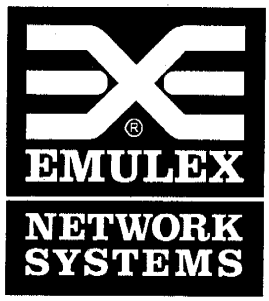

NETQue™ Multiprotocol Printer Server User's Guide

ER2054605-00 Rev. G
August 1995

Information contained in this document is believed to be accurate and reliable. However, Emulex Corporation assumes no responsibility for its use nor for any infringements of patents or other rights of third parties which may result from its use. Emulex Corporation reserves the right to change product specifications at any time without notice.

The following trademarks of Emulex Corporation are used in this document: Emulex, NETQue, NETQue Mate, NETQue Pro2, NETQue Token Ring, NETJet.

The following are trademark acknowledgments: UNIX is a trademark of AT&T Bell Laboratories, Novell and NetWare are trademarks of Novell Corporation, AppleTalk is a trademark of Apple Computer. ***rprint*** and ***enstall*** are trademarks of Emulex Corporation. Other brands and product names are trademarks of their respective companies.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Shielded cables must be used between this equipment and attached peripheral devices. The reader is cautioned that changes or modifications made to the equipment not expressly approved by Emulex could void the user's authority to operate this equipment.
The above statement applies to products marketed in the U.S.A.

NOTE: This class A digital apparatus meets all requirements of the Canadian Interference - Causing Equipment Regulations. Cet Appareil numerique de la classe A respecte toutes les exigences du reglement sur le material brouilleur du Canada.

The above statetment applies to products marketed in Canada.
Copyright 1995 Emulex Corporation. All rights reserved worldwide. No part of this document may be reproduced by any means nor translated to any electronic medium without the written consent of:

Emulex Corporation
3535 Harbor Boulevard
Costa Mesa, CA 92626
(714) 662-5600
FAX (714) 513-8266
Printed in U.S.A.

Table of Contents

CHAPTER 3 NOVELL NETWARE

CHAPTER 4 UNIX

CHAPTER 5 VAX/VMS DECNET LAT

CHAPTER 6 APPLETALK

CHAPTER 7 LAN MANAGER/T

CHAPTER 8 LAN SERVER

CHAPTER 9 WINDOWS NT

CHAPTER 10 CONTACTING EMULEX

APPENDIX

Introduction

Chapter 1

Thank you for purchasing an Emulex network product. You have joined the Emulex family of users who have found that our products greatly facilitate computer communication and management of network resources. We value a strong relationship with our customers and seek to serve your needs in the years to come.

Emulex Corporation (HQ)	(714) 662-5600
PreSales Support	(714) 513-8053
Technical Support	(714) 513-8270

New customers will be excited to find that the default printer server parameters are applicable for most networks and the printer server can be used immediately. The printer server may be customized to meet your particular needs from a host terminal, console terminal, or with NETWizard. NETWizard is a management tool allowing you to configure, control and monitor any Emulex multi-protocol printer server.

Check Contents

- Emulex printer server
- User's Guide (this book)
- NETWizard Printer Server Management Guide
- External Power supply (North American shipments only)
- Warranty Registration Card
- Brochure describing Emulex Support and Service Programs
- Read Me First envelope containing four 3.5 inch diskettes

If any of these items are missing, please contact your local Emulex distributor.

Check Software

Remove the four 3.5 inch diskettes found in the Read Me First envelope. Verify the following:

- Two NETWizard Printer Server Management diskettes.
- Two Printer Server diskettes.

- Both diskettes display the printer server software (SW) version (beginning with the initial **v**).
- The two diskettes combined will contain the following software:

  UNIX Utilities (tar fmt)

  TES Utilities for Netware & LANMan/T Printer Manager for OS/2 (DOS format)

User Guide Conventions

This guide provides additional information and assistance when techniques involving a particular procedure are emphasized. Prior to instructions on performing an installation step, the user will find this information marked **Note, Important**, or **Caution**. See example:

CAUTION:	*Provides the user with directions to prevent a mistake from occurring.*

When a command is illustrated in the user's guide, the variable choices allowed to be changed will appear in **bold** print. All command lines will begin with a triangular shaped symbol. Emulex command lines will contain a printer server prompt displayed as Server>, Server>> or Local>. An example of a command line is:

▷ Server>>change port **1** name **port name**

Meeting Your Network Needs

This user's guide will help you understand and perform printer server configuration procedures and ways to effectively use the unit on your network.

