

# **PortMaster 3 Hardware Installation Guide**

PM-3A-1T, PM-3D-1T, PM-3A-1E, PM-3D-1E,  
PM-3A-2T, PM-3D-2T, PM-3A-2E, PM-3D-2E

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March 1998

950-1189C

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## *FCC Class A Notice - United States*

Computing devices and peripherals manufactured by Lucent Technologies, Inc. generate, use, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions contained in this manual, may cause interference to radio communications. Such equipment has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of the FCC Rules, which are designed to provide reasonable protection against radio interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user — at his own expense — will be required to take whatever measures may be required to correct the interference.

Some components may not have been manufactured by Lucent Technologies, Inc. If not, Lucent Technologies has been advised by the manufacturer that the component has been tested and complies with the Class A computing device limits as described above.

## *IC-CS03 Notice - Canada*

The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

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Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

## *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 Guide

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This guide provides instructions for installing and troubleshooting the PortMaster<sup>®</sup> 3 Integrated Access Server from Lucent Technologies, as well as pinout, electrical, and physical specifications.

## **Audience**

This guide 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. The hardware installation guides are included with most PortMaster products; other manuals 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<sup>®</sup> Administrator's Guide*

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

- *PortMaster Command Line Reference*

This guide provides the complete description and syntax of each command in the ComOS command set.

- *PortMaster Configuration Guide*

This guide provides a comprehensive overview of networking and configuration issues related to PortMaster products.

- PortMaster hardware installation guides

These guides contain complete hardware installation instructions. An installation guide is available for each PortMaster product line—IRX™, Office Router, Communications Server, and Integrated Access Server.

- *PMconsole™ for Windows Administrator's Guide*

This guide covers PMconsole Administration Software for Microsoft Windows, a graphical tool for configuring the PortMaster. The majority of the material in this guide also applies to the UNIX version of PMconsole.

- *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 Administrator's Guide*

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

## ***Document Conventions***

The following conventions are used in this guide:

<b>Convention</b>	<b>Use</b>	<b>Examples</b>
<b>Bold font</b>	Indicates a user entry—a command, menu option, button, or key—or the name of a file, directory, or utility, except in code samples.	<ul style="list-style-type: none"><li>• Enter <b>version</b> to display the version number.</li><li>• Press <b>Enter</b>.</li><li>• Open the <b>permit_list</b> file.</li></ul>

Convention	Use	Examples
Italic font	Identifies a command-line placeholder. Replace with a real name or value.	<ul style="list-style-type: none"> <li>• set <i>Ether0</i> address <i>Ipaddress</i></li> <li>• Replace <i>Area</i> with the name of the OSPF area.</li> </ul>
Square brackets ([ ])	Enclose optional keywords and values in command syntax.	<ul style="list-style-type: none"> <li>• set nameserver [2] <i>Ipaddress</i></li> <li>• set <i>S0</i> destination <i>Ipaddress</i> [<i>Ipmask</i>]</li> </ul>
Curly braces ({ })	Enclose a required choice between keywords and/or values in command syntax.	set syslog <i>Logtype</i> {[ <i>disabled</i> ] [ <i>Facility.Priority</i> ]}
Vertical bar ( )	Separates two or more possible options in command syntax.	<ul style="list-style-type: none"> <li>• set <i>S0/W1</i> ospf on off</li> <li>• set <i>S0</i> host default prompt <i>Ipaddress</i></li> </ul>

## 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 Remote Access Technical Support***

The PortMaster comes with a 1-year hardware warranty.

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

New releases and upgrades of PortMaster software are available by anonymous FTP from **<ftp://ftp.livingston.com.pub/le/>**.

In North America you can schedule a 1-hour software installation appointment by calling the technical support telephone number listed below. Appointments must be scheduled at least one business day in advance.

### ***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 Remote Access 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 Remote Access sales channel partner in this region, contact the Lucent Remote Access EMEA Support Center Monday through Friday between the hours of 8 a.m. and 8 p.m. (GMT+1), excluding French public holidays.

- By voice, dial +33-4-92-92-48-88.
- By fax, dial +33-4-92-92-48-40.
- By electronic mail (email) send mail to **[emeasupport@livingston-ent.fr](mailto:emeasupport@livingston-ent.fr)**

### ***For North America, Latin America, and the Asia Pacific Region***

Contact Lucent Remote Access Monday through Friday between the hours of 6 a.m. and 6 p.m. (GMT -8).

- By voice, dial 800-458-9966 within the United States (including Alaska and Hawaii), Canada, and the Caribbean, or +1-510-737-2100 from elsewhere.
- By fax, dial +1-510-737-2110.
- By email, send mail as follows:

- From North America and Latin America to **support@livingston.com**.
- From the Asia Pacific Region to **asia-support@livingston.com**.
- Using the World Wide Web, see **http://www.livingston.com/**.

## ***Subscribing to PortMaster Mailing Lists***

Lucent 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-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.



The PortMaster 3 Integrated Access Server consolidates digital modem technology, Frame Relay, ISDN Primary Rate Interface (PRI), and T1, channelized T1, or E1 services for seamless remote access.

**ISDN PRI Service.** PRI is an ISDN service that connects your site to a telephone company's central office.

- In North America, PRI is transmitted over 1.544Mbps T1 lines and consists of twenty-three 64Kbps bearer (B) channels for the transmission of voice and data and one 64Kbps data (D) channel for ISDN call control and signaling.
- In Europe, PRI is transmitted over 2.048Mbps E1 lines and consists of thirty 64Kbps B channels for the transmission of voice and data and one 64Kbps D channel for ISDN call control and signaling.

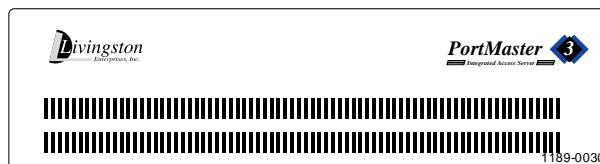
**Channelized T1 Service.** The PortMaster 3 also connects to channelized T1 circuits for dial-up access supporting twenty-four 56Kbps data channels. When used on channelized T1 lines, the PortMaster 3 has the unique ability to automatically answer a modem or ISDN call using the same phone number.

**Fractional T1 service.** The PortMaster 3 operates over T1 and E1 lines in fractional data rates selectable in any multiple of 64Kbps (T1 or E1 lines) up to the line capacity. This feature is frequently used for Frame Relay or point-to-point communications.

**Fully Integrated Digital Solution.** The PortMaster 3 reduces the complexity of LAN-to-LAN internetworking and remote access by providing a fully integrated digital solution. It offers the functionality of channel service units (CSUs), channel banks, digital modems, communication servers, and multiprotocol routing in a single rack-mountable chassis.

**Multiple Access.** The PortMaster 3 comes with one or two T1/E1 ports, one Ethernet port with three connector types, one asynchronous console port, and six expansion slots for optional digital modem cards. Up to six digital modem cards—for a maximum of 60 modems—can be installed in each chassis, with 8 or 10 modems per card.

## Front Panel



### Five-Section DIP Switch

Table 1-1 shows DIP switch functionality.

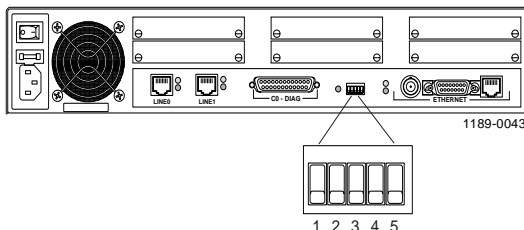


Table 1-1 DIP Switch Functionality

DIP Switch	Controls	Switches UP	Switches DOWN
1	Console mode	C0 acts as a console	C0 acts as an asynchronous RS-232 port
2	Net boot mode	PortMaster 3 attempts to boot from the network using RARP and TFTP	PortMaster 3 boots from internal flash memory
3	Reserved for future use	Not Applicable	Should be left DOWN
4 and 5	Selection of Ethernet connector	10BaseT is selected If 4 is DOWN and 5 is UP, AUI is selected	BNC is selected





**Note** – When Ethernet DIP switch positions are changed, you must turn the power off and on in order for the new settings to be recognized.

