Net-Net® 4250
Hardware Installation Guide

Release Version 1.0

Acme Packet, Inc.
100 Crosby drive
Bedford, MA 01730 USA
t 781-328-4400
f 781-425-5077
http://www.acmepacket.com

Last Updated: October 16, 2012
Document Number: 400-0109-10 Rev: 1.29

Notices

Contents

About This Guide

Overview

The Net-Net™ 4250 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 Net-Net system provides exceptional functionality in a tightly integrated system. This chapter provides an introduction and overview of the Net-Net system's main components.

The Net-Net Session Director Hardware Installation Guide describes:

- Hardware components of the Net-Net system
- Graphic display and its usage
- 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 system. Only experienced and authorized personnel should perform installation, configuration, and maintenance tasks.

For information about Net-Net system training, contact your Acme Packet sales representative directly or email support@acmepacket.com.

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 public company that is traded on NASDAQ, headquartered in Bedford, MA.

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

Acme Packet
100 Crosby drive
Bedford, MA 01730 USA
t 781 328 4400
f 781 425 5077
http://www.acmepacket.com

Revision History

This section contains a revision history for this document.

Date	Revision Number	Description
November 11, 2008	Revision 1.21	• Added -72 VDC Power Supply Specifications. • Clarifies list of available physical interface cards. • Adds caution against mixing physical interface cards. • Adds caution to use appropriate fuses for AC and DC power installations.
May 28, 2009	Revision 1.22	• Updates AC and DC fuse size recommendation.
June 26, 2009	Revision 1.23	• Adds Battery Warning section in Safety chapter.
August 10, 2009	Revision 1.25	• Adds Power Supply Input Circuit Fuse Requirements table and removes Power Supply Specifications and Current Requirements tables for clarity • Updates Regulatory Specifications and Certifications section
December 1, 2011	Revision 1.26	• SFP section added
May 7, 2012	Revision 1.27	• Changed the wording in the power supply section
September 7, 2012	Revision 1.28	• Added a caution in the power supply installation section
October 16, 2012	Revision 1.29	• Added AC and DC terminology to the display usage section

1 Component Overview

Chassis

The Net-Net 4250 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 4250 chassis looks like this:

The rear view of the Net-Net 4250 chassis looks like this:

Mounting Hardware

The Net-Net 4250 includes mounting ears and adjustable rack mounting bars that support the Net-Net 4250 from two or four points. Left-right orientation used in this section is given as you face the rear panel of the Net-Net 4250 chassis.

Front Mount Installation Hardware

In front mount installations, the chassis is attached to the equipment rack at four mount points.

- The front mounting ears attach the Net-Net 4250 to the front rail of the equipment rack. The image below shows the front mounting ears with their orientation labeled.

- The chassis-side mounting bars attach to the sides of the Net-Net 4250 chassis and then to the rack-side mounting bars, which in turn mount to the equipment rack. Two identical chassis-side mounting bars are provided in the mounting kit.

- The rack-side mounting ears are first screwed to the equipment rack before the Net-Net 4250 chassis is mounted. These ears feature sliding captive nuts to adjust for rack depths between 21.5″ and 28.5″. Two identical rack-side mounting ears are provided in the mounting kit

Center Mount Installation Hardware

For center mount installations, front mounting ears' orientation is switched, compared to the front mount installation. The ears attach to both sides of the center

of the chassis. Center mount installations do not use the rack-side or chassis-side mounting bars or the rear mounting ears.

Installed mounting hardware for a center mount installation looks like this:

Net-Net 4250 Control Panels

This section describes the Net-Net 4250's front and rear control panels. Although your system might be equipped with different physical interface cards, the basic front control panel features are the same.

Front Control Panel

The Net-Net 4250's front control panel looks like this:

The Net-Net 4250's front control panel with the flip-down door opened looks like this:

Physical Interface Card Slots

The Net-Net 4250 has two slots on the front chassis that each accept a physical interface card. The physical interface cards are used for forwarding and processing media and signaling traffic. The two physical interface card slots, unpopulated, look like this:

When facing the front of the chassis, the left slot is the 0-slot, and the right slot is the 1-slot. These slots can accept any of the physical interface card, or Network Interface Card (NIU) configurations:

- 4-port 10/100 RJ45 copper
- 1-port GigE SFP with optical (SX/LX/CX) or copper (RJ45) transceiver
- 2-port GigE SFP with optical (SX/LX/CX) or copper (RJ45) transceiver
- 2-port IPSec-accelerated GigE RJ45 copper
- 2-port IPSec-accelerated GigE SFP with optical (SX/LX/CX) or copper (RJ45) transceiver

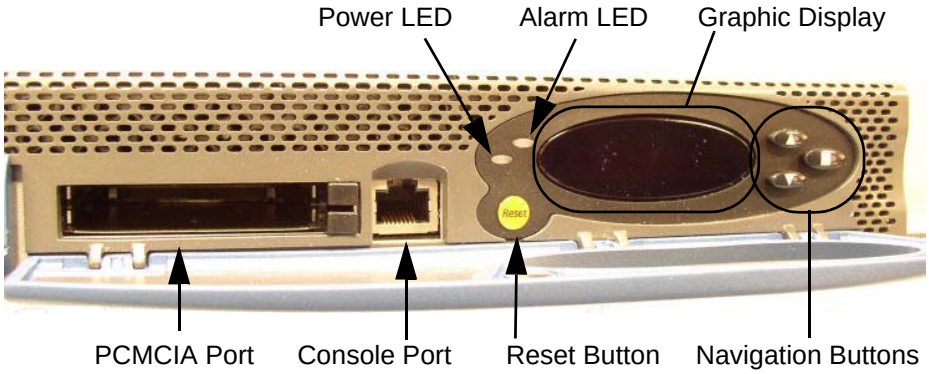
In order to use physical interface cards, you must have both slots populated. The Net-Net 4250 cannot send and receive network traffic over a front panel interface if only one physical interface card is installed.

Caution

Both physical interface cards MUST be identical models; mixing physical interface cards types in your Net-Net 4250 is unsupported.

Components Behind the Flip-Down Door

When you open the Net-Net 4250's flip-down door, you can access the reset button, the front-panel console port, and the PCMCIA port. The following figure shows a close-up of the front control panel behind the flip-down door.



Reset

You reset the Net-Net 4250 by pressing the front panel's reset button. This causes a hard reset, immediately rebooting the Net-Net 4250. After the reset button is released, the Net-Net 4250 begins its boot sequence and loads the configured software image file.

The reset button is only accessible when the front control panel flip-down door is open. To avoid an accidental system reset, keep the front panel flip-down door closed when the hardware behind it is not in use. Accidentally pressing the reset button can result in the loss of software data or your configuration.

Power LED

The power LED on the front control panel indicates when the Net-Net 4250 is powered on or off.

- A green LED indicates that the power is on and that the system is functioning within specified parameters.
- An unlit LED indicates that the system is not powered.

Alarm LED

The alarm LED on the front control panel indicates if any alarms are active on the Net-Net 4250. The LED can be three different colors to indicate the severity of the alarms.

- Unlit indicates that the Net-Net 4250 is fully functional without any faults.
- Yellow indicates a minor alarm has been generated.
- Amber indicates that a major alarm has been generated.
- Red indicates that a critical alarm has been generated.

Graphic Display

The graphic display is a 4-line VFD display window on the Net-Net 4250's front control panel that reports real-time status, alarms, and general system information.

Navigation Buttons

The navigation buttons are used to navigate through the menus and information visible on the graphic display.

Console Port

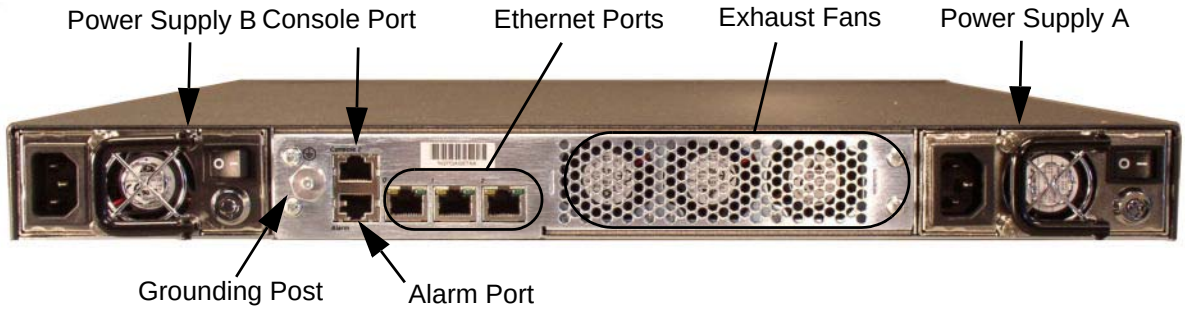
The console port on the front control panel provides console access to the Net-Net 4250 over a RS-232C serial connection. See this chapter's "Console Ports" section for more information.

PCMCIA Port

The PCMCIA port features two Type III PCMCIA slots. This Type III slot can hold one Type III card or any two-card combination of Type I and Type II cards.

Rear Panel

The rear panel chassis with all components labeled looks like this:



Power Supplies

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. See this chapter's "Power Components" section for more information.

Console Port

The console port on the rear panel provides console access to the Net-Net 4250 over a RS-232C serial connection. See this chapter's "Console Ports" section for more information.

Alarm Port

The alarm port is a flexible interface that closes a circuit when a specific alarm level becomes active on the Net-Net 4250. See this chapter's "Alarm Port" section for more information.

Ethernet Ports

Rear panel Ethernet ports are used for high availability, management, and maintenance applications. See this chapter's "Ethernet Ports" section for more information.

Grounding Post

The grounding post is used to attach the Net-Net 4250 chassis to a local earth ground.

Exhaust Fans

The three exhaust fans keep the Net-Net 4250 cool by blowing warm air out of the chassis's rear panel. They are a part of the fan module assembly. See this chapter's "Fan Module" section for more information.

Power Components

Acme Packet offers AC or DC power options for the Net-Net 4250. The power supplies are user-replaceable components.

Power Supply Redundancy

The Net-Net 4250's redundant power supplies provide on-board power load sharing and switchover circuitry. While facing the rear of the Net-Net 4250, power supply A is located on the right-hand side, and power supply B is located on the left-hand side.

During normal operation, the system is load-balanced and draws power from both supplies. However, if a power supply fails, the Net-Net 4250 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 Net-Net 4250 starts up with only one power supply, it will not generate an alarm.

AC Power

The chassis accepts two different AC power supply models. These power supplies are auto-sensing AC, rated at 110-240 VAC, 50-60 Hz, and come with an IEC connector. Both maintain identical electrical specifications. The "style-A" AC power supply has a swinging handle and keyed-lock. The "style-B" AC power supply locks into the Net-Net 4250 chassis with a spring-loaded clip, not a lock. See the following images to distinguish between the two types of power supplies

Style-A

Style-B

The following table lists the AC power supply's physical specifications:

Specification	Description
Height	1.60"
Width	3.74"
Depth	8.86"
Weight	2lbs., 13.5 oz.

AC Power Cords

Acme Packet ships all AC-powered Net-Net 4250s with one 1.5 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

The Net-Net 4250 can be powered by central office –48 VDC operations with a DC-DC supply. The chassis accepts two different DC power supply models. Both maintain identical electrical specifications. The "style-A" DC power supply's power terminals are vertically oriented. The "style-B" DC power supply's power terminals

are horizontally oriented. In addition, the style-B DC power supply locks into the Net-Net 4250 chassis with a spring-loaded clip, not a lock. See the following images to distinguish between the two types of power supplies.

Style-A

Style-B

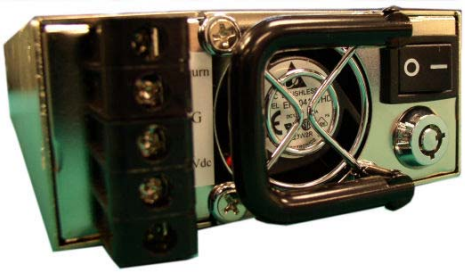
A terminal block on the DC power supply serves as the DC power interconnect. In order to limit the chance of electrical shock, the DC power module has a safety guard that covers the three terminals on the terminal block.

The following table lists the DC power supply's physical specifications:

Specification	Description
Height	1.600"
Width	3.740"
Depth	8.863"
Weight	2lbs., 11.5 oz.

-72VDC Power Supplies

Acme Packet can provide you with -72 VDC power supplies for your Net-Net 4250. The -72 VDC power supplies are physically identical to the style-A DC power supplies and use all respective procedures.



Please refer to the following procedures that are applicable to -72VDC power supply installation and maintenance:

- DC Power Supply Installation
- Style-A DC Power Cord Installation
- Removing a style-A AC or DC Power Supply

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 sleeve terminal DC power leads have spade lugs on each end that connect to the 3-

post 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:

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

Note: Style-B DC power supplies ship with power cables that are tinned on both ends; no spade lugs are provided.

Power Supply Switch

Power switches are located on the power supplies, located on the rear of the system chassis. The Net-Net 4250 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 Net-Net 4250. The side of the switch labeled with a 1 is *on* and 0 side is *off*.

Style-A AC power Supply:

Style-B AC power supply:

Style-A DC power supply:

Style-B DC power supply:

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. Accidentally pressing the reset button can result in corrupted data configuration or service interruption.

