PortMaster® 4

User Manual
Addendum

European Terminal Marking

CE188X

The PortMaster Communications Server carries the CE188X approval marking in accordance with the CE Marking Directive 93/68/EEC. This marking may be found on the base of the unit.

This equipment has been tested and is compliant with the following European Directives:

- 91/263/EEC (Telecommunications Terminal Equipment)

- 73/23/EEC (Low Voltage Directive)

- 89/336/EEC (ElectroMagnetic Compatibility) as amended by 92/31/EEC

Pan-European Approval

BTZ, the German Notified Body, has issued Pan-European Approval to the PortMaster in accordance with the TTE Directive (91/263/EEC). This approval is valid throughout the European Economic Market.

This approval is valid in the following European Union Countries: Belgium, Denmark, Finland, France, Germany, Great Britain, Greece, Holland, Iceland, Ireland, Italy, Luxembourg, Portugal, Spain, and Sweden.

European CE approvals are automatically recognized by Norway.

In addition to compliance with the ETSI-based European standards, I-CTR 3 (Net 3 + Bridging Measures) NET 3 and ETS 300 047, the PortMaster has been tested and complies with the following National Delta requirements:

- French delta requirements CSE P 10-21 A

- German delta requirements BAPT 223 ZV 25

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About This Addendum

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The *PortMaster® 4 User Manual Addendum* from Lucent Technologies provides the following updates to the *PortMaster 4 User Manual*:

- **Redundant Manager Modules.** Instructions for installing, configuring, and performing basic hardware troubleshooting on redundant manager modules in the PortMaster 4

- **ComOS® 4.2 Commands.** Descriptions of ComOS 4.2 command line interface commands

- **RADIUS Improvements for L2TP.** New RADIUS attributes and tunnel attribute tags to support the Layer 2 Tunneling Protocol (L2TP) on the PortMaster 4

Consult the *PortMaster 4 User Manual* for installation, configuration, and command information for the PortMaster 4 Integrated Access Concentrator. For additional configuration, maintenance, and troubleshooting information common to all PortMaster products, see "PortMaster Documentation."

Audience

This addendum is designed to be used by qualified system administrators and network managers. Knowledge of basic networking concepts is required.

PortMaster Documentation

The following manuals are available from Lucent Technologies. Unless otherwise noted, they can be ordered through your PortMaster distributor or directly from Lucent.

The manuals are also provided as PDF and PostScript files on the *PortMaster Software CD* shipped with your PortMaster.

In addition, you can download PortMaster information and documentation from **http://www.livingston.com**.

- *ChoiceNet® Administrator's Guide*

  This guide provides complete installation and configuration instructions for ChoiceNet server software.

- *PMVision™ User's Guide*

  This guide provides instructions for installing, configuring, and using the PMVision monitoring and configuration application for PortMaster products. This guide is not available in printed form.

- *PortMaster 4 User Manual*

  This collection of the following three standalone manuals provides instructions and commands for installing, configuring, and troubleshooting PortMaster 4 products:

- – *PortMaster 4 Installation Guide*

- – *PortMaster 4 Configuration Guide*

- – *PortMaster 4 Command Line Reference*

  It also includes a comprehensive table of contents, glossary, and master indexes.

- *PortMaster Routing Guide*

  This guide describes routing protocols supported by PortMaster products, and how to use them for a wide range of routing applications.

- *PortMaster Troubleshooting Guide*

  This guide can be used to identify and solve software and hardware problems in the PortMaster family of products.

- *RADIUS for UNIX Administrator's Guide*

  This guide provides complete installation and configuration instructions for Lucent Remote Authentication Dial-In User Service (RADIUS) software on UNIX platforms.

RFCs

To find a Request for Comments (RFC) online, visit the website of the Internet Engineering Task Force (IETF) at **http://www.ietf.org/**.

RFC 1157, *A Simple Network Management Protocol (SNMP)*
RFC 1212, *Concise MIB Definitions*
RFC 1213, *Management Information Base for Network Management of TCP/IP-based Internets: MIB-II*
RFC 1700, *Assigned Numbers*
RFC 2138, *Remote Authentication Dial In User Service (RADIUS)*
RFC 2139, *RADIUS Accounting*
RFC 2400, *Internet Official Protocol Standards*

Document Conventions

The following conventions are used in this addendum:

Convention	Use	Examples
Bold font	Indicates a user entry—a command, menu option, button, or key—or the name of a file, directory, or utility, except in code samples.	• Enter **version** to display the version number. • Press **Enter**. • Open the **permit_list** file.

Convention	Use	Examples
Italic font	Identifies a command-line placeholder. Replace with a real name or value.	• **set** *Ether0* **address** *Ipaddress* • Replace *Area* with the name of the OSPF area.
Square brackets ([ ])	Enclose optional keywords and values in command syntax.	• **set nameserver** [**2**] *Ipaddress* • **set** *S0* **destination** *Ipaddress* [*Ipmask*]
Curly braces ({ })	Enclose a required choice between keywords and/or values in command syntax.	**set syslog** *Logtype* {[**disabled**] [*Facility.Priority*]}
Vertical bar (|)	Separates two or more possible options in command syntax.	• **set** *S0*|*W1* **ospf on**|**off** • **set** *S0* **host default**|**prompt**|*Ipaddress*

Document Advisories

Note – means take note. Notes contain information of importance or special interest.

Caution – means be careful. You might do something—or fail to do something—that results in equipment failure or loss of data.

Warning – means danger. You might do something—or fail to do something—that results in personal injury or equipment damage.

Contacting Lucent NetCare Technical Support

The PortMaster 4 comes with a 1-year hardware warranty.

For all technical support requests, record your PortMaster 4 ComOS version number and report it to the staff of NetCare® Professional Services or your authorized sales channel partner.

New releases and upgrades of PortMaster software are available at **http://www.livingston.com/forms/one-click-dnload.cgi** or by anonymous FTP from **ftp://ftp.livingston.com/pub/le/**.

For the EMEA Region

If you are an Internet service provider (ISP) or other end user in Europe, the Middle East, Africa, India, or Pakistan, contact your local Lucent sales channel partner. For a list of authorized sales channel partners, see the World Wide Web at **http://www.livingston.com/International/EMEA/distributors.html**.

If you are an authorized Lucent sales channel partner in this region, contact the Lucent NetCare EMEA Support Center Monday through Friday, 24 hours a day.

*   By voice, dial +33-4-92-38-33-33.

*   By fax, dial +33-4-92-38-31-88.

*   By electronic mail (email) send mail to **emeacallcenter@lucent.com**.

For North America, CALA, and the Asia Pacific Region

Contact Lucent NetCare Monday through Friday between the hours of 7 a.m. and 5 p.m. (GMT –8).

*   By voice, dial 800-458-9966 within the United States (including Alaska and Hawaii), Canada, and the Caribbean and Latin America (CALA), or +1-925-737-2100 from elsewhere.

*   By email, send mail as follows:

    –   From North America and CALA to **support@livingston.com**.

    –   From the Asia Pacific Region to **asia-support@livingston.com**.

*   Using the World Wide Web, see **http://www.livingston.com/**.

PortMaster Training Courses

Lucent NetCare Professional Services offers hands-on, technical training courses on PortMaster products and their applications. For course information, schedules, and pricing, visit the Lucent NetCare website at **http://www.netcaredata.com**.

Subscribing to PortMaster Mailing Lists

Lucent Remote Access maintains the following Internet mailing lists for PortMaster users:

*   **portmaster-users**—a discussion of general and specific PortMaster issues, including configuration and troubleshooting suggestions. To subscribe, send email to **majordomo@livingston.com** with **subscribe portmaster-users** in the body of the message.

    The mailing list is also available in a daily digest format. To receive the digest, send email to **majordomo@livingston.com** with **subscribe portmaster-users-digest** in the body of the message.

- **portmaster-modems**—a discussion of problems and solutions for PortMaster 4 internal digital modems and also the external modems that work with the PortMaster 4. To subscribe, send email to **majordomo@livingston.com** with **subscribe portmaster-modems** in the body of the message.

- **portmaster-radius**—a discussion of general and specific RADIUS issues, including configuration and troubleshooting suggestions. To subscribe, send email to **majordomo@livingston.com** with **subscribe portmaster-radius** in the body of the message.

  The mailing list is also available in a daily digest format. To receive the digest, send email to **majordomo@livingston.com** with **subscribe portmaster-radius-digest** in the body of the message.

- **portmaster-announce**—announcements of new PortMaster products and software releases. To subscribe, send email to **majordomo@livingston.com** with **subscribe portmaster-announce** in the body of the message. All announcements to this list also go to the portmaster-users list. You do not need to subscribe to both lists.

- **tech-bulletin@livingston.com**—a moderated push list featuring technical notes, Web links, and information about the latest code and beta releases sent on a weekly basis, as well as periodic technical updates. To subscribe, complete the form at **http://www.livingston.com/tech/bulletin/index.html**.

Installing and Working with the
Redundant System Manager Module   1

This chapter provides the following installation, configuration, troubleshooting, and maintenance information for the redundant system manager module (RSMM) on the PortMaster 4:

Redundant System Manager Module Description

You can install a redundant system manager module in the PortMaster 4 chassis to provide system manager backup. The manager modules must be installed in slots 4 and 5 and must be physically identical to each other. One, usually the module in slot 4, functions as the primary manager, and the backup module is called the secondary manager.

Overview of Redundant Manager Operation

By installing a redundant system manager module, you can prevent PortMaster 4 downtime due to manager module failure. With two manager modules installed, if the primary manager fails, the secondary manager takes over. Although all active calls are dropped during failover to the secondary manager, power to the entire system is never interrupted and call traffic resumes as soon as the secondary manger takes over as primary and resets the individual line boards.

When operating the PortMaster 4 with a single manager module, you must install the module in slot 4. You install the backup manager module in slot 5. When you boot the system for the first time, the module in slot 4 starts up as the primary manager and the module in slot 5 starts up as the secondary. (See "Primary Manager Module Selection at Startup" on page 1-18 for details.)

Each system manager module consists of a manager board and an Ethernet 10/100Mbps board. The manager board manages and administers the installed line boards. The manager board communicates with installed line boards at 155Mbps speeds through an embedded Asynchronous Transfer Mode (ATM) cell-switching network linked to the chassis' passive backplane. Manager modules communicate with each other via a 115Kb universal asynchronous receiver/transmitter (UART) channel.