## LED Descriptions

Table 1-2 and Table 1-3 describe LED behavior.

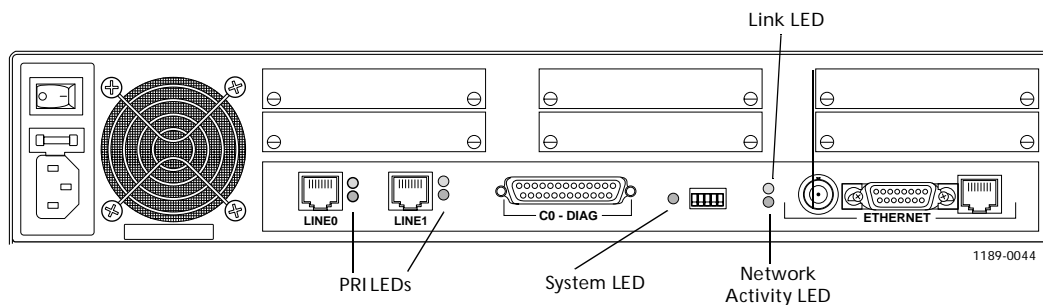


Table 1-2 PRI Status LEDs

Green	Red	Description
OFF	OFF	The PRI line is disabled. Typically only occurs while the unit is booting.
OFF	ON	There is no physical synchronization with the switch.
ON	ON	The port is physically synchronized with the switch, but D channel signalling is not up.
ON	OFF	Line is fully operational.

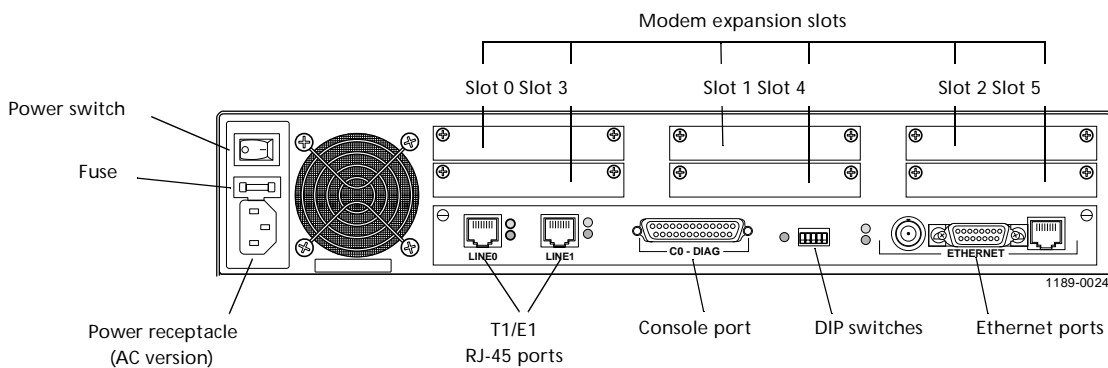
Table 1-3 System, Link, and Network Activity LEDs

<b>LED</b>	<b>Description</b>
System	<p>This LED provides three types of diagnostic information:</p> <p>During the initial hardware self-test, the LED blinks three times per second.</p> <p>After the power-on self-test is successfully completed, and while the operating system is loading, the LED blinks at one-second intervals.</p> <p>When the system is fully operational, the LED remains on, blinking off once every five seconds.</p>
Link	<p>This LED is on when the system has link integrity to a 10BaseT hub.</p>
Network Activity	<p>This LED blinks to indicate Ethernet traffic. During heavy traffic, this light might appear solid due to its rapid blinking.</p>

## Rear Panel

The rear panel of the PortMaster 3 includes the following:

- A power switch
- A user-serviceable fuse on the AC version
- An AC or DC power receptacle
- Six slots for digital modem cards, capable of supporting up to 60 modems
- One or two T1/E1 ports for channelized T1, T1, E1, or PRI connectivity, each with a pair of LEDs
- An asynchronous console port
- A five-section DIP switch with LED
- An Ethernet port with connectors for a 10Base2, AUI, or 10BaseT cable
- An alarm LED on the DC version (not shown in the figure)
- A dual redundant power supply on the DC version (not shown in the figure)



## PortMaster 3 Product Line

The PortMaster 3 product line includes the models described in Table 1-4.

Table 1-4 PortMaster 3 Product Line

Model	Power	Ports	CT1, T1, E1, and PRI Support
PM-3A-1T	AC	1 T1/PRI (23 ISDN)	PRI ISDN dial-up support over T1 trunks. T1/PRI consists of twenty-three 64Kbps B channels and one 64Kbps D channel.
PM-3D-1T	DC	1 Ethernet 1 asynchronous 6 slots for digital modem cards	Channelized T1 dial-up support consists of 24 56Kbps channels with robbed-bit signaling.  Channelized synchronous routing of leased line or Frame Relay connections through the T1 port. No PRI signaling is required. All 24 channels of a digital signal level 0 (DS-0) T1 line are available for channelized synchronous routing.
PM-3A-1E	AC	1 E1/PRI 1 Ethernet	PRI ISDN dial-up support over E1 trunks. E1/PRI consists of thirty 64Kbps B channels and one 64Kbps D channel.
PM-3D-1E	DC	1 asynchronous 6 slots for digital modem cards	Channelized synchronous routing of leased line or Frame Relay connections through the E1 port. No PRI signaling is required. All 31 channels of a digital signal level 0 (DS-0) E1 line are available for channelized synchronous routing.
PM-3A-2T	AC	2 T1/PRI (46 ISDN)	PRI ISDN dial-up support over T1 trunks. T1/PRI consists of twenty-three 64Kbps B channels and one 64Kbps D channel.
PM-3D-2T	DC	1 Ethernet 1 asynchronous 6 slots for digital modem cards	Channelized T1 dial-up support consists of twenty-four 56Kbps channels with robbed-bit signaling.  Channelized synchronous routing of leased line or Frame Relay connections through the T1 port. No PRI signaling is required. All 24 channels of a digital signal level 0 (DS-0) T1 line are available for channelized synchronous routing.

Table 1-4 PortMaster 3 Product Line (Continued)

Model	Power	Ports	CT1, T1, E1, and PRI Support
PM-3A-2E	AC	2 E1/PRI	PRI ISDN dial-up support over E1 trunks. E1/PRI consists of thirty 64Kbps B channels and one 64Kbps D channel.
PM-3D-2E	DC	1 Ethernet 1 asynchronous 6 slots for digital modem cards	
			Channelized synchronous routing of leased line or Frame Relay connections through the E1 port. No PRI signaling is required. All 31 channels of a digital signal level 0 (DS-0) E1 line are available for channelized synchronous routing.

Table 1-5 lists digital modem cards available for use with the PortMaster 3.

Table 1-5 Digital Modem Cards for the PortMaster 3

Model	Description
MDM-PM3-8	8-port digital modem card
MDM-PM3-10	10-port digital modem card

## PortMaster 3 Software

Every PortMaster product comes with ComOS operating system software installed in nonvolatile Flash RAM. This software is periodically updated. New releases are announced on the PortMaster mailing lists and are available by anonymous FTP from **ftp.livingston.com**. See “Contacting Lucent Remote Access Technical Support” on page xii for information on mailing lists.

The PortMaster 3 operates with ComOS version 3.5 or later.

To configure the PortMaster, you can use either of the following:

- **Command Line Interface.** If you are using the command line interface to configure the PortMaster 3, refer to the *PortMaster Command Line Reference* and the *PortMaster Configuration Guide* for instructions.

- **PMconsole Software.** PMconsole guides you through configuration using a simple graphical user interface (GUI). It is available for Windows 95, Windows NT 4.0 or later, and for many versions of UNIX. You can install PMconsole from the *PortMaster Software CD* or from the Livingston FTP site.

Refer to the *PMconsole for Windows Administrator's Guide* for configuration instructions.



**Note** - You must use the command line interface to configure certain ComOS features such as the Open Shortest Path First (OSPF) protocol and the Border Gateway Protocol (BGP) on the PortMaster 3.

## ***Installation Checklist***

- 1. Choose a Site
- 2. Prepare the Work Area
- 3. Install a Rack Mount (Optional)
- 4. Connect a Console
- 5. Connect T1, Channelized T1, E1, or ISDN PRI Line(s)
- 6. Connect an Ethernet Cable
- 7. Turn On Power
- 8. Log In
- 9. Set the Network Address

## **1. Choose a Site**

Follow these guidelines to select a site for your PortMaster 3.