Cooling Components

The Net-Net 4250 must remain well ventilated for reliable and continuous operation. The cooling features of the chassis include:

- Perforated air inlets
- Fan module

Perforated Air Inlets

Cool ambient air enters the Net-Net 4250 chassis through the perforated air inlets located along the front bezel of the chassis; the air then exits through exhaust fans at the rear of the chassis. To avoid overheating the system, do not block the air inlets or the fan module, or otherwise obstruct airflow to the system in any way.

Fan Module

The following figure shows the Net-Net 4250's fan module, which has been removed from the Net-Net 4250 chassis.

The Net-Net 4250 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 attaches to the chassis with four screws, and is powered by a connector that joins to the motherboard when screwed into the chassis. The fan module face plate features a grounding post that can be used either when the chassis must share a common ground with other equipment, or when a lab technician or administrator requires a grounding point.

The fan module is a user-replaceable, hot-swappable component. If the Net-Net 4250 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.

Console Ports

The Net-Net 4250 has two serial ports for console communication.

- The first console connector is located behind the flip-down door of the front control panel.
- The second console connector is located above the alarm port on the rear panel of the chassis.

Refer to the front and rear panel images for their locations.

The Net-Net 4250 supports only one active serial console connection at a time. The rear console port is useful for customers who want console access, but do not want to leave the front panel flip-down door open. The front console port provides easy access to the Net-Net 4250 for a temporary connection.

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

- Creating the initial connection to the Net-Net 4250
- Accessing and using all functionality available via the ACLI
- Performing in-lab system maintenance

Pin Assignments: Net-Net 4250 Side

Net-Net 4250 console ports are accessed through the two RJ45 jacks on the system console. Because the Net-Net 4250 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 (RXD)
4	Ground (GND)
6	Transmit Data (TXD)

Console Adapter

A standard RJ45 to DB-9 serial console adapter is shipped with your Net-Net 4250. 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 4250 and the console adapter.

Alarm Port

The Net-Net 4250 features an alarm control signal interface that can be used in a Central Office (CO) location to indicate when internal alarms are generated. The Net-Net 4250 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.

The following table lists the three alarm 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., an LOS).
Critical	Catastrophic condition has occurred (e.g., the system is overheating).

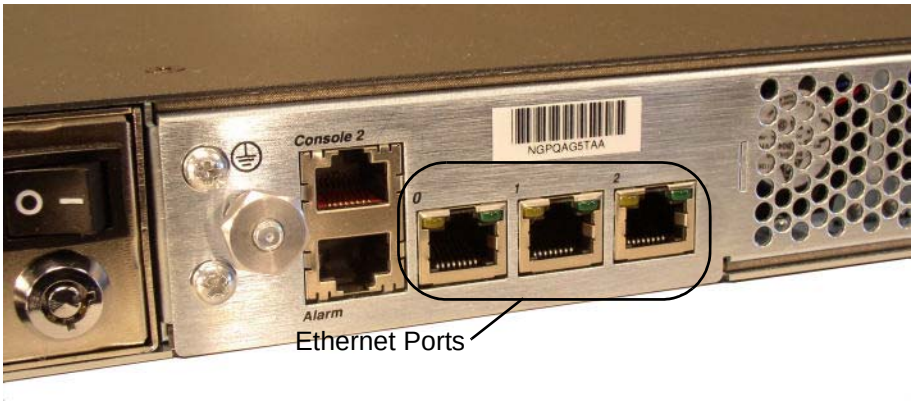
The alarm port uses a standard RJ45 connector. Refer to the image of the Net-Net 4250's rear panel in the "Rear Panel" section to see the location of the alarm port.

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

Ethernet Ports

The Net-Net 4250 has three 10/100 Base-T Ethernet ports located on the rear its chassis. They are used for high availability, management, and maintenance applications. Refer to the following image of the Net-Net 4250's rear panel to see the location of these Ethernet ports.



Upon initial bootup, these Ethernet ports are not configured. You must first connect to the Net-Net 4250 over a serial connection before you can configure the rear panel

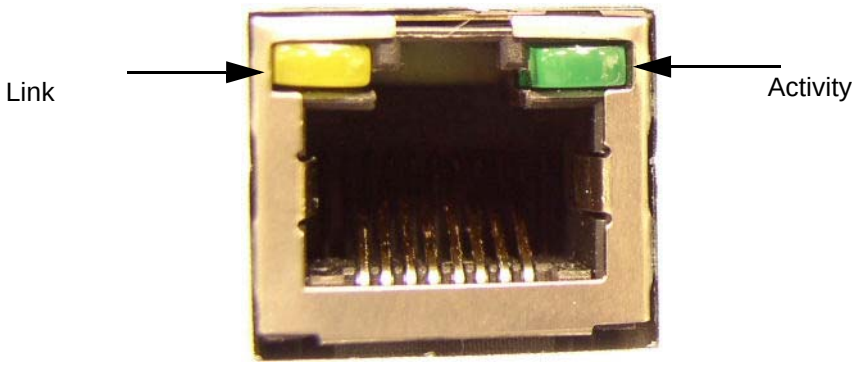
Ethernet ports for use. Once the management network interface is configured, it should be reserved for the following:

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

We recommend that you use shielded category 5 Ethernet cables with RJ45 plugs for connecting to the rear-panel Net-Net 4250 Ethernet interfaces. These Ethernet interfaces have a distance limitation of 328 feet (100 m), as defined by the FAST Ethernet standard, IEEE 802.3.

Ethernet LEDs

Each Ethernet jack has two integrated LEDs: one to indicate link and activity, and one to indicate speed. The LED pair is located directly above its associated port on the rear panel.



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. When Ethernet activity occurs, the LED blinks off, but always returns to the steady-on state when there is no activity and the link is established. When the Ethernet connection is inactive, the activity LED remains in the steady-off state.

Link LED

The link LED is located to the top left side of the Ethernet port. This LED illuminates yellow when link has been established between the link partner device and the Net-Net 4250.

Host Subsystem

At the heart of the host subsystem is a high-speed microprocessor that houses the main memory and communicates with all of the internal components. The host subsystem provides read/write access to the internal device register and provides CAM forwarding table initialization and updates. In addition, this subsystem performs all signaling processing, including call initiation and teardown. This processor also collects statistics and provides access to external device communications (e.g., the maintenance interface).

Memory

The Net-Net 4250 contains several types of memory:

- Main memory (2 GB of RAM maximum)
- Internal Boot Flash Memory (64 MB)
- Internal Code Flash Memory (64 MB)
- On-board NVRAM (32 KB)
- I2C PROM (containing serial number, revision, etc.)
- PCMCIA ATA Flash Memory

PCMCIA Slots

The Net-Net 4250 features two Type III PCMCIA slots, located behind the flip-down door of the chassis's Front Control Panel. This Type III slot can hold one Type III card or any two-card combination of Type I and Type II cards. You should not insert any foreign object into these slots.

Packet Forwarding Subsystem

The Net-Net 4250's packet forwarding subsystem performs routing table lookups, packet classification, and packet modifications, as well as QoS and quality metric calculations. The packet forwarding subsystem is responsible for performing these actions defined on a per-flow basis.

The subsystem consists of the network processor, the Content Addressable Memory (CAM,) the traffic management ASIC suite, and the Flow Quality Measurement Engine (FQME).

Network Processor

The network processor performs packet header inspections and makes packet forwarding decisions. In addition, the network processor also supports MPLS label extraction and insertion.

The network processor is programmable and provides for wirespeed policy-based packet processing (including fixed-size packets) in both ingress and egress directions. The network processor provides Layer 2 and Layer 3+ packet processing for multi-service packet forwarding systems.

Traffic Manager

The traffic manager performs packet storage and traffic management functions. Incoming packets are stored with a tag associated with certain parameters, an IP flow number, and a packet priority. These packets are temporarily stored in memory until the traffic manager schedules them for egress transition.

The traffic manager also performs flow metering and traffic shaping functions through the execution of a number of traffic management algorithms.

Flow Quality Measurement Engine

The FQME monitors, measures, and maintains statistics (e.g., latency, jitter, packet loss, etc.) on a flow-by-flow basis. The host processor makes this statistical information available for processing.

2 Graphic Display

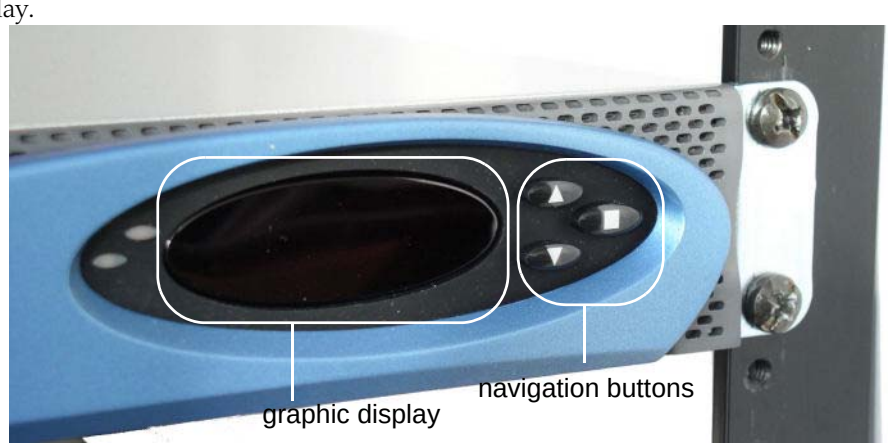
Graphic Display

A 4-line graphic display on the Net-Net system's front control panel is visible when the flip down panel is up. 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 Net-Net system.

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.



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

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 Net-Net system's graphic display defaults to one of two display modes:

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

Base Display

The base display shows the type of Net-Net system 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 a Net-Net SD 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 Net-Net system graphic display, which indicates either a link alarm or a hardware alarm. For example, if there are two link alarms present on the Net-Net system, 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 learn 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 Net-Net system's graphic display lets you access the five display menus for quick access to the system's current status.

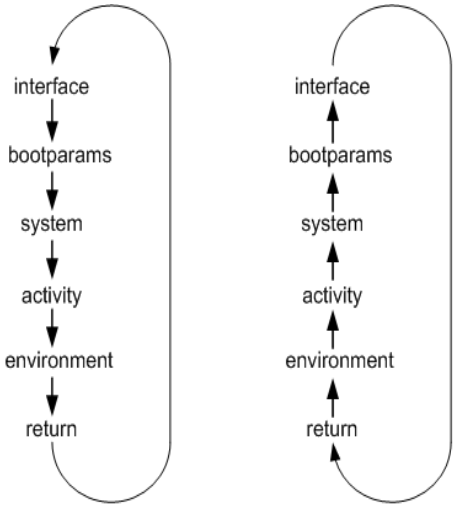
Top Menu

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:

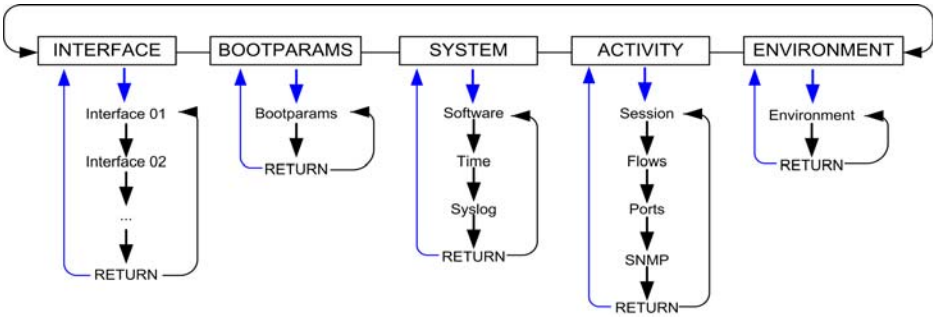
1. Press the **Enter** button. The first entry in the top menu appears.
2. Press the **Up** and **Down** buttons to scroll through the top menu categories. The top menu will roll over when the top or bottom of the menu is reached.

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



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.



INTERFACE

The INTERFACE menu allows you to scroll through a list of all configured physical interfaces. Front and rear panel physical interfaces appear in the list, in addition to 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 element. The BOOT PARAMS selection displays the IP information necessary to connect to the first Ethernet interface, wancom0, located on the rear of the Net-Net system. This interface is used primarily for maintenance, configuration, and downloading software images.

The following information for wancom0 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 you to view system software, current time, and syslog information. The following information displays over three screens in the graphic display in the order listed:

- Net-Net system software version and creation date:

```
Software:
ACME OS 4.0.0
01/01/2005
```

- Current time of day, uptime, memory utilization:

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

- 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 Net-Net system 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 Net-Net system's ACTIVITY display in the order listed:

- Number of sessions, sessions per minute, sessions per hour:

  200 Sessions
  40 Sessions/Minute
  180 Sessions/Hour

- Number of flows, flows per minute, flows per hour:

  400 Flows
  80 Flows/Minute
  360 Flows/Hour

- Number of used ports, number of free ports:

  1000 Used Ports
  2000 Free Ports

- 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's operational status. The graphic display presents the following information in the order listed:

- Alarm state
- System temperature
- Fan speed

Environmental conditions:

```
ALARM: NONE
TEMPERATURE: 38.00 C
FAN SPEED: 68% 70% 70%
```

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 Net-Net nodes. The graphic display on a Net-Net SD 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 a Net-Net SD 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 Net-Net SD.

```
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 Net-Net SD.