Physical Characteristics of a Manager Module

Each manager module provides the following (see Figure 1-1):

- C0 port—for a console connection with a null modem cable or for an asynchronous connection to an external modem

  – The green LED on the C0 port is illuminated when the manager module is the primary manager, and not illuminated when it is the secondary manager

  – The green LED on the C0 port blinks when the manager module has not yet determined if it is the primary or secondary manager

  – The amber LED on the C0 port is illuminated when it receives a message from the other manager module

- C1 port—for an asynchronous connection to an external modem

- Ether0 interface—10BaseT Ethernet interface for a private LAN connection

- DIP switch 1 (bottom) and 2 (top)—to set C0 function and the boot mode of the manager card

- Ether1 interface—10/100BaseT Ethernet interface for an upstream Ethernet connection

- Media-independent interface (MII) connection—alternative Ether1 interface that accepts optional adapters for connection to copper or optical media

- DIAG LED—lights when the module is booting and blinks off every 5 seconds during normal operation

- PWR LED—remains solidly lit when the module is receiving power during normal operation

Figure 1-1   System Manager Module

1406_0007
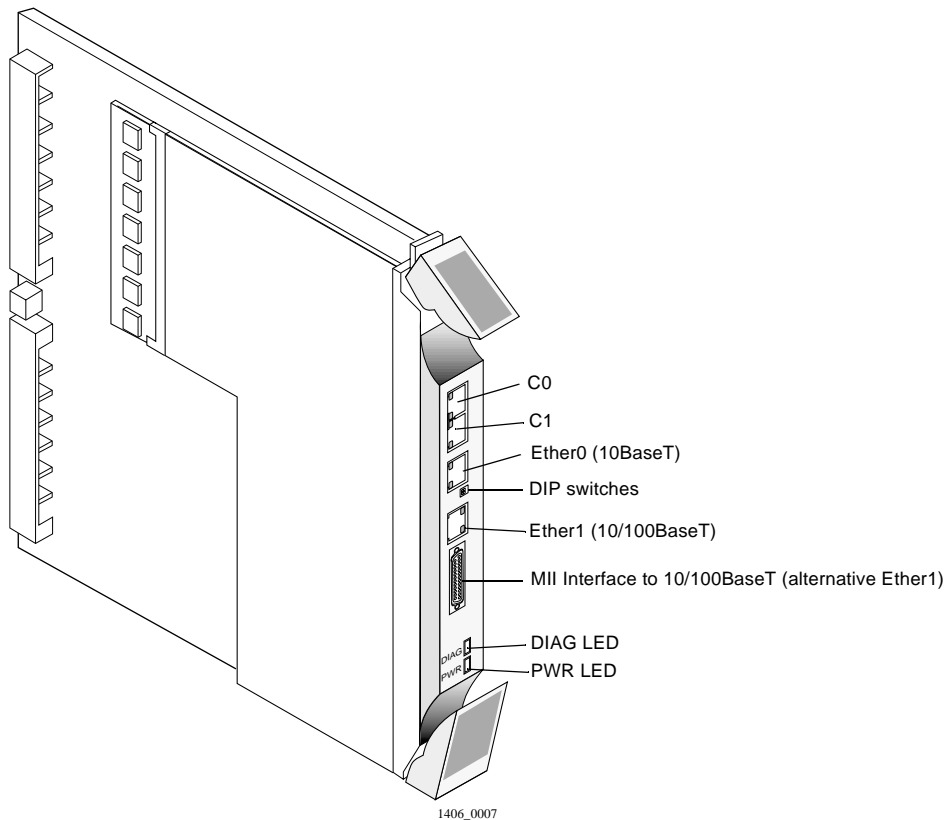
Installation and Configuration Requirements

To install and configure a redundant system manager module, you must have the appropriate hardware and software and must take the proper safety precautions.

Verifying Hardware and Software for Redundant Operation

Before installing and configuring the redundant manager module feature on your PortMaster 4, make sure of the following:

1. **Verify that your PortMaster 4 chassis has the Revision C backplane.**

    Check the backplane for the revision letter **C**. The revision letter is located behind slot 2.

2. **Make sure that both system manager modules are capable of redundancy.**

    Verify that the model number on each module ends in **R**. Or check the label on the box that each module was shipped in for a manufacture date **after July 1999**.

3. **Verify that both system manager modules have ComOS 4.2 loaded.**

Warning – Use of a version earlier than ComOS 4.2 can damage PortMaster 4 hardware.

Safety Precautions

Warning – (DC models only) Before working on equipment that is connected to power lines, remove jewelry such as rings, necklaces, and watches. Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.

If an electrical accident occurs, turn off the emergency power switch for the room in which you are working, cautiously unplug the system's power, and get medical assistance for any injured person.

Warning – To avoid damaging the internal components of the PortMaster 4, follow antistatic precautions by wearing a grounding wrist strap.

Grounding Wrist Strap Instructions

When working with the internal components of the PortMaster 4, you must wear a grounding wrist strap. Grounding wrist straps can be attached either at the front of the chassis behind the power bay door, or at the back of chassis in the lower right and left corners.

Figure 1-2 shows the proper place to attach a grounding wrist strap at the front of the chassis.

Figure 1-2   Grounding Strap Attachment—Front Panel

grounding strap attachment

1406_0004
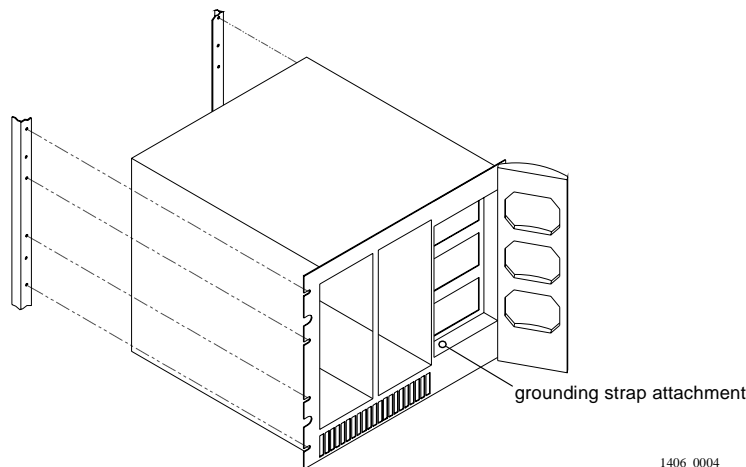
Figure 1-3 shows the proper places to attach a grounding wrist strap at the back of the chassis.

Figure 1-3 Grounding Strap Attachments—Rear Panel

grounding strap attachments   1406_0003
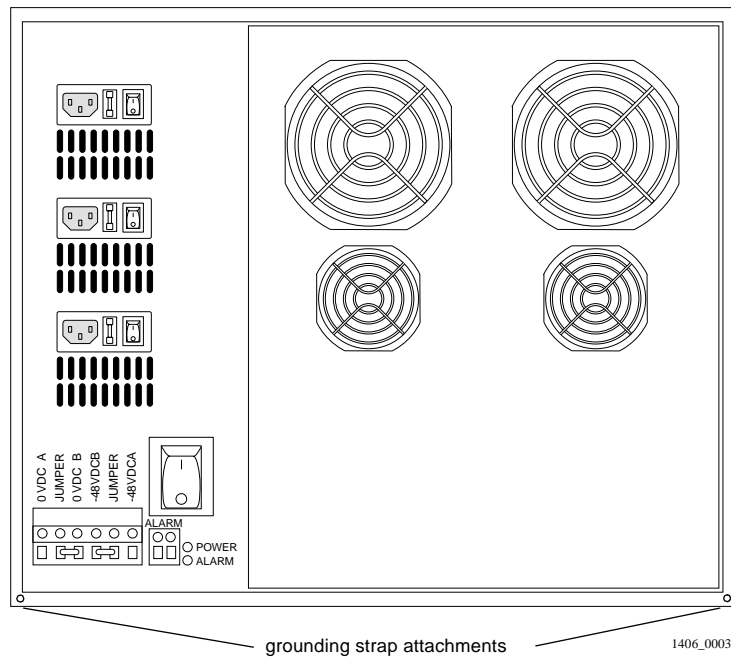
Installing a Redundant System Manager Module

Procedure

Follow these instructions to install the redundant manager module.

1. **Line up the edge of the module with the card guide in slot 5 (Figure 1-4).**

Note – The physical slots are numbered 0 through 9 from left to right. Although a manager module is physically installed in slot 4 or slot 5, the Ethernet board of the module functioning as the primary manager is monitored through virtual slot 10.

2. **Insert the manager module in slot 5, gently guiding the module into the slot.**

If you have trouble sliding the module into the card guide, gently wiggle it back and forth to help it slide in.

Figure 1-4   Installing the Redundant System Manager Module
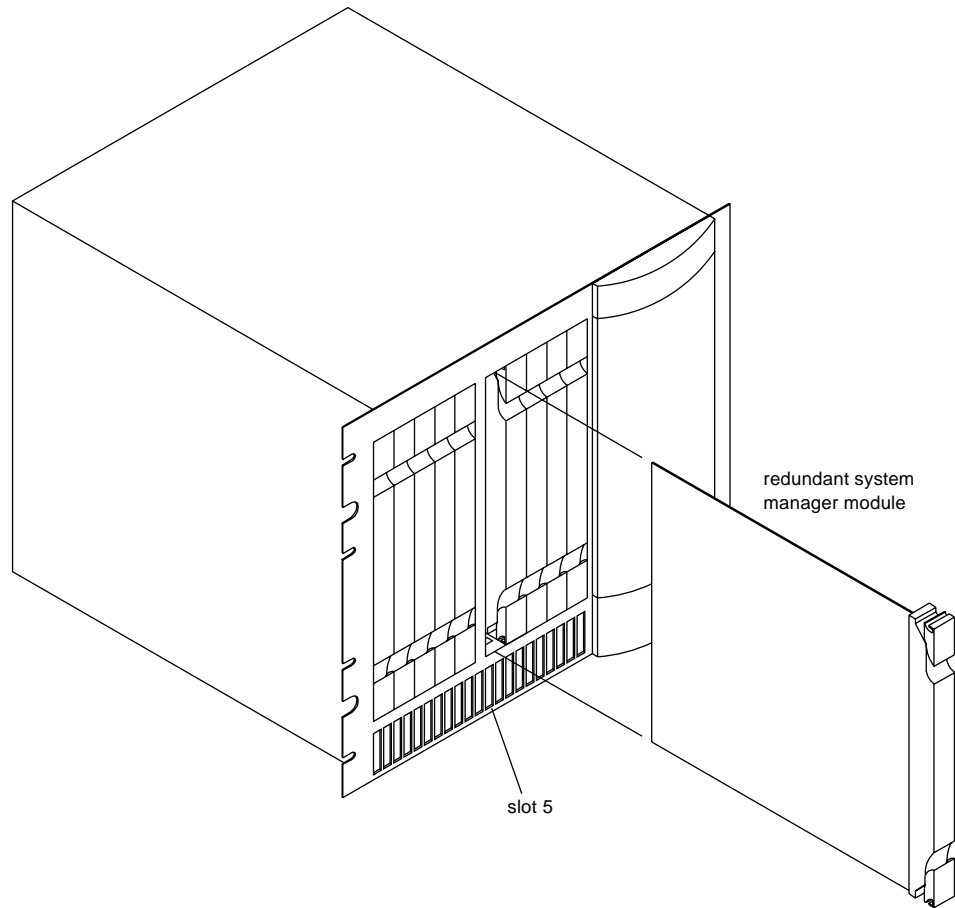
3. **When the module is completely inserted in the slot, close the top and bottom tabs so they are flush with the face of the chassis.**

    Closing the tabs causes the module to connect with the backplane.