### *Environment*

- Choose a clean and dust free environment.
- Choose a secure, flat surface area for desktop installation.
- Choose an air conditioned area if possible.
- Choose an area without direct sunlight, close proximity to heat sources, or high levels of electromagnetic interference (EMI).

### *Chassis Accessibility*

- Provide 3 inches (8cm) clearance at the rear of the PortMaster 3 for cabling purposes.
- Provide 18 inches (46cm) clearance at the rear of the PortMaster 3 for modem card installation.

### *Air Flow and Cooling*

- Provide 3 inches (8cm) around all vent openings of the PortMaster 3 for proper air flow.
- Ensure that the operating environment of the PortMaster 3 does not drop below 41°F (5°C) or exceed 113°F (45°C).

### *Power Guidelines*

- Ensure that the power source of the PortMaster 3 is properly grounded and falls within the internal power supply rating.
  - PortMaster 3A models operate correctly at any AC voltage from 100V to 240V and frequencies from 47Hz to 63Hz.
  - PortMaster 3D models operate correctly at a DC voltage level of -48VDC.



## 2. Prepare the Work Area

Prepare for installation by gathering the following equipment and following these safety recommendations.

### *Required Equipment*

- Number 1 Phillips screwdriver
- 5/32-inch flathead screwdriver

### *Safety Recommendations*

- Keep the chassis area clean and dust free during and after installation.
- Disconnect the PortMaster 3 from the power source before working near power supplies, changing a fuse, or upgrading memory.
- Before applying power, look for possible hazards such as moist floors, ungrounded power extension cables, or missing safety grounds and locate the emergency power switch for the room in which you are working.
- Wear safety glasses when working under any conditions that might be hazardous to your eyes.
- Keep tools away from walk areas where you and others could fall over them.
- Do not work alone if potentially hazardous conditions exist.
- Wear a grounding strap when handling the internal components of the PortMaster 3.



**Warning** – Before working on equipment that is connected to power lines, remove jewelry including 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.

### 3. Install a Rack Mount (Optional)

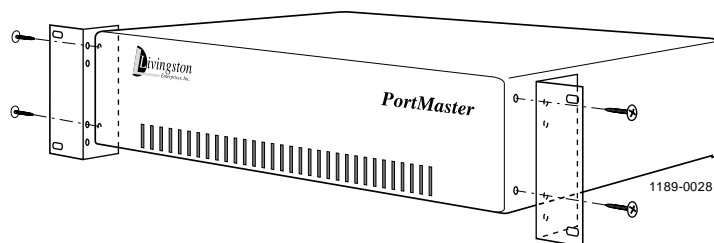
Follow these instructions to attach the PortMaster 3 to a rack.

#### *Required Equipment*

- Two angle brackets (included)
- Four 12-24 screws (included)
- Flathead screwdriver
- Number 1 Phillips screwdriver
- Rack with universal Electronic Industries Association (E.I.A.) spacing

#### *Procedure*

1. **Remove the plastic plugs from the mounting holes in the chassis by inserting a flathead screwdriver under the plug edge and prying the plug loose.**
2. **Mount the angle brackets to the sides of the PortMaster 3 using four 12-24 screws so that the top edge of the angle bracket is aligned with the top of the PortMaster 3.**



3. **Attach the PortMaster 3 to a rack using four 12-24 screws so that the front of the PortMaster is flush with the front of the rack.**

## 4. Connect a Console

Follow these instructions to connect a console.

### Required Equipment

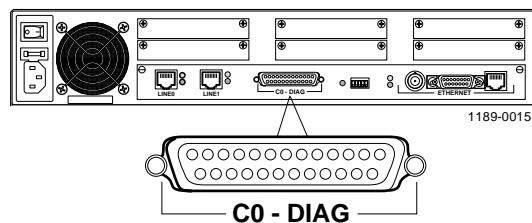
- DB-25 male-to-male serial null modem cable, with a 25-to-9-pin female adapter if you are using a PC. (See “Null Modem Cable” on page B-2 for pinout information.)

This cable and adapter are available from most computer equipment suppliers.

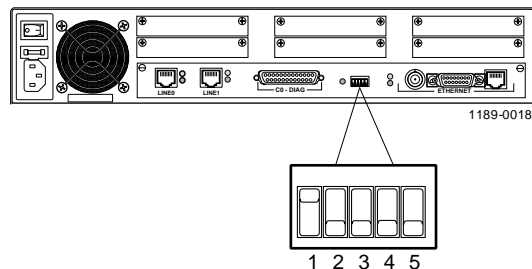
- PC or terminal.

### Procedure

1. **Attach one end of the cable to the PortMaster 3 console port, and attach the other end to the serial port of a PC or terminal.**



2. **Ensure that DIP switch 1 is up.**



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

## 5. Connect a T1, Channelized T1, E1, or ISDN PRI Line(s)

Follow these instructions to connect a T1, channelized T1, E1, or ISDN PRI line(s) to the T1/E1 port(s) if you have already ordered the service from the phone company.

Call your local telephone service provider to order T1, channelized T1, E1, or ISDN PRI service and to find out about service availability, pricing, features, and wait time. Typically you must pay an installation charge, a monthly flat-rate service charge, and usage charges.

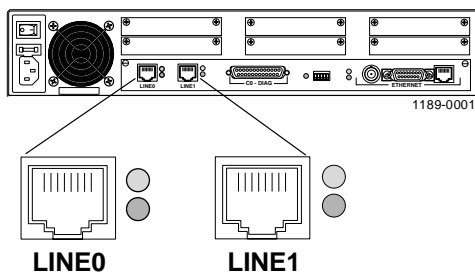
### Required Equipment

- ❑ A category 5 twisted pair cable, as specified by the EIA/TIA-568-B wiring standard, with an RJ-48C connector (See “T1/E1 Cable” on page B-4 for more information.)

One of these cables is included for each T1/E1 port. Additional cables are available from most computer equipment suppliers.

### Procedure

#### Connect a line to the T1/E1 port.



To connect a 75-ohm coaxial cable to an E1 port with an impedance of 100 ohms, use a 75-ohm to 100-ohm impedance-matching adapter available from most electronic equipment suppliers.



**Note** – The PortMaster 3 has an integrated channel service unit/digital service unit (CSU/DSU). However, the other end of a T1/E1 connection might require an external clock signal provided by the telephone company or a (CSU/DSU).

## 6. Connect an Ethernet Cable

The following Ethernet cables can be connected to the PortMaster 3 (See “Ethernet Interface” on page B-5 for specifications.)

- Ethernet 10BaseT
- Ethernet AUI
- Ethernet 10Base2

### *Ethernet 10BaseT*

Follow these instructions to connect an Ethernet cable to the Ethernet 10BaseT port.

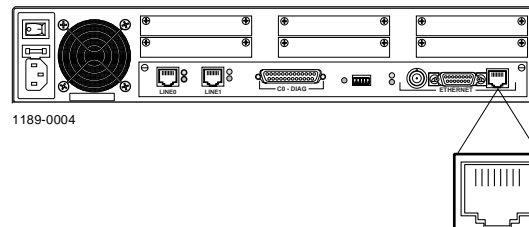
#### *Required Equipment*

- ❑ A category 5 twisted pair cable, as specified by the EIA/TIA-568-B wiring standard, with an RJ-45C connector

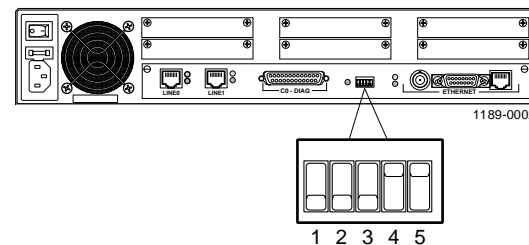
This cable is available from most computer equipment suppliers.

#### *Procedure*

1. **Connect the cable to the Ethernet 10BaseT port.**



2. **Set DIP switches 4 and 5 up.**



## Ethernet AUI

Follow these instructions to connect an Ethernet cable to the Ethernet AUI port.