```
NET - NET
SESSION DIRECTOR (B/S)
```

Standby State Displays

The following example shows the output in the graphic display window of a standby Net-Net SD.

```
NET - NET
SESSION DIRECTOR (S)
```

Active State Displays

Net-Net systems in the active state use the default graphic display. The following example shows the display of an active Net-Net SD.

```
NET - NET
SESSION DIRECTOR
```

3 System Installation

Introduction

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

Shipped Parts

Each Net-Net system ships in one box. Inside this box is the Net-Net system chassis, the accessory tray, and an accessory kit.

The following table lists the contents of one Net-Net system order.

Location	Item
Main Shipping Box	Net-Net chassis
Accessory Tray	physical interface cards and power supplies
Accessory Kit	AC or DC power cords, one per power supply Left and right front mounting ears Cable dressing clip 12 x 5/16" 10-32 flat head screws 4 x 5/8" 10-32 flat head screws 2 x chassis-side mounting bars 2 x rack-side mounting bars Grounding cable Documentation CD Console adapter Declaration of Conformity (For EU Customers)

Installation Tools and Parts

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

- #2 Phillips-head screwdriver
- 5 mm slotted screwdriver *style-B DC power supply only*
- ESD wrist strap
- Rack and associated mounting hardware
- Shielded Ethernet Category 5 RJ45 cables

Note: The Net-Net system is **NOT** shipped with screws, washers, and other mounting hardware for attachment to the equipment rack itself. You must obtain and use the appropriate hardware recommended by the equipment rack's manufacturer.

Recommended Tools and Parts

- Crimper for DC spade lugs
- Spade lugs for DC installations to fuse panel
- Cable labels

- UPS for AC installations

Preinstallation

The Net-Net system should be located in a secured CO or data center with reliable power and cooling. When choosing a location for your Net-Net system, note the following guidelines.

Environmental Guidelines

When preparing to install your Net-Net system:

- 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 system in a clean, well-ventilated, and dust-free 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 system:

- Ensure that the installation location has access to adequate power and grounding. Separate circuits should be available for each of the Net-Net system's two power supplies.
- Never use extension cords when powering a Net-Net system.
- Use grounded, 3-conductor circuits.
- A local earth ground must be available.

Caution

Connect each of the Net-Net system's power supplies to a separate circuit. If both supplies are connected to outlets on the same circuit, the Net-Net system will lose power to both supplies when that circuit loses power. In that case, the whole Net-Net system would lose power.

Mounting Guidelines

When preparing to install your Net-Net system:

- 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 3" (8 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 servicability. This will aid in chassis removal without 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 system:

- 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 Net-Net system 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.

Equipment Rack Installation

This section explains how to unpack and install your Net-Net system in a telecommunications or server equipment rack. The Net-Net system's standard mounting hardware is used for installation in a 19" equipment rack. Mounting hardware for a 23" equipment rack is available by special order.

> **Note:** The Net-Net system is NOT shipped with screws, washers, and other mounting hardware for attachment to the equipment rack itself. You must obtain and use the appropriate hardware recommended by the equipment rack's manufacturer.

Unpacking the Net-Net System

To unpack the Net-Net system:

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 system shipment.
4. Locate the packing list that comes with the Net-Net system shipment.
5. Confirm that all of the components listed in the shipping box contents tables are present.

   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 Options

You can install the Net-Net 4250 in either a front or center mount configuration with the supplied hardware. This section explains the procedures for each mounting option.

Caution

Failure to follow the instructions in the following sections might compromise the Net-Net system's proper functioning. To prevent personal injury, we recommend that two people lift and install the chassis into the equipment rack.

Front Mount Chassis Installation

This section explains how to mount the Net-Net 4250 chassis in a front mount configuration. Left-right orientation used in this section is given as you face the rear panel of the Net-Net system chassis.

Caution

The Net-Net System must be supported by the front AND rear mounting ears in a front mount installation. Use of the rear mounting ears is NOT optional.

To prepare your Net-Net system for a front mount configuration:

1. Locate the following components:
   - left and right front mounting ears
   - 2 x chassis-side mounting bars
   - 12 x 5/16″ 10-32 flat head screws
   - 4 x 5/8″ 10-32 flat head screws
   - cable dressing clip (optional)
2. Screw the left front mounting ear to the front mount screw holes on the left side of the Net-Net system chassis with 3 x 5/16″ 10-32 Phillips head screws. The flat side of the mounting ear aligns with the bottom of the Net-Net system chassis; the slanted side of the mounting ear points upward.

3. Optionally, press the cable dressing clip into the right front mounting ear. With the mounting flange pointing toward you, snap the cable dressing clip from behind into the two holes on the mounting ear. The cable dressing clip is used to route cables neatly away from the chassis.

4. Screw the right front mounting ear to the front mount screw holes on the right side of the Net-Net system chassis with 3 x 5/16″ 10-32 Phillips head screws.

The flat side of the mounting ear aligns with the bottom of the Net-Net system chassis; the slanted side of the mounting ear points upward.

5. Secure one chassis-side mounting bar to left side of the Net-Net 4250 chassis by screwing 3 x 5/16″ 10-32 flat head screws through the mounting bar's countersunk holes into the chassis. The stationary rack mounting bars are reversible and need not be mated to a specific side of the chassis.

6. Secure the other chassis-side mounting bar to left side of the Net-Net 4250 chassis by screwing 3 x 5/16″ 10-32 flat head screws through the mounting bar's countersunk holes into the chassis. The stationary rack mounting bars are reversible and need not be mated to a specific side of the chassis.

7. Secure the two rack-side mounting bars to the rear mounting rail of your equipment rack with four rack screws. Ensure that they are mounted at the same position on the mounting rail as you use on the front of the equipment rack so that the front and rear mounting ears align properly.

   In addition, slide the cage nuts toward the equipment rack rails

Note: The screws used to attach the rear mounting ears to your equipment rack are not included in a Net-Net system shipment.

Installing the Chassis in the Rack

You now will lift the Net-Net system and install it into the rack. To prevent personal injury or damage to the Net-Net system, 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 system chassis remains supported until you have completely installed it into the equipment rack.
- The mounting hardware can accommodate cabinet depths (distance between equipment rack rails) from 21.5″ - 28.5″.

To install your Net-Net system in an equipment rack:

1. Lift the Net-Net system into the correct position in the equipment rack.
2. Screw the front mounting ears on the Net-Net system into the front of the equipment rack using four rack screws. One person should hold the Net-Net system in the correct position, and another person should screw the Net-Net system in place.

Note: The screws used to attach the front mounting ears to your equipment rack are not included in a Net-Net system shipment.

Once you have secured the front of the chassis to the equipment rack, the chassis-side mounting bar should be positioned on the inside of the rack-side mounting bar as shown in the following image.

3. Screw the chassis-side mounting bar to the rack-side mounting bar with 2 x 5/8″ 10-32 Phillips-head screws. You perform this step from the inside of the equipment rack enclosure.

4. Repeat Step 3 for the other side of the system.

Ensure that the Net-Net system chassis remains supported until you have completely installed it into the equipment rack.

Center Mount Chassis Installation

This section explains how to mount the Net-Net system chassis in a center mount configuration. Left-right orientation used in this section is given as you face the rear panel of the Net-Net system chassis.

To install your Net-Net system in a center mount configuration:

1. Locate the following components:
   - left and right front mounting ears,
   - 6 x 5/16″ 10-32 flat head screws.
   - 4 screws and associated hardware for securing chassis to rack (NOT INCLUDED with Net-Net System shipment)
2. Screw the left front mounting ear to the center mount screw holes on the left side of the Net-Net system chassis with 3 x 5/16″ 10-32 flat head screws. This mounting ear has a notch in it. The flat side of the mounting ear aligns with the bottom of the Net-Net system chassis; the slanted side of the mounting ear faces the front of the Net-Net system.

3. Screw the right front mounting ear to the center mount screw holes on the right side of the Net-Net system chassis with 3 x 5/16″ 10-32 flat head screws. The flat

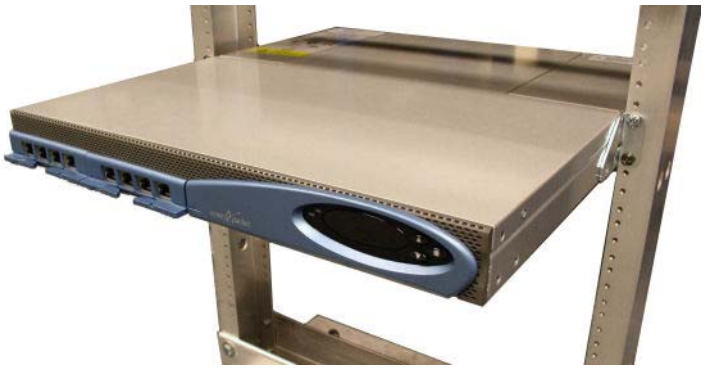
side of the mounting ear aligns with the bottom of the Net-Net system chassis; the slanted side of the mounting ear faces the front of the Net-Net system.

Installing the Chassis in the Rack

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

1. Lift the Net-Net system into the correct position in the equipment rack.
2. Screw the front mounting ears on the Net-Net system into the front of the equipment rack using four rack screws. One person should hold the Net-Net system in the correct position, and another person should screw the Net-Net system in place.



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

Power Supply Installation

Power supplies can be installed in the Net-Net chassis before or after the chassis is mounted in an equipment rack. For ease of installation, you should install the power supply in the Net-Net system after the chassis is securely mounted in an equipment rack.

Ground yourself to the grounding post located on the rear panel of the chassis with an ESD wrist strap before performing any installation or maintenance work on a power supply.

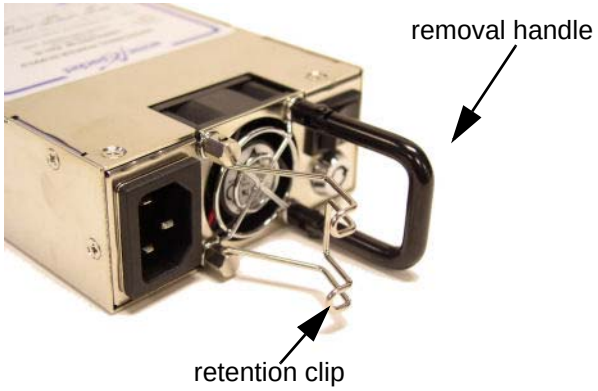
Caution — Always disconnect the power to a power supply when working near, installing, removing, or replacing it.

AC Power Supply Installation

The following procedure is used to install an AC power supply in the Net-Net system. The numbered procedure uses the style-A power supplies for illustration. A note about style-B power supplies is included after the procedure.

To install an AC power supply in the Net-Net system chassis:

1. Locate and remove the power supply from the packaging accessory kit.
2. AC power supplies have a removal handle that swings out. Hold the handle when inserting the power supply into the Net-Net system. Extend the power supply's removal handle so that it is perpendicular to the rear face of the power supply. Swing the power retention clip toward the removal handle to keep it out of your way.



Note: Ensure that the locking mechanism is retracted so the power supply can be completely inserted into the system chassis.

3. Insert the power supply into the power supply bay located on the rear panel of the Net-Net system chassis in the orientation shown below. The label on the power supply faces upward.

4. Fold the power supply removal handle to the left once the power supply is fully inserted into a power supply bay. The power supply sits flush with the chassis's rear panel.

