Voltage 5V has emergency alarm, the system should shutdown
PLD VOLTAGE ALARM CPU (Host Voltage)	65547	MINOR EMERGENCY	• Voltage CPU has minor alarm • Voltage CPU has emergency alarm, the system should shutdown

NIU Card Alarms

The following table lists the NIU card alarms. PHY0 and PHY1 are both located on the same NIU. PHY0 encompasses S0P0 and S0P1, while PHY1 encompasses S1P0 and S1P1. Therefore, both insertion and both removal alarms will be activated at the same time when the NIU is inserted or removed from the Acme Packet 4500.

Table 6 - 14. NIU Card Alarms

Alarm	Alarm ID	Alarm Severity	Cause(s)	Log Message
PHY0 Removed	65550	MAJOR	NIU S0Px was removed	physical interface card 0 has been removed
PHY0 Inserted	65552	MAJOR	NIU S0Px was inserted	None

Table 6 - 14. NIU Card Alarms

Alarm	Alarm ID	Alarm Severity	Cause(s)	Log Message
PHY1 Removed	65553	MAJOR	NIU S1Px was removed	physical interface card 1 has been removed
PHY1 Inserted	65554	MAJOR	NIU S1Px was inserted	None

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 4500's NIU link alarms, including their ID assignments, severities, causes, log messages, and messages printed in the graphic display window.

Media Ethernet Link Alarms

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

Table 6 - 15. Media Ethernet Link Alarms

Alarm Name	Alarm ID	Alarm Severity	Cause(s)	Example Log Message	Graphic Display Message
LINK UP ALARM GIGPORT	131073	MINOR	GbE S0P0 link up	Slot 0 port 0 UP	X LINK ALARMS (where X is number of alarming links)
LINK UP ALARM GIGPORT	131074	MINOR	GbE S1P0 link up	Slot 1 port 0 UP	X LINK ALARMS
LINK DOWN ALARM GIGPORT	131075	MAJOR	GbE S0P0 link down	Slot 0 port 0 DOWN	X LINK ALARMS
LINK DOWN ALARM GIGPORT	131076	MAJOR	GbE S1P0 link down	Slot 1 port 0 DOWN	X LINK ALARMS
LINK UP ALARM GIGPORT	131109	MINOR	GbE S0P1 link up	Slot 0 port 1 UP	X LINK ALARMS
LINK UP ALARM GIGPORT	131110	MINOR	GbE S1P1 link up	Slot 1 port 1 UP	X LINK ALARMS
LINK DOWN ALARM GIGPORT	131111	MAJOR	GbE S0P1 link down	Slot 0 port 1 DOWN	X LINK ALARMS
LINK DOWN ALARM GIGPORT	131112	MAJOR	GbE S1P1 link down	Slot 1 port 1 DOWN	X LINK ALARMS

Management Ethernet Link Alarms

The following table lists the NIU management Ethernet port alarms:

Table 6 - 16. Ethernet Link Alarms

Alarm Name	Alarm ID	Alarm Severity	Cause(s)	Example Log Message	Graphic Display Message
LINK UP ALARM VXINTF	131077	MINOR	Mgmt0 link up	Port 0 UP	X LINK ALARMS (where X is number of alarming links)
LINK UP ALARM VXINTF	131078	MINOR	Mgmt1 link up	Port 1 UP	X LINK ALARMS
LINK UP ALARM VXINTF	131079	MINOR	Mgmt2 link up	Port 2 UP	X LINK ALARMS
LINK DOWN ALARM VXINTF	131080	MAJOR	Mgmt0 link down	Port 0 DOWN	X LINK ALARMS
LINK DOWN ALARM VXINTF	131081	MAJOR	Mgmt1 link down	Port 1 DOWN	X LINK ALARMS
LINK DOWN ALARM VXINTF	131082	MAJOR	Mgmt2 link down	Port 2 DOWN	X LINK ALARMS

SFP Presence Alarms

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

Table 6 - 17. SFP Presence Alarms

Alarm Name	Alarm ID	Alarm Severity	Cause(s)	Example Log Message
SFP REMOVED GIGPORT 0	65568	CRITICAL	S0P0 SFP Removed	Slot 0 Port 0 SFP Removed
SFP INSERTED GIGPORT 0	65564	CRITICAL	S0P0 SFP Inserted	Slot 0 Port 0 SFP Inserted
SFP REMOVED GIGPORT 1	65570	CRITICAL	S1P0 SFP Removed	Slot 1 Port 0 SFP Removed
SFP INSERTED GIGPORT 1	65566	CRITICAL	S1P0 SFP Inserted	Slot 1 Port 0 SFP Inserted
SFP REMOVED GIGPORT 2	65569	CRITICAL	S0P1 SFP Removed	Slot 0 Port 1 SFP Removed
SFP INSERTED GIGPORT 2	65565	CRITICAL	S0P1 SFP Inserted	Slot 0 Port 1 SFP Inserted
SFP REMOVED GIGPORT 3	65571	CRITICAL	S1P1 SFP Removed	Slot 1 Port 1 SFP Removed
SFP INSERTED GIGPORT 3	65567	CRITICAL	S1P1 SFP Inserted	Slot 1 Port 1 SFP Inserted

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

7 Specifications

Introduction

This chapter provides information regarding the physical, electrical, environmental, and connector specifications of the Acme Packet 4500.