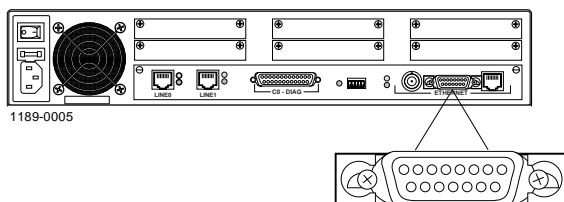
### Required Equipment

- ❑ An RG-11 50-ohm coaxial cable with a DB-15 female connector

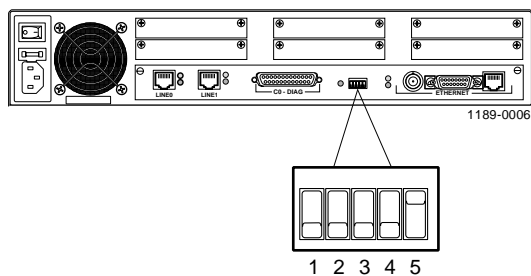
This cable is available from most computer equipment suppliers.

### Procedure

- 1. Connect the cable to the Ethernet AUI port.**



- 2. Set DIP switch 4 down and DIP switch 5 up.**



## Ethernet 10Base2

Follow these instructions to connect an Ethernet cable to the Ethernet BNC port.

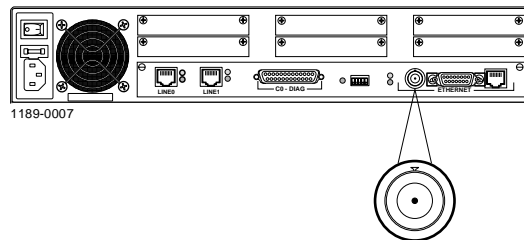
### Required Equipment

- ❑ A 10Base2 (thin Ethernet) RG-58 A/U50-ohm coaxial cable with a BNC T-adapter

This cable is available from most computer equipment suppliers. The BNC T-adapter is included with the PortMaster 3.

### Procedure

1. **Connect the cable to the Ethernet BNC port using the BNC T-adapter.**

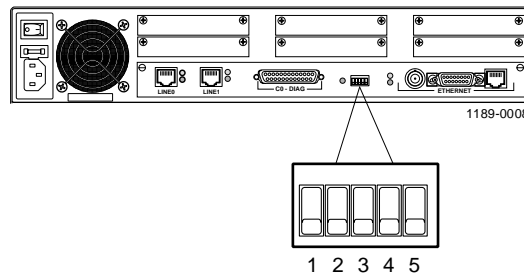


2. **Terminate the 10Base2 cable at both ends using a 50-ohm terminator cap.**



**Warning** – One terminator cap of a 10Base2 Ethernet chain must be grounded to prevent damage to Ethernet equipment.

3. **Set DIP switches 4 and 5 down.**



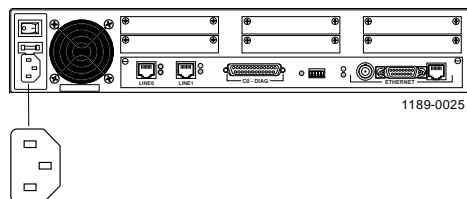
## 7. Turn On Power

Follow these instructions to start the PortMaster 3.

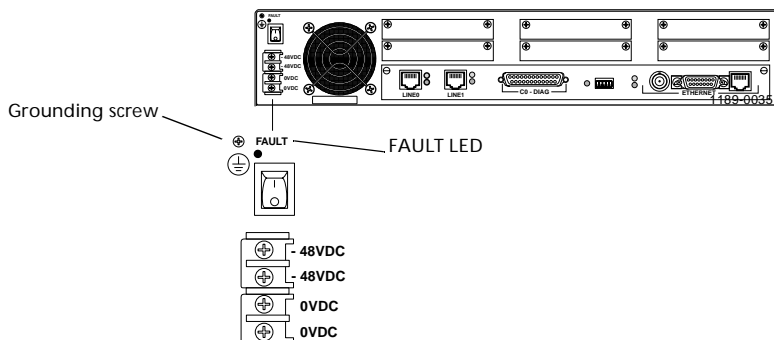
### Procedure

#### 1. Attach the PortMaster 3 to a power source.

- **AC version.** Attach the power cord to the PortMaster 3 and to a properly grounded electrical outlet.



- **DC version.** Attach a -48VDC line to the -48VDC terminal block, a 0VDC line to the 0VDC terminal block, and a ground line to the grounding screw of the PortMaster 3.



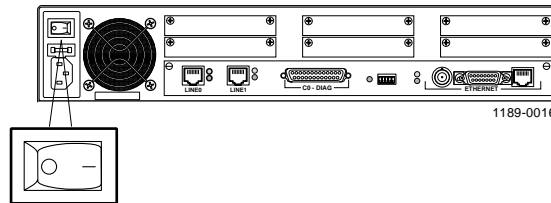
The DC PortMaster 3 has two -48VDC terminal blocks and two 0VDC terminal blocks so two power sources can be used. If you are using a single -48VDC power source, use the provided jumpers to short the two -48VDC and 0VDC inputs together.





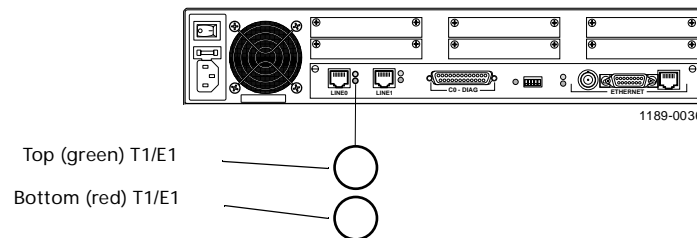
**Note** – The FAULT LED of the DC PortMaster indicates power difficulties. If it is blinking, the fan has stopped rotating and the unit should be taken out of service. If it is solidly lit, one of the redundant power converters has failed. The unit can continue to operate but should be repaired when convenient.

**2. Turn the power switch on.**



**3. If you are using T1, E1, or ISDN PRI, verify that the top (green) T1/E1 LED is solidly lit.**

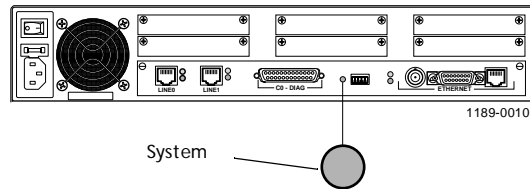
If the bottom (red) T1/E1 LED is solidly lit, see Appendix A, “Troubleshooting.”



**4. Verify that the system LED blinks three times per second on power up and then stays solidly lit with an interruption once every 5 seconds.**

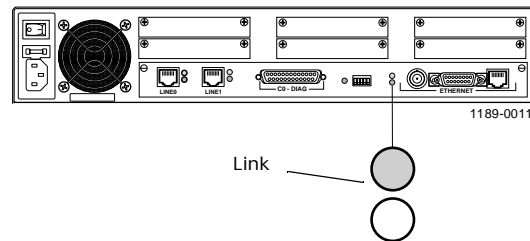
System LED behavior might vary, depending on the version of ComOS.

If the system LED does not behave in this way, see Appendix A, “Troubleshooting.”



5. **If you are using the Ethernet 10BaseT port, verify that the link LED stays solidly lit.**

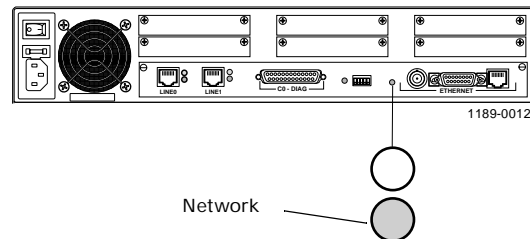
If the link LED does not behave this way, see Appendix A, “Troubleshooting.”



6. **Verify that the network LED blinks when Ethernet traffic is present.**

Heavy traffic can cause the network LED to blink so rapidly that it appears to be solidly lit.

If the network LED does not behave in this way, see Appendix A, “Troubleshooting.”



## 8. Log In

Follow these instructions to log in to the PortMaster 3.