5. AC power supplies use a keyed mechanism to lock in place. Turn the key to lock the style-A AC power supply into the chassis.

6. Remove the key and store in a safe place.
7. Connect the power cord to the inserted power supply as described in the "Ground and Power Cable Installation" section of this chapter.

Note: Style-B AC power supplies click into place as you press them completely into the chassis. In addition, their removal handle is fixed and does not swing toward the chassis.

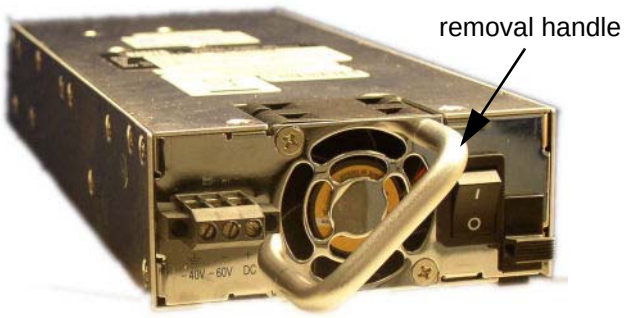
DC Power Supply Installation

The following procedure is used to install a DC power supply in the Net-Net system. Style-B DC power supplies are used in the following images except where style-A DC power supplies require different procedures.

Note: For -72VDC power supply installation, refer to style-A DC power supply procedures.

To install a DC power supply in the Net-Net system chassis:

1. Locate and remove the power supply from the packaging accessory kit.
2. Style-B DC power supplies have a fixed removal handle. Hold the handle to insert the power supply into the Net-Net system.



Style-B DC power supply

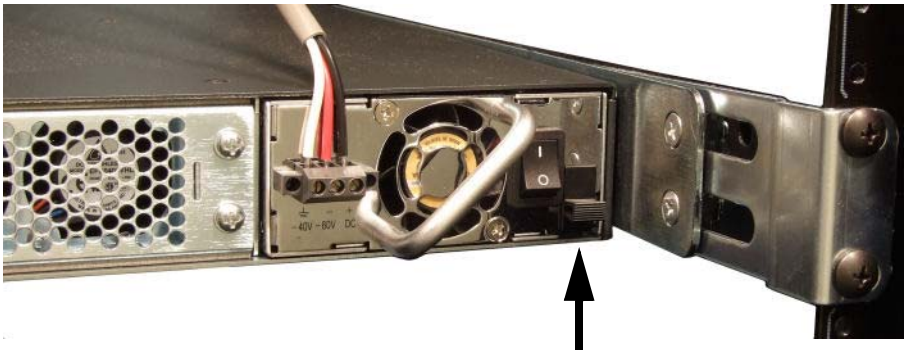
Note: Style-A DC power supplies have a removal handle that swings out. Hold the handle to insert the power supply into the Net-Net system.

Style-A DC power supply

Note: Ensure that the locking mechanism is retracted so the power supply can be completely inserted into the system chassis.

3. Insert the power supply into the power supply bay located on the rear panel of the Net-Net system chassis in the orientation shown below.

4. Style-B DC power supplies click into place as you press them completely into the chassis. The arrow in the photograph below points to the spring-loaded tab that clicks when the power supply is completely inserted into the chassis



Note: Style-A DC power supplies require that you fold the power supply removal handle to the left once the power supply is fully inserted into a power supply bay.

Style-A DC power supplies use a keyed mechanism to lock in place. Turn the key to lock the style-A DC power supply into the chassis.

Remove the key and store in a safe place.

5. Connect the power cord to the inserted DC power supply as described in the "Ground and Power Cable Installation" section of this chapter.

Fan Module Installation

The fan module is preinstalled in the Net-Net system 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 Replacement and Ventilation Maintenance" section in the *Maintenance* chapter of this guide.

Ground and Power Cable Installation

The Net-Net system should be properly grounded to ensure efficient system performance. Grounding your Net-Net chassis is an extremely important part of the installation and maintenance procedures. Physical harm or problems with system functionality may occur on Net-Net systems that are not properly grounded. If your Net-Net chassis is not properly grounded, it can exhibit unpredictable problems such as:

- Garbled output on the screen
- Sudden crashes
- Physical damage to the Net-Net chassis and its hardware components

Failure to ground the chassis properly can result in permanent damage to the Net-Net system and its components. There is also the possibility that you could suffer physical harm.

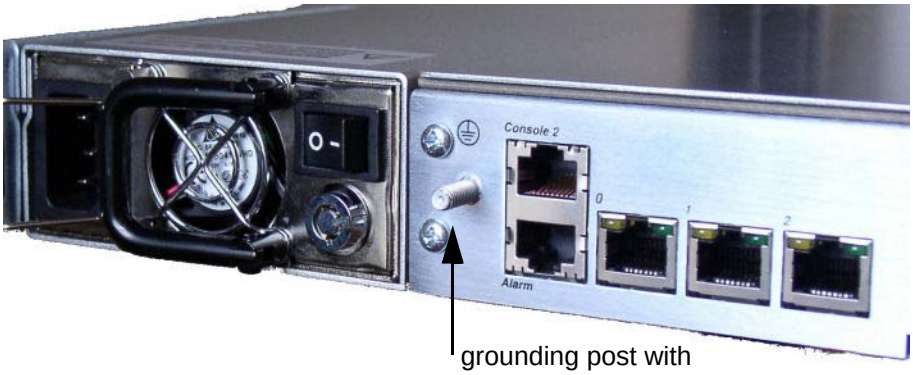
Your equipment rack location must have a local earth ground. This ground can be either an unpainted spot on the grounded equipment rack frame, or a grounded bus bar in the equipment room. You should use the grounding cable provided with your Net-Net system to attach to the local ground.

Caution

Always make the ground connection first and disconnect it last when installing the system in an equipment rack.

Grounding Cable Installation

1. Unscrew the thumb nut and remove the lock washer from the grounding post located on the fan module on the rear of the Net-Net system.



2. Place the ring lug on the end of the grounding cable onto the grounding post.

3. Replace the lock washer on the grounding post on top of the ring lug.

4. Screw the thumb nut onto the grounding post. When attached correctly, the grounding cable loop will fit snugly between the chassis's rear panel and the lock washer and thumb nut combination.

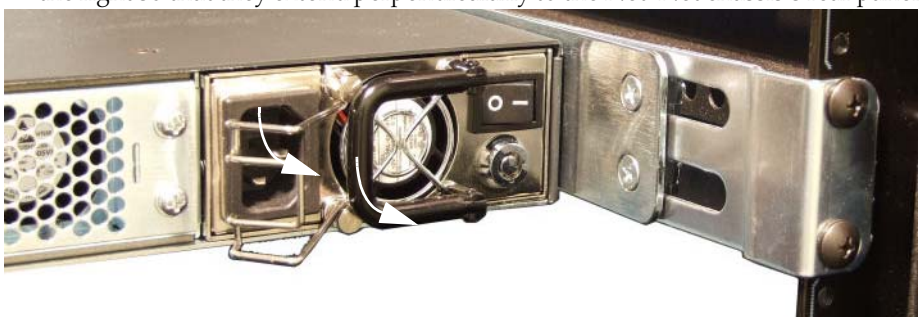
5. Connect the other end of the ground wire to a suitable grounding point at your site.

AC Power Cord Installation

Caution — Use a 2 Amp fused circuit for each AC power supply.

To install the AC power cords in the Net-Net system:

1. Locate the two AC power cords shipped with your Net-Net system. Choose one power supply to work on first.
2. Swing the power retention clip and the power supply removal handles toward the right so that they extend perpendicularly to the Net-Net chassis's rear panel.



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

4. Swing the power retention clip to the left so that it secures the power cord onto the power supply. Also, swing the supply removal handle to the left so that it is out of the way.

5. Repeat Steps 2 through 4 for the other power supply.
6. Route the AC power cords through your rack and cabling system to the power outlets.
7. Plug the supply end of each power cord into its own circuit.

DC Power Cord Installation

For Net-Net systems shipping with -48 VDC power supplies, one DC power cord is included with each power supply.

Ends of each lead are stripped and tinned. The DC power cord has three leads: red -48 VDC lead, black return lead, and a white ground lead. One end of the DC power

cord is secured to the Net-Net system and the other end is secured to a DC fuse panel.

It is easier to cable the power supply out-of-chassis, and then insert the power supply and cable assembly into the Net-Net system chassis.

Note: For -72VDC power supply installation, refer to style-A DC power supply procedures.

Caution

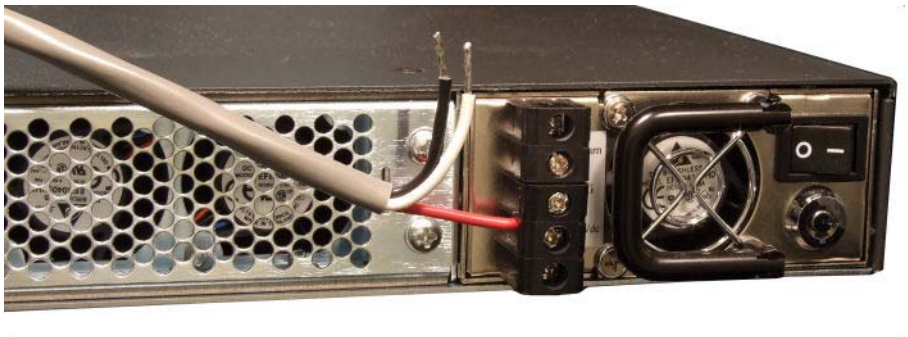
Use a 5 Amp fused circuit for each -48 VDC power supply. Use a 3 Amp fused circuit for each -72 VDC power supply.

Style-A DC Power Cord

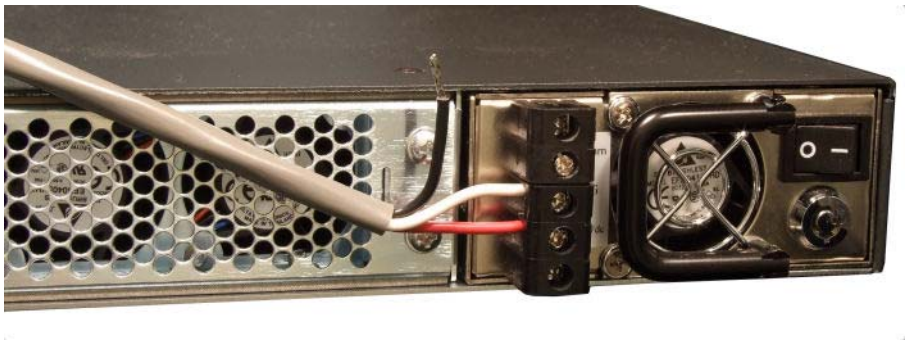
To install a DC power cord on a style-A DC power supply:

1. Locate the two DC power cords shipped with your Net-Net system.
2. Ensure that the equipment rack's circuit breaker is shut off.
3. Insert a DC power supply into the Net-Net system and lock it into place.
4. Loosen the three middle screws on the power terminal of the Net-Net system's DC power supply. Terminal markings may be on either the side or rear of the power supply.

5. Insert the tinned end of the red -48VDC wire into the terminal labeled -48Vdc. Tighten the screw on this terminal.



6. Insert the tinned end of the white ground wire into the terminal labeled FG. Tighten the screw on this terminal.



7. Insert the tinned end of the black return lead into the terminal labeled RTN. Tighten the screw on this terminal.

8. Route the DC power cord through your rack and cabling system to the -48 VDC power supply.
9. Connect the supply leads of the DC power cord to the DC power supply.
10. Repeat Steps 3 through 9 for connecting the other power supply to a power source.
11. Turn the circuit breaker on after the Net-Net system has been connected to the -48 VDC power source.

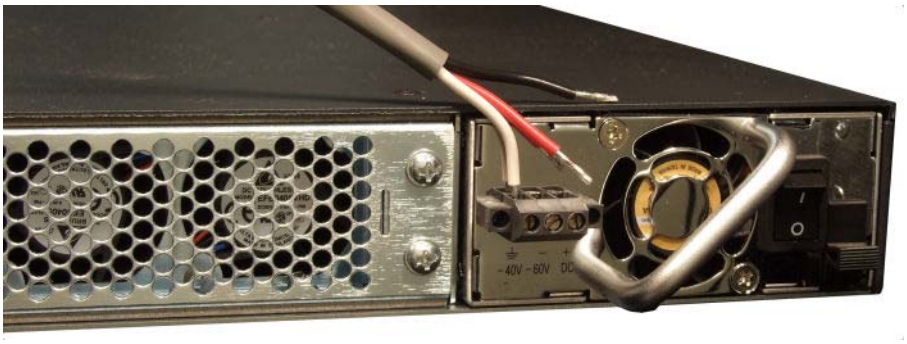
Style-B DC Power Cord

To install a DC power cord on a style-B DC power supply:

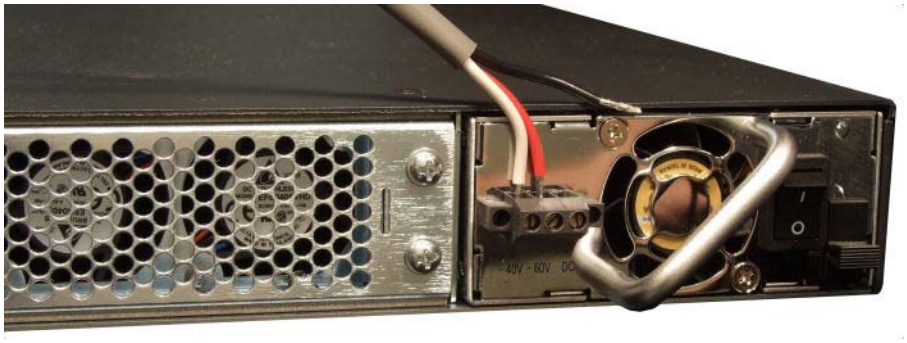
1. Locate the DC power cord(s) shipped with your Net-Net system.
2. Ensure that the equipment rack's circuit breaker is shut off.
3. Insert a DC power supply into the Net-Net system and lock it into place.

4. Loosen the three screws on the power terminal of the Net-Net system's DC power supply. Note their markings:

5. Insert the tinned end of the white ground wire into the left-most terminal. Tighten the screw to secure the wire in place.



6. Insert the tinned end of the red -48VDC wire into the middle terminal. Tighten the screw to secure the wire in place.



7. Insert the tinned end of the black return lead into the right-side return terminal. Tighten the screw to secure the wire in place.

8. Route the DC power cord through your rack and cabling system to the -48 VDC power supply.
9. Connect the supply leads of the DC power cord to the DC power supply.
10. Repeat Steps 3 through 9 for connecting the other power supply to a power source.
11. Turn on the circuit breaker after the Net-Net system has been connected to the -48 VDC power source.

Physical Interface Card Installation

- The Net-Net system can accept four types of physical interface cards in the chassis's 4-port 10/100 RJ45 copper
- 1-port GigE SFP with optical (SX/LX/CX) or copper (RJ45) transceiver
- 2-port GigE SFP with optical (SX/LX/CX) or copper (RJ45) transceiver
- 2-port IPSec-accelerated GigE RJ45 copper
- 2-port IPSec-accelerated GigE SFP with optical (SX/LX/CX) or copper (RJ45) transceiver

Both of the Net-Net 4250's front physical interface card slots must be populated. The Net-Net system cannot send and receive network traffic over a front panel interface if only one physical interface card is installed. The optical GigE cards can accept an LC fiber connector using either single mode or multimode cable.

Caution

Both physical interface cards MUST be identical models; mixing physical interface cards types in your Net-Net 4250 is unsupported.

Without powering down the Net-Net system, you can exchange a physical interface card (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.

Caution

You must wear grounded ESD straps when replacing physical interface cards.

GigE SFP Physical Interface Card Installation

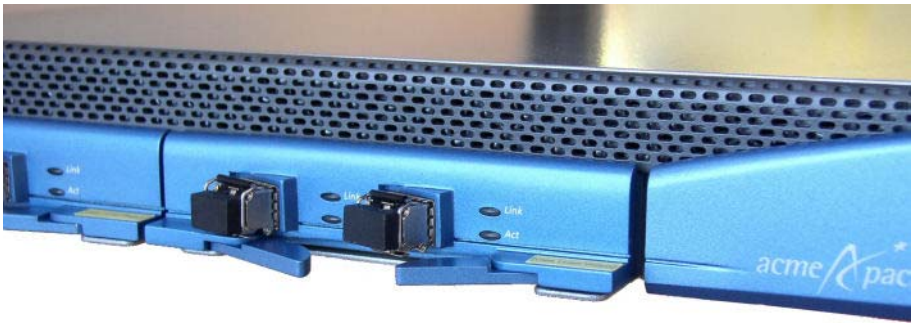
To install a 1 or 2 port GigE SFP optical or copper physical interface card in the Net-Net system chassis:

1. Locate and remove the GigE physical interface card from its accessory box.
2. Ensure that the ejection levers on the front of the card are in the open and extended position.

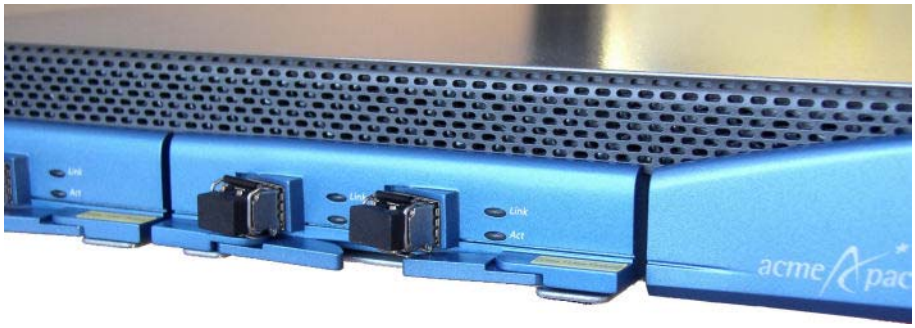
3. Hold the physical interface card by its sides with the front panel bezel facing you.
4. Slide the card into the Net-Net system chassis. The physical interface card circuit board slides into the rails in the physical interface card ports of the system chassis.

5. Continue sliding the card into the chassis until it cannot be inserted any farther. At this point, the front bezel of the card will not set flush against the front panel of the chassis.

6. 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.



The front bezel of the card should now be flush against the front panel of the chassis.



7. Repeat Steps 1 through 6 to install the second GigE physical interface card.

10/100 Ethernet Physical Interface Card Installation

To install a 10/100 Ethernet physical interface card in the Net-Net system chassis:

1. Locate and remove the 10/100 Ethernet physical interface card from its accessory box.

2. Ensure that the ejection levers are in the open and extended position.

3. Hold the physical interface card by its sides with the front panel bezel facing you, viewing it from the same perspective in the previous image.
4. Slide the card into the Net-Net system chassis. The physical interface card circuit board slides into the rails in the physical interface card ports of the system chassis.

5. Continue sliding the card into the chassis until it cannot be inserted any farther. At this point, the front bezel of the card will not set flush with the front panel of the chassis.

6. Fold both ejection levers inward at the same time 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.

The front bezel of the card should now be flush against the front panel of the chassis.

7. Repeat Steps 1 through 6 to install the second 10/100 Ethernet physical interface card.

IPsec Capable Physical Interface Cards

The IPsec-capable physical interface cards (NIUs) are offered in two options:

- 2-port GigE IPsec-capable RJ45 Copper NIU
- 2-port GigE IPsec-capable SFP NIU Configurable for SX, LX, or Copper via SFP transceiver

The 2-port GigE IPsec-capable SFP interface looks exactly like the non-IPsec-capable 2-port GigE SFP physical interface cards. The following image shows a 2-port IPsec-capable RJ45 Copper NIU.

