Net-Net® 3800 System Hardware Installation Guide

Release Version 1.0

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Notices

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About This Guide

Overview

The Net-Net™ 3800 is a 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 Net-Net 3800 provides exceptional functionality in a tightly integrated system. This chapter provides an introduction and overview of the Net-Net 3800's main components.

The Net-Net 3800 Hardware Installation Guide describes:

- Hardware components of the Net-Net 3800
- Installation of the system chassis
- System startup and maintenance
- Safety procedures
- System specifications

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 Net-Net 3800. Only experienced and authorized personnel should perform installation, configuration, and maintenance tasks.

Who is Acme Packet?

Acme Packet enables service providers to deliver trusted, first class interactive communications—voice, video and multimedia sessions—across IP network borders. Our Net-Net family of session border controllers satisfy critical security, service assurance and regulatory requirements in wireline, cable and wireless networks. Our deployments support multiple applications—from VoIP trunking to hosted enterprise and residential services; multiple protocols—SIP, H.323, MGCP/NCS and H.248; and multiple border points-interconnect, access network and data center.

Established in August 2000 by networking industry veterans, Acme Packet is a public company that is traded on NASDAQ, headquartered in Burlington, MA.

Technical Assistance

If you need technical assistance with Acme Packet products, you can obtain it on-line by going to https://support.acmepacket.com. With your customer identification number and password, you can access Acme Packet's on-line resources 24 hours a day. If you do not have the information required to access the site, send an email to tac@acmepacket.com requesting a login.

In the event that you are experiencing a critical service outage and require live assistance, contact the Acme Packet Technical Assistance Center emergency hotline:

- From the United States, Canada, and Mexico call: 1 866 226 3758

- From all other locations, call: +1 781 756 6920

Please note that a valid support/service contract with Acme Packet is required to obtain technical assistance.

Customer Questions, Comments, or Suggestions

Acme Packet is committed to providing our customers with reliable documentation. If you have any questions, comments, or suggestions regarding our documentation, please contact your Acme Packet customer support representative directly or email support@acmepacket.com.

Contact Us

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Revision History

This section contains a revision history for this document.

Date	Revision Number	Description
April 16, 2009	Revision 1.01	• Updates the Shipped Parts listed in the guide
May 26, 2009	Revision 1.02	• Updates AC fuse size recommendation.
June 26, 2009	Revision 1.03	• Updates Battery Warning section
August 10, 2009	Revision 1.04	• Adds Supply Input Circuit Fuse Requirement section and removes power supply specifications.

1 Component Overview

Chassis

The Net-Net 3800 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 Net-Net 3800 chassis looks like this:

The rear view of the Net-Net 3800 chassis looks like this:

Mounting Hardware

The Net-Net 3800 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.

Equipment Rack Installation Hardware

For equipment rack installations, the Net-Net 3800 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 Net-Net 3800 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:

- You screw the chassis section slides in place on both sides of the Net-Net 3800. These slides are reversible and can be used on either side of the system chassis. The following image shows a chassis section slide:

- 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:

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

System Control Panels

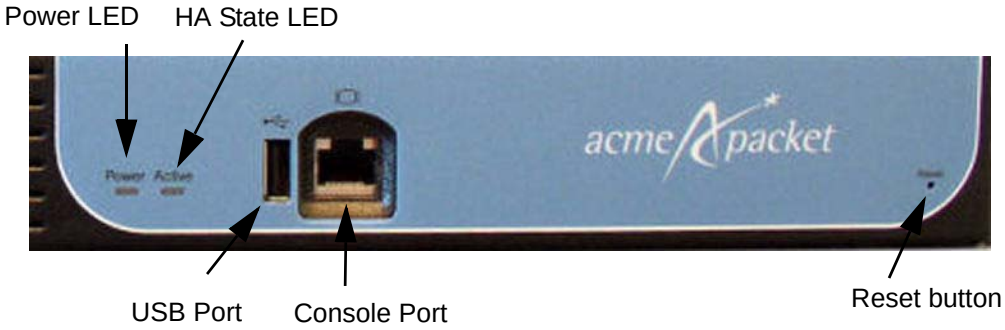
This section describes the Net-Net 3800's front and rear control panels.

Front Panel

The Net-Net 3800's front panel looks like this:

Front Control Panel

The Net-Net 3800's front control panel provides easy access to several system components. You can access the reset button, Power LED, High Availability State LED, console port, and the USB port from the front control panel as shown in the following image:



Reset Button

You reset the Net-Net 3800 using the front panel's reset button. This button is recessed, and can only be pressed by inserting a thin, rigid 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 Net-Net 3800. After the reset button is released, the Net-Net 3800 begins its boot sequence and loads the configured software file.

Power LED

The power LED on the front control panel illuminates when the system is powered.

Active LED

The active LED on the front control panel indicates the active state of the Net-Net 3800 in both standalone and HA configurations. The following LED conditions indicate the system state.

On a Net-Net 3800 standalone configuration:

- Green—The Net-Net 3800 is licensed and online
- Unlit—The Net-Net 3800 is unlicensed or offline

On a Net-Net 3800 HA configuration:

- Green—The Net-Net 3800 is in active role
- Amber—The Net-Net 3800 is in standby role
- Unlit—The Net-Net 3800 is in an OutOfService state

Console Port

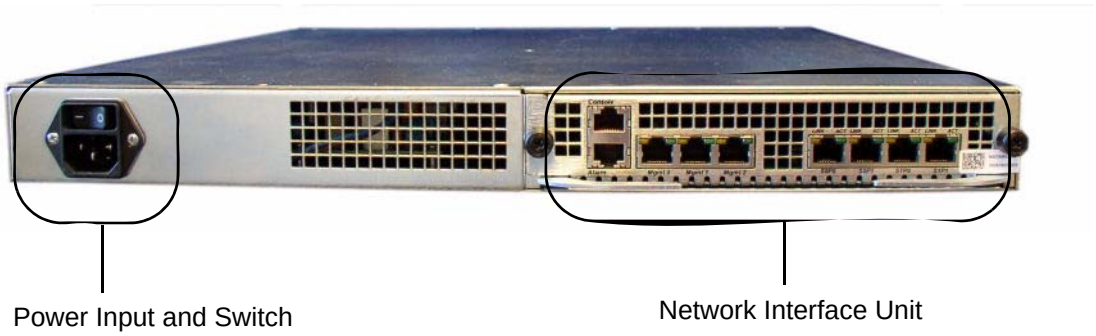
The console port provides console access to the Net-Net 3800 over an RS-232C serial connection. It is logically identical to the rear console port; however only one of the two console ports can be active at a time. See this chapter's later "Console Port (11)" section for more information.

USB Port

The USB port is reserved for future access to external flash-based memory devices.

Rear Panel

The power input and switch and network interface unit (NIU) are located on the rear chassis panel, which looks like this:

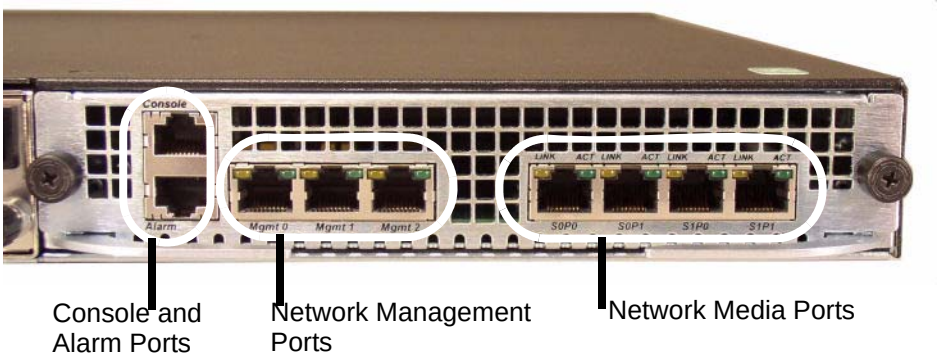


Each of these two system components is described in subsequent sections of this chapter.

Network Interface Unit

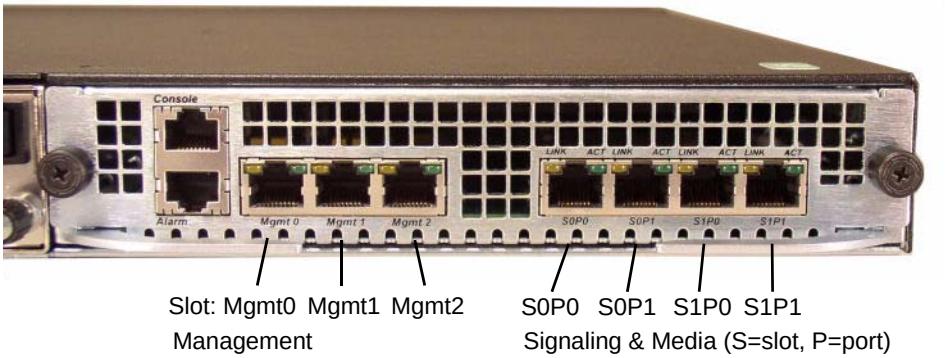
The Net-Net 3800's network interface unit (NIU) is located on the right side of the chassis's rear. The single, hot-pluggable NIU contains all media and management interfaces. Media interfaces are located on the right side of the card, while

management interfaces are located on the left side of the card. A 4-port GigE Copper (RJ45) NIU is shown below.



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.