1. **From the login prompt, type !root and press the Enter key.**
2. **From the password prompt, press the Enter key—no password is needed**

Login: !root

Password:

Command>

## 9. Set the Network Address

Set an IP address and netmask for an IP network and/or an IPX network number and frame type for an IPX network.

### *IP Address*

Follow these instructions to set an IP address and netmask for the PortMaster 3.

**From the command prompt, enter the following information, pressing the Enter key after each line.**

Replace the *italicized* values with values appropriate for your network.

Command> set ether0 address *172.168.200.1*

Command> set netmask *255.255.255.0*

Command> save all

Command> Quit

## *IPX Address*

Follow these instructions to set an IPX address and frame type for the PortMaster 3.

**From the command prompt, enter the following information, pressing the Enter key after each line.**

Replace the *italicized* values with values appropriate for your network.

```
Command> set ehther0 ipxnet AFAF0808
```

```
Command> set ether0 ipxframe ethernet_802.2
```

```
Command> save all
```

## **Configuration Information**

You can use either of the following to configure the PortMaster:

- **Command Line Interface.** If you are using the command line interface to configure the PortMaster 3, refer to the *PortMaster Command Line Reference* and the *PortMaster Configuration Guide* for instructions.
- **PMconsole Software.** PMconsole guides you through configuration using a simple graphical user interface (GUI). It is available for Windows 95, Windows NT 4.0 or later, and for many versions of UNIX. You can install PMconsole from the *PortMaster Software CD* or from the Livingston FTP site.

Refer to the *PMconsole for Windows Administrator's Guide* for configuration instructions.



**Note** – You must use the command line interface to configure certain ComOS features such as the Open Shortest Path First (OSPF) protocol and the Border Gateway Protocol (BGP) on the PortMaster 3.

## Installing Digital Modem Cards

Follow these instructions to install digital modem cards.

### Required Equipment

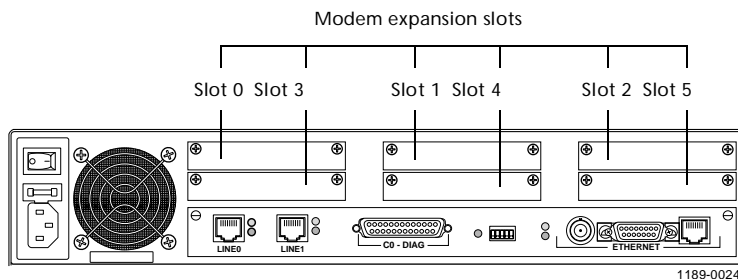
- ❑ Livingston 8-modem or 10-modem digital modem cards
- ❑ Number 1 Phillips screwdriver

### Procedure

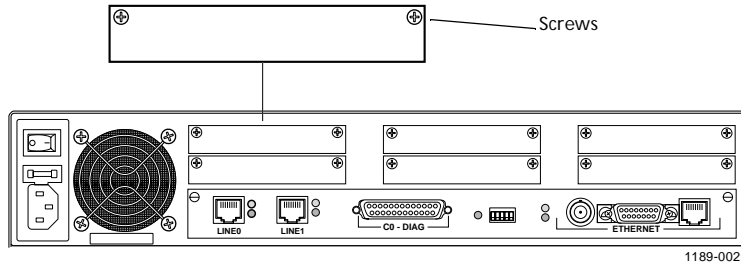


**Caution** – Digital modem cards can be installed or removed while the PortMaster 3 is in use. If a card is removed while the PortMaster 3 is in use, all connections associated with that card are terminated.

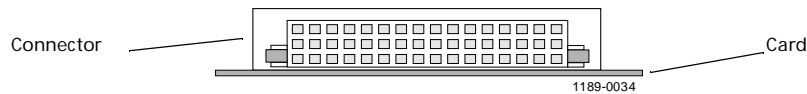
Wear a grounding strap when handling the internal components of the PortMaster 3.



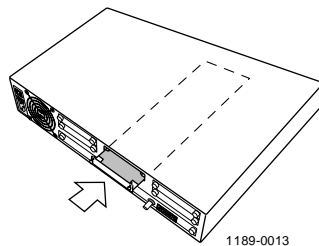
1. **Remove the backplate of a modem card port by unscrewing the two phillips screws.**



2. **Store the backplate and screws in a safe place.**
3. **With the port end of the modem card facing the rear panel of the PortMaster 3, insert the modem card into the two slide guides at the opening.**
4. **Ensure that the rear connector is facing up.**



5. **Gently slide the modem card into the chassis until the rear connectors of the card touch the rear connectors of the chassis.**



6. **Gently press the front of the modem card until it is fully seated.**  
The 48-pin connectors should slide smoothly together; do not force the connectors together.
7. **Tighten the thumbscrews on the modem card.**

Once the modem card is installed, it is ready for use. No additional configuration is required.

## Removing Digital Modem Cards

Follow these instructions to remove digital modem cards from the PortMaster 3.

### Procedure

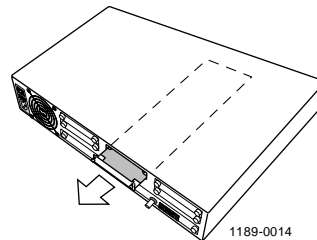


**Caution** – Digital modem cards can be installed or removed while the PortMaster 3 is in use. If a card is removed while the PortMaster 3 is in use, all connections associated with that card are terminated.

Wear a grounding strap when handling the internal components of the PortMaster 3.

1. **Loosen the thumbscrews on the modem card.**
2. **Using the thumbscrews as handles, gently pull the modem card until the connectors release.**

If you have difficulty getting the connectors to release, gently move the modem card from side to side.



3. **With the modem card disconnected completely from the connectors, gently slide the card back through the opening until the card is completely out.**
4. **Secure the faceplate that originally came installed on the PortMaster 3.**

## Installing an External Modem

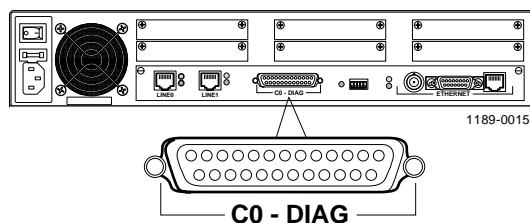
Follow these instructions to install an external modem.

### Required Equipment

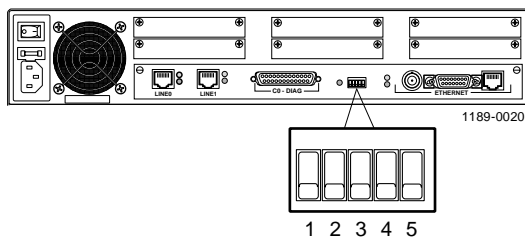
- ❑ A standard male-to-male straight-through RS-232 cable (See “Straight-through Cable” on page B-3 for pinout information.) This cable is available from most computer equipment suppliers.
- ❑ An external modem.

### Procedure

1. **Attach one end of the cable to the PortMaster 3 C0 port and the other end to an external modem.**



2. **Set DIP switch 1 down.**



For modem configuration information, refer to one of the following:

- If you are using the command line interface to configure the PortMaster 3, refer to the *PortMaster Configuration Guide*.
- If you are using PMConsole to configure the PortMaster 3, refer to the *PMconsole for Windows Administrator's Guide*.



## Adding Memory

Follow these instructions to add memory to the PortMaster 3.

The PortMaster 3 is shipped from the factory with one 72-pin, 4MB (1x36), 70-nanosecond single inline memory module (SIMM) of RAM installed. The memory can be increased to 8MB (2x36), 16MB (4x36), or 32MB (8x36). To run the Border Gateway Protocol (BGP), the PortMaster 3 requires at least 16MB of RAM.