Both cards are installed in the same manner as other physical interface cards explained previously in this section.

Cabling the Net-Net System

After unpacking and mounting the Net-Net system in an equipment rack and installing all components into the chassis, connect all appropriate cables to the ports before powering the system up and configuring it.

We strongly recommend using fully shielded Category 5 Ethernet cables for physical interface card and wancom Ethernet connections to protect the Net-Net system from potential damage.

Front Panel Cabling

The Net-Net system has multiple media network ports, depending on configuration, on the front panel of the chassis. Network cabling refers to the connections that connect the physical interface cards to the production network. These connections carry the media and signaling traffic that the Net-Net system processes and forwards. In addition, the Net-Net system has one console connection located on the front panel.

You can install and remove Ethernet and GigE optical cables while the Net-Net system 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.

Front Panel 10/100 Ethernet Cabling

This section explains how to cable a Net-Net system configured with 10/100 physical interface cards, IPsec copper cards, or SFP cards with the GigE copper option. Shielded Category 5 (or higher) Ethernet cables with RJ45 jacks are used for connecting the Net-Net system's front panel 10/100 physical interface cards to your network. You should keep Ethernet cables separated from AC and DC power cables

by at least 60mm where possible and never run in the same channel of a trunking system without segregation.

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

To connect Ethernet cables to the 10/100 Ethernet physical interface cards:

1. Locate the Ethernet cables you plan to connect to the Net-Net system.
2. Insert the RJ45 jack on the end of the Ethernet cable into the assigned Ethernet port of the Net-Net system's physical interface card. The release tab on the RJ45 jack will click into place when you insert it properly.

3. Route the cable away from the physical interface card toward the cable dressing clip and up (or down) the equipment rack.

4. For front mount-installations that use a cable dressing clip: Gently pull the Ethernet cable away from the front panel, and slide it behind the cable dressing clip. Release the clip. Make sure that the Ethernet cables are not stretched tightly or subjected to extreme stress.

   If you have a center mount installation, the Ethernet cables hang freely.

5. Repeat Steps 1 through 4 for each additional Ethernet cable you connect to your Net-Net system.

Front Panel GigE Optical Cabling

This section explains how to cable a Net-Net system configured with GigE optical physical interface cards. Standard single mode or multimode fiber optic cabling with duplex LC connectors is used to connect the Net-Net system's front panel GigE optical physical interface cards to your network. The Net-Net system is only shipped with LC to SC optic cabling. The procedures listed below are applicable to both one and two port GigE optical physical interface cards.

The optical transceiver on a physical interface card is angled toward the right side of the chassis allowing for ease in guiding the cables away from the chassis via the cable dressing clip (in front mount chassis installations only). This feature also prevents kinks in the cable.

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 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 system.
2. Remove the protective dust covers from the duplex LC connector.

3. Insert the duplex LC connector on the end of the fiber cable to the assigned optical transceiver port on the physical interface card. The connector should click and lock in place when you insert it properly.

4. Route the cable away from the physical interface card toward the cable dressing clip and up (or down) the equipment rack.

5. For front mount installations that use a cable dressing clip: Gently pull the fiber optic cable away from the front panel and slide it behind the cable dressing clip. Release the clip. Make sure the fiber optic cables are not stretched tightly or subjected to extreme stress.

   If you have a center mount installation, the fiber optic cables hang freely.

6. Repeat Steps 1 through 5 for each additional fiber optic cable you connect to your Net-Net system.

Front Panel Console Cable Cabling

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

The Net-Net system ships with a console adapter, which allows you to connect a standard DB-9 serial port to the Net-Net system's RJ45 console port. Only one console port on the Net-Net system can be used at a time.

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 system.
2. Pull down the front flip-down door on the Net-Net system to reveal the front panel console port.

3. 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.

4. If your front panel console connection is permanent, route the cable away from the console port toward the cable dressing clip and up (or down) the equipment rack.

5. For front mount installations that use a cable dressing clip: Gently pull the cable away from the front panel, and slide it behind the cable dressing clip. Release the clip. Make sure that the cable is not stretched tightly or subjected to extreme stress.

   If you have a center mount installation, the console cable can hang freely.

6. For temporary front console connection use, remember to close the flip-down door after disconnecting the cable.

Rear Panel Cabling

The following Net-Net system rear ports all use RJ45 connectors:

- 3 x Ethernet ports
- 1 x console port
- 1 x one alarm port

You can connect and disconnect Ethernet, serial, and alarm cables while the Net-Net system is operational; not every port needs to be utilized for proper operation. However, when an Ethernet cable is disconnected from a rear interface, and the link is lost, alarms are generated. The alarm and console ports do not have associated alarms.

Rear Panel Ethernet Cabling

Standard shielded Category 5 (or higher) Ethernet cables with RJ45 jacks are used for connecting the Net-Net system's rear panel Ethernet ports to your network.

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

To connect Ethernet cables to the rear panel Ethernet ports:

1. Locate the Ethernet cables you plan to connect to the Net-Net system.

2. Insert the RJ45 connector on the end of the Ethernet cable into an Ethernet port of the Net-Net system's rear panel. The release tab on the RJ45 jack will click into place when you insert it properly.

3. Route the cable away from the Net-Net system chassis. Make sure that the Ethernet cables are not stretched tightly or subjected to extreme stress.
4. Repeat Steps 1 through 3 for each additional Ethernet cable you will connect to your Net-Net system.

Rear Panel Console Cabling

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

The Net-Net system ships with a console adapter cable, which allows you to connect a standard DB9 serial port to the Net-Net system's RJ45 console port. Only one console port on the Net-Net system can be used at a time. The rear panel console port is used primarily for permanent connection 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 rear panel console port:

1. Locate a shielded Category 5 console cable to connect to the Net-Net system.

2. Insert the RJ45 connector on the end of the console cable into the console port. 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 system with a console cable properly connected.

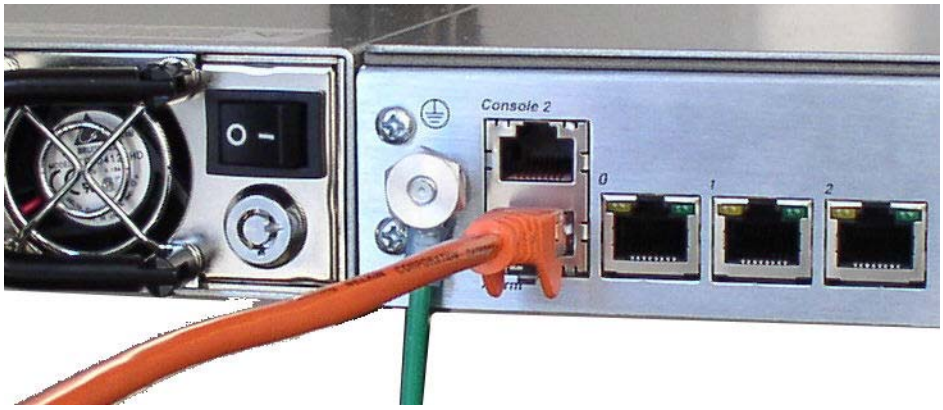
Rear Panel Alarm Port Cabling

The alarm port is a flexible interface that you can use to indicate electrically when an alarm has been generated on the Net-Net system. 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.

To connect the alarm port cable to the rear panel alarm port:

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

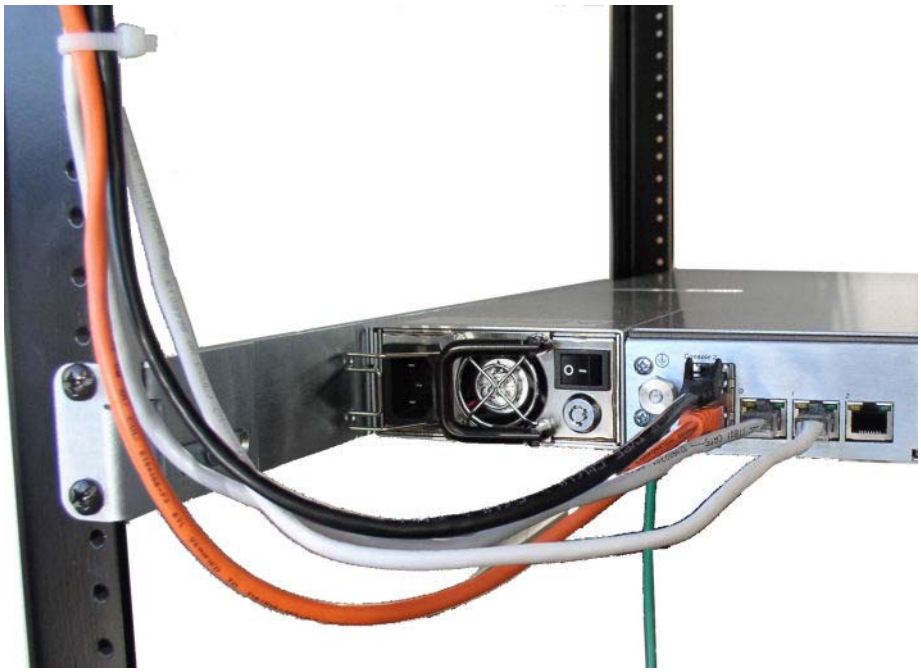
2. Insert the RJ45 connector on the end of the alarm port cable into the alarm port. The release tab on the RJ45 jack clicks into place when you insert it properly.



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

Perform all cabling procedures according to the established standards for your organization. When you are finished cabling the rear panel of your Net-Net system,

it should resemble the following figure.



Cabling for HA Deployments

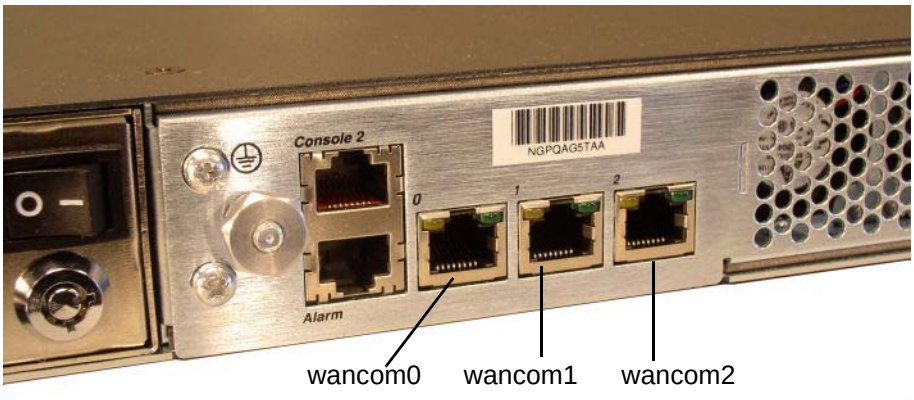
The information and instructions in this section explain how to cable an HA node.

HA Cabling

Category 5 (or higher) shielded **crossover** 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, wancom0 should be reserved as the boot/maintenance interface. This leaves wancom1 and wancom2 available for sharing HA information.



To cable Net-Net SDs using single rear interface support:

1. Insert one end of an Ethernet cable into either wancom1 or wancom2 on the rear panel of the Net-Net SD1. 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 wancom interface on the rear panel of the second Net-Net SD. The release tab on the RJ45 jack clicks into place when you insert it properly. If you use wancom1 on Net-Net SD1, then you will connect it to wancom1 on Net-Net SD2.
3. Refer to the configuration procedures located in the *HA Nodes* chapter of the *Net-Net Configuration Guide*.

To cable Net-Net SDs using multiple rear interface support:

1. Insert one end of an Ethernet cable into wancom1 on the rear panel of Net-Net SD1. The release tab on the RJ45 jack clicks into place when you insert it properly.
2. Insert the other end of the cable into wancom1 on the rear panel of Net-Net SD2. 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 wancom2 on the rear panel of Net-Net SD1. The release tab on the RJ45 jack clicks into place when you insert it properly.
4. Insert the other end of the cable into wancom2 on the rear panel of Net-Net SD2. 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*.

Front Panel Cabling

The way you cable the front panel interfaces in your HA node varies with your network. The only guideline is that corresponding front panel physical interface cards must both be connected to the same Ethernet switch. When there is a switchover between the two Net-Net SDs 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 within the same Ethernet switch.

4 Startup

Introduction

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

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

You can perform these actions is any order. However, if your console connection is configured first, you can observe the booting processes as your Net-Net system 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 system, you need to configure the terminal hardware/software appropriately. The following table lists your terminal application's serial configurations.

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

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

Creating a Console Connection

To create a console connection:

1. Set the terminal application's parameters to match the Net-Net system'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 Cable Cabling" section for how to connect your PC or terminal server to the Net-Net system's console port.
3. If the Net-Net system 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 system, you can watch the boot process as it displays on your screen.

Powering On the Net-Net System

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

To power on the Net-Net system hardware:

1. Refer to the *Component Overview* chapter of this guide to learn how to connect your Net-Net system to either AC or DC power.
2. Flip the power supply switches on the rear panel of the Net-Net system to the ON position. Press the 1 side for *on* and 0 side for *off*.

   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.
3. The Power LED on the front control panel should be illuminated green.

Creating the Initial Console Connection

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