Without powering down the Net-Net 3800, you can exchange an NIU (for the same type of card) by removing it, replacing it, and then rebooting from the ACLI. The last step causes a soft-reboot rather than a power cycle of the system.

Console Port

The console port on the NIU provides console access to the Net-Net 3800 over an RS-232C serial connection. The Net-Net 3800 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 Net-Net 3800 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 Net-Net 3800
- Accessing and using all functionality available via the ACLI
- Performing in-lab system maintenance

For information regarding the prerequisites for creating a console connection see "Creating a Console Connection (39)".

Console Port Pin-out

Net-Net 3800 console ports are accessed through one of the two RJ45 jacks on the system console. Because the Net-Net 3800 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.

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 Net-Net 3800. 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 Net-Net 3800 and the 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 Net-Net 3800. The Net-Net 3800 features an alarm control signal interface that can be used in a CO location to indicate when internal alarms are generated. The Net-Net 3800 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.

Alarm Type	Description
Minor	Functionality has been impaired to a small degree (e.g., ethernet link up).
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 Net-Net 3800's rear panel in the "Rear Panel" section to see the location of the alarm port.

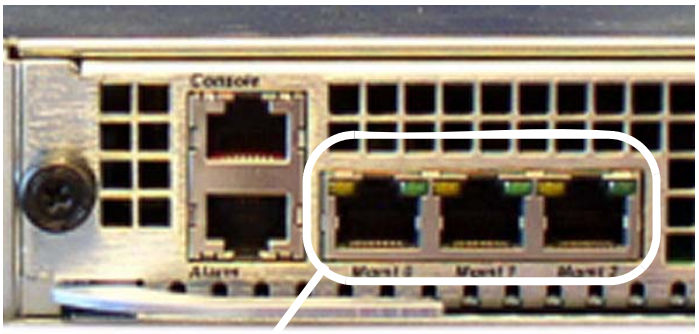
Alarm Port Pin-out

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

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)
7	Ground
8	Ground

Network Management Ports

The Net-Net 3800 has three 10/100/1000 Base-T Ethernet ports located on every configuration of 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 Net-Net 3800's NIU to see the location of these Ethernet ports.



Ethernet Ports

Upon initial bootup, these Ethernet ports are not configured. You must first connect to the Net-Net 3800 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 *Net-Net 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

We recommend that you use shielded CAT5e or CAT6 Ethernet cables with RJ45 plugs for connecting to the rear-panel Net-Net 3800 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 GigE speeds. Network interface and hardware options differentiate the available NIU cards for order.

NIUs are available in the following configurations:

- 4-port GigE Copper (RJ45)
- 4-port GigE SFP (LX, SX, or Copper)
- 4-port GigE SFP with IPSec (LX, SX, or Copper)
- 4-port GigE SFP with QoS and IPSec (LX, SX, or Copper)

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

Power and Cooling Components

Acme Packet offers an AC power supply for the Net-Net 3800. The power supply is not a user-servicable component.

AC Power

The auto-sensing AC power supply is rated at 100-240 VAC, 50-60 Hz, and uses an IEC connector mounted on the rear of the chassis for input.

AC Power Cords

Acme Packet ships all Net-Net 3800s with one 2 meter, 3-conductor 18 AWG power cord. The power cord plugs into the IEC-320 receptacle on the power supply.

Power Switch

The power switch is located on the Net-Net 3800's rear panel. For normal operation, the switch should be in the ON position. Flipping the switch to the OFF position immediately powers down the Net-Net 3800. The side of the switch labeled with a 1 is *on* and 0 side is *off*.

Internal Cooling Fans

The Net-Net 3800's internal cooling fans run at a constant speed and require no user intervention.

Net-Net 3800 Series Hardware Architecture

The hardware architecture of the Net-Net 3000 series is analogous to that of the Net-Net 4000 series hardware architecture as depicted below. The Net-Net 4000 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.

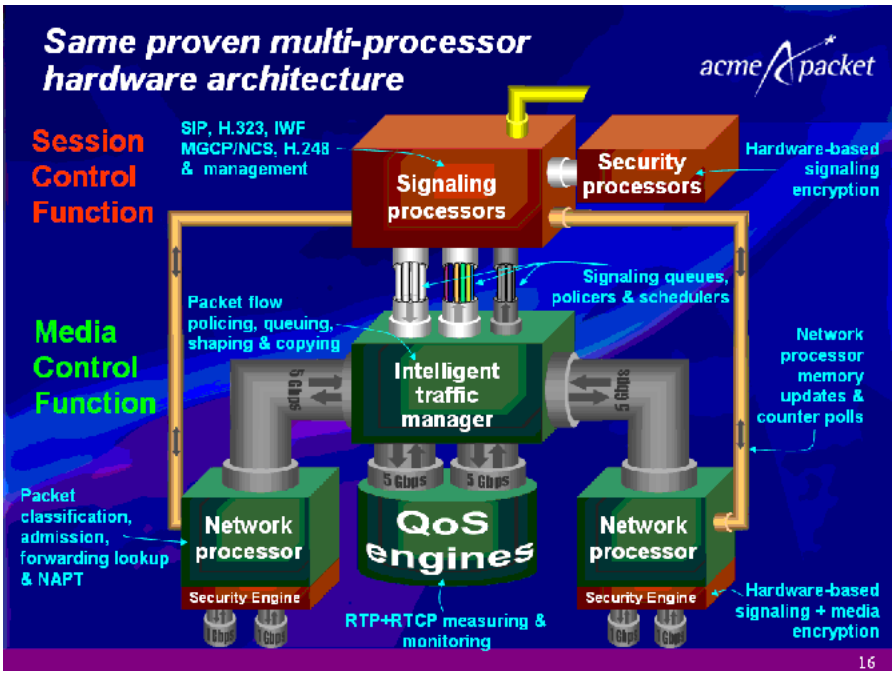
The Network Processing (nP) subsystem is comprised of the network processors, traffic management, and content addressable memory. This subsystem hosts the media control module and is completely hardware based. ADjunct to the network processing components are the QoS engine for monitoring bearer QoS metrics.

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 physical representation in the case of the Net-Net 4250 and is a logical representation of the Net-Net 3800. With the Net-Net 3800 the Network Processor is physically one device.



2 System Installation

Introduction

This chapter provides information about how to install the Net-Net 3800 and its associated components, including cabling information.

Shipped Parts

Each Net-Net 3800 ships in one box. Inside this box is the Net-Net 3800 chassis and the accessory kit. The following table lists the contents of one Net-Net 3800 order.

Location	Item
Main Shipping Box	Net-Net chassis with NIU installed
Accessory Kit	Console adapter Hardware installation guide

Installation Tools and Parts

The following tools and parts are required to install the Net-Net 3800 into your equipment rack.

- #1 Phillips-head screwdriver
- #2 Phillips-head screwdriver
- ESD wrist strap
- Rack and associated mounting hardware
- Shielded Ethernet CAT5e or CAT6 RJ45 cables

Recommended Tools and Parts

We recommend that you have the following parts on hand.

- Cable labels

Preinstallation

The Net-Net 3800 should be located in a secured CO or data center with reliable power and cooling. When choosing a location for your Net-Net 3800 follow the guidelines listed in this section.

Environmental Guidelines

When preparing to install your Net-Net 3800:

- 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 Net-Net 3800 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 Net-Net 3800:

- Ensure that the installation location has access to adequate power.
- Never use extension cords when powering a Net-Net 3800.
- Use grounded, 3-conductor circuits.

Mounting Guidelines

When preparing to install your Net-Net 3800:

- Leave enough clearance, approximately 8" (20 cm), in front of the equipment rack to allow access to the console port, USB port, and reset button.
- 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.

Other Safety Guidelines

When preparing to install your Net-Net 3800:

- 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.
- Use a regulating UPS to protect the Net-Net 3800 from power surges, voltage spikes, and power failures.
- 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 Net-Net 3800 in a telecommunications or server equipment rack. The Net-Net 3800's 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 Net-Net 3800 ships with hardware for mounting in 4-post tapped-hole equipment rack or square-hole equipment rack. The Net-Net 3800 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 Net-Net 3800's proper functioning. To prevent personal injury, we recommend that two people lift and install the chassis into the equipment rack.

Unpacking the Net-Net 3800

To unpack the Net-Net 3800:

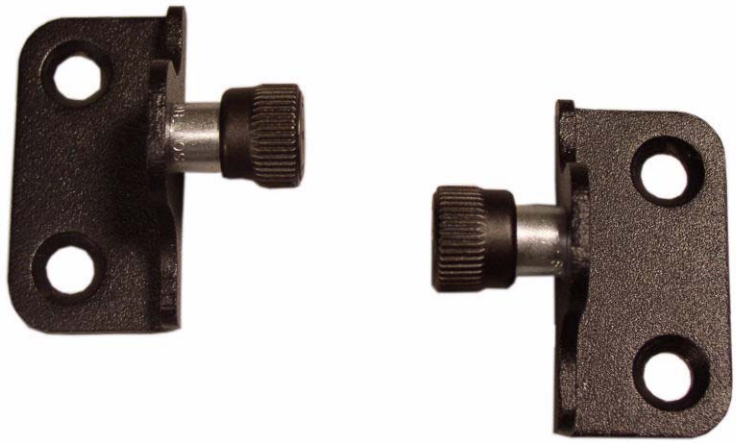
1. Inspect the external packing materials and note if they are damaged in any way.
2. Open the exterior box.
3. Unpack the contents of the Net-Net 3800 shipment.
4. Locate the packing list that comes with the Net-Net 3800 shipment, located outside of shipment box #1.
5. Confirm that all of the components 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 Net-Net 3800 mounting procedures.