DIP Switch Settings

The DIP switches on each manager module are located between Ether0 and Ether1 (see Figure 1-5). Each switch is off when turned to the left, and on when turned to the right.

*   DIP switch 1 turned to the left forces the C0 port to transmit at 9600 baud, 8 bits, no parity, and 1 stop bit for use as a console port. When switch 1 is turned to the right, C0 can be configured as an asynchronous port.

*   DIP switch 2 turned to the left sets the PortMaster 4 for netbooting. When switch 2 is turned to the right, the PortMaster 4 can boot normally.

    Procedures for netbooting are located at **http://www.livingston.com/tech/technotes**. Scroll to **PortMaster Troubleshooting**, click **Netboot Procedures**, then select the procedure for your platform.

Figure 1-5 shows the location of the DIP switches on the manager module.

Figure 1-5   DIP Switches
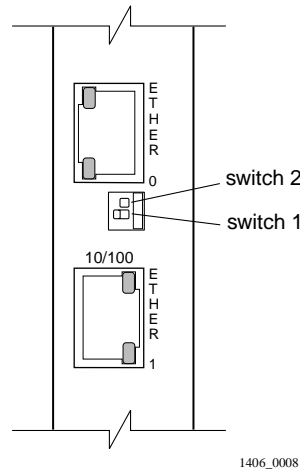
1406_0008

Connecting a Console

Because the console port is your primary connection to the manager module, Lucent strongly recommends that you connect a PC or terminal to the console port on both the primary and secondary manager modules. Follow these instructions to connect a PC or terminal to a PortMaster 4 manager module for use as a console. You can use the console connection on each manager module to configure and manage the PortMaster 4.

Required Equipment

❏   If you are using a PC, a RJ-45-to-DB-25 console cable with a 25-to-9-pin female adapter (See "Console Cable" on page A-2 for more information.)

❏   PC or terminal

Procedure

1.   **Remove the cover from the cable guide if necessary.**

2.   **Run the end of the cable with the RJ-45 connector through the cable guide duct until it is directly over the manager module.**

3.   **Pull the end of the cable with the RJ-45 connector through the fingers of the cable guide duct as shown in Figure 1-6.**

Figure 1-6   Pulling a Cable through the Cable Guide
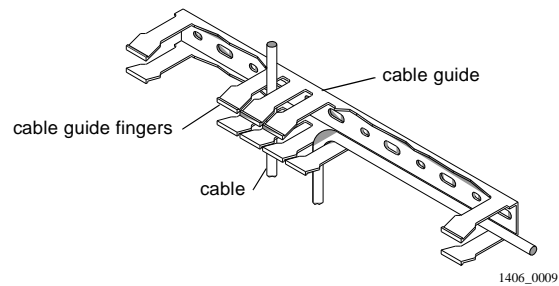
4. Attach the RJ-45 connector to the C0 or C1 port of the manager module (see Figure 1-7).

Figure 1-7   Asynchronous Ports on the System Manager Module
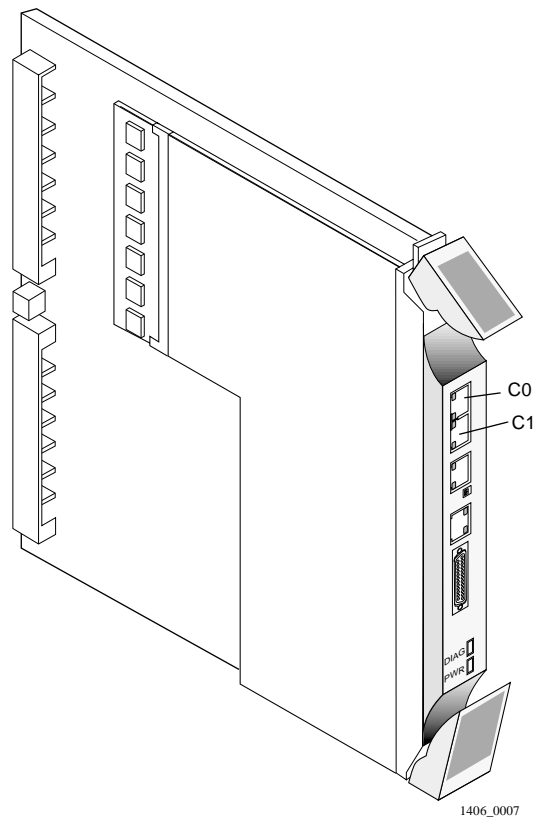
5. Attach the RS-232 end of the cable to a dumb terminal or computer running terminal emulation software.

6. If you have finished inserting modules and boards and connecting lines, replace the cable guide cover by squeezing the duct fingers together with one hand, and sliding the cover over the duct fingers with the other.

7. Ensure that DIP switch 1 on the manager module is turned to the left.

8. **Set the PC or terminal to 9600 baud, 8 data bits, 1 stop bit, a parity of none, and software flow control on (XON/XOFF).**

(Optional) Connecting an External Modem

Follow these instructions to connect an external modem for remote administration and troubleshooting.

Required Equipment

❏ RJ-45-to-RS-232 modem cable (See "Modem Cable" on page A-1 for more information.)

❏ External modem

Procedure

1. **Remove the cover from the cable guide, if necessary.**

2. **Run the end of the cable with the RJ-45 connector through the cable guide duct until it is directly over the manager module.**

3. **Pull the cable through the fingers of the cable guide duct as shown in Figure 1-8.**

Figure 1-8 Pulling a Cable through the Cable Guide

cable guide

cable guide fingers

cable

1406_0009
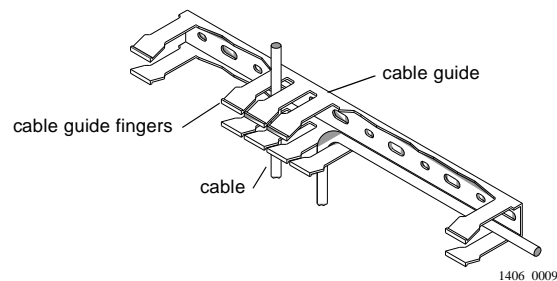
4. **Attach the RJ-45 end of the cable to the C0 port of the manager module (see Figure 1-9).**

Figure 1-9   Console Port on the System Manager Module
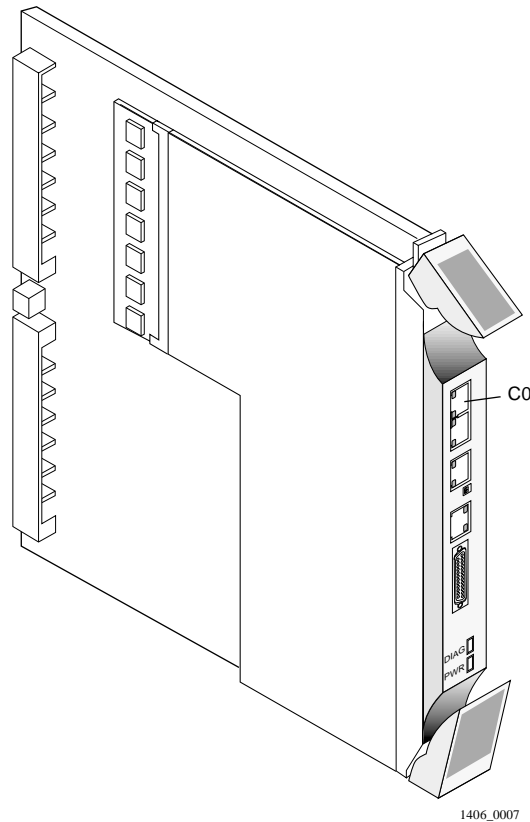
1406_0007

5. If you have finished inserting modules and boards and connecting lines, replace the cable guide cover by squeezing the duct fingers together with one hand, and sliding the cover over the duct fingers with the other.

6. Ensure that DIP switch 1 is turned to the right.

7. Attach the RS-232 end of the cable to the external modem.

Refer to the documentation that came with your external modem for information on how to attach the RS-232 cable.

Connecting an Ethernet Cable

The PortMaster 4 supports the following Ethernet connections on each manager module:

- 10/100BaseT—used as the primary uplink. This Ether1 interface is located on the Ethernet board but powered from the manager board. It is used for **syslog**, **traceroute**, Telnet, RADIUS, ChoiceNet, the Domain Name System (DNS), and TFTP.

- 10BaseT—used for private network management. This Ether0 interface is physically located on the manager board.

- Media-independent interface (MII)—used to connect other wiring types (copper or fiber, for example) to the 10/100BaseT Ethernet. Devices attached to the MII interface must be MII-compliant.

Lucent strongly recommends that you configure and connect lines to both Ether0 and Ether1 interfaces on each manager module. These interfaces must be on different Ethernet subnetworks.

However, because Ether1 interface on the redundant manager inherits its IP address from the primary manager, be sure to connect the Ether1 interface on the redundant manager to the same subnetwork as the Ether1 interface on the primary manager module. (See "Configuring the Ethernet Interfaces" on page 1-15.)

Ethernet 10/100BaseT

When using a PortMaster 4 with a redundant system manager module, you must configure the Ether1 interface on both manager modules. The Ether1 interface has the following characteristics and functions:

- Resides on the Ethernet board, which receives power from the manager board. The Ethernet board and the manager board make up the manager module

- Communicates with the manager board over the PortMaster 4's passive ATM backplane

- Contains a CPU for inbound data and a CPU for outbound data

- Remains active during low power or excessive heat conditions

- Is generally used to carry network traffic

Note – The PROM of the Ethernet card attached to the manager module contains the MAC address, which is actually a MAC address range. Conceptually, the Ethernet card has the MAC address, and MAC addresses for other devices in the system are software assigned from the address range based on the Ethernet card's MAC address. The primary manager in slot 4 assigns MAC addresses immediately after bootup. During failover, system components retain the MAC address assigned by the primary manager in slot 4.