```
User Access Verification
Password:
```

If the Net-Net system completed booting before you connected to the console port, press the <Enter> key 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 system, but you cannot configure anything.
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 terminate 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 system. Refer to the *Net-Net Configuration Guide* to learn how to establish an IP address for your Net-Net system.

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.

5 Maintenance

Introduction

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

System Shut Down

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

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

You can set the Net-Net system to reject all incoming calls from your system with the **set-system-state** command. 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 Net-Net system. Shutting down the system is appropriate when you are replacing a physical interface card, power supply, or are removing the Net-Net system from the equipment rack.

Rejecting Incoming Calls

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

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 System

To shut down the Net-Net system hardware:

1. Exit the ACLI and close your console or Telnet connection.
2. Turn the power supply switches on the rear panel of the Net-Net system to the OFF position.

3. Confirm that the power LED and other system LEDs are off.

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

Rebooting, Resetting, and Power Cycling

Reboot

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

Before rebooting the Net-Net system, 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 system:

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** <Enter>.

```
ACMEPACKET# reboot

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

3. Type **Y** <Enter> at the confirmation prompt to proceed with the reboot.

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

System Reset

Resetting the Net-Net system by pressing the orange front panel reset button 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 Net-Net system when the system 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 system before performing a cold reset. Only reset the system as a last resort.

To reset the Net-Net system:

1. Open the front control panel flip-down door.
2. Press the orange reset button.

The system will immediately reset and begin its initialization and boot sequence.

Power Cycling

Power Cycling the Net-Net 4500 System 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 30 seconds between power down and power up to ensure that all components are completely powered down before restart.

Standby Mode

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

There are two ways to determine the HA state of each Net-Net SD in an HA pair.

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

Once you have determined that the Net-Net SD 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 SD, you need to manually force the two Net-Net SDs to switch HA states. This will render the currently active Net-Net SD as standby, and the currently standby Net-Net SD will assume all traffic processing and forwarding as the active system.

Caution

This procedure is only applicable to Net-Net SDs in an HA deployment.

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

1. Confirm that Net-Net SD1 and Net-Net SD2 are synchronized with the **show health** command. Type **show health** <Enter> on each system.

```
NETNETSD1# show health
        Media Synchronized              true
        SIP Synchronized                true
        MGCP Synchronized               true
        Config Synchronized             true
        Active Peer Address             0.0.0.0

Redundancy Protocol Process (v2):
        State                           Active
        Health                          100
        Lowest Local Address            13.13.13.1:9090
        1 peer(s) on 1 socket(s):
        NETNETSD2: v2, Standby, health=100, max silence=1050
               last received from 13.13.13.2 on wancom1:0

        Switchover log:
NETNETSD1#

NETNETSD2# show health
        Media Synchronized              true
        SIP Synchronized                true
        MGCP Synchronized               true
        Config Synchronized             true
        Active Peer Address             13.13.13.1

Redundancy Protocol Process (v2):
        State                           Standby
        Health                          100
        Lowest Local Address            13.13.13.2:9090
        1 peer(s) on 1 socket(s):
        NETNETSD1: v2, Active, health=100, max silence=1050
               last received from 13.13.13.1 on wancom1:0

        Switchover log:
NETNETSD2#
```

synchronized

active system

synchronized

standby system

2. Confirm that Net-Net SD1 and Net-Net SD2's current configurations match by typing **display-current-cfg-version** <Enter> at the ACLI prompt.

```
NETNETSD1# display-current-cfg-version
Current configuration version is 5
NETNETSD1#

NETNETSD2# display-current-cfg-version
Current configuration version is 5
NETNETSD2#
```

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

3. Confirm that Net-Net SD1 and Net-Net SD2's running configurations match by typing **display-running-cfg-version** <Enter> at the ACLI prompt.

```
NETNETSD1# display-running-cfg-version
Running configuration version is 5
NETNETSD1#

NETNETSD2# display-running-cfg-version
Running configuration version is 5
NETNETSD2#
```

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

4. Initiate a switchover on Net-Net SD1 by typing **notify berpd force** <Enter> at the ACLI prompt.

```
NETNETSD1# notify berpd force
```