Front mounting ears (2 x shipped) for use with mounting slides



Mounting slide assembly, as shipped, with chassis slide inserted into stationary slide. (2 x shipped)

Stationary Slide only (2 x shipped)

Chassis Slide only (2 x shipped)

Nut Bar (4 x shipped)

Mounting Spacer (2 x shipped)

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)

Center-mounting ears (2 x shipped)

Cabinet-style 4-Post Chassis Installation

The following sections explain how to mount your Net-Net 3800 in a cabinet-style, 4-post equipment rack.

Mounting System

Acme Packet provides flexible mounting options for your Net-Net 3800 equipment rack installation.

Stationary slides are mounted on each side of the equipment rack. Complimentary chassis slides are mounted on each side of the Net-Net 3800 chassis. Once the equipment rack and chassis hardware is in place, you insert the chassis, on its slides into the equipment rack mounted slides. When the Net-Net 3800 is fully inserted into the equipment rack, it is secured in place with two thumb screws.

Installing the Stationary Slides

In this first stage of system installation, you 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.

You can mount the stationary rail to both tapped hole rack rails and square hole rack rails. Follow the appropriate procedure below.

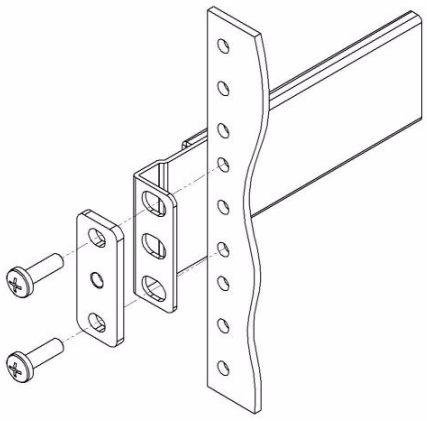
Tapped Hole Rack Installation

This section explains how to mount the Net-Net 3800's 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. Line up the painted side of the stationary rail with an appropriate mount point on the front of the equipment rack.

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 procedure:



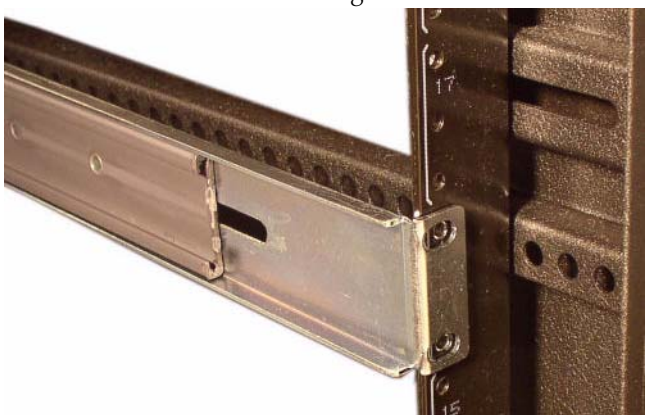
Do not completely torque the screws; leave a small amount of play at this point.

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

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

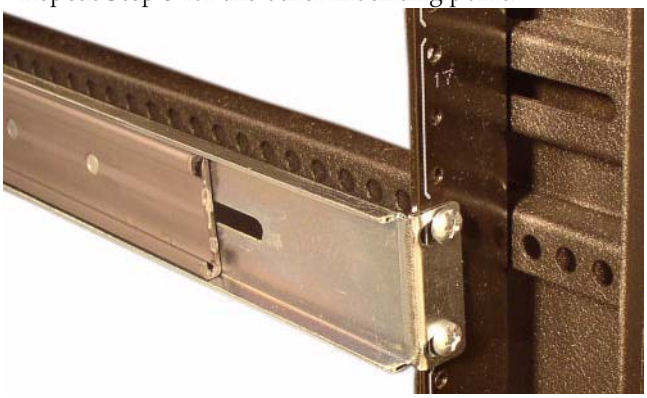
To install the stationary rails on the rear of an equipment rack with threaded holes:

1. Locate the following components:
   - 4 x 10-32 x 5/8″ screws
2. Expand and line up 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.



3. Place one 10-32 screw through the stationary rail ear and screw in place.

4. Repeat Step 3 for the other mounting point.



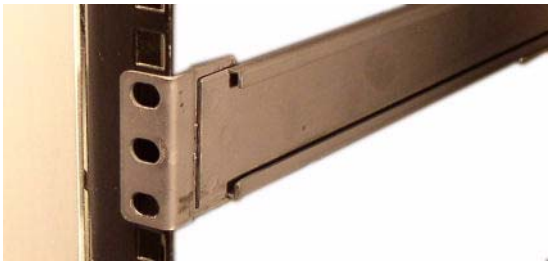
5. Repeat this procedure for the rear of the other stationary slide.
6. Your rack should resemble the following image:

Square Hole Rack Installation

This section explains how to mount the Net-Net 3800's 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.

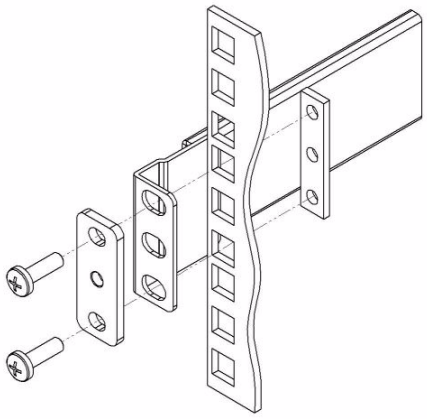
To install the stationary rails on the front of a tapped hole equipment rack:

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



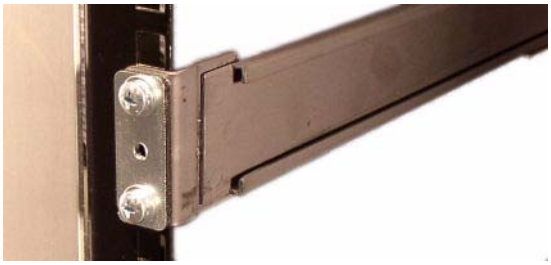
3. Place 2 x 10-32 screws through the mounting spacer, through the stationary rail ear, through the square rack rail.

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 procedure:



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

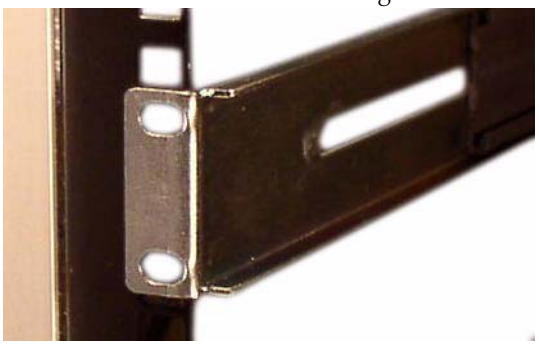
6. Repeat Steps 3 - 5 for the other mounting point.



7. Repeat this procedure for the other stationary slide

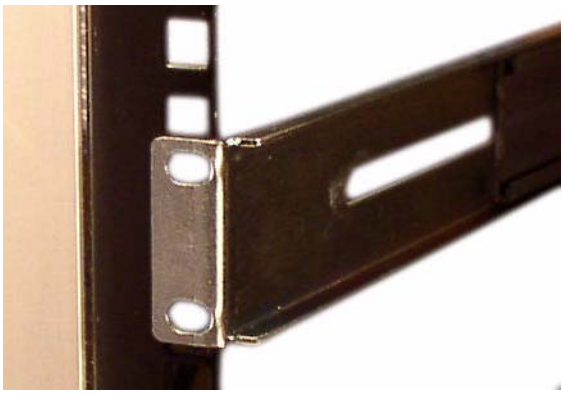
To install the stationary rails on the rear of a square hole equipment rack:

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



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 Steps 3 and 4 for the other mounting point.



6. 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 Net-Net 3800 chassis.

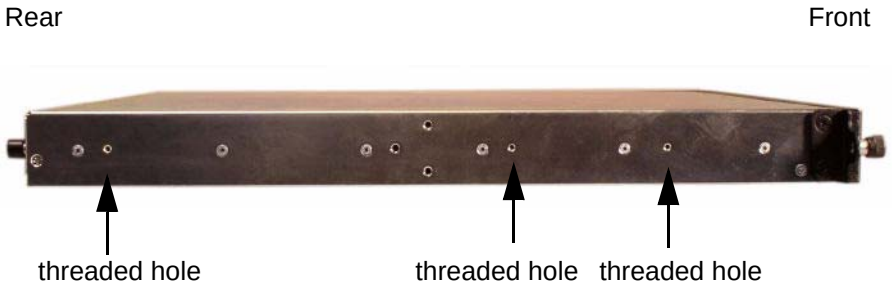
To install the chassis rails on the Net-Net 3800 chassis:

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. Line up one chassis ear with the threaded holes as shown in the following image. Position the chassis ear's spring-loaded thumb screw toward the front panel of the system.

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

4. Line up the chassis slide with the Net-Net 3800's side panel. Position the slide's large marker hole at the front of the Net-Net 3800 chassis. The remaining three

threaded holes will line up with the slide's holes. The following image points out the threaded holes.



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 is positioned toward the front of the Net-Net 3800 chassis.