Safety and Regulatory Certifications

For information regarding safety and regulatory certifications applicable to the Acme Packet 4500, refer to the *Acme Packet Platforms Safety and Compliance Guide* in addition to this document.

Physical Specifications

Acme Packet 4500 Chassis Specifications

This table lists the physical dimensions and weight of the Acme Packet 4500.

Table 7 - 18. Chassis Physical Dimensions and Weight

Specification	Description
Height	1.72" (4.37 cm) (1U)
Width	17.10" (43.43 cm) (+ mounting ear width: 19" (48.26 cm))
Depth	19" (48.26 cm) (+ mounting slide bar depth)
Weight	approximately 19 lbs (8.62 kg), fully loaded

AC Power Supply Physical Dimensions

This table lists the physical dimensions and weight of the Acme Packet 4500 AC power supply.

Table 7 - 19. AC Power Supply Physical Dimensions

Specification	Description
Height	1.594" (4.05 cm)
Width	4" (10.16 cm)
Depth	8.50" (21.59 cm)
Weight	2lbs., 2 oz. (0.96 kg)

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

DC Power Supply Physical Dimensions

This table lists the physical dimensions and weight of the Acme Packet 4500 DC power supply.

Table 7 - 20. DC Power Supply Physical Dimensions

Specification	Description
Height	1.594" (4.05 cm)
Width	4" (10.16 cm)
Depth	8.50" (21.59 cm)
Weight	2lbs., 0 oz. (0.91 kg)

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

Fan Module Specifications

This table lists the specifications for the Acme Packet 4500 fan module.

Table 7 - 21. Fan Module Specifications

Specification	Description
Number of Fans	4
Total Maximum Airflow	41 CFM

Electrical Specifications

Refer to the following tables for information regarding the electrical specifications of the Acme Packet 4500.

Power Supply Input Circuit Fuse Requirements

This table lists the Acme Packet 4500 input circuit fuse and cable size requirements.

Table 7 - 22. Power Supply Input Circuit Fuse Requirements

Power Circuit	Fuse Rating	Power cable size
120 VAC	5 AMP	18 AWG
240 VAC	5 AMP	18 AWG
-48 VDC	10 AMP	16 AWG

Alarm Port Dry Contact Current Limits

This table lists the Acme Packet 4500's alarm port's electrical characteristics.

Table 7 - 23. Alarm Port Dry Contact Current Limits

Specification	Value
Max AC switching current	0.3 A @ 125 VAC
Max DC switching current	1 A @ 30 VDC

Environmental Specifications

For the Acme Packet 4500 to function properly, we recommend that you follow the environmental guidelines in the following table.

Table 7 - 24. Environmental Specifications

Specification	Description
Temperature	The Acme Packet 4500 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
Maximum Altitude	The Acme Packet 4500 is required to operate below the maximum altitude of 10,000 feet.
Air Flow	50 CFM
Heat Dissipation	100W (341 BTU/hr) typical, 200W (682 BTU/hr) maximum

Connector Specifications

Refer to the following table for information about the connector specifications for the Acme Packet 4500.

Table 7 - 25. Connector Specifications

Specification	Description
RJ45/Management Ethernet Ports	The 3 x 8-pin RJ45 10/100/1000BaseT Gigabit Ethernet ports are compliant with IEEE's 802.3, 802.3u, and 802.3ab.
RJ45/Alarm Contact Port	Any alarms generated by the system are accessible via the 8-pin RJ45 alarm contact port.
RS232/Serial Port	The RS232 serial port uses an 8-pin RJ45 connector that supports RS232-C protocol.
GbE Port(s)	The GbE fiber optic connection ports use duplex LC connectors.

Table 7 - 25. Connector Specifications *(continued)*

Specification	Description
IEC Connector Ports	The IEC connector ports accept a 3-lead IEC-320 connector for AC power installations.
Terminal Block Connections	The terminal block connections accept a bare (tinned) wire for DC power installations.

Optical Transceiver Interface Module Specification

Refer to the following table for information about the optical specifications of the GbE SFP optical transceivers for the Acme Packet 4500

.

Table 7 - 26. Optical Transceiver Interface Module Specifications

Specification	Multimode (SX) Fiber Module	Singlemode (LX) Fiber Module
Wavelength λ	850 nm	1330 nm
Laser Type	VCSEL	FP
Fiber type / Transmission Distance	-0.5 to 550m -50µm -0.5 to 550m -50µm	-5.0 m to 10km

8 Glossary

Acronyms, Definitions, and Terms

ACLI — Acme command line interface is the CLI used by Acme Packet to configure, maintain, and monitor SBCS and other Acme Packet 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 pertains to 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

flash memory — flash memory is a solid-state, non-volatile, rewritable 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.

GbE — gigabit ethernet is an Ethernet type that supports data transfer rates of 1 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 network interface unit provides network connectivity for management, signaling, and media traffic to and from the Acme Packet 3820.

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 3820 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 3820.

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.

UPS — an uninterruptible power supply is a power supply that can run off of a backup battery when primary power is lost.

UDP — a 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 — a vacuum fluorescent display is used on the graphic display window of the Acme Packet 3820 chassis front control panel.

VLAN — a 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.

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