Follow these instructions to connect an Ethernet cable to the Ethernet 10/100BaseT interface

Required Equipment

One of the following:

❏ Category 5 twisted pair cable, as specified by the EIA/TIA-568-B wiring standard, with an RJ-45 connector (See "RJ-45 Cable" on page A-2 and "Ethernet Cable Specifications" on page A-3 for more information.)

❏ MII cable with an MII connector

Procedure

1. **Remove the cover from the cable guide, if necessary.**

2. **Run the cable through the cable guide duct until it is directly over the manager module.**

3. **Pull the cable through the fingers of the cable guide duct as shown in Figure 1-10.**

4. **Connect the cable to the RJ-45 or MII Ethernet 10/100BaseT interface (see Figure 1-11).**

   If both interfaces are connected, the system uses the MII by default.

5. **If you have finished inserting modules and boards and connecting lines, replace the cable guide cover by squeezing the duct fingers together with one hand, and sliding the cover over the duct fingers with the other.**

Figure 1-10   Pulling a Cable through the Cable Guide
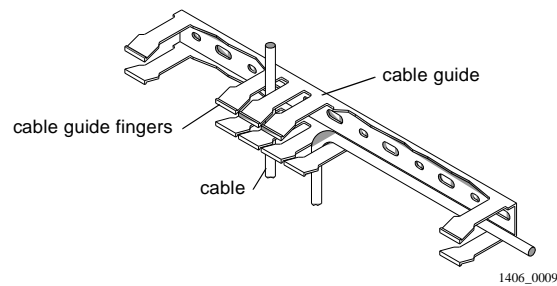
Figure 1-11   Ethernet 10/100BaseT Interfaces on the Redundant Manager Module

RJ-45 Ethernet 10/100BaseT (Ether1)

MII Ethernet 10/100BaseT (alternative Ether1)

DIAG

PWR

1406_0007
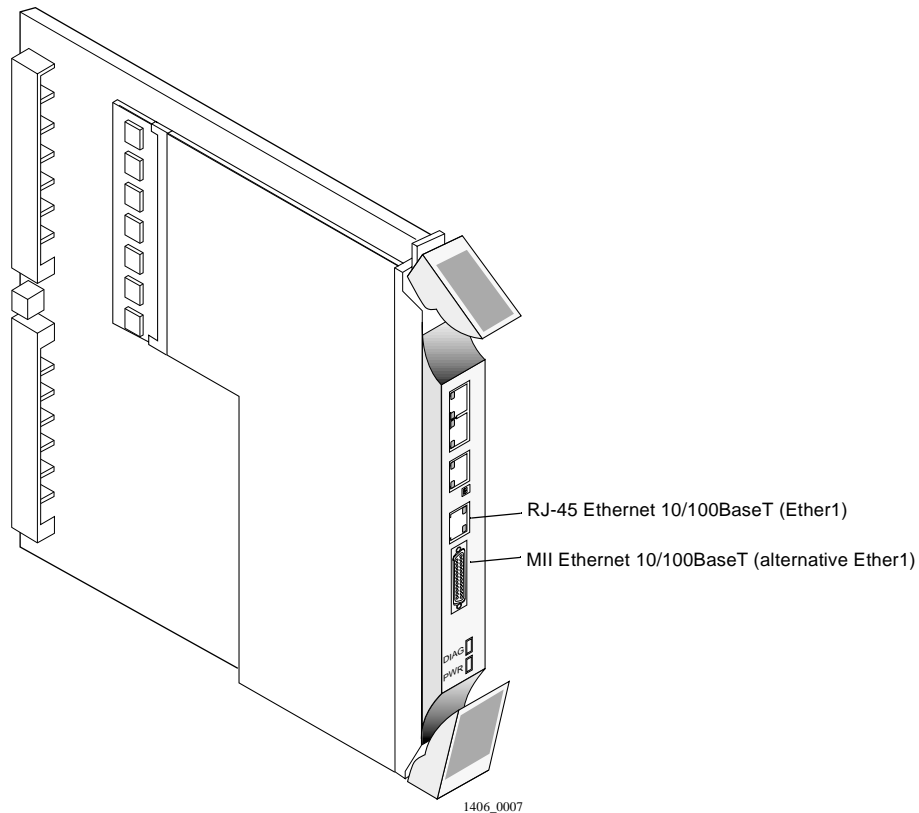
Ethernet 10BaseT

Because you communicate with the system manager modules over the network via the Ether0 interfaces, Lucent strongly recommends that you configure Ether0 on both manager modules when operating the PortMaster 4 with a redundant system manager module.

Follow these instructions to connect an Ethernet cable to the Ethernet 10BaseT interface of the redundant manager module.

Required Equipment

❏ Category 5 unshielded twisted pair cable, as specified by the EIA/TIA-568-A wiring standard, with an RJ-45 connector (See "RJ-45 Cable" on page A-2 and "Ethernet Cable Specifications" on page A-3 for more information.)

Procedure

1. **Remove the cover from the cable guide, if necessary.**

2. **Run the cable through the cable guide duct until it is directly over the manager module.**

3. **Pull the cable through the fingers of the cable guide duct as shown in Figure 1-12.**

Figure 1-12   Pulling a Cable through the Cable Guide
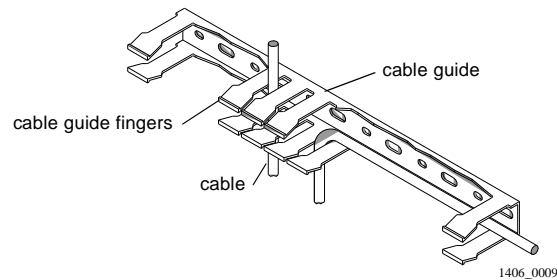
4. **Connect the cable to the Ethernet 10BaseT interface (see Figure 1-13).**

Figure 1-13   Ethernet 10BaseT Interface on the Manager Module
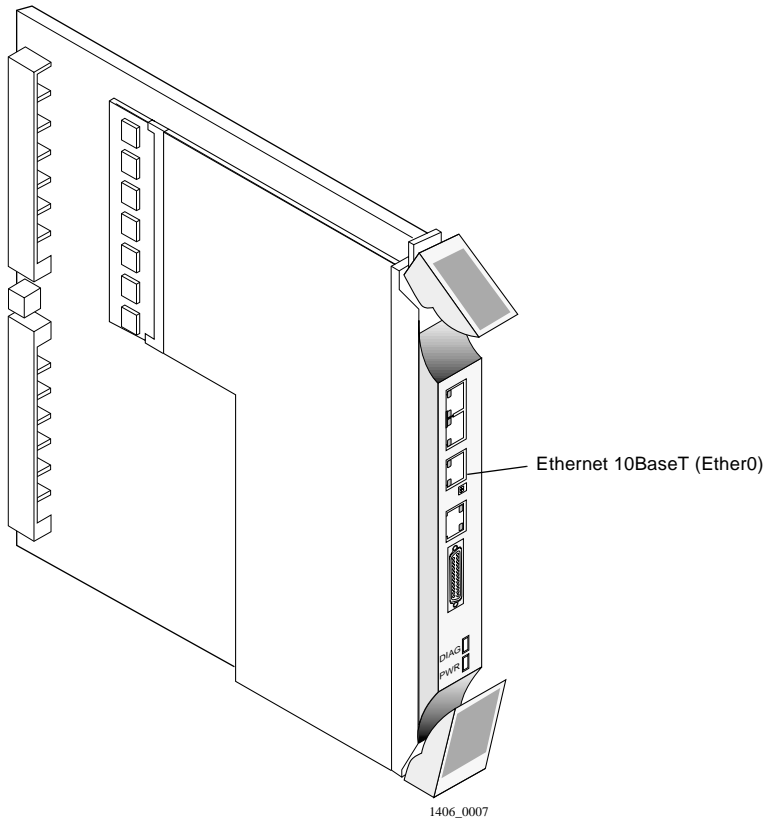
5. **If you have finished inserting modules and boards and connecting lines, replace the cable guide cover by squeezing the duct fingers together with one hand, and sliding the cover over the duct fingers with the other.**

Configuring a Redundant System Manager Module

Before following the instructions in this section, you must have installed a redundant system manager module in slot 5 of a fully configured, functioning PortMaster 4. Use the following procedure to copy the PortMaster 4 system configuration to a redundant manager module:

1. **Review "Installation and Configuration Requirements" on page 1-3 to make sure you are ready to configure.**

2. **Connect to the primary manager module in slot 4 via the console or an Ethernet port and enter the following command:**

   Command> **save all**

   This command copies the system configuration from the primary manager module to the redundant (secondary) manager module's nonvolatile memory.

You can now configure the redundant manager's Ethernet interface.

Configuring the Ethernet Interfaces

When you install a redundant system manager module in a fully configured, functioning PortMaster 4, you need to configure only the Ether0 interface on the redundant manager. The redundant manager inherits its Ether1 interface IP address from the Ether1 interface of the primary manager during failover.

The IP address you assign to the Ether0 interface on the redundant manager can be in the same subnet as the Ether0 address on the primary manager, but Ether0 addresses for either manager module must be in a different subnet than the address of the Ether1 interface. See Chapter 4, "Configuring an Ethernet Interface," in the *PortMaster 4 Configuration Guide* for a complete discussion of Ethernet interfaces.

Use the following procedure to assign an IP address to the redundant manager and activate the configuration:

1. **Connect to the secondary manager in slot 5 via the console port and use the following command to assign an IP address and netmask:**

   Command (Secondary)> **set** *Ether0* **address** *Ipaddress* [*/NM*] [*Ipmask*]

   To communicate with the redundant module on the network, you must assign it an IP address.

2. **Enter the following commands to activate the configuration:**

   Command (Secondary)> **save all**
   Command (Secondary)> **reboot secondary**

   The s**ave all** command, entered on the redundant manager, saves the configuration to nonvolatile memory on the secondary manager.

   When using a redundant manager, entering the **save all** command on the primary manager console saves the configuration to nonvolatile memory on both manager modules.

3. Use the commands in Table 1-1 as necessary to configure and operate the redundant manager module.

Refer to Chapter 3, "ComOS 4.2 Commands," for a detailed description of each command.