6. Repeat this procedure for the other side of the Net-Net 3800 chassis.

Installing the Chassis in the Rack

You now lift the Net-Net 3800 and install it into the rack. To prevent personal injury or damage to the Net-Net 3800, 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 Net-Net 3800 chassis remains supported until you have completely installed it into the equipment rack.

To install the Net-Net 3800 chassis in the equipment rack:

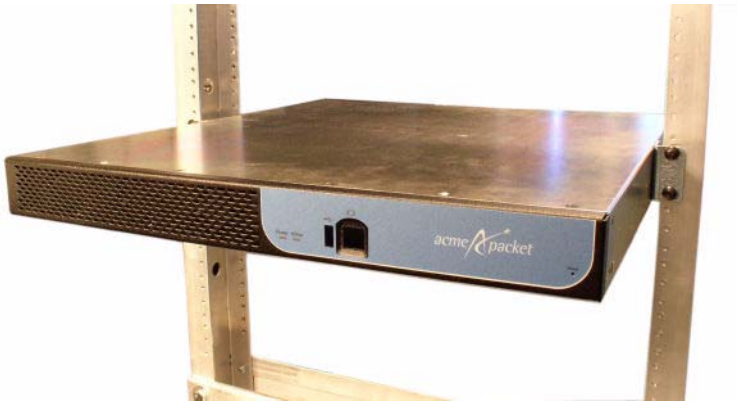
1. Lift the Net-Net 3800 into the correct position in the equipment rack.
2. Insert the chassis slides into the stationary slides.

3. Push the Net-Net 3800 fully into the equipment rack.

4. Line up the chassis-mounted thumb screws with the threads on the mounting spacer. You may have to adjust the spacer locations before they line up with the Net-Net 3800's captive screws.
5. Once correctly positioned, screw the thumb screws 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 Net-Net 3800 in a center-mount, 2-post equipment rack. The Net-Net 3800 in a center-mount installation looks like this:



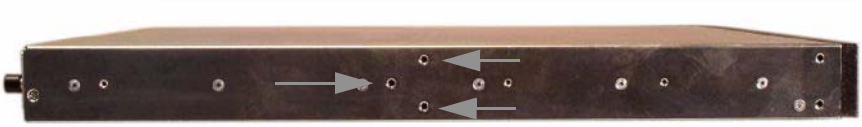
Installing the Center-mount Hardware

Center-mounting ears are attached to each side of the Net-Net 3800. These mounting ears are reversible, and are not mated to a specific side of the chassis. While the Net-Net 3800 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's manufacturer for mounting the system in the rack.

To install your Net-Net 3800 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 threaded holes as shown in the following image. The chassis ear's 3 screw holes will only align in one direction.



threaded holes

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.

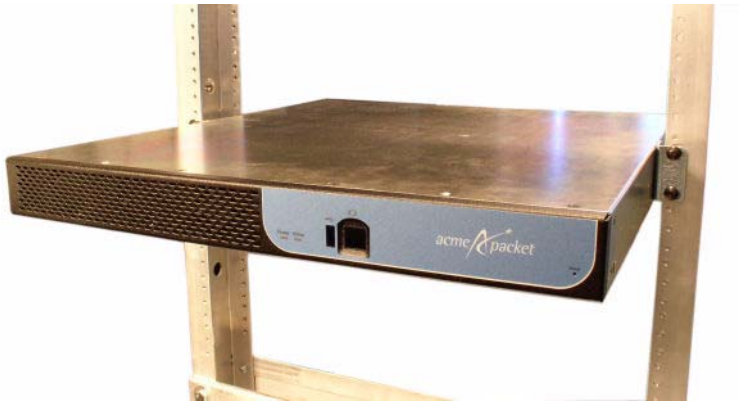
4. Repeat this procedure for the other side of the Net-Net 3800 chassis.

Installing the Chassis in the Rack

You now will lift the Net-Net 3800 and install it into the rack. To prevent personal injury or damage to the Net-Net 3800, 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 Net-Net 3800 chassis remains supported until you have completely installed it into the equipment rack.

1. Locate the following components:
   - 4 x equipment rack screws
2. Lift the Net-Net 3800 into the correct position in the equipment rack.
3. Screw the mounting ears on the Net-Net 3800 into the equipment rack using four rack screws. One person should hold the Net-Net 3800 in the correct position, and another person should screw the Net-Net 3800 in place.



Be sure that the Net-Net 3800 chassis remains supported until you have completely installed it into the equipment rack.

Power Cable Installation

Power Cord Installation

This section shows you how to install a power cable.

Caution

Ensure that the Net-Net 3800 is powered by a circuit with a 2 Amp fuse.

To install the power cable in the Net-Net 3800:

1. Locate the power cable shipped with your Net-Net 3800.
2. Connect the power cable to the power supply by inserting the 3-lead IEC-320 plug into the IEC connector located on the power supply.

3. Route the power cord through your rack and cabling system to the power outlet.
4. Plug the supply end of the power cord into its own circuit.

   Note: To remove the AC power cable from the Net-Net 3800, reverse the previous procedure.

Cabling the Net-Net 3800

After mounting the Net-Net 3800 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.

We recommend using fully shielded CAT5e or CAT6 Ethernet cables for NIU media and management Ethernet connections to protect the Net-Net 3800 from potential damage.

You can install and remove Ethernet and GigE optical cables while the Net-Net 3800 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 might be generated.

Console Port

The Net-Net 3800 has two console ports, one mounted on the chassis's front control panel and the other mounted on the rear-facing NIU. The Net-Net 3800 ships with a console adapter, which allows you to connect a standard DB-9 serial port to the

Net-Net 3800's RJ45 console port. Only one console port on the Net-Net 3800 can be used at a time.

If both console ports are connected to a terminal application, the front port defaults to active. This can be overridden by configuration.

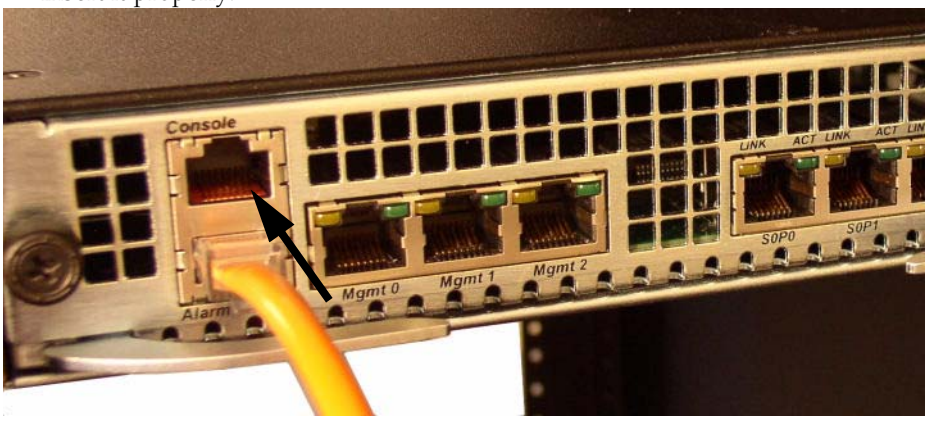
NIU Console Cabling Procedure

This section explains how to create a serial connection to the Net-Net 3800's NIU console port. Use the rear panel console port primarily for permanent connections to a terminal server or other serial device.

Refer to this guide's *Startup* chapter 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 Net-Net 3800.
2. 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.



3. 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 Net-Net 3800 with a console cable properly connected (in addition to the Alarm cable).

Front Panel Console Cabling Procedure

This section explains how to create a serial connection to the Net-Net 3800's front panel console port.

Refer to this guide's *Startup* chapter 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 Net-Net 3800.
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.

console port

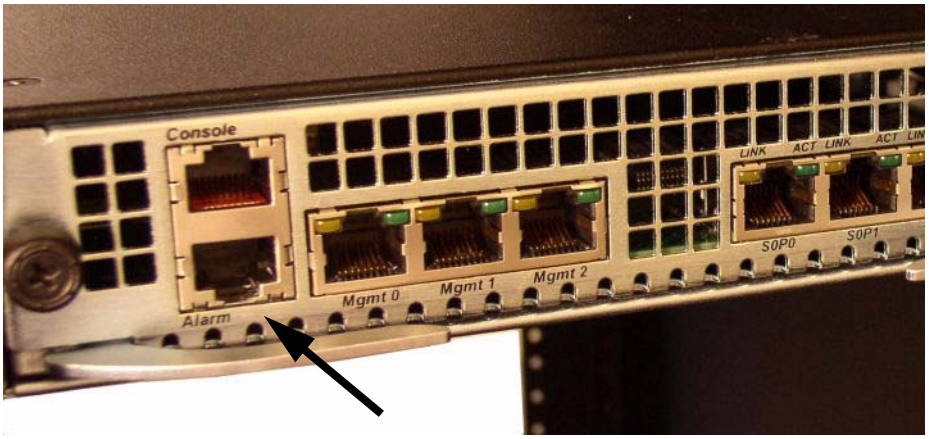
Alarm Port Cabling

You can use the alarm port to indicate electrically when an alarm has been generated on the Net-Net 3800. The alarm port contains leads for three circuits, each of which closes to signify a corresponding alarm. Refer to this guide's *Component Overview* chapter for how to build an alarm cable and interface it with your monitoring system.