5. Wait for Net-Net SD2 to transition to the standby state. Confirm that it is in the standby state by typing **show health** <Enter> at the ACLI prompt.

```
NETNETSD2# 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 system from an equipment rack.

To prevent injury, we recommend that any time a Net-Net system is installed or removed from an equipment rack, two people complete the procedure.

Caution

Always disconnect the Net-Net system's power supplies from the power source when removing a chassis from an equipment rack.

Removing the Net-Net System from an Equipment Rack

Review the precautions detailed in this guide's *Safety* chapter before proceeding. Procedures for removing the Net-Net system in both a front mount installation and a center mount installation are listed below.

Removing a Front Mounted Net-Net System

To remove a front mounted Net-Net system from the equipment rack:

1. Turn the power supply switches to the OFF position.
2. Remove all power cables from the Net-Net system.
3. Remove and label all attached network cables, the alarm contact cable, and console cables from their respective ports on the chassis.
4. Unscrew the rear of the rack-side mounting bar from the chassis-side mounting bar. This is performed from the inside of the equipment rack enclosure.

Caution

Beginning in this step, one person should support the Net-Net system from below while the other person unscrews the rear mounting bars.

5. Unscrew the front mounting ears on the Net-Net system from the front of the equipment rack. There are two screws on each mounting ear.
6. Lift the Net-Net system out of the equipment rack and set it on a flat and stable surface.

Removing a Center Mounted Net-Net System

To remove a center mounted Net-Net system from an equipment rack:

1. Turn the power supply switches to the OFF position.
2. Remove all power cables from the Net-Net system.
3. Remove and label all attached network cables, the alarm contact cable, and console cables from their respective ports on the chassis.
4. Unscrew the front mounting ears on the Net-Net system from the front of the equipment rack. There are two screws on each mounting ear to remove.

Caution

One person should support the Net-Net system from below while the other person unscrews the Net-Net system from the rack.

5. Lift the Net-Net system out of the equipment rack and set it on a flat and stable surface.

Power Supply Removal

This section explains how to remove the power supplies from the Net-Net system chassis.

Caution

Always disconnect the Net-Net system from the power source when removing a power supply from the system's chassis.

Caution

Both power supplies must be the same type AC or DC. The Net-Net SBC 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.

Removing and Replacing a Power Supply

The power supply is a user-replaceable component. If a Net-Net system power supply malfunctions, remove the malfunctioning power supply and replace it. The power supply can be removed from the chassis while still installed in the rack.

When removing and replacing a power supply, remember to first ground yourself to the grounding post located on rear panel of the chassis.

> **Note:** Style-B AC and DC power supplies do not have a keyed locking mechanism. They are secured to the chassis with a spring-loaded tab, and can be removed without a key.

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

Removing a style-A AC or DC Power Supply

To remove a style-A power supply:

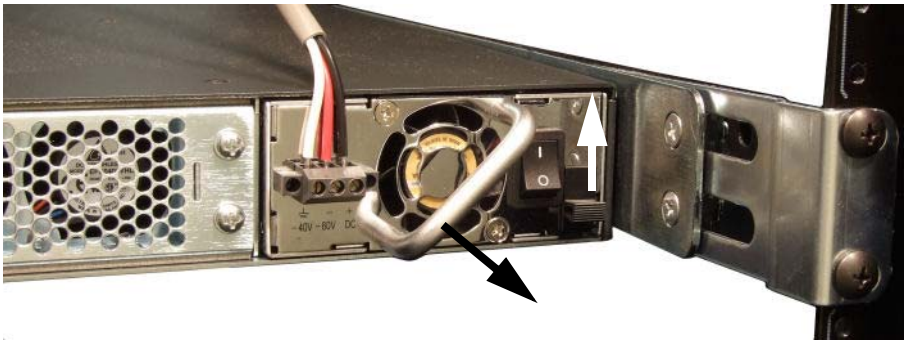
1. Turn the power switch to the OFF position on the defective power supply only.
2. Disconnect all power to the defective power supply only.
3. Use the key to unlock the defective power supply only.
4. Lift up the removal handle on the defective power supply only.
5. Hold the removal handle and gently pull the defective power supply out from the power supply bay.

Removing a style-B AC or DC Power Supply

To remove a style-B power supply:

1. Turn the power switch to the OFF position on the defective power supply only
2. Disconnect all power to the defective power supply only.
3. Lift the black locking tab upward.

4. Pull the removal handle out from the power supply bay, while lifting the black locking tab upward.



5. Continue to pull the power supply all the way out of the chassis.

Replacing a Power Supply

To replace a power supply:

1. Please see the *Power Supply Installation* section of the "System Installation" chapter of this guide.
2. 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 Replacement and Ventilation Maintenance

This section explains how to remove and replace the fan module and perform ventilation maintenance on your Net-Net system.

Removing and Replacing the Fan Module

The fan module is a user-serviceable, hot-swappable component. If the Net-Net system 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

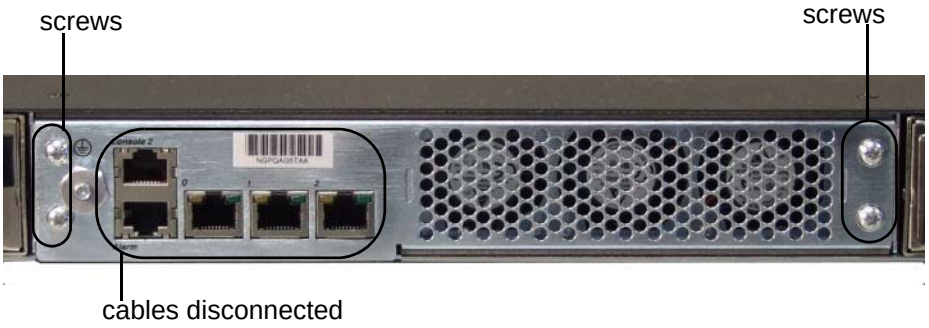
An over temperature condition can stop packet processing.

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.

To remove the fan module:

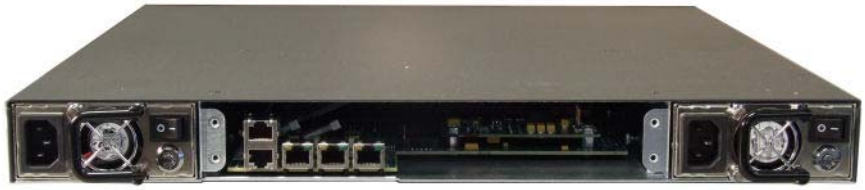
1. Remove the Ethernet, console, ground, and alarm cables from their corresponding ports located on the rear panel of the chassis.

2. Unscrew four screws located in the four corners of the fan module on the rear panel with a #2 Phillips-head screwdriver.



3. Holding the ground lug bolt, gently pull the module out of the chassis. Pulling the fan module out of the chassis disengages the fan module connector from the motherboard.

   The following figure shows the system chassis with the fan module removed.



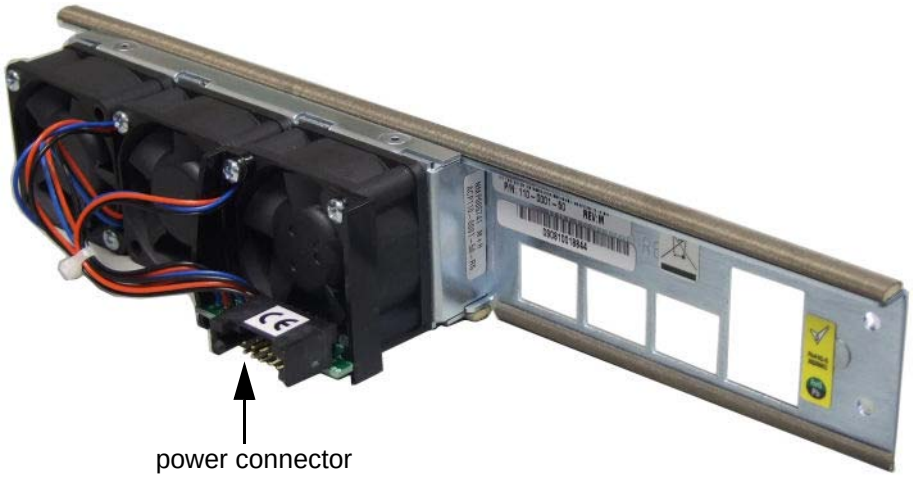
Replacing the Fan Module

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

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

To replace the fan module:

1. Holding the ground lug bolt on the fan module, insert the fan module squarely into the chassis. The power connector should be on the bottom side of the module.



2. Keep the 4 screw holes on the fan module aligned with the chassis as you insert the module.

3. Continue to push the fan module into the Net-Net system until its panel lies flush with the Net-Net system's rear panel. You will feel the module's connector secure itself to the motherboard. All five RJ45 ports should be visible.

4. Screw the four screws through the fan module and into the chassis.
5. Reconnect the Ethernet, console, and alarm cables to their corresponding ports located on the rear panel of the chassis.
6. After powering on the Net-Net system, verify that the fans are rotating and expelling air from the system chassis.

Maintaining the Cooling Components

To prevent system malfunction and prolong the life of the system's cooling components, We recommend that you clean the fan module once every six months, and that you clean the air inlets once a week.

Cooling maintenance encompasses cleaning the fan module and cleaning the air inlets on the front of the Net-Net system's chassis. Cleaning the fan module requires that you remove the module itself. This procedure must be performed quickly, or else the system may overheat and cause packet processing to stop.

This maintenance should be performed alongside of 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 this chapter's "Removing and Replacing the Fan Module" section to remove the fan module from the rear panel of the chassis.
2. Spray compressed air into the fan module to dislodge and blow away any contaminants and clean out the three fans.
3. Refer to the instruction detailed in this chapter's "Removing and Replacing the Fan Module" section to replace the fan module.

To clean the perforated air inlets:

1. Gently wipe the gray front bezel of the chassis that contains the perforated air inlets with a clean, dry cloth. You can alternatively use compressed air to clean out the perforated air inlets on the gray front bezel of the chassis.

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. Do not attempt to remove the front bezel of the chassis for any reason, including cleaning purposes.

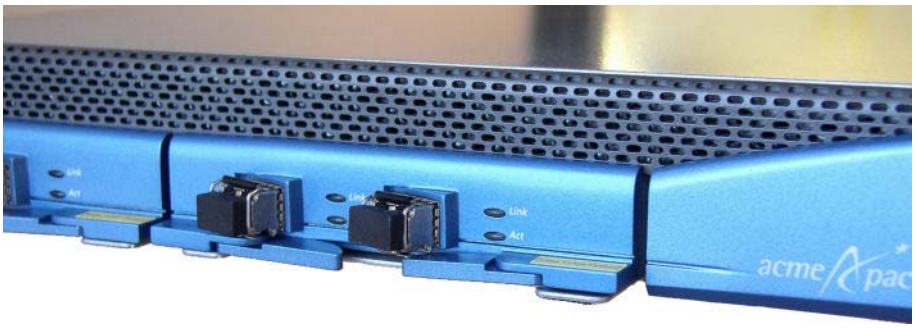
Physical Interface Card Removal

Both the 10/100 Ethernet physical interface card and the GigE optical physical interface cards are removed from the Net-Net system chassis similarly. Without powering down the Net-Net system, you can exchange a physical interface card (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.

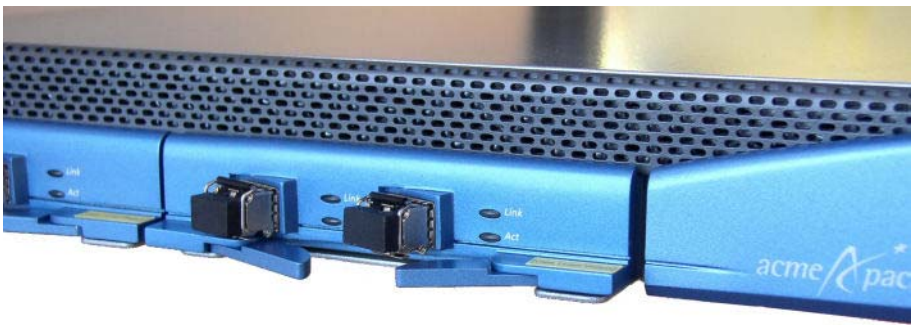
At any time when the system is powered off, you can remove a physical interface card. Make sure you are properly grounded to the system chassis with an ESD strap before removing a physical interface card.

To remove a physical interface card:

1. Unplug all network cables from the physical interface card you want to remove from the Net-Net chassis.



2. 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.



3. Pull the loosened physical interface card out of the Net-Net system chassis by holding each side of the physical interface card's front panel.

4. Place the physical interface card in an antistatic bag while it remains outside of the Net-Net system 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. This part 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 should be replaced while the Net-Net system is powered on. Leave the interface card inside the Net-Net system as you extract the optical transceiver.

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

Caution

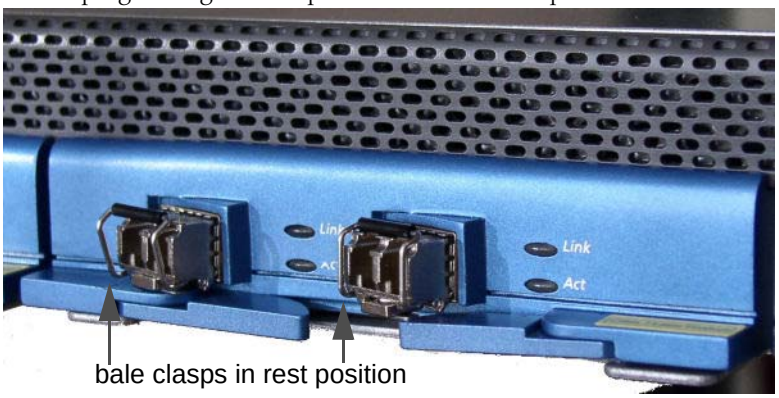
To prevent damage to the optical lens, We recommend that the protective dust cover stay on the optical transceiver port when the GigE physical interface card is not cabled.

A GigE copper Ethernet transceiver is available in SFP form factor for use with a GigE physical interface card. The GigE copper Ethernet transceiver is installed like the optical SFP transceivers in the Net-Net system chassis. The following is an image of a GigE copper SFP transceiver:

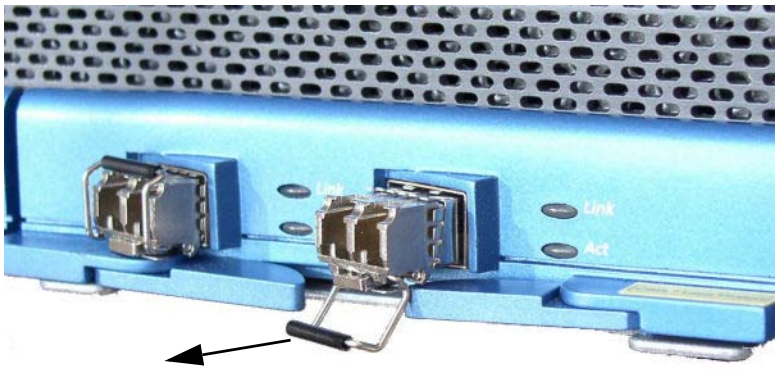
Removing an Optical Transceiver

To remove the optical transceiver on a GigE physical interface card:

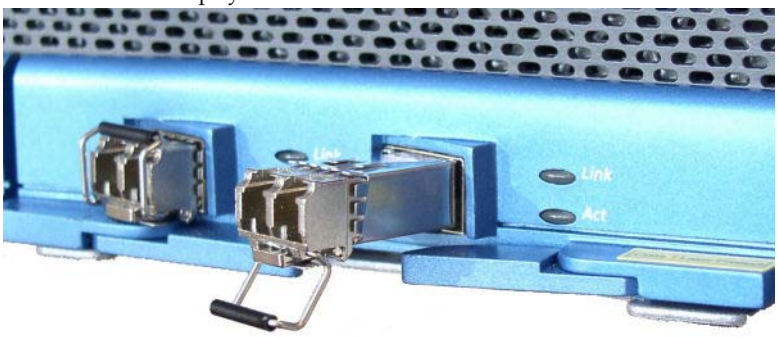
1. Unplug all GigE fiber optic cables from the optical transceiver to be replaced.



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 socket on the GigE optical physical interface card.
2. Flip the bale clasp latch back into the rest position.
3. Reconnect the optical cables to their corresponding ports.

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.

Physical Interface card Information

- Copper transceiver and RJ45 cable are inserted into the physical interface card.
- 4- port 10/100/1000Mbps card, the three different transceivers are inserted in to the physical interface card.

SFP Information

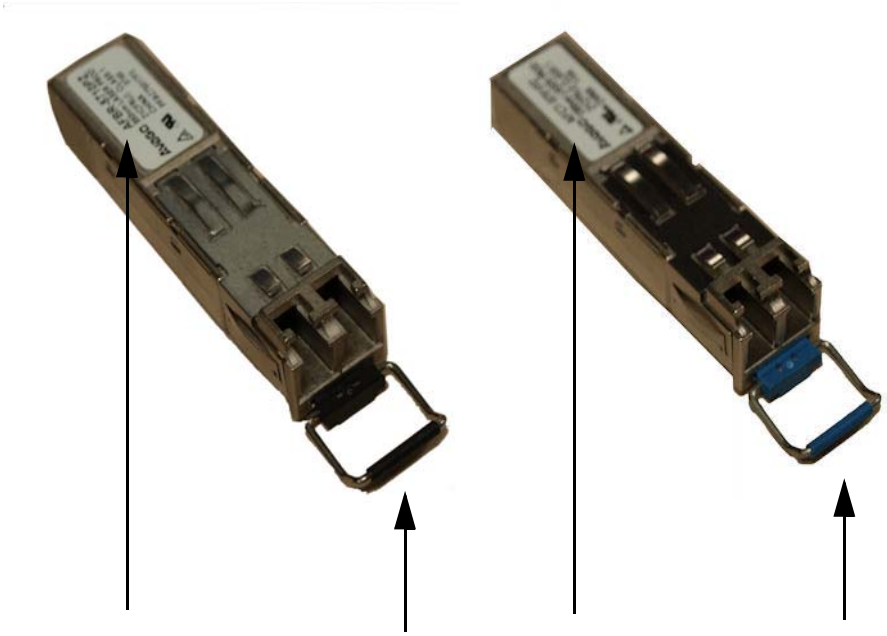
Only transceivers qualified by acme packet can be used in the Net-Net 4250. Mixed transceiver types are unsupported. All transceiver locations must be populated with the same SFP type based on compliance testing.

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.



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.

SFP Identification

The following image shows a gigabit ethernet copper SFP transceiver.

Media Cables

This section describes the media signaling interface, fiber optic and copper cables used on the Physical Interface 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 Net-Net 4250 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.

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

Copper category 5 or 6, ethernet cable.

Alarms

The Net-Net system 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., an LOS).
Critical	Catastrophic condition has occurred (e.g., the system is overheating).

The Net-Net system polls its hardware components to ensure that 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 Net-Net system's alarm name, hardware alarm ID, alarm severity, causes, log message, and graphic display window message, if any.