### Required Equipment

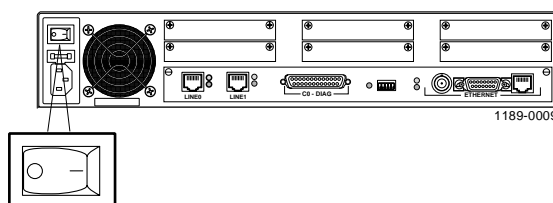
- ❑ One 72-pin 70-nanosecond single inline memory module (SIMM)

### Procedure

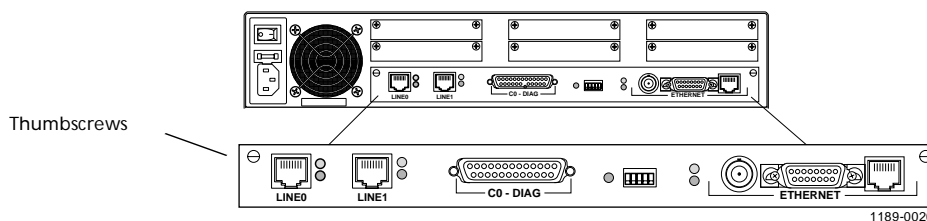


**Caution** – Wear a grounding strap when handling the internal components of the PortMaster 3.

1. Turn the power switch off and disconnect the PortMaster 3 from the power source.



2. Loosen the two thumbscrews on the rear of the motherboard.

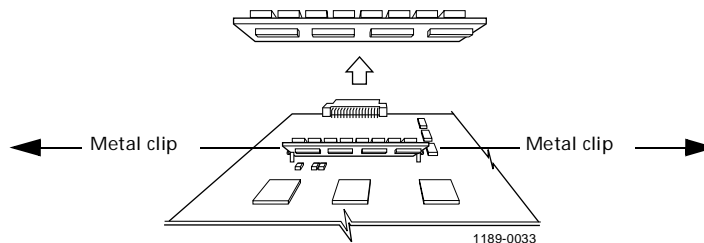


3. Using the thumbscrews as handles, gently pull the motherboard until the connectors release.

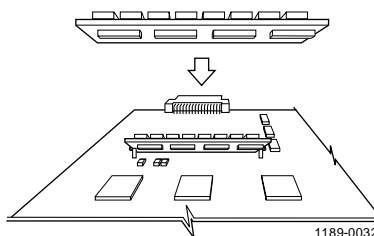
4. **With the motherboard disconnected completely from the connectors, gently slide the board back through the opening until the board is completely out.**
5. **Lay the motherboard down on a hard, flat, static free surface.**
6. **Locate the existing SIMM.**

The SIMM is located in the corner farthest away from the power supply and the external connectors.

7. **Remove the old SIMM by placing your thumbs on the metal clips on each side of the SIMM and pulling them apart, releasing the SIMM.**

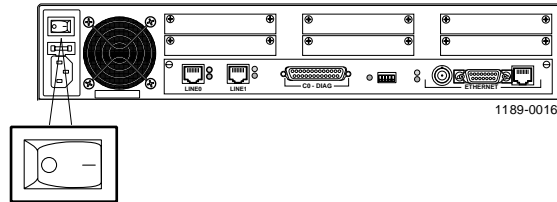


8. **Insert the new SIMM at a 40-degree angle, then gently push it to the right and down (towards you) until it clicks into place at a 30-degree angle.**



9. **Reinstall the motherboard into the chassis.**
10. **Tighten the thumbscrews.**

11. Connect the PortMaster 3 to the power source and turn the power switch on.



## Installing a T1 Card

Follow these instructions to install a T1 card in a PortMaster 3.

### Required Equipment

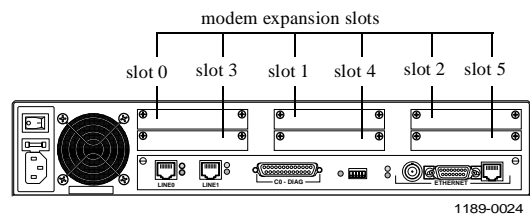
- A category 5 twisted pair cable, as specified by the EIA/TIA wiring standard, with an RJ-45 connector
- A Phillips screwdriver

### Procedure



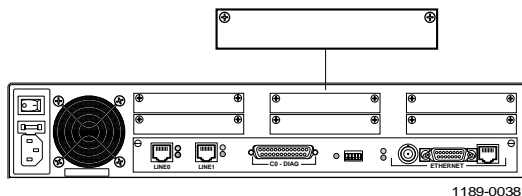
**Note** - The T1 card can be installed while the PortMaster 3 is in use.

1. Identify the desired modem slot.

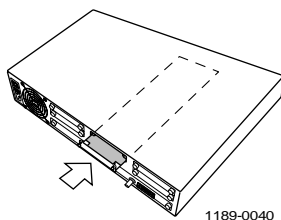


**Note** - Only one T1 card can be installed in a PortMaster 3. If more than one card is installed, the PortMaster 3 will not recognize it.

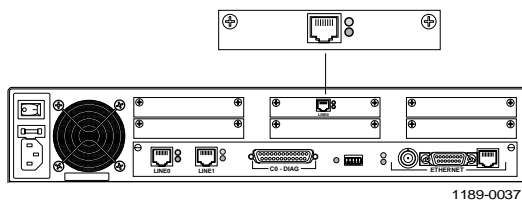
2. Remove the backplate of the modem card port by unscrewing the two Phillips screws.



3. Store the backplate and screws in a safe place.
4. Ensuring that the rear connector is facing up, insert the T1 card into the slide guides of the PortMaster 3 modem port.
5. Gently slide the T1 card into the chassis until the rear connectors of the card touch the rear connector of the chassis.



6. Gently press the front of the T1 card until it is fully seated.  
The 48-pin connectors will slide together smoothly; do not force the connectors together.
7. Tighten the thumbscrews on the T1 card.
8. Connect a line to the RJ-45 port of the T1 card.



When the green LED light is on, the T1 port is available, and when the red LED light is on, the T1 port is not available.

## *T1 Card Configuration Information*

When installed, the T1 card becomes line2 in ComOS. Line2 supports the same line framing and encoding as line0 and line1. However, line2 does not support ISDN Primary Rate Interface (PRI). If line2 is set for ISDN, it defaults to T1 operation.

Valid line types for line2 are T1 and fractional. When set to fractional, line2 supports one channel group; The first group found numerically is the one used for configuration. The fractional channel group supports any number of time slots and also supports 56Kbps channels.

In addition to line2, the T1 card adds a new port to the list of active ports. If the PortMaster 3 has a single PRI, this port is W24. If the PortMaster 3 has a double PRI, this port is W48.

StacLZS data compression can be enabled for line2 if the PortMaster 3 has a Stac compression card installed.

See the *PortMaster Command Line Reference* for information on ComOS commands.

## *Install a Compression or Accelerator Card*

Follow these instructions to install a compression or accelerator card in the PortMaster 3.



**Note** – ComOS 3.6 or later is required to use the PortMaster 3 compression card, and ComOS 3.8b8 or later is required to use the PortMaster 3 accelerator card.

### *Required Equipment*

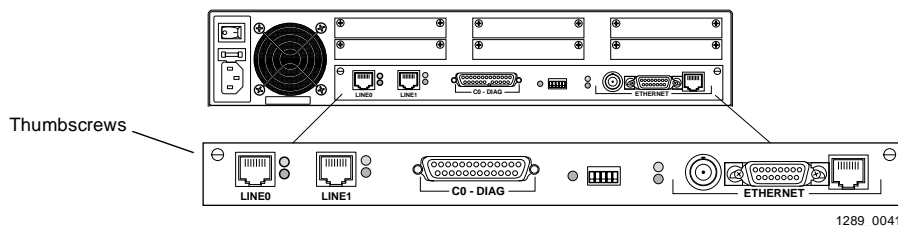
- A PortMaster 3 compression or accelerator card
- A grounding strap (included with the PortMaster 3 compression and accelerator cards)

## Procedure



**Caution** – Wear a grounding strap when handling the internal components of the PortMaster 3.

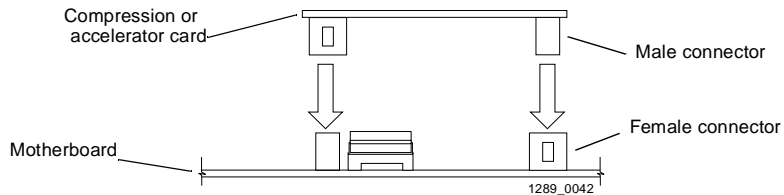
1. Turn the power switch off, and disconnect the PortMaster 3 from the power source.
2. Loosen the two thumbscrews on the rear of the motherboard.