Cabling Procedure

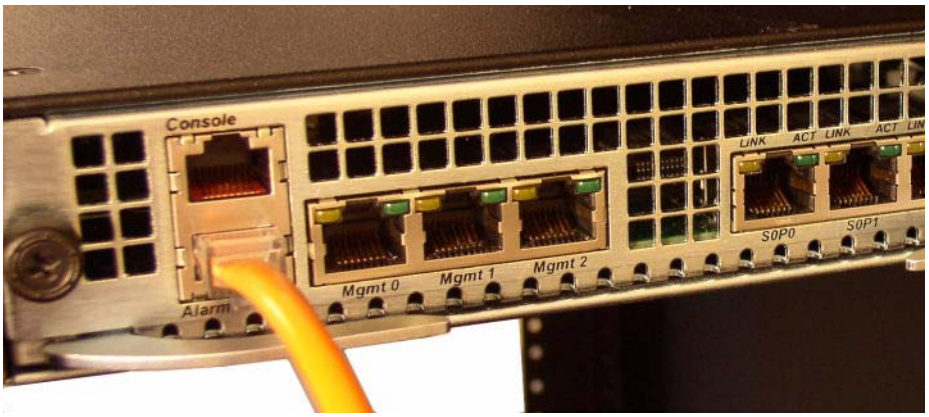
To connect the alarm port cable to the NIU alarm port:

1. Locate the alarm contact cable you plan to connect to the Net-Net 3800.
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.



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

The following figure shows a Net-Net 3800 with an alarm cable properly connected.



Management Network Ports

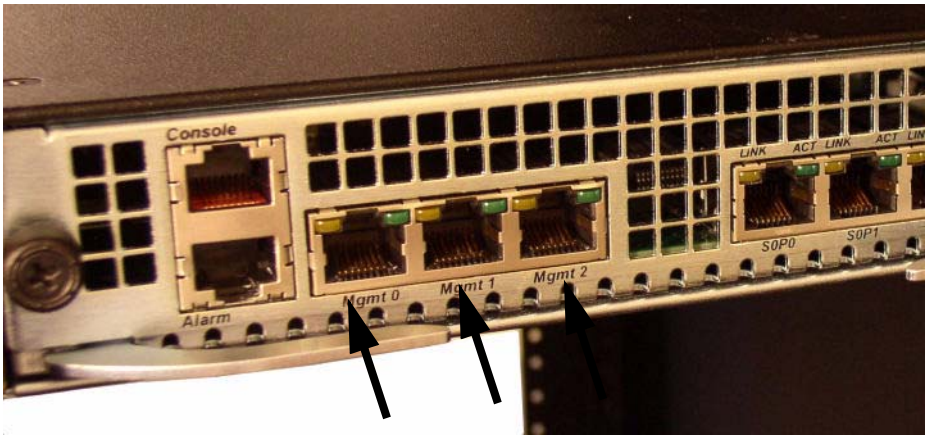
Standard shielded CAT5e or CAT6 (or higher) Ethernet cables with RJ45 jacks are used for connecting the Net-Net 3800's management Ethernet ports to your network. These ports support 10/100/1000 Mbps speeds.

Note: Keep Ethernet cables separated from the power cable 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 Net-Net 3800.
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.



Route the cable away from the Net-Net 3800 chassis. Make sure that the Ethernet cables are not stretched tightly or subject to extreme stress.

The following figure shows a Net-Net 3800 with a network management cable properly connected and inserted in *Mgmt0* (in addition to the Alarm and Console cables).

Media and Signaling Network Interfaces

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

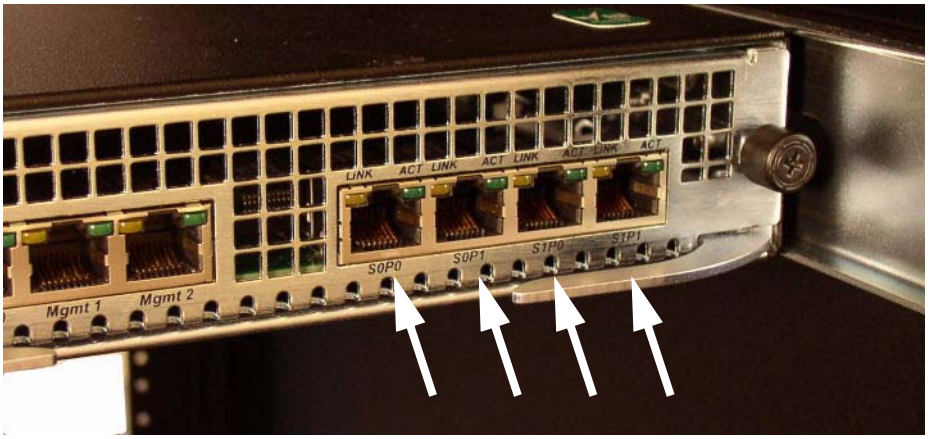
Note: Perform all cabling procedures according to the established standards for your organization.

GigE Copper Cabling Procedure

Shielded CAT 5e or CAT 6 (or higher) Ethernet cables with RJ45 jacks are used for connecting the Net-Net 3800's GigE copper NIUs to your production network.

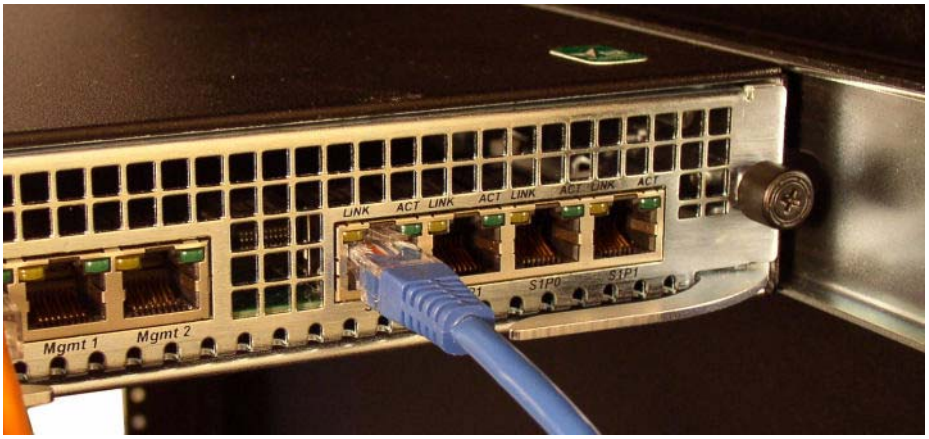
To connect Ethernet cables to the GigE Copper ports on the NIU:

1. Locate the Ethernet cables you plan to connect to the Net-Net 3800.
2. Insert the RJ45 connector on the end of the Ethernet cable into one of the GigE 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, P1P1*.



Route the cable away from the Net-Net 3800. Make sure that the Ethernet cables are not stretched tightly or subjected to extreme stress.

The following figure shows a Net-Net 3800 with media network cable properly connected and inserted in *S0P0*.



3. Repeat Steps 1 through 2 for each additional Ethernet cable you connect to your Net-Net 3800.

GigE SFP Optical Cabling Procedure

This section explains how to cable a Net-Net 3800 configured with GigE optical NIUs. Standard single mode or multimode fiber optic cabling with duplex LC connectors are used to connect the Net-Net 3800's SFP-based NIUs to your network.

Fiber Optic Cable Handling

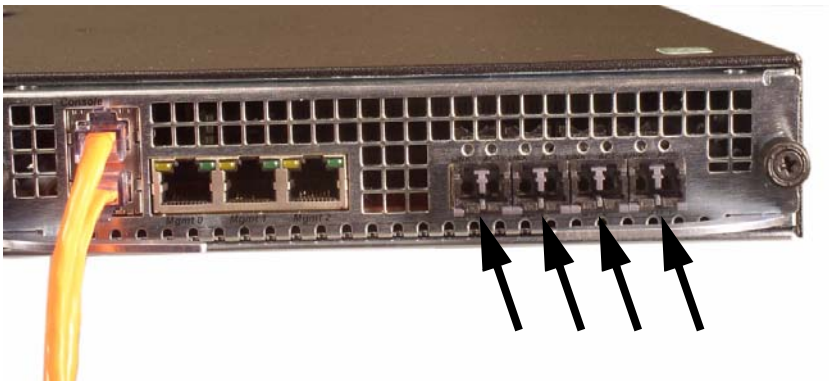
When handling a fiber optic cable:

- 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 GigE optical cabling to the GigE optical physical interface cards:

1. Locate the GigE fiber optic cables you plan to connect to the Net-Net 3800.
2. Insert the duplex LC connector on the end of the fiber cable into one of the NIU's 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*.



Route the cable away from the Net-Net 3800. Make sure that the fiber optic cables are not stretched tightly or subjected to extreme stress.

The following figure shows a Net-Net 3800 with media network cable properly connected and inserted in *S0P0*.