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	Graphic Display Window 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)	Temperature X C (where X is the temperature in degrees)
If this alarm occurs, the Net-Net system turns the fan speed up to the fastest possible speed.					

Fan Speed Alarm

The following table lists the 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 Net-Net system turns the fan speed up to the fastest possible speed.					

Environmental Sensor Alarm

The following table lists the 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.

Alarm	Alarm ID	Alarm Severity	Causes	Log Message	Graphic Display Window 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.

Alarm	Alarm ID	Alarm Severity	Cause(s)	Log Message	Graphic Display Window 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	

Physical Interface Card Alarms

The following table lists the physical interface card alarms.

Alarm	Alarm ID	Alarm Severity	Cause(s)	Log Message	Graphic Display Window Message
PHY0 Removed	65550	MAJOR	Physical interface card 0 was removed	physical interface card 0 has been removed	
PHY0 Inserted	65552	MAJOR	Physical interface card 0 was inserted	None	
PHY1 Removed	65553	MAJOR	Physical interface card 1 was removed	physical interface card 1 has been removed	
PHY1 Inserted	65554	MAJOR	Physical interface card 1 was inserted	None	

Link 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 exist that indicates whether the link goes up or down.

The following tables lists detailed information about the Net-Net system's physical interface link alarms, including their ID assignments, severities, causes, log messages, and messages printed in the graphic display window.

GigE Optical Link Alarms

The following table lists the GigE optical physical interface card alarms.

Alarm Name	Alarm ID	Alarm Severity	Cause(s)	Example Log Message	Graphic Display Message
LINK UP ALARM GIGPORT	131073	MINOR	GigE slot 1, port 0 link up	Slot 1 port 0 UP	X LINK ALARMS (where X is number of alarming links)
LINK UP ALARM GIGPORT	131074	MINOR	GigE slot 2, port 0 link up	Slot 2 port 0 UP	X LINK ALARMS
LINK DOWN ALARM GIGPORT	131075	MAJOR	GigE slot 1, port 0 link down	Slot 1 port 0 DOWN	X LINK ALARMS
LINK DOWN ALARM GIGPORT	131076	MAJOR	GigE slot 2, port 0 link down	Slot 2 port 0 DOWN	X LINK ALARMS
LINK UP ALARM GIGPORT	131109	MINOR	GigE slot 1, port 1 link up	Slot 1 port 1 UP	X LINK ALARMS
LINK UP ALARM GIGPORT	131110	MINOR	GigE slot 2, port 1 link up	Slot 2 port 1 UP	X LINK ALARMS
LINK DOWN ALARM GIGPORT	131111	MAJOR	GigE slot 1, port 1 link down	Slot 1 port 1 DOWN	X LINK ALARMS
LINK DOWN ALARM GIGPORT	131112	MAJOR	GigE slot 2, port 1 link down	Slot 2 port 1 DOWN	X LINK ALARMS

10/100 Ethernet Link Alarms

The following table lists the 10/100 Ethernet physical interface card alarms.

Alarm Name	Alarm ID	Alarm Severity	Cause(s)	Example Log Message	Graphic Display Message
LINK UP ALARM FEPORT	131083	MINOR	Fast Ethernet slot 1, port 0 link up	Slot 1 port 0 UP	X LINK ALARMS (where X is number of alarming links)
LINK UP ALARM FEPORT	131084	MINOR	Fast Ethernet slot 2, port 0 link up	Slot 2 port 0 UP	X LINK ALARMS
LINK UP ALARM FEPORT	131085	MINOR	Fast Ethernet slot 1, port 1 link up	Slot 1 port 1 UP	X LINK ALARMS
LINK UP ALARM FEPORT	131086	MINOR	Fast Ethernet slot 2, port 1 link up	Slot 2 port 1 UP	X LINK ALARMS
LINK UP ALARM FEPORT	131087	MINOR	Fast Ethernet slot 1, port 2 link up	Slot 1 port 2 UP	X LINK ALARMS
LINK UP ALARM FEPORT	131088	MINOR	Fast Ethernet slot 2, port 2 link up	Slot 2 port 2 UP	X LINK ALARMS
LINK UP ALARM FEPORT	131089	MINOR	Fast Ethernet slot 1, port 3 link up	Slot 1 port 3 UP	X LINK ALARMS
LINK UP ALARM FEPORT	131090	MINOR	Fast Ethernet slot 2, port 3 link up	Slot 2 port 3 UP	X LINK ALARMS
LINK DOWN ALARM FEPORT	131091	MAJOR	Fast Ethernet slot 1, port 0 link down	Slot 1 port 0 DOWN	X LINK ALARMS
LINK DOWN ALARM FEPORT	131092	MAJOR	Fast Ethernet slot 2, port 0 link down	Slot 2 port 0 DOWN	X LINK ALARMS
LINK DOWN ALARM FEPORT	131093	MAJOR	Fast Ethernet slot 1, port 1 link down	Slot 1 port 1 DOWN	X LINK ALARMS
LINK DOWN ALARM FEPORT	131094	MAJOR	Fast Ethernet slot 2, port 1 link down	Slot 2 port 1 DOWN	X LINK ALARMS
LINK DOWN ALARM FEPORT	131095	MAJOR	Fast Ethernet slot 1, port 2 link down	Slot 1 port 2 DOWN	X LINK ALARMS
LINK DOWN ALARM FEPORT	131096	MAJOR	Fast Ethernet slot 2, port 2 link down	Slot 2 port 2 DOWN	X LINK ALARMS
LINK DOWN ALARM FEPORT	131097	MAJOR	Fast Ethernet slot 1, port 3 link down	Slot 1 port 3 DOWN	X LINK ALARMS
LINK DOWN ALARM FEPORT	131098	MAJOR	Fast Ethernet slot 2, port 3 link down	Slot 2 port 3 DOWN	X LINK ALARMS

Chassis Ethernet Link Alarms

The following table lists the chassis Ethernet port alarms:

Alarm Name	Alarm ID	Alarm Severity	Cause(s)	Example Log Message	Graphic Display Message
LINK UP ALARM VXINTF	131077	MINOR	wancom0 link up	Port 0 UP	X LINK ALARMS (where X is number of alarming links)
LINK UP ALARM VXINTF	131078	MINOR	wancom1 link up	Port 1 UP	X LINK ALARMS
LINK UP ALARM VXINTF	131079	MINOR	wancom2 link up	Port 2 UP	X LINK ALARMS
LINK DOWN ALARM VXINTF	131080	MAJOR	wancom0 link down	Port 0 DOWN	X LINK ALARMS
LINK DOWN ALARM VXINTF	131081	MAJOR	wancom1 link down	Port 1 DOWN	X LINK ALARMS
LINK DOWN ALARM VXINTF	131082	MAJOR	wancom2 link down	Port 2 DOWN	X LINK ALARMS

6 Safety

Introduction

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

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

General Safety

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

Precautions

- 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 Net-Net system clean and clutter-free.
- Aside from the fan module, power supply, and physical interface cards, there are no user-serviceable parts inside the Net-Net system chassis. Only professionals trained to maintain, adjust, or repair the Net-Net system may provide these services.
- 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.
- Adhere to the "Environmental Specifications" section in the *Specifications* chapter of this guide.
- Read and understand all notes of warning and caution included in the Net-Net system documentation. These warnings and cautions are designed to keep you safe and protect the Net-Net system from damage.

Electrical Safety

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

Precautions

- Note the locations of the power supply switches on the Net-Net system, and the location of the emergency power-off switch for the room where the Net-Net system 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 system 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 power cords that are plugged into grounded electrical outlets.
- Never use extension cords to power a Net-Net system.
- Ensure that the installation facilities have proper grounding systems and include a grounded rack structure or local grounding bus bar.
- When installing the Net-Net system in an equipment rack, always make the ground connection first and disconnect it last upon uninstallation.
- Use shielded Category 5, RJ45 cables for all 10/100 Ethernet connections to protect the Net-Net system 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 system.
- Remove jewelry before working on the Net-Net system.

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 system's delicate electronic components from damage due to 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 system hardware and while performing any Net-Net system hardware procedures.

Precautions

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

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

7 Specifications

Introduction

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

Physical Specifications

Net-Net System Chassis's Physical Specifications

Specification	Description
Height	1.72"/4.37 cm (1U)
Width	17"/ 43.18 cm (+ mounting ear width)
Depth	19"/48.26 cm (+ mounting bar depth)
Weight	approximately 12 lbs/5.44 kg, fully loaded

AC Power Supply Physical Dimensions

Specification	Description
Height	1.600"
Width	3.740"
Depth	8.863"
Weight	2lbs., 13.5 oz.

DC Power Supply Physical Dimensions

Specification	Description
Height	1.600"
Width	3.740"
Depth	8.863"
Weight	2lbs., 11.5 oz.

Fan Module Specifications

Specification	Description
Number of Fans	3
Total Maximum Airflow	27 CFM

Electrical Specifications

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

Power Supply Input Circuit Fuse Requirements

This table lists the Net-Net 4250 input circuit's fuse and cable size requirements.

Power Circuit	Fuse Rating	Power cable size
120 VAC	2 AMP	18 AWG
240 VAC	2 AMP	18 AWG
-48 VDC	5 AMP	16 AWG
-72 VDC	3 AMP	16 AWG

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

Specification	Description
Temperature	The Net-Net system is required to operate within the temperature range of: +0° C to +40° C, 32° F to 104° F (operating) -20° C to +65° C, -4° F to 149° F (storage)
Relative Humidity	Operating conditions of 10% to 85% humidity under non-condensing operating conditions
Maximum Altitude	The Net-Net system is required to operate below the maximum altitude of 10,000 feet.
Air Flow	30 CFM
Heat Dissipation	205 BTU typical, 511 BTU maximum

Connector Specifications

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

Specification	Description
RJ45/Ethernet Ports	The 8-pin RJ45 ports are compliant with the FAST Ethernet standard, IEEE 802.3.
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 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 3-conductor power connector for DC 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 system..

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

The Net-Net system bears CE marking, indicating compliance with the 99/5/EC directive. This includes the EN and IEC standards for safety and electromagnetic compatibility that are identified in the following table.

Specification/Certification	Description
EMC	USA FCC Part 15 (CFR 47) Class A Canada ICES-003 Class A EN 55022 Class A, EN50081-1, EN50082-1 VCCI Class A
Immunity	EN 55024 EN 300386
NEBS	GR-63 GR-1089 SR-3580 Level 3 Compliance
Safety	USA UL 60950 Canada CSA C22.2 No. 60950 EN 60950, EN 60825-1, EN 60825-2

The Net-Net 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

WEEE Directive Compliance

On January 27, 2003, the European Parliament and the Council of the European Union issued directive 2002/96/EC concerning waste electrical and electronic equipment (WEEE). That directive's goals are to:

- Reduce the amount of WEEE produced.
- Increase the amount of WEEE that is reused, recycled, or recovered.

Along with Restriction of Hazardous Substances Directive (RoHS) 2002/95/EC, the WEEE directive became European Union law in February, 2004. The goals of the RoHS directive are to reduce the amounts of hazardous materials in EEE.

Acme Packet is compliant with WEEE, offering disposal of its equipment that adheres to the EU directive:

- For products sold after August 13, 2005, Acme Packet ensures the proper waste recycling resulting from Acme Packet products at customer locations in the EU.
- The costs of collecting this waste from the customer premises is included in the standard product price.
- All equipment returned to Acme Packet for disposal shall leave the EU.
- At the time of collection, Acme Packet covers the cost of shipping equipment back to its headquarters.

For information about how to dispose of your Acme Packet equipment, visit our Web site at http://www.acmepacket.com/recycle.

8 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 systems.

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—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.

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 system 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 system.

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 system 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.

9 Index

A

C

D

E

F

G

H

I

L

M

O

P

R

S

T

V

W