To better service our long-term customers, Emulex has removed the use of a PAK license (Product Authorization Key) as a requirement for software upgrades. For customers operating with software prior to version 4.5 (3.0 through 4.15), we recommend you upgrade your printer server. Upgrade information may be obtained by contacting Emulex technical support. For new customers, the printer server is fully functional on all supported network operating systems and protocols.

NOS & Protocol Support

The Emulex printer server can be used with these network operating systems and protocols:

	NETQue	*NQMate*	*NQPro2*	*NETJet*	*NQToken*
Novell Netware *TES, IPX/SPX*	✔	✔	✔	✔	✔
UNIX *TCP/IP, LPD*	✔	✔	✔	✔	✔
Apple *Ether/TokenTalk*	✔	✔	✔	✔	✔
VAX/VMS *DECnet LAT*	✔		✔	✔	
LAN Manager/T *TCP/IP, LPD*	✔	✔	✔	✔	✔
OS/2 LAN Server/T *TCP/IP, LPD*	✔	✔	✔	✔	✔
Windows NT *TCP/IP, LPD*	✔	✔	✔	✔	✔

Connection to Ethernet

The printer server can be connected to the Ethernet by using either Thinwire (10base2) BNC cable or unshielded twisted-pair (10baseT) UTP cable. Front panel LEDs on the printer server provide immediate visual indication of power, network connection, and port activity.

Peripheral Support

The printer server parallel ports can drive parallel printers or plotters and the serial port can drive a serial printer or a console terminal. The serial port may also be configured for a HP 3000 host connection.

Printer Server Setup

Chapter 2

Reference Numbers

It is important that you make a note of the printer server's unique Ethernet address (known as the Media Access Control or MAC address) and its serial number. Figure 1 shows the location of the MAC address and serial number on the printer server.

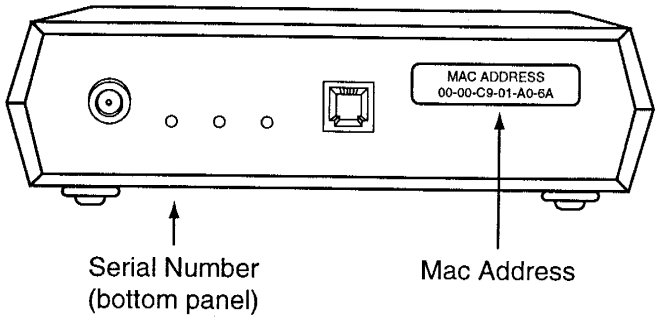

Figure 1: Location of Reference Numbers

Although the following information is clearly printed on the unit, we suggest you write the numbers here for later reference.

Ethernet (MAC) Address: 00-00-C9- ____ ____-____ ____-____ ____

Serial Number: ____ ____ ____ ____ ____ ____ ____

Next, enter the default printer server name. This name begins with a three digit prefix unique to the type of printer server. The remaining digits are taken from the last six characters of the MAC address, without the dashes. For example, the prefix for the NETQue is NQA. Combined with a MAC address such as 00-00-C9-01-A0-6A, the default server name for the printer server will be NQA01A06A.

The default printer server name is very important and is always used when installing the printer server for the first time. Once a successful installation has been accomplished, the default printer server name can be changed.

Default Server Name: NQA _____ _____ _____ _____ _____ _____

NOTE: *We suggest you use the default printer server name when installing the printer server for the first time.*

To define the default printer name: enter the Emulex default printer server name combined with the Emulex printer server port number. The default printer server port is either 1 or 2

Default Printer Name: NQA ____ ____ ____ ____ ____ ____-____

LAN Connections & Cabling

The printer server may be connected to the network using one of these types of connections:

- Thinwire cable with BNC T-adapter
- Unshielded twisted-pair cable with an RJ-45 (UTP) connector

Unshielded Twisted-Pair UTP Connection

1) Attach one end of the twisted-pair cable to the printer server UTP port using a standard RJ-45 connector. See ***Appendix*** for UTP pinout details.
2) Attach the other end of the cable to a UTP wall receptacle or other UTP LAN connection.
3) Do not attach anything to the printer server BNC port.