3. Repeat Steps 1 through 2 for each additional fiber optic cable you connect to your Net-Net 3800.

Cabling for HA Deployments

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

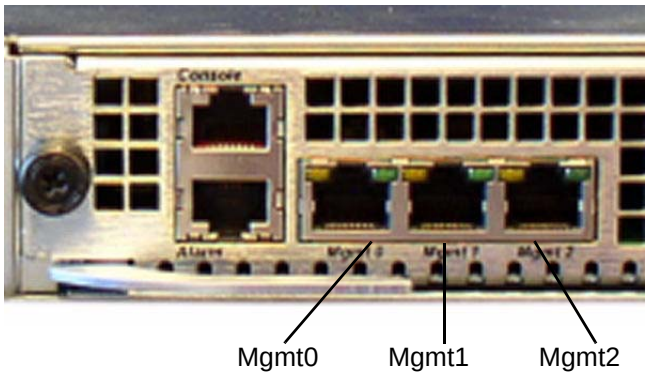
HA Cabling

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 is used for network

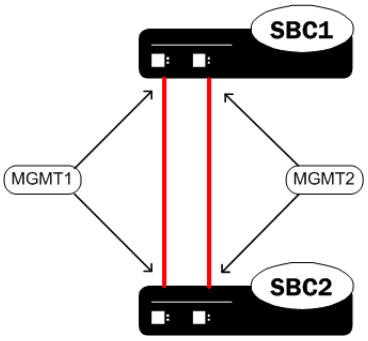
connectivity to the management network and Mgmt1 and Mgmt2 are used to connect two Net-Net 3800s together for HA.



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

To cable Net-Net 3800s in an HA configuration using dual rear interface support:

1. Insert one end of an Ethernet cable into mgmt1 on the rear panel of Net-Net 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 Net-Net 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 Net-Net 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 Net-Net SBC2. The release tab on the RJ45 jack clicks into place when you insert it properly.

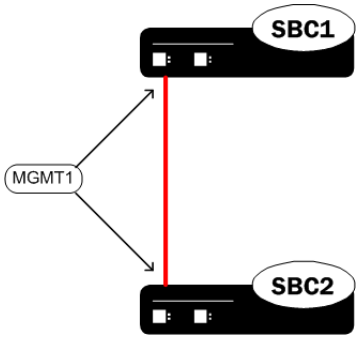


5. Refer to the configuration procedures located in the *HA Nodes* chapter of the *Net-Net Configuration Guide*.

To cable Net-Net 3800s 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 Net-Net 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 Net-Net SBC2. The release tab on the RJ45 jack clicks

into place when you insert it properly. If you use mgmt1 on Net-Net SBC1, then you will connect it to mgmt1 on Net-Net SBC2.



3. Refer to the configuration procedures located in the *HA Nodes* chapter of the *Net-Net 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 Net-Net 3800s 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.

3 Startup

Introduction

This chapter describes Net-Net 3800 startup which involves two tasks:

- Powering on the Net-Net 3800.
- Creating the first console connection to the Net-Net 3800.

You can perform these actions in any order. However, if your console connection is configured first, you can observe the booting processes as your Net-Net 3800 goes online.

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

Creating a Console Connection

This section explains how to create a console connection.

Prerequisites

In order to create a console connection to the Net-Net 3800, you need to configure the terminal hardware/software appropriately. The following table indicates how to configure your terminal application.

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

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

Creating a Console Connection

To create a console connection:

1. Set the terminal application's parameters to match the Net-Net 3800's default parameters listed in the table above. These settings are standard serial connection parameters, commonly referred to as 8N1.
2. Refer the "Front Panel Console Cabling Procedure" section for how to connect your PC or terminal server to the Net-Net 3800's console port.
3. If the Net-Net 3800 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 Net-Net 3800, you can watch the boot process as it displays on your screen.

Powering On the Net-Net 3800

This section explains how to power on your Net-Net 3800.

To power on the Net-Net 3800 hardware:

1. Refer to the *Component Overview* chapter of this guide to learn how to connect your Net-Net 3800 to a power source.
2. Flip the power supply switch on the rear panel of the Net-Net 3800 to the ON position by pressing the 1 side of the switch.

Initial Log on

Once you have established the console connection, powered on the Net-Net 3800, and loaded a runtime image, you are ready to login and begin configuring the system. After the Net-Net 3800 has initialized, the ACLI login prompt appears in your terminal application as follows:

```
User Access Verification
Password:
```

If the Net-Net 3800 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 email 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 Net-Net 3800, but you cannot 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 end 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 Net-Net 3800. Refer to the *Net-Net Configuration Guide* to learn how to establish an IP address for your Net-Net 3800.

If you have any questions about booting or powering on your system, contact your Acme Packet customer support representative directly or email: tac@acmepacket.com.

4 Maintenance

Introduction

This chapter explains Net-Net 3800 hardware maintenance procedures. This chapter also provides hardware alarm information.

System Shut Down

Before you shut down or restart the Net-Net 3800, ensure that there are no active calls in progress. Procedures to reroute call and network traffic around the Net-Net 3800 are outside the scope of this guide.

After all call processing has stopped, you can power off your Net-Net 3800. Shutting down the system is appropriate when you are replacing a physical interface card or are removing the Net-Net 3800 from the equipment rack.

Rejecting Incoming Calls

To reject all incoming calls on the Net-Net 3800:

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#
```

Shutting Down the Net-Net 3800

To shut down the Net-Net 3800 hardware:

1. Exit the ACLI and close your console or network connection.
2. Turn off the power supply switch on the rear panel of the Net-Net 3800 by pressing the 0 side.

3. Confirm that power LED is dark and the fans are quiet.

You can now unplug the Net-Net 3800 from its power supply and continue with maintenance procedures.

Rebooting, Resetting, and Power Cycling

Reboot

Rebooting the Net-Net 3800 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 Net-Net 3800 is required every time you upgrade with a new version of the Net-Net 3800 software.

Before rebooting the Net-Net 3800, 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 Net-Net 3800:

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 Net-Net 3800 via the front of the chassis performs a cold reboot. This is 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 Net-Net 3800 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 Net-Net 3800 from the ACLI before performing a cold reset. Only reset the system as a last resort.

To reset the Net-Net 3800:

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

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

Power Cycling

Power Cycling the Net-Net 3800 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.

Standby Mode for HA Nodes

When performing hardware maintenance on the Net-Net 3800, it is best to minimize any risk of interrupting network traffic or losing data. If the Net-Net 3800s are configured as an HA node, you should only work on the Net-Net 3800 that is in standby mode.

To determine the HA state of each Net-Net 3800 in an HA pair:

1. If you are not in the same physical location as the Net-Net 3800s, you can use the ACLI **show health** command. The output of this command indicates the current HA state of the Net-Net 3800.

Once you have determined that the Net-Net 3800 due for maintenance is in standby mode, you can continue with the appropriate procedures to replace a part.

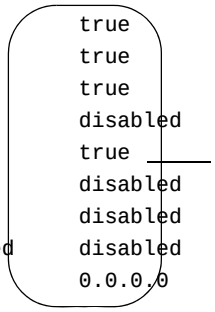
If you need to perform maintenance on the active Net-Net 3800, you need to manually force the two Net-Net 3800s to switch HA states. Forcing a switchover renders the currently active Net-Net 3800 standby, and the currently standby Net-Net 3800 will assume all traffic processing and forwarding as the active system.

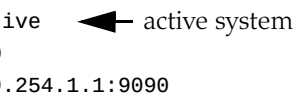
Caution This procedure is only applicable to Net-Net 3800s in an HA deployment.

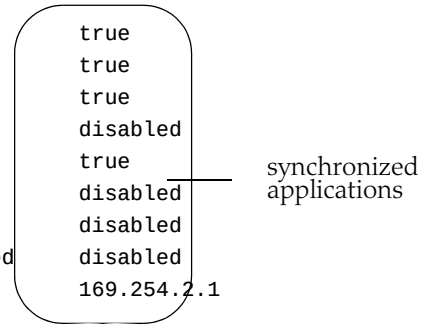
To force a Net-Net 3800 into the standby HA state:

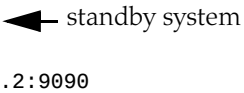
1. Confirm that the relevant systems on Net-Net SBC1 and Net-Net SBC2 are synchronized with the **show health** command. Type **show health** and press <Enter> on each system.

```
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:
```









2. Confirm that Net-Net SBC1 and Net-Net SBC2's current configurations 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 Net-Net SBC1 and Net-Net SBC2's 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 Net-Net SBC1 by typing **notify berpd force** and pressing <Enter> at the ACLI prompt.