Note – The redundant manager always displays (Secondary) in the prompt. You can observe in the logs how the prompt shifts from one manager to the other when they change roles.

Table 1-1 Redundant Manager Module Configuration Commands

Action	Command Syntax	Event
Update the secondary manager with the current system configuration.	Command> **save all**	This command entered on the primary manager copies the system configuration to the secondary manager.
Save configuration information to the primary or secondary manager.	• Command> **save** *Keyword* **local-only** • Command> **save** *Keyword* **peer-also**	Using **local-only** saves configuration information to the manager module you enter it from. From the primary manager only, **peer-also** saves to both modules. You cannot use this keyword from the secondary manager module.
Configure an Ethernet address on the secondary manager.	• Command> **set ether0 address** *Ipaddress*	This command activates the secondary manager module on the LAN.
Update ComOS on the secondary manager.	Command (Secondary)> **tftp get** *Ipaddress Filename* **local-only**	This command downloads ComOS from the local TFTP server and saves it to nonvolatile memory on the secondary manager module.
Copy a line card executable file to the redundant manager. You can also copy configuration files.	Command> **copy** */Subdirectory/Filename(source)* **peer:**[*/Subdirectory/Filename (destination)*]	With two managers, the PortMaster 4 has two separate file systems. Use the **copy peer** command to copy an executable file from the primary to the secondary manager. For example: **copy /shared/quadt1 peer:**
View manager module status.	Command> **show smm-backup**	This command displays information about the primary and secondary manager modules.
Name the redundant manager module.	Command> **set altname** *Hostname*	This command sets the prompt for the manager module in slot 5.

Table 1-1   Redundant Manager Module Configuration Commands *(Continued)*

Action	Command Syntax	Event
Reboot the PortMaster 4.	Command> **reboot system**	This command reboots the entire system. You can enter this command from either manager. This is the highest-level **reboot** command.
Reboot the secondary manager.	Command> **reboot secondary**	This command reboots the secondary manager module and can be entered from either module. Rebooting the secondary manager does not affect the current operating parameters of the system. It just ensures that the secondary manager is running the current code and that its configuration is up-to-date.
Reboot the current manager module.	Command> **reboot me**	If you enter this command on the primary manager, it disconnects all calls and shifts the primary responsibility to the secondary. If you enter this command on the secondary, it reboots the secondary and has no effect on current PortMaster 4 operation.

To better understand the **reboot** commands, note the defaults:

• Entering **reboot** without an argument from the primary manager reboots the entire system—just like the **reboot system** command.

• Entering **reboot** without an argument from the secondary manager reboots only the secondary. |
| Reboot the secondary manager. | Command (Secondary)> **reset secondary** | This command is an alternative way to reboot the secondary manager. It has the same effect as the **reboot secondary** command. |

Table 1-1 Redundant Manager Module Configuration Commands *(Continued)*

Action	Command Syntax	Event
Reboot the primary from the secondary	`Command (Secondary)>` **`reset slot`***`Slotnumber`*	Entering this command is the only way you can reboot the primary manager from the secondary manager. You can also reboot the secondary from the primary with the **reset slot** command.
Debug the connection between the primary and secondary manager modules.	• `Command>` **`set console`** • `Command>` **`set debug m2m`**	These commands display the messages sent over the UART channel between the primary and secondary manager modules to the screen of your console session.
	• `Command>` **`set debug off`** • `Command>` **`reset console`**	These commands turn debug mode off and redirect all debug output to null.

Primary Manager Module Selection at Startup

The PortMaster 4 uses the following criteria for primary manager module selection when you turn on the unit:

1. A manager module is primary if it does not encounter another manager module for 4 seconds during the boot-up process.

2. If two manager modules boot at the same time, the manager in slot 4 is primary and the manager in slot 5 is secondary.

After boot-up, the secondary manager sends hello messages at 1-second intervals to the primary manager and the primary manager responds.

See "Handling System Manager Module Failure" on page 1-23 for information about manager module failover and replacement.

SNMP Alarms Supporting Redundancy

The SNMP alarms shown in Table 1-2 have been added for events related to the redundant system manager module feature. These alarms are valid for either slot 4 or slot 5. When slot 5 is primary, the slot numbers in the message are reversed.

Table 1-2 SNMP Alarms for Redundant Manager Module Events

Alarm	Description
`Slot 4 becoming primary manager.`	This alarm, reported by the primary manager, is generated when a system manager module recognizes itself as the primary manager. This event can take place after the bootup decision process or after a failover has occurred.

Table 1-2   SNMP Alarms for Redundant Manager Module Events

Alarm	Description
Slot 5 becoming secondary manager.	This alarm, reported by the secondary manager, is generated when a system manager module recognizes itself as the secondary manager.
Primary manager in slot 4 failed.	This alarm is generated by the secondary manager module after it fails to get a response to its hello messages for 5 seconds—five hello messages are ignored by the primary manager module.
Secondary manager in slot 5 failed.	This alarm, reported by the primary manager, is generated when the primary manager does not receive hello messages from the secondary for 30 seconds.
Secondary manager detected in slot 5.	This alarm is generated by the primary manager module when it detects a secondary manager module in slot 5. This alarm conveys the same information as "Slot 5 becoming secondary manager," except that it is reported by the primary module.
Can't hear manager in slot 4.	This alarm is generated when the communication between managers fails. The manager module in slot 5 determines that the manager in slot 4 is still running because it can still detect a heartbeat.

Using PMVison 1.8 with a Redundant System Manager Module

Note – Be sure to use PMVision 1.8 on a PortMaster 4 with a redundant system manager module. Earlier versions of PMVision and the older programs **pminstall**, PMconsole, and PMconsole for Microsoft Windows do not recognize the redundant system manager module feature and view each manager module in the PortMaster 4 as a separate system.

PMVision automatically handles both system manager modules transparently. If you connect to a PortMaster 4 using the Ether0 interface of the manager module in **either** slot 4 or slot 5, PMVision automatically contacts both managers and determines which is primary. You can display information about both managers by selecting the **Configure** → **Boards** option.

Figure 1-14 shows a display for a PortMaster 4 with a redundant manager module. For more information about PMVision, see the *PMVision User's Guide*.

Figure 1-14 PMVision Showing a Primary and Secondary Manager

Configuring Manager Information

You can set the IP address for the Ether0 port of either manager by double-clicking the desired manager module name and clicking the **Ethernets** button on the resulting display. Lucent recommends that you issue a **reboot** command using the **Command** option after changing the IP address.

You can also set the system name for each module by selecting the **Configure** → **Global** option.

Downloading an Image of ComOS

The ComOS for both modules can be updated simultaneously. In PMVision, select **Maintain** → **Upgrade** to perform the update. Enter or browse to the location of the ComOS image, and click the **Update** button.

Troubleshooting a Redundant System Manager Module

When troubleshooting a redundant manager module system, always verify that both manager modules are running ComOS 4.2 or later. A possible indication of an incompatible ComOS on one of the modules is a solidly lit amber C0 light.

Table 1-3 identifies manager module LED behavior, possible causes of the behavior, and explanation or possible solution.

Table 1-3 Hardware Problems and Solutions on the Manager Module

LED Behavior	Possible Cause	Explanation or Possible Solution
Green C0 LED is lit.	Manager module is primary	Normal behavior when a redundant manager module is installed.
Green C0 LED off.	Manager module is secondary	Normal behavior when a redundant manager module is installed.

Table 1-3   Hardware Problems and Solutions on the Manager Module *(Continued)*

LED Behavior	Possible Cause	Explanation or Possible Solution
Green C0 LED is flashing.	Manager module is booting and negotiating with the other manager to determine which is primary.	Normal behavior for a few seconds during bootup. Persistent flashing indicates trouble in the communications path between the two manager modules. See "Troubleshooting Communication between Manager Modules" on page 1-24.
Amber C0 LED is flashing.	Peer-to-peer messages are traveling between manager modules.	Normal behavior when a redundant manager module is installed.
All LEDs fail to light.	Power is not present.	Check the power switch, power cable, outlet, and fuse. For instructions on checking and changing the fuse in the AC version, see "Replacing a Fuse" on page 4-10 of the *PortMaster 4 Installation Guide*. Contact Lucent NetCare technical support if power is not present on the DC version.
Amber DIAG LED on the manager module does not light.	Board malfunction.	Contact Lucent NetCare technical support.
During startup, the DIAG LED on the manager module fails to light, stays lit, or blinks three times per second continuously.	A hardware problem has occurred.	Contact Lucent NetCare technical support.
During startup, the DIAG LED on the manager module blinks once per second for more than a minute.	• DIP switch 2 is turned to the left and no boot server is present. • Nonvolatile RAM contents are corrupt.	• If no boot server is available, verify that DIP switch 2 is turned to the right and reboot; otherwise, see the network booting procedure in the *PortMaster Troubleshooting Guide*. • If nonvolatile RAM contents are corrupt, follow the *PortMaster Troubleshooting Guide* procedure for network booting and rewriting the contents of nonvolatile RAM.

Table 1-3   Hardware Problems and Solutions on the Manager Module *(Continued)*

LED Behavior	Possible Cause	Explanation or Possible Solution
Immediately after booting, the DIAG LED on the manager module stays solidly lit or does not light. This behavior does not refer to the boot sequence, during which the DIAG LED is not lit for between 5 and 7 seconds.	A component might have loosened during shipping.	Remove the manager module from the PortMaster 4 chassis and verify the following: • The SIMM is firmly seated. • The nonvolatile RAM is firmly in place. If all items have been verified and the problem is not fixed, refer to "Observing Boot Messages" on page 4-3 in the *PortMaster 4 Installation Guide*, and boot in console mode. If the boot messages do not suggest a solution, record the information and contact Lucent NetCare technical support.
During operation, the DIAG LED on the manager module stays solidly lit or does not light.	A hardware problem might have been caused by an external device.	If the LED stays solidly lit or does not light after you have removed all external devices, contact Lucent NetCare technical support.
No console login prompt is displayed.	Terminal settings are incorrect or a connection or cable is inoperable.	• Verify terminal settings of 9600 baud, 8 data bits, 1 stop bit, a parity of none, and software control on (XON/XOFF). • Verify that DIP switch 1 is turned to the left. • Verify that you have a working console (null modem) cable and that it is properly connected at both ends. For cable information see "Console Cable" on page A-2.
Link (green) LED on an Ethernet interface is not lit when connected to an Ethernet hub.	There is no link integrity.	Check the connection to the hub.
Network (amber) LED on an Ethernet interface is solidly lit.	Heavy traffic can cause the network LED to blink so rapidly that it appears to be solidly lit. However; If packets cannot be passed, you might have an incorrectly cabled network.	Verify that the network cabling is correct.