3. Using the thumbscrews as handles, gently pull the motherboard until the connectors release.
4. With the motherboard disconnected completely from the connectors, gently slide the board back through the opening until the board is completely out.
5. Lay the motherboard down on a hard, flat, static free surface.
6. Locate the male and female connectors on the motherboard.

The male connector is located at the rear of the motherboard, across from the single inline memory module (SIMM). The female connector is located approximately 4.5 inches from the male connector.

- 7. Match the male and female connectors on the compression or accelerator card with the male and female connectors on the motherboard, and gently press the compression or accelerator card until it clicks into place.**



- 8. Reinstall the motherboard into the chassis.**
- 9. Tighten the thumbscrews.**

The PortMaster operating system will autodetect the compression or accelerator card on startup. No additional configuration is required.





This appendix provides the following troubleshooting procedures for the PortMaster 3:

- Observing LED behavior
- Observing boot messages
- Replacing a fuse

## ***Observing LED Behavior***

Table A-1 identifies LED behavior, possible causes of the behavior, and potential solutions.

For information on contacting technical support, see “Contacting Lucent Remote Access Technical Support” on page xii.

*Table A-1* Hardware Problems and Solutions

<b>LED Behavior</b>	<b>Possible Cause</b>	<b>Solution</b>
System LED does not 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 A-7.  Contact Lucent Remote Access Technical Support if power is not present on the DC version.
A T1, E1, or ISDN PRI line is connected to a T1/E1 port and the bottom (red) T1/E1 LED stays lit.	The PortMaster 3 does not recognize service from the telephone company.	Contact the telephone company.

Table A-1 Hardware Problems and Solutions (Continued)

LED Behavior	Possible Cause	Solution
During startup, the system LED fails to light, stays lit, or blinks three times per second continuously.	A hardware problem has occurred.	Contact Lucent Remote Access Technical Support.
During startup, the system LED blinks once per second for more than a minute.	<ul style="list-style-type: none"> <li>• DIP switch 2 is up and no boot server is present.</li> <li>• Flash RAM contents are corrupt.</li> </ul>	<ul style="list-style-type: none"> <li>• If no boot server is available, verify that DIP switch 2 is down and reboot; otherwise, see the network booting procedure in the <i>PortMaster Configuration Guide</i>.</li> <li>• If flash RAM contents are corrupt, follow the <i>PortMaster Configuration Guide</i> procedure for network booting and rewriting the contents of Flash RAM.</li> </ul>
<p>Immediately after booting, the system LED stays solidly lit or does not light.</p> <p>Note: This behavior does not refer to the boot sequence, during which the system LED is not lit for between 5 and 7 seconds.</p>	A component might have loosened during shipping.	<p>Open the PortMaster 3 using antistatic precautions (see “Safety Recommendations” on page 2-3). Verify the following:</p> <ul style="list-style-type: none"> <li>• The SIMM is firmly seated.</li> <li>• The PROM is firmly in place.</li> </ul> <p>If all items have been verified and the problem is not fixed, refer to “Observing Boot Messages” on page A-4, and boot in console mode. If the boot messages do not suggest a solution, record the information and contact Lucent Remote Access Technical Support.</p>
During operation, the system LED 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 Remote Access Technical Support.

Table A-1 Hardware Problems and Solutions (Continued)

LED Behavior	Possible Cause	Solution
No console login prompt is displayed.	Terminal settings are incorrect or a connection or cable is inoperable.	<ul style="list-style-type: none"> <li>• Verify terminal settings of 9600 baud, 8 data bits, 1 stop bit, a parity of none, and software control (XON/XOFF).</li> <li>• Verify that DIP switch 1 is UP.</li> <li>• Verify that you have a working null modem cable and that it is properly connected at both ends. For cabling information see “Pinout Specifications” on page B-1.</li> </ul>
The link LED is not lit when connected to a 10BaseT Ethernet hub.	There is no link integrity.	Verify that DIP switches 4 and 5 are up and that you have a working 10BaseT cable properly connected to the PortMaster 3 and to the hub. Turn the power off and on to activate the DIP switch setting.
Network LED is solidly lit.	<p>Heavy traffic can cause the network LED to blink so rapidly that it appears to be solidly lit.</p> <p>However; If packets cannot be passed, you might have an incorrectly cabled network.</p>	Verify that the network cabling is correct.
Network LED is not lit.	If the PortMaster 3 is not receiving, or sending traffic, the network LED is not lit.	Verify that the network cabling is correct.

Table A-1 Hardware Problems and Solutions (Continued)

LED Behavior	Possible Cause	Solution
An undefined difficulty 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 A-4. If the boot messages do not suggest a solution, record the information and contact Lucent Remote Access Technical Support.

## Observing Boot Messages

If you are having difficulty booting the PortMaster 3 and are unable to isolate the problem by observing LED behavior, boot the PortMaster 3 in console mode and check the boot messages.

Follow these instructions to check boot messages:

1. **Attach a console** (see “Connect a Console” on page 2-5).
2. **Turn on power** (see “Turn On Power” on page 2-10).
3. **Observe the boot messages displayed on the console screen.**



**Note** – Boot messages vary slightly, depending on the version of the PROM and ComOS and whether modem cards are installed.

The following example is from a PortMaster 3A-2T:

```

Livingston Enterprises, Inc. Boot Prom Rev N

Testing Low Memory....
Testing System Clock....
Testing System Memory.... 1024K
Checking Boot Rom....
CPU Type.... 486DE2-66
Starting FLASH Boot.....
Booting From Flash Type Am29F040
Loading Image at 0fff0000
17048 flash copy complete
Verifying Load Module Checksum...
Starting Load Module ...
Loading kernel... 619172 bytes
Testing High Memory .... 4096K
Found 47 ports....
ether0 active... 64K burst-10
Running ComOS...

PortMaster Console login:

```

Use Table A-2 to interpret possible diagnostic boot messages.

Table A-2 Interpreting Diagnostic Boot Messages

Field	Possible Message	Explanation
Boot Prom Rev	<i>N</i>	Version number of the installed boot PROM.
Testing Low Memory	ERROR	This error indicates a boot failure. Record all information to this point and contact Lucent Remote Access Technical Support.
Testing System Clock	ERROR	This error indicates a boot failure. Record all information to this point and contact Lucent Remote Access Technical Support.

Table A-2 Interpreting Diagnostic Boot Messages (Continued)

Field	Possible Message	Explanation
Testing System Memory	ERROR at <i>failed memory address</i> .	This error indicates a boot failure. Record all information to this point and contact Lucent Remote Access Technical Support.
Checking Boot Rom	ERROR	This error indicates a boot failure. Record all information to this point and contact Lucent Remote Access Technical Support.
CPU Type	486DE2-66	The type of CPU installed.
Starting FLASH Boot	N/A	N/A
Booting From FLASH Type	Am29F040	Flash brand name.
Loading Image at flash copy complete	0fff0000 17048	RAM address. Counter for Flash bytes transferred to RAM. If the counter freezes, record all information to this point and contact Lucent Remote Access Technical Support.
Verifying Load Module Checksum	Invalid Length for Flash at <i>RAM address</i> .	This error indicates a boot failure. Record all information to this point and contact Lucent Remote Access Technical Support.
Starting Load Module	N/A	N/A
Loading kernel	619172	Size of kernel image in bytes.
Testing High Memory	ERROR at <i>failed memory address</i>	This error indicates a boot failure. Record all information to this point and contact Lucent Remote Access Technical Support.
Found x ports	Integer between 2 and 61	Number of ports found, including C0.
ether0 active	64K burst-IO	Ethernet interface found.

Table A-2 Interpreting Diagnostic Boot Messages (Continued)

Field	Possible Message	Explanation
Running ComOS	N/A	If system becomes suspended at this point and does not print the next message, the configuration nonvolatile RAM (NVRAM) has been corrupted. Refer to the <i>PortMaster Troubleshooting Guide</i> for instructions on NVRAM recovery.
PortMaster Console login:	N/A	System is up and running.

## Replacing a Fuse

If your PortMaster 3 loses power while connected to an active power source, check the fuse.