```
NETNETSBC1# notify berpd force
```

5. Wait for Net-Net 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.

Chassis Removal

This section explains how to remove the Net-Net 3800 from an equipment rack. To prevent injury, we recommend that any time a Net-Net 3800 is installed or removed from an equipment rack, two people complete the procedure.

Caution

Always disconnect the Net-Net 3800's power supply from the power source when removing the chassis from an equipment rack.

Removing the Net-Net 3800 from an Equipment Rack

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

To remove the Net-Net 3800 from an equipment rack:

1. Turn the power supply switch to the OFF position.

2. Remove the power cable from the Net-Net 3800.
3. Remove and label all attached network cables, alarm cable, and console cables from their respective ports on the chassis.
4. Unscrew the thumb screws that secure the Net-Net 3800 chassis to the front rack rails. This may require using a #2 Phillips screwdriver.

Caution

Beginning in this step, one person should support the Net-Net 3800 from below while the other person removes the system chassis from the equipment rack.

5. Pull the Net-Net 3800 forward and out of the equipment rack.
6. Lift the Net-Net 3800 out of the equipment rack, and set it on a flat and stable surface.

NIU Removal and Replacement

Without powering down the Net-Net 3800, you can exchange an NIU (for the same type of card) by removing it, replacing it, and then rebooting from the ACLI. The last step causes a soft-reboot rather than a power cycle of the system.

At any time when the system is powered off, you can remove an NIU. Make sure you are properly grounded to the system chassis with an ESD strap before removing a NIU.

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 cables from the NIU you want to remove from the Net-Net 3800 chassis.

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

2. Unscrew the two thumb screws 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.

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.

4. Pull the loosened NIU out of the Net-Net 3800 chassis by holding each side of the NIU's front panel.

5. Place the NIU in an antistatic bag while it remains outside of the Net-Net 3800 chassis.

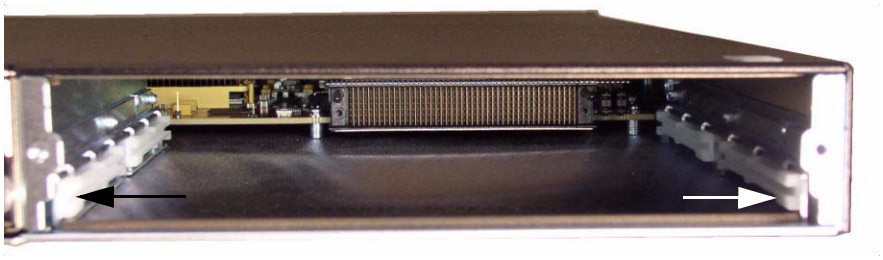
NIU Replacement

To install an NIU in the Net-Net 3800 chassis:

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

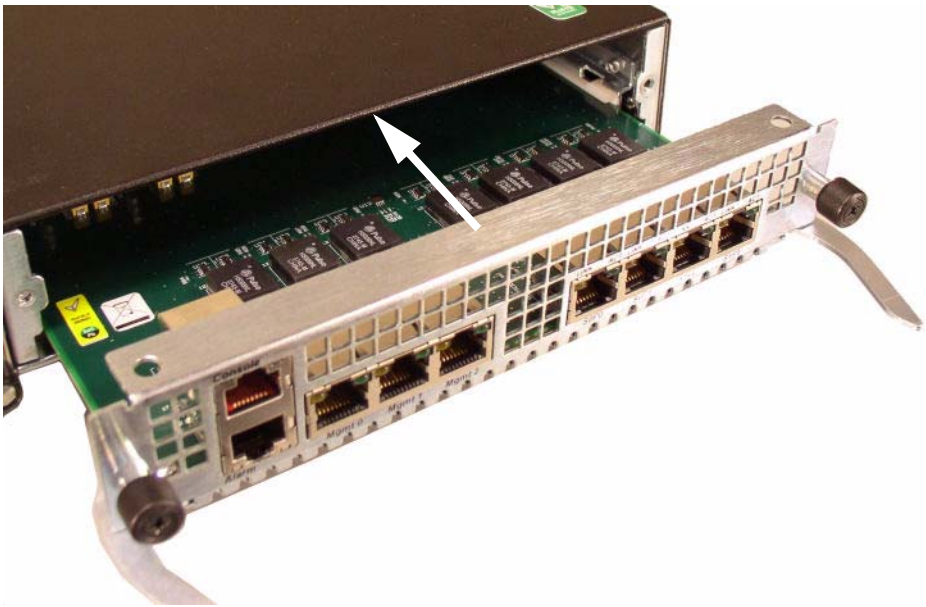
3. Hold the NIU by its sides with the front panel bezel facing you.

4. Note the two flared guide rails that the NIU rides as it is inserted into the Net-Net 3800 chassis.

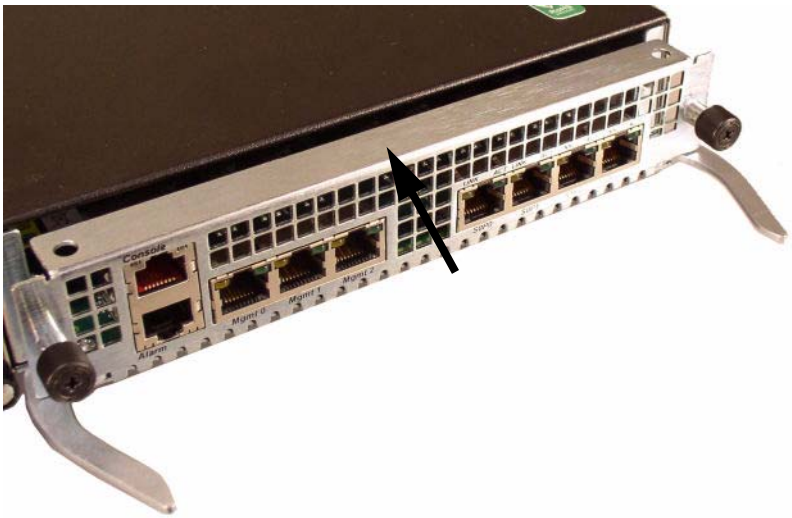


The guide rails guide the interface unit to engage the NIU bus connector squarely.

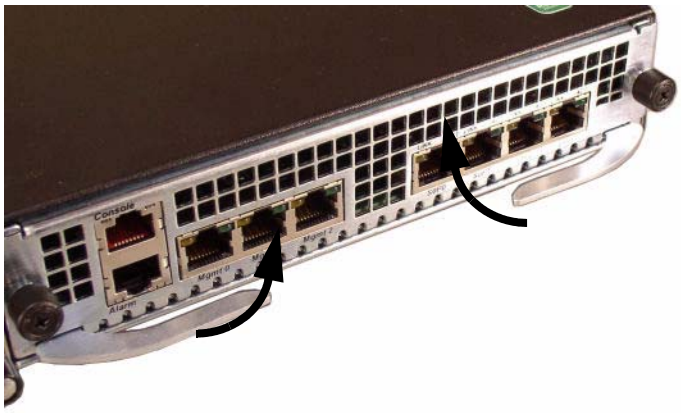
5. Slide the card into the Net-Net 3800 chassis. The physical interface card circuit board slides into the guide rails in the NIU bay of the system chassis.



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.



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.



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

Optical Transceiver Removal and Replacement

Your troubleshooting and diagnostics might reveal that the optical transceiver component of a GigE 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 Net-Net 3800 is powered on. Leave the NIU in the Net-Net 3800 as you extract the optical transceiver.

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

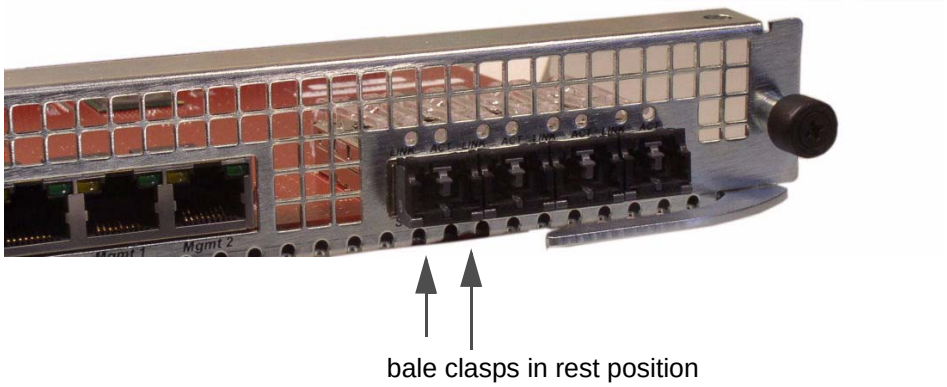
Caution

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

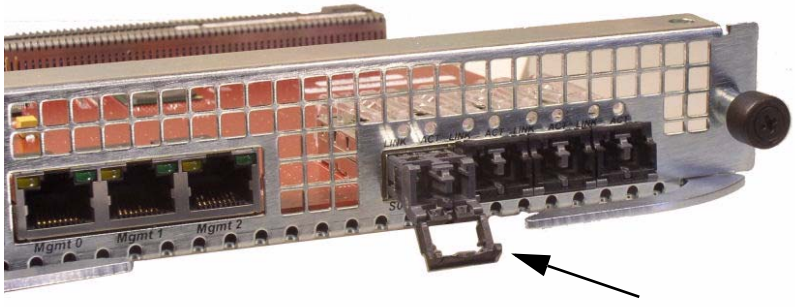
Removing an Optical Transceiver

To remove the optical transceiver on an NIU's SFP port:

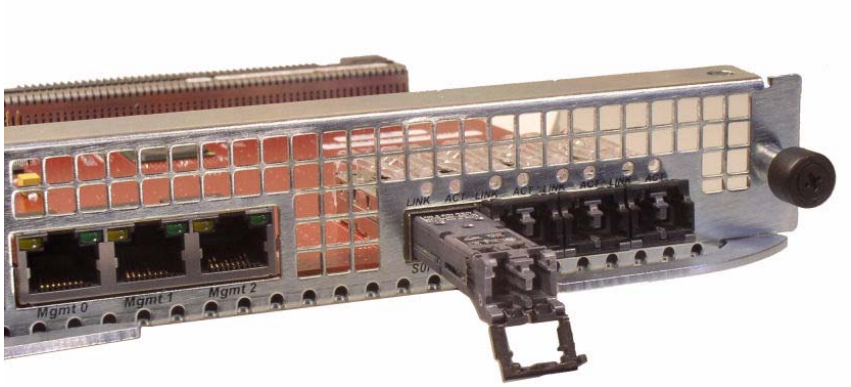
1. Unplug all GigE fiber optic cables from the optical transceiver to be replaced.



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



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



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.

GigE Copper Transceivers

GigE Copper transceivers are also available for the Net-Net 3800. They are removed and replaced similarly to the optical transceivers.

Alarms

The Net-Net 3800 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.

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., a los of service).
Critical	Catastrophic condition has occurred (e.g., the system is overheating).

The Net-Net 3800 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
- Environmental sensor
- Power supply

- Voltage
- Physical interface cards

For each category, the following tables list the Net-Net 3800's alarm name, hardware alarm ID, alarm severity, causes, and log message.

Hardware and Environmental Alarms

This section provides details about hardware and environmental alarms.

Hardware Temperature Alarm

The following table lists the hardware temperature alarm.

Alarm Name	Alarm ID	Alarm Severity	Causes	Example Log Message
TEMPERATURE HIGH	65538	CRITICAL: ≥75°C MAJOR: ≥65°C MINOR: ≥55°C	Fans are obstructed or stopped. The room is abnormally hot.	Temperature: XX.XXC (where XX.XX is the temperature in degrees)

Environmental Sensor Alarm

The following table lists the environmental sensor alarm.

Alarm Name	Alarm ID	Alarm Severity	Cause(s)	Example Log 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!

Voltage Alarms

The following table lists the voltage alarms.

Alarm Name	Alarm ID	Alarm Severity	Cause(s)	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 Net-Net 3800.

Alarm Name	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
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 Net-Net 3800'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 GigE interface link up/link down alarms.

Alarm Name	Alarm ID	Alarm Severity	Cause(s)	Example Log Message
LINK UP ALARM GIGPORT	131073	MINOR	GigE S0P0 link up	Slot 0 port 0 UP
LINK UP ALARM GIGPORT	131074	MINOR	GigE S1P0 link up	Slot 1 port 0 UP
LINK DOWN ALARM GIGPORT	131075	MAJOR	GigE S0P0 link down	Slot 0 port 0 DOWN
LINK DOWN ALARM GIGPORT	131076	MAJOR	GigE S1P0 link down	Slot 1 port 0 DOWN
LINK UP ALARM GIGPORT	131109	MINOR	GigE S0P1 link up	Slot 0 port 1 UP
LINK UP ALARM GIGPORT	131110	MINOR	GigE S1P1 link up	Slot 1 port 1 UP
LINK DOWN ALARM GIGPORT	131111	MAJOR	GigE S0P1 link down	Slot 0 port 1 DOWN
LINK DOWN ALARM GIGPORT	131112	MAJOR	GigE S1P1 link down	Slot 1 port 1 DOWN

Management Ethernet Link Alarms

The following table lists the NIU management Ethernet port alarms:

Alarm Name	Alarm ID	Alarm Severity	Cause(s)	Example Log Message
LINK UP ALARM VXINTF	131077	MINOR	Mgmt0 link up	Port 0 UP
LINK UP ALARM VXINTF	131078	MINOR	Mgmt1 link up	Port 1 UP
LINK UP ALARM VXINTF	131079	MINOR	Mgmt2 link up	Port 2 UP
LINK DOWN ALARM VXINTF	131080	MAJOR	Mgmt0 link down	Port 0 DOWN
LINK DOWN ALARM VXINTF	131081	MAJOR	Mgmt1 link down	Port 1 DOWN
LINK DOWN ALARM VXINTF	131082	MAJOR	Mgmt2 link down	Port 2 DOWN

SFP Presence Alarms

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

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.

5 Safety

Introduction

This chapter provides an overview of the recommended safety precautions for installing the Net-Net 3800.

Before you install your Net-Net 3800, 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 Net-Net 3800 from experiencing any harm during the installation process. These chapters also provide information that helps to keep your Net-Net 3800 functioning properly and keep it from damage.