Table 1-3 Hardware Problems and Solutions on the Manager Module *(Continued)*

LED Behavior	Possible Cause	Explanation or Possible Solution
Network (amber) LED on an Ethernet interface is not lit.	If the PortMaster 4 is not receiving or sending traffic, the network LED is not lit.	Verify that the network cabling is correct.
An undefined problem occurred at startup, but the cause cannot be determined from LED behavior.	Refer to the solution column.	Try booting in console mode, and observe the boot messages. See "Observing Boot Messages" on page 4-3 of the *PortMaster 4 Installation Guide*. If the boot messages do not suggest a solution, record the information and contact Lucent NetCare technical support.

Handling System Manager Module Failure

This section explains the failover process for the primary system manager module and provides instructions for troubleshooting communication between the manager modules, replacing a failed manager module, and upgrading a replacement manager.

Primary Manager Module Failover

Primary manager module failover on the PortMaster 4 proceeds as follows:

1. If the secondary manager module does not receive responses to five consecutive hello messages, it listens for the heartbeat of the primary.

2. If it detects a heartbeat, the secondary does not take over as primary manager but generates a "Can't hear manager in slot 4." SNMP alarm.

3. If the secondary manager does not detect a heartbeat from the primary, it takes over and becomes primary.

4. The new primary manager reboots the system. All calls and network connections to the PortMaster are dropped, and dynamic routing information is lost.

Heavy traffic on the primary manager can temporarily impede manager-to-manager communication. This normal condition can create a failover-like situation. See "Troubleshooting Communication between Manager Modules" on page 1-24 for details.

Troubleshooting Communication between Manager Modules

A burst of heavy traffic on the primary manager can cause temporary loss of communication over the 115Kb UART communications channel between the primary and the secondary manager modules. This behavior can appear very much like a failover. To troubleshoot the UART channel for possible failure, follow this procedure:

1. **Check for the following two events, which can indicate channel failure:**

   a. The secondary manager does not detect a heartbeat from the primary and generates a "Primary manager in slot 4 failed." SNMP alarm. If you can verify that the primary manager is functioning properly, proceed to Step 5. If the secondary generates a "Can't hear manager." alarm, proceed to Step 2.

   b. The primary receives no communication from the secondary for 30 seconds and generates a "Secondary manager in slot 5 failed." SNMP alarm. (The primary does not check for the secondary's heartbeat.)

2. **If you receive these failure alarms on both manager modules, wait and monitor the problem for several minutes.**

3. **If the problem persists for more than a minute or two, reboot the secondary manager module from the secondary's console.**

4. **If the reboot fails to correct the problem, turn power to the PortMaster 4 off and on.**

5. **If the manager modules are still not communicating, reseat the secondary manager module by pulling it out and reinserting it into the slot.**

   See "Safety Precautions" on page 1-4 and "Grounding Wrist Strap Instructions" on page 1-4 before proceeding.

6. **If reseating the secondary manager fails to correct the problem, reseat the primary manager module.**

7. **If the communication problem persists, contact Lucent NetCare technical support.**

Replacing a Failed Manager Module

Redundant manager modules are shipped with ComOS 4.2 installed. When the active system manager module fails, the secondary manager takes over as the primary manager. To hot-swap the failed manager module with a new one, follow this procedure:

1. **Make sure that you have the proper hardware and software, and take the proper safety precautions.**

   See "Installation and Configuration Requirements" on page 1-3 for instructions.

2. **Disconnect lines to the failed manager module.**

3. **Open the top and bottom tabs on the failed manager module and remove it from the slot in the PortMaster 4 chassis.**

4. **Insert a new manager module.**

   See "Installing a Redundant System Manager Module" on page 1-5 for instructions.

5. **Connect a console cable and Ether0 and Ether1 lines.**

   See "Connecting a Console" on page 1-7 and "Connecting an Ethernet Cable" on page 1-10.

6. **Enter the following command to configure an Ethernet address for Ether0:**

   `Command> ` **`set ether0 address`** *`Ipaddress`*

   See "Configuring the Ethernet Interfaces" on page 1-15 for more information.

7. **Enter the following commands to save changes to nonvolatile memory and activate the configuration:**

   `Command> ` **`save all`**
   `Command> ` **`reboot secondary`**

Upgrading a Replacement Manager Module to ComOS 4.2

This section describes how to upgrade a spare system manager module to ComOS 4.2 or later from the command line.

You can also use PMVision 1.8 to upgrade the PortMaster 4.

Note – Be sure to use PMVision 1.8 on a PortMaster 4 with a redundant system manager module. Earlier versions of PMVision and the older programs **pminstall**, PMconsole, and PMconsole for Microsoft Windows do not recognize the redundant system manager module feature and view each manager module in the PortMaster 4 as a separate system.

Follow this procedure to upgrade a spare system manager module to ComOS 4.2 or later:

1. **Make sure that you have the proper hardware and software, and take the proper safety precautions.**

   a. See "Installation and Configuration Requirements" on page 1-3 for instructions.

   b. Make sure that the manager module in slot 4 is running ComOS 4.2. If it is not, upgrade this manager before going on to Step 2

2. **Prepare the spare manager module for netbooting:**

   a. Set DIP switch 2 to the left.

      See "DIP Switch Settings" on page 1-6 for more information.

b. Set up a directory structure to load ComOS 4.2 for netbooting to the manager's Ether0 IP address.

Procedures for netbooting are located at **http://www.livingston.com/tech/technotes**. Scroll to **PortMaster Troubleshooting**, click **Netboot Procedures**, then select the procedure for your platform.

3. **Insert the spare manager module in slot 5.**

See "Installing a Redundant System Manager Module" on page 1-5 for instructions.

4. **Connect a console cable and Ether0 and Ether1 lines.**

See "Connecting a Console" on page 1-7 and "Connecting an Ethernet Cable" on page 1-10.

5. **Connect to the spare manager module.**

6. **If an IP address, netmask, and gateway address for the Ether0 interface are not provided by Dynamic Host Configuration Protocol (DHCP) services, enter the following commands to configure them:**

```
Command> set ether0 address Ipaddress
Command> set netmask Netmask
Command> set gateway Ipaddress
Command> save all
```

See "Configuring the Ethernet Interfaces" on page 1-15 for more information.

7. **Upgrade ComOS on the spare manager module to ComOS 4.2.**

   – You can use the **tftp get** command to download ComOS by entering the command as follows from the spare manager module:

   ```
   Command> tftp get Ipaddress Filename
   ```

   Replace *Ipaddress* with the IP address of the TFTP server and *Filename* with the name of the ComOS image.

   – You can also use PMVision 1.8 or later to upgrade the manager.

8. **Set DIP switch 2 to the right to turn off netbooting on the manager module.**

RADIUS Improvements for L2TP 2

ComOS 4.2 adds the new Layer 2 Tunneling Protocol (L2TP) **set l2tp id-for-host** command and the new L2TP Bearer Type attribute, and supports RADIUS enhancements for authorization, authentication, and accounting of L2TP users.

New L2TP Command

You can set an L2TP access concentrator (LAC) to use the RADIUS Tunnel-Assignment-ID value instead of its IP address or hostname during L2TP tunnel negotiations with its peer—the L2TP network server (LNS). This attribute allows for more precise tracking of tunnel usage for accounting.

To specify whether a LAC uses the RADIUS Tunnel-Assignment-ID value or its IP address or hostname during L2TP tunnel negotiations, use the following command:

Command> **set l2tp id-for-host on | off**

Setting **id-for-host** to **on** sets a LAC host to identify itself by its RADIUS Tunnel-Assignment-ID value. Setting **id-for-host** to **off** sets a LAC host to use its hostname or IP address during tunnel negotiations. This is the default.

New L2TP Bearer Type Attribute

The Bearer Type L2TP attribute identifies the type of calling device used in an L2TP connection as analog or digital. The LAC sends this information to its L2TP peer (the LNS). The LNS then passes the information to the RADIUS accounting server in the NAS-Port-Type attribute.

New RADIUS Tunnel Attributes for L2TP

The *RADIUS Attributes for Tunnel Protocol Support Internet-draft* defines a set of RADIUS attributes to implement compulsory tunneling. To provide this functionality, ComOS 4.2 supports the following new RADIUS tunnel attributes for L2TP with Lucent RADIUS 2.1 or a RADIUS server with equivalent functionality:

- Tunnel-Client-Endpoint—this attribute contains the address of the initiating end of the L2TP tunnel (the LAC). This attribute can be used to provide a globally unique way to identify a tunnel for accounting and auditing uses.

- Tunnel-Password—this attribute supports an encrypted password between a RADIUS server and a LAC.

- Tunnel-Assignment-ID—this attribute enables RADIUS to inform the tunnel initiator (the LAC) about how to assign the session—to a multiplexed tunnel or to a separate tunnel.

- Tunnel-Preference—this attribute indicates the relative preference assigned to each tunnel if more than one set of tunneling attributes is returned by the RADIUS server. For example, if two different tunnel end points are included in the RADIUS attributes, the tunnel end point with the lowest value specified in the value field is given preference.

If these attributes are not already in your RADIUS dictionary, add them as follows:

```
ATTRIBUTE        Tunnel-Client-Endpoint    66    string

ATTRIBUTE        Tunnel-Password           69    string

ATTRIBUTE        Tunnel-Assignment-ID      82    string

ATTRIBUTE        Tunnel-Preference         83    integer
```

RADIUS Tunnel Attribute Tags

In versions of RADIUS that support this feature, you can now tag all RADIUS tunnel attributes so that ComOS can manage redundant tunnels more easily. The tag field can assign the same ID to each attribute for a particular tunnel server end point to group the attributes and identify the tunnel more clearly.

Note – Lucent RADIUS 2.1 does not currently support the tagging feature.

ComOS 4.2 Commands   3

This chapter describes the commands introduced in ComOS 4.2 for the PortMaster 4. Command descriptions appear in the following sections:

- "Redundant Manager Module Commands" on page 3-1

- "RADIUS Commands" on page 3-8

- "L2TP Command" on page 3-12

- "Global Command" on page 3-13

- "SS7 Commands" on page 3-13

The complete set of commands used to configure, monitor, and debug the PortMaster 4 is described in the *PortMaster 4 Command Line Reference*.