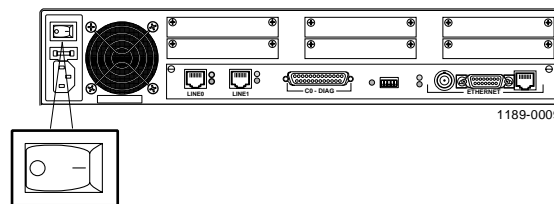
Follow these instructions to check and replace the fuse in the PortMaster 3.

### Required Equipment

- 5/32-inch flathead screwdriver
- 250V, 2A fuse (AC version)

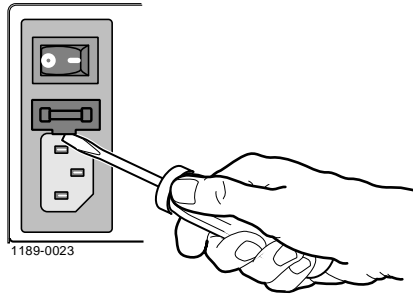
### Procedure

1. Turn the power switch off and disconnect the PortMaster 3 from the power source.



2. Detach the power cord from the PortMaster 3.

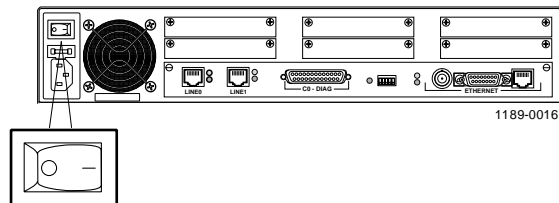
3. **Insert a 5/32-inch flathead screwdriver between the fuse door and the chassis, and gently pull the fuse door open.**



4. **If the white outer coating of the fuse is discolored (burned), replace the fuse.**

The fuse can be inserted from either end.

5. **Press the fuse door shut until it clicks.**
6. **Reconnect the power cord to the PortMaster 3.**
7. **Turn the power switch on.**





This appendix provides cable and pinout specifications.

## ***Pinout Specifications***

This appendix provides pinout information for the following cables:

- **B-25 serial male-to-male null modem cable.** This cable is used to connect a data terminal equipment (DTE) device (terminal) to the C0 port.

This cable is available from most computer equipment suppliers.

- **Male-to-male straight-through RS-232 cable.** This cable is used to connect a data communication equipment (DCE) device (modem) to the C0 port.

This cable is available from most computer equipment suppliers.

- **T1/E1 category 5 twisted pair cable, as specified by the EIA/TIA-568-B wiring standard, with an RJ-48C connector.** This cable is used to connect a T1, channelized T1, E1, or ISDN PRI line to the T1/E1 port.

One of these cables is included for each T1/E1 port. Additional cables are available from most computer equipment suppliers.

## ***Null Modem Cable***

Table B-1 shows the cable pinouts for a B-25 male-to-male null modem cable. The PortMaster 3 does not use data set ready (DSR).

*Table B-1* Null Modem Cable Pinout

<b>PortMaster 3 Serial Port (C0)</b>			<b>Terminal Serial Port</b>			
<b>DB-25 (DTE)</b>	<b>Signal</b>	<b>Definition</b>	<b>Direction to or from the PortMaster 3</b>	<b>DB-25 (DTE)</b>	<b>DB-9 (DTE)</b>	<b>Signal</b>
2	TXD	Transmit Data	Output	3	2	RXD
3	RXD	Receive Data	Input	2	3	TXD
4	RTS	Request to Send	Output	5	8	CTS
5	CTS	Clear to Send	Input	4	7	RTS
6, 8	DCD	Data Carrier Detect	Input	20	4	DTR
7	GND	Signal Ground	N/A	7	5	GND
20	DTR	Data Terminal Ready	Output	6, 8	6, 1	DCD

## ***Straight-through Cable***

Table B-2 shows the cable pinouts for a male-to-male straight-through RS-232 cable.

*Table B-2* Straight-through Cable Pinout

<b>PortMaster 3 Serial Port (C0)</b>			<b>Terminal Serial Port</b>			
<b>DB-25 (DTE)</b>	<b>Signal</b>	<b>Definition</b>	<b>Direction to or from the PortMaster 3</b>	<b>DB-25 (DCE)</b>	<b>DB-9 (DCE)</b>	<b>Signal</b>
2	TXD	Transmit Data	Output	2	3	TXD
3	RXD	Receive Data	Input	3	2	RXD
4	RTS	Request to Send	Output	4	7	RTS
5	CTS	Clear to Send	Input	5	8	CTS
6	DSR	Data Set Ready	N/A	6	6	DSR
7	GND	Signal Ground	N/A	7	5	GND
8	DCD	Data Carrier Detect	Input	8	1	DCD
20	DTR	Data Terminal Ready	Output	20	4	DTR

## T1/E1 Cable

Table B-3 shows the pinouts for a category 5 twisted pair cable, as specified by the EIA/TIA-568-B wiring standard, with an RJ-48C connector.

Table B-3 T1/E1 RJ-48C Connector Pinout

<b>PortMaster 3 T1/E1 RJ-45 Ports</b>			
<b>RJ-48C</b>	<b>Signal</b>	<b>Definition</b>	<b>Direction to or from the PortMaster 3</b>
1	RXD (Ring)	Receive Data	Input
2	RXD (Tip)		
4	TXD (Ring)	Transmit Data	Output
5	TXD (Tip)		

## Ethernet Interface

Table B-4 provides specifications for the 10Mbps baseband IEEE 802.3-compatible Ethernet interface.

*Table B-4* Ethernet Interface

<b>Ethernet Type</b>	<b>Connector Type</b>	<b>Cable Type</b>	<b>Transmission Distance</b>
AUI	15-pin DEC-Intel-Xerox (DIX) to external transceiver	RG-11 50-ohm coaxial	Trunk segment—1,640ft (500m) maximum Transceiver cable—164ft (50m) maximum Network trunk—8,200ft (2,500m) maximum
BNC	BNC T-adapter	RG-58 A/U 50-ohm coaxial	Trunk segment—984ft (300m) maximum Station distance—1.5ft (0.5m) maximum Network trunk—3,035ft (925m) maximum
RJ-48C	RJ-48C for 10BaseT	Category 5 unshielded twisted pair	Hub distance—328ft (100m) maximum Repeaters—four maximum



This appendix describes the following PortMaster 3 specifications:

- Interface
- Size and weight
- Environmental
- Electrical

## Interface Specifications

Table C-1 Interface Specifications

Interface	Description	PM-3A-1T	PM-3A-2T	PM-3D-1E	PM-3D-2E
		PM-3D-1T	PM-3D-2T	PM-3A-1E	PM-3A-2E
Ethernet	10BaseT (RJ-45), AUI (DB-15), or BNC	1	1	1	1
Asynchronous serial	RS-232/423, with data rates up to 115,200bps	1	1	1	1
T1/PRI	RJ-45	1	2	0	0
E1/PRI	RJ-45	0	0	1	2

## Size and Weight Specifications

Table C-2 Size and Weight Specifications

Description	PortMaster 3
Dimensions (HxWxD)	3.5 inches x 16.8 inches x 12.0 inches (8.9cm x 42.7cm x 30.5cm)
Weight	16.5lb (7.5kg)

## Environmental Specifications

Table C-3 Environmental Specifications

Description	Specifications
Operating temperature	41 to 113°F (5 to 45°C)
Storage temperature	-40 to 185°F (-40 to 85°C)
Operating humidity	20 to 80 percent, noncondensing

## Electrical Specifications

Table C-4 Electrical Specifications

Description	Specifications
Input voltage	PM-3A models: 100VAC to 240VAC +/-10 percent, 47Hz to 63Hz, 1.0A  PM-3D models: -48VDC +/-10 percent, 3.9A
Fuses	AC version: One 250V, 2A  DC version: Six 125V, 5A fast acting (Littelfuse Mfg. No.R451005 or equivalent)



*Table C-4 Electrical Specifications (Continued)*

<b>Description</b>	<b>Specifications</b>
Power Dissipation	30W for dual input, load sharing, and redundant power supply operation, plus installed modem cards: <ul style="list-style-type: none"><li>• 8W per MDM-PM3-8 digital modem card</li><li>• 10W per MDM-PM3-10 digital modem card</li></ul>
Memory	1MB FLASH RAM, 4MB dynamic RAM (DRAM) expandable to 32MB



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