General Safety Precautions

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

System Maintenance

Aside from the NIU, there are no user-serviceable parts inside the Net-Net 3800 chassis. Only professionals trained to maintain, adjust, or repair the Net-Net 3800 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 Net-Net 3800 documentation. These warnings and cautions are designed to keep you safe and protect the Net-Net 3800 from damage.

Electrical Safety Precautions

To protect yourself from harm and the Net-Net 3800 from damage, follow these electrical safety precautions:

Precautions

- Note the locations of the power supply switches on the Net-Net 3800, and the location of the emergency power-off switch for the room where the Net-Net 3800 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 Net-Net 3800 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 a Net-Net 3800.
- Ensure that the installation facilities have proper grounding systems.
- Use shielded Category 5e or 6, RJ45 cables for all 10/100/1000 Ethernet connections to protect the Net-Net 3800 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 Net-Net 3800.
- Remove jewelry before working on the Net-Net 3800.

Battery Warning

Caution: **RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERY ACCORDING TO THE INSTRUCTIONS.**

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

ESD Safety

To protect the Net-Net 3800's delicate electronic components from damage from static electricity, always follow the appropriate ESD procedures and wear the proper protective devices (such as an ESD wrist strap) when handling any and all Net-Net 3800 hardware and while performing any Net-Net 3800 hardware procedures.

Precautions

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

- Ensure that the Net-Net 3800 is properly grounded.
- If you are grounding your Net-Net 3800 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 Net-Net 3800 to prevent static discharge.

- To avoid damaging ESD-sensitive hardware, discharge all static electricity from your body before working directly with the Net-Net 3800 chassis by touching a grounded object.

Environmental, Safety, and Regulatory Certifications

For specific information regarding the environmental, safety, and regulatory certifications applicable to the Net-Net 3800, refer to the "Environmental, Safety, and Regulatory Certifications" section included in this guide's *Specifications* chapter.

6 Specifications

Introduction

This chapter provides information regarding the physical, electrical, environmental, and connector specifications of the Net-Net 3800. It also lists regulatory specifications and certifications.

Physical Specifications

Net-Net 3800 Chassis's Specifications

This table lists the Net-Net 3800's 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 18 lbs (8.16 kg), fully loaded

Fan Specifications

This table lists the Net-Net 3800's fan module's specifications.

Specification	Description
Number of Fans	3
Total Maximum Airflow	30 CFM

Electrical Specifications

Refer to the following tables for information regarding the electrical specifications of the Net-Net 3800.

Power Supply Input Circuit Fuse Requirements

This table lists the Net-Net 3800's power requirements.

Power Circuit	Fuse Rating	Power Cable Size
120 VAC	2 AMP	18 AWG
240 VAC	2 AMP	18 AWG

Alarm Port Dry Contact Current Limits

This table lists the Net-Net 3800's alarm port's electrical characteristics.

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

Environmental Specifications

For the Net-Net 3800 to function properly, we recommend that you follow the environmental guidelines in the following table.

Specification	Description
Temperature	The Net-Net3800 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 Net-Net 3800 is required to operate below the maximum altitude of 10,000 feet.
Air Flow	30 CFM
Heat Dissipation	100W (341 BTU/hr) typical, 160W (614 BTU/hr) maximum

Connector Specifications

Refer to the following table for information about the connector specifications for the Net-Net 3800.

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.
GigE Port(s)	The GigE fiber optic connection ports use duplex LC connectors.
IEC Connector Port	The IEC connector ports accept a 3-lead IEC-320 connector for AC power installations.

Optical Transceiver Interface Module Specification

Refer to the following table for information about the optical specifications of the GigE SFP optical transceivers for the Net-Net 3800.

Specification	Multimode Fiber Module	Singlemode Fiber Module
Wavelength λ	850 nm	1330 nm
Laser Type	VCSEL	FP
Fiber type / Transmission Distance	62.5 μm core (MM) fiber / 275 m	62.5 μm core (MM) fiber / 550 m
	50.5 μm core (SM) fiber / 550 m	50.5 μm core (SM) fiber / 10 km

Regulatory Specifications and Certifications

Specification/Certification	Description
Safety	• US: UL 60950-1, 1st Ed. • Canada: CSA-C22.2 No. 60950-1-03, 1st Ed. • EU: EN 60950-1:2006 *
EMI	• US: FCC Part 15 (CFR 47), Class A Limits • Canada: ICES-003 Issue 4, Class A Limits • EU: EN 55022: 1998 + A1: 2000 + A2: 2003 Class A Limits *
Immunity	• EU: EN 300 386 v 1.3.3 *
Australia	• C-Tick Registration No. N4292
Japan	• VCCI-A

CE Mark indicated by * above

The Net-Net 3800 System bears CE marking, indicating compliance with the 99/5/EC directive. This includes the EN standards for safety and electromagnetic compatibility.

FCC Statement

The Net-Net 3800 System has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions and information in this guide, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Industry Canada

ICES-003 Class A

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

EN55022 Class A Warning

Warning: This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Japan: VCCI-A

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take corrective actions.

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

VCCI-A

7 Glossary

Acronyms, Definitions, and Terms

ACLI—Acme Command Line Interface is the command line interface used by Acme Packet to configure, maintain, and monitor Net-Net 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 means the diameter.

BTU—British Thermal Unit

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

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

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

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

CE—European Compliance

EN—European Norm

FCC—Federal Communications Commission

FG—Frame ground

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.

GigE—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 NIU provides network connectivity for management, signaling, and media traffic to and from the Net-Net 3800.

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 Net-Net 3800 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 Net-Net 3800.

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

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

VFD—Vacuum Fluorescent Display is used on the graphic display window of the Net-Net 3800 chassis's front control panel.

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

VAC—Volts Alternating Current

VDC—Volts Direct Current

VCCI—Voluntary Control Council for Information Technology Equipment (Japan)

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