For detailed information on how to use these commands, see the *PortMaster 4 Configuration Guide*, the *PortMaster Routing Guide*, and the *PortMaster Troubleshooting Guide*.

You can also configure the PortMaster 4 with the PMVision graphical user interface (GUI) for Microsoft Windows, UNIX, and other platforms supporting the Java Virtual Machine (JVM). Access PMVision online help for more information or see the *PMVision User's Guide* for additional information.

The See Also section in each command description refers to related commands in the *PortMaster 4 Command Line Reference*.

Redundant Manager Module Commands

ComOS 4.2 introduces the following commands to configure and manage the redundant system manager module. ComOS 4.2 also includes existing commands that have been modified to support the redundant manager module.

Chapter 1, "Installing and Working with the Redundant Manager Module," describes in detail how to use these commands to configure the redundant manager module for the PortMaster 4.

copy peer

This command copies a file between the system manager modules.

> **copy** */Subdirectory/Filename(source)*
> **peer:**[*/Subdirectory/Filename(destination)*]

/Subdirectory	Path to the file.
/Filename(source)	Name of the file to be copied. Filenames and directory names cannot exceed 16 characters.
peer:	Manager module to copy the file to.
/Filename (destination)	Optional name to assign to the copied file in the new directory. If no name is specified, the PortMaster assigns the original filename.
	Leave no space between **peer:** and the path to the file and filename.

Usage

ComOS 4.2 supports an enhanced **copy** command that allows a specific file to be copied from one manager module to another manager module using the **peer** keyword.

Each manager module has is own file system. Use the **show files** command before and after using the **copy** command. See the **copy** command description in the *PortMaster 4 Command Line Reference* for additional information.

Example

```
Command> copy /shared/m2c_2.4 peer:
Queued transfer of /shared/m2c_2.4 to /shared/m2c_2.4 on peer.
Starting transfer of /shared/m2c_2.4 to /shared/m2c_2.4 on peer........
Transfer complete. 74204 bytes copied to /shared/m2c_2.4 on peer.
```

See Also

copy

reboot me|system|secondary

This command restarts the software on a module of the PortMaster 4 or on the entire PortMaster 4, using the currently saved configuration.

reboot [**me**|**system**|**secondary**]

me	Reboots the manager module receiving the command.

⚠ **Caution –** Using the **reboot me** command on the primary manager module drops all calls and shifts primary responsibility to the secondary manager module.

system	Reboots the entire PortMaster 4 when issued from either manager module.
secondary	Reboots the secondary manager when issued from either manager module.

Note – Use the **save all** command to copy the current system configuration to the secondary manager module before rebooting it.

Usage

ComOS 4.2 supports the enhanced **reboot** commands on the PortMaster 4 to support a redundant manager module. Entering the **reboot** command without any arguments on the primary manager module reboots the entire PortMaster 4. Entering **reboot** from the secondary manager module reboots only the secondary manager module.

For additional information on redundant manager module failover, see "Primary Manager Module Failover" on page 1-23.

Examples

```
Command> reboot me
Rebooting PortMaster....
Command (Secondary)>
<system reboots>

Command> reboot secondary
Command>
```

See Also

reboot

rename

This command saves a copy of a file under another name to the local module's nonvolatile RAM.

> **rename** */Subdirectory* */Filename(original)* */Filename(copy)*

/Subdirectory	Path to the file.
/Filename(original)	Name of the file to be copied.
/Filename(copy)	Name of the file to save.

reset secondary

This command shuts down and immediately restarts the secondary manager module.

> **reset secondary│slot***Slotnumber*

secondary   Resets the secondary manager module when issued from either manager module. This command performs the same function as the **reboot secondary** command.

Note – Use the **save all** command to copy the current system configuration to the secondary manager module before resetting it.

slot*Slotnumber*   Resets a board in the specified slot—physical or virtual.

Usage

ComOS 4.2 supports the enhanced **reset** command to support the secondary manager module using the **secondary** keyword. Entering **reset slot***Slotnumber* from the secondary manager using the slot number of the primary manger is the only way to reboot the primary manager from the secondary.

For additional information about the reset command, see the *PortMaster 4 Command Line Reference*.

No output is generated from this command.

See Also

reset

save [peer-also|local-only]

This command saves configuration information to the nonvolatile memory of the primary manager module or of both the primary and secondary manager modules.

> **save** *Keyword* [**local-only**|**peer-also**]

Keyword	**all**, **global**, **console**, **filter**, **host**, **location**, **netmask**, **ports**, **route**, **snmp**, **user**, **ospf**, **bgp**.
	For a complete description of these keywords, see the *PortMaster 4 Command Line Reference*.
local-only	Saves to the nonvolatile memory of the manager module from which you enter the command.
peer-also	Saves to nonvolatile memory of both the primary and secondary manager modules. This is the default.
	The **save peer-also** command cannot be issued from the secondary manager module.

Usage

ComOS 4.2 supports the enhanced **save** command with the new keywords **peer-also** and **local-only** to allow the PortMaster 4 to save to the primary manager module or to both the primary and secondary manager modules. See the **save** command description in the *PortMaster 4 Command Line Reference* for additional information.

See Also

save

set altname

This command sets the prompt for the system manager module occupying slot 5 in the PortMaster 4.

> **set altname** *Hostname*

Hostname	Alternate hostname of up to 39 characters for the manager module occupying slot 5.

See Also

set host

set debug m2m

This command debugs the manager-to-manager protocol that runs between the primary and secondary manager modules.

> **set debug m2m**

Usage

Use this command to see if the universal asynchronous receiver transmitter (UART) is functioning properly between the manager modules.

Example

```
Command (Secondary)> set console
Setting CONSOLE to admin session

Command (Secondary)> set debug m2m
Enabling Redundant Manager debugging

Command (Secondary)> MGR2MGR Pinging at 5830: Com=3999a8 silence=5,0
ping=18MGR2MGR Sending hello. My state 3, his state 2.
MGR2MGR Sending type 0x1, 36 bytes, seq 58.
MGR2MGR Message: type 0x81, length 36, sequence 58
MGR2MGR Received hello. My state 3, his state 2.
Hello says my state is 3, his state is 2

Command (Secondary)> set debug off
Command (Secondary)> reset console
```

show bootlog

This command shows the reboot information and stack traces of the boards and modules that are stored in a boot log file.

> **show bootlog**

Usage

ComOS 4.2 supports the enhanced **show bootlog** command, which now displays register and software version information in the output.

Use this command to capture reboot information without using a console. The PortMaster 4 reserves a portion of its memory to store stack traces and the last process ID. The boot log is stored in the nonvolatile RAM file system in a file named **bootlog**, a circular buffer up to 64KB in length.

When a board in the PortMaster 4 reboots, it checks for information in the reserved area and sends it to the boot log and the console, if configured. This portion of memory is not overwritten at boot time so this information can be preserved. To erase boot log information, use the **erase file bootlog** command.

To translate the last process and stack trace data, send the information to Lucent Netcare Technical support.

The information that is stored in the boot log consists of the following:

Time Stamp	Time elapsed since the board was last rebooted.
Slot	Slot where the reboot occurred.
Description	Indicates if the unit was powered on, soft booted, or crashed.
	If a crash occurred, the stack trace is displayed.
	If a softboot and crash occurred, the last process is displayed.

Example

In the following example, the software version is ComOS 4.2b6. The register values are displayed after *Regs*.

```
Command> show bootlog
000:00:01:21:65] Slot0 - Crash Boot @ 0:19 pm4qt1OS: [[4.2b6]]
Crash type 3 - Last Proc 0x0 - IP 0x167768
Regs: 00167760 001E7120 00245488 00000000 00210D68 001E7154 00000000 00210D4C
1c4aa7 (8 216 1e7154 0 0 31 206 0)
167768 (245488 210d94 1e7120 1e7154 0 210dac 15b90b 2)
15b4a2 (245488 12df8 ffff000 0 0 0 0 0)
15b8dc (2 1fff28 800 210ddc 210dd8 12df8 ffff000 1)
11ea15 (1bee 14e574 202498 0 0 0 0 0)
11ed5d (1022b9 1bee 0 40 ffff000 ff540 ffff000 a)
10272f (0 0 0 0 0 0 0 0)
-- Press Return for More --
10f0f4 (0 0 0 0 0 0 0 0)
ff1e1 (0 0 0 0 0 0 0 0)
0 (0 0 0 0 0 0 0 0) }}}
```

show smm-backup

This command displays information about the primary and secondary manager modules if a redundant manager module is installed and operating in the PortMaster 4.

> **show smm-backup**

Example

```
Command (Secondary)> show smm-backup
System Manager Module Backup Information for slot 4
My state:    Secondary     My protocol version: 1.0
Peer state: Primary    Peer protocol version: 1.0
Peer Management Address: 149.198.32.171
Time since last hello: 0.8 seconds
```

tftp get peer-also|local-only

This command retrieves a file and saves to the nonvolatile memory on one system manager module or on both the primary and secondary manager modules.

>   **tftp get** *Ipaddress* *Filename* **peer-also**|**local-only**

Ipaddress	IP address of the TFTP server.
Filename	Name of a file.
peer-also	Saves a file to the nonvolatile RAM on both the primary and secondary manager modules.
local-only	Saves a file to the nonvolatile RAM on the manager module from which you enter the command.

Usage

ComOS 4.2 supports this modified **tftp** command to enable a system manager on the PortMaster 4 to save a file to the other manager module in addition to its own nonvolatile RAM.

RADIUS Commands

ComOS 4.2 introduces the following RADIUS commands to configure the PortMaster 4 to use a RADIUS server. For a complete list of RADIUS commands, see Chapter 3 of the *PortMaster 4 Command Line Reference*.

set accounting count

This command sets the number of times the PortMaster attempts to send a RADIUS accounting packet to a RADIUS accounting server.

set accounting count *Number*

Number	Number of times the PortMaster attempts to send a RADIUS accounting packet to a RADIUS accounting server if it does not receive an acknowledgment from the server.
	Integer between 1 and 99. The default is 5.

Usage

When the PortMaster attempts to send a RADIUS accounting packet to the RADIUS accounting server and it does not receive an acknowledgment, it retransmits the packet the number of times set with this command.

If no acknowledgment is sent from the primary accounting server in response to the last retry packet, the PortMaster sends the packet to both the primary and alternate RADIUS accounting servers.

If an acknowledgment is received from the RADIUS accounting server, the PortMaster no longer tries to resend the accounting packet.

To view the accounting count setting, use the **show global** command.

Example

Command> **set accounting count 45**
Accounting retry count changed from 23 to 45

See Also

set accounting interval - page 3-9

set accounting interval

This command sets the interval between accounting packet retransmissions to a RADIUS accounting server.

set accounting interval *Seconds*

Seconds	Number of seconds that elapse between RADIUS accounting packet retransmissions that are not acknowledged by an accounting server.
	Integer between 1 and 255. The default is 30 seconds.

Usage

When the PortMaster attempts to send a RADIUS accounting packet to the RADIUS accounting server and it does not receive an acknowledgment, it retransmits the packet the number of times set with the **set accounting count** command. Use the **set accounting interval** command to set the time interval between attempts to resend the RADIUS accounting packet.

If no acknowledgment is sent from the primary accounting server in response to the last retry packet, the PortMaster sends the packet to both the primary and alternate RADIUS accounting servers.

To view the accounting count and the accounting interval settings, use the **show global** command.

Example

Command> **set accounting interval 60**
Accounting retry interval changed from 30 to 60 sec

See Also

set accounting count - page 3-8

set authentication failover

This command enables the PortMaster to dynamically switch primary and alternate RADIUS authentication servers based on their response to authentication requests.

> **set authentication failover on|off**

on	If the primary authentication server fails to respond to three consecutive requests, the PortMaster sends seven requests to both the primary and secondary servers.
	If the secondary server replies before the primary server, it becomes the primary server.
off	The PortMaster always tries the primary server first. This is the default.

Usage

This command enables the RADIUS authentication failover feature on the PortMaster. When RADIUS authentication failover is enabled, the PortMaster does the following:

1. Sends three access-request packets to the primary authentication server and awaits a response.

2. Sends seven requests to both the primary and secondary authentication servers and awaits a response.

3. If the secondary server responds first and failover is set to **on**, designates it as the primary authentication server and sends it the authentication request from the next login attempt.

4. If the designated primary server does not respond after three attempts, starts the failover process again.

The server currently designated as primary is marked with an asterisk (*) in the output of the **show global** command.

To set the request interval, use the **set authentication interval** command.

Example

```
Command> set authentication failover off
Auth failover changed from on to off
```

See Also

set authentication interval - page 3-9

set authentication interval

This command sets the number of seconds that a PortMaster waits for a response from a RADIUS authentication server.

set authentication interval *Seconds*

Seconds	Value between 1 and 255. The number of seconds that must elapse between RADIUS access-request retransmissions if the PortMaster receives no response from a RADIUS authentication server. The default is 3 seconds, and 0 resets the value to the default.

Usage

The *Seconds* value determines how long the PortMaster waits before sending a subsequent request to the authentication server. In addition, the PortMaster waits two times this value to initiate failover. For example, if **set authentication interval 6** is used, failover occurs in 12 seconds.

Example

```
Command> set authentication interval 15
Auth retry interval changed from 5 to 15 sec
```

See Also

set authentication failover - page 3-10

L2TP Command

ComOS 4.2 introduces the following Layer 2 Tunneling Protocol (L2TP) command for the PortMaster 4. For a complete description of L2TP commands, see Chapter 17, of the *PortMaster 4 Command Line Reference*.

set l2tp id-for-host

This command sets an L2TP access concentrator (LAC) host to report itself using the RADIUS Tunnel-Assignment-ID value instead of its IP address or hostname during tunnel negotiations.

set l2tp id-for-host on|off

on   Sets a LAC host to identify itself by its RADIUS
                    Tunnel-Assignment-ID during L2TP negotiations.

off   Sets a LAC host to identify itself using its IP address or
                    hostname during L2TP negotiations. This is the default.

Usage

To use this command on a line board designated as a LAC, you must first select a slot for configuration using the **set view** command.

By default, a host identifies itself with an IP address during L2TP negotiations. You can use this command to enable a host to identify itself with the Tunnel-Assignment-ID that you assign in RADIUS.

Example

```
Command> set view 3
view set to slot 3

Command 3> set l2tp id-for-host on
OK
```

Global Command

set chapname

This command sets a name that the entire PortMaster 4 uses to identify itself during Challenge Handshake Authentication Protocol (CHAP)negotiations.

> **set chapname** *Name*

Name	Name of up to 39 characters that the PortMaster 4 uses to identify itself during CHAP negotiations.

Usage

This command enables multiple PortMaster 4 units to act like one system for CHAP operations if you set the same CHAP name on all of them.

Example

No output is generated from this command.

Command> **set chapname building1**

SS7 Commands

ComOS 4.2 introduces the following commands used to configure Signaling System 7 (SS7) on the PortMaster 4. For a description of other commands related to SS7 configuration, see Chapter 15 of the *PortMaster 4 Command Line Reference*.

set imt-reject-cause

The command sets the cause code used when incoming calls are rejected by RADIUS when call-checking is enabled for SS7.

> **set imt-reject-cause** *Cause_code*

Cause_code	Value of the reject code, an integer between 1 and 63. The default value is 1.

Usage

To use this command, you must first select a slot for configuration using the **set view** command.

Use this command for telecommunications service providers that require a specific action to be taken when a RADIUS rejection occurs.

Example

```
Command> set view slot 3
Command 3 > set imt-reject-code 63
Changed RADIUS reject code from 1 to 63
```

set imt-alt

This command sets one or more alternate SS7 gateways for the line boards of the PortMaster 4.

> **set imt-alt 1|2|3** *Ipaddress*

1	First alternate gateway.
2	Second alternate gateway.
3	Third alternate gateway.
Ipaddress	IP address of the alternate gateway.

Usage

To use this command, you must first select a slot for configuration using the **set view** command.

Use this command to configure the alternate gateways for each card. To remove an alternate gateway, set the IP address to 0.0.0.0.

Each slot card first attempts to connect to the primary gateway. If the attempt is unsuccessful, the card retries in the following order:

1. First alternate gateway

2. Second alternate gateway

3. Third alternate gateway

4. Primary gateway

Only one SS7 gateway must be active at any given time. When an alternate gateway is enabled after a line board detects that the primary gateway is unavailable, a failover is accomplished within 30 seconds or less. The PortMaster 4 retains calls between failovers, and informs the new gateway about existing calls.

Note – If multiple gateways are running at the same time, a situation can occur in which the first connection attempt might succeed for an alternate gateway, and the different slots become connected to different gateways. When the primary gateway comes back online, the alternate gateways must be shut down to allow the PortMaster 4 to switch back to the primary gateway.

See Also

set imt-parms

Cable Specifications   A

This appendix provides pinout and length information for the following cables used on the PortMaster 4 and specifications for cables used on PortMaster 4 Ethernet interfaces.

- **Modem Cable.** This cable is used to connect a data communication equipment (DCE) device (modem) to the C0 or C1 port. See page A-1.

  This cable is available from most computer equipment suppliers.

- **Console Cable.** Also known as a null-modem cable, this cable is used to connect a data terminal equipment (DTE) device (terminal) to the C0 port. See page A-2.

  This cable is available from most computer equipment suppliers.

- **RJ-45 Cable.** This cable is used to connect an Ethernet 10BaseT or 10/100BaseT line to an Ethernet port, or to connect a T1, channelized T1, E1, channelized E1 or ISDN PRI line to a T1 or E1 port. See page A-2.

Modem Cable

Table A-1 gives pinout specifications for an RS-232 modem cable with RJ-45 and DB-25 connectors.

Table A-1 Modem Cable Pinouts

PortMaster 4 Serial Port (C0, C1)				PC or Terminal Serial Port	
RJ-45	**Name**	**Definition**	**Direction**	**DB-25 (DTE)**	**Signal**
1	RTS	Request to Send	Output	5	CTS
2	DTR	Data Terminal Ready	Output	8^1	DCD
3	TXD	Transmit Data	Output	3	RXD
4	GND	Signal Ground		NC^2	
5	GND	Signal Ground		7	GND
6	RXD	Receive Data	Input	2	TXD
7	DCD	Data Carrier Detect	Input	20	DTR
8	CTS	Clear to Send	Input	4	RTS
NC^2		Data Set Ready		6^1	DSR

1. Pins 8 and 6 in the DB-25 connectors are connected internally.

2. Not connected.

Lucent recommends that the length of an RS-232 null-modem cable does not exceed 50 feet (15 meters).

Console Cable

Table A-2 gives pinout information for an RS-232 console (null modem) cable with RJ-45 and DB-25 connectors.

Table A-2   Console Cable Pinouts

PortMaster 4 Serial Port (C0, C1)				External Modem
RJ-45	Name	Definition	Direction	DB-25 (DCE)
1	RTS	Request to Send	Output	4
2	DTR	Data Terminal Ready	Output	20
3	TXD	Transmit Data	Output	2
4	GND	Signal Ground		NC[1]
5	GND	Signal Ground		7
6	RXD	Receive Data	Input	3
7	DCD	Data Carrier Detect	Input	8
8	CTS	Clear to Send	Input	5

1. Not connected.

Lucent recommends that the length of an RS-232 straight-through console cable does not exceed 50 feet (15 meters).

RJ-45 Cable

Table A-3 shows the pinout specifications for a Category 5 twisted pair cable, as specified by the ANSI/EIA-568-A wiring standard, with an RJ-45 connector—also known as a RJ-48C connector.

Table A-3   RJ-45 Cable Pinouts

PortMaster 4 Ethernet, T1, and E1 RJ-45 Ports			
RJ-45	Signal	Definition	Direction to or from the PortMaster 4
1	RXD (Ring)	Receive Data	Input
2	RXD (Tip)		
4	TXD (Ring)	Transmit Data	Output
5	TXD (Tip)		

See "Ethernet Cable Specifications" on page A-3 for more information.

Ethernet Cable Specifications

Table A-4 provides cable specifications for the PortMaster 4 Ethernet interface.

Table A-4   Ethernet Cable Specifications

Ethernet Type	Connector Type	Cable Type	Transmission Distance
RJ-45	RJ-45 for 10BaseT	Category 5 unshielded twisted pair[1]	A Category 5 distributed cable that meets the ANSI/EIA-568-A standard has a maximum length of 328 feet (100 meters), divided as follows:
RJ-45	RJ-45 for 100BaseT	Category 5 unshielded twisted pair[1]	• 20 feet (6 meters) between the hub and the patch panel (if used)
			• 295 feet (90 meters) from the wiring closet to the wall outlet
			• 10 feet (3 meters) from the wall outlet to the desktop device
			• A maximum of four repeaters
			Ethernet cable must be grounded at both ends.

1. For NEBS-compliant installations, Category 5 **shielded** twisted pair cable must be used.

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