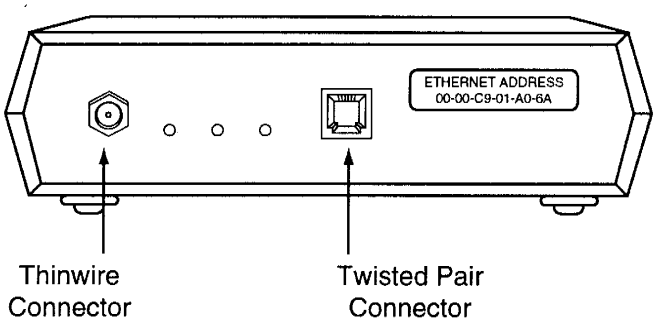

Figure 2: Printer Server LAN Connections

Thinwire BNC Connection

1) If patching into the middle of a cable segment to install the Emulex printer server, use a BNC T-adapter to connect to the LAN cable.

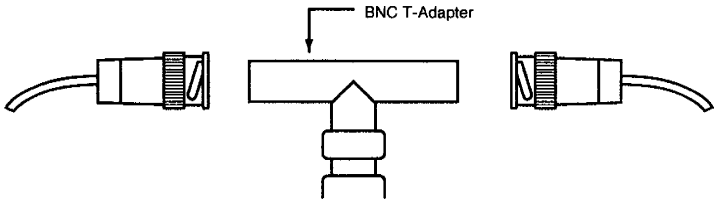

Figure 3: BNC T-Adapter Within a Segment

2) If connecting the printer server to the end of a cable segment, connect the LAN cable to one side of the BNC T-adapter and connect an Ethernet 50 Ohm terminator to the other side.

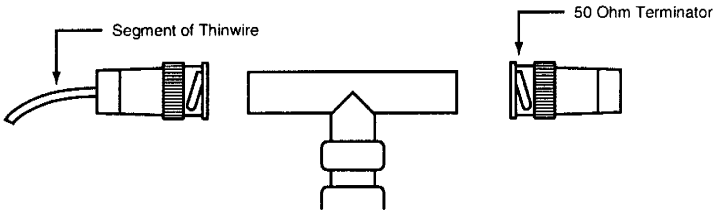

Figure 4: BNC T-Adapter With Terminator at End of Segment

3) Attach the BNC T-adapter and cable to the printer server BNC port.

4) Do not attach anything to the printer server UTP port.

Peripheral Connections & Cabling

Parallel Port

The printer server's parallel port can be used with these printing devices:

- A printer or plotter supporting a Centronics parallel port
- A printer or plotter supporting bi-directional printing (IEEE 1284)

The parallel cable between the printer server and the printing device should not exceed 12 feet (3.65 meters). The printer server has one DB25 female connector. The cable needs a DB25 male connector on one end and a 36-pin male Centronics connector on the other. See ***Appendix*** for further information on configuring the parallel port and for a pinout of the connector.

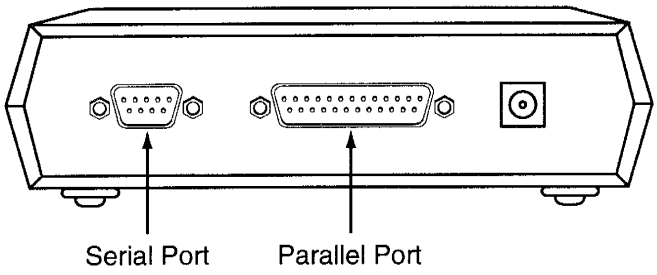

Figure 5: Peripheral Connections

Serial Port

The serial port can support several peripheral devices, such as a serial printer or plotter, a console terminal, or a serial host system like a HP 3000. To use the serial port with a console terminal, Emulex recommends using a VT100-compatible terminal set for 9600 bps, 8 data bits, no parity, and 1 stop bit.

Serial cable between the printer server and the peripheral device or console terminal should not exceed 50 feet (15.24 meters). The printer server has a male DB9 connector. The cable needs a DB9 female connector on one end and a DB25 male connector on the other. See ***Appendix*** for further information on configuring the serial port and for a pinout of the connector.

Power Up

After connecting the LAN cable and peripherals, the printer server is ready for power up. Perform the following:

1) Verify the LAN connection to the printer server is secure.
2) Verify the LAN cable is connected to **one** port, either BNC **or** UTP.
3) Verify all serial and parallel cable connections are secure.
4) Attach the modular power supply cable to the printer server jack labeled +5 VDC, then plug the power supply module into the AC power outlet.

5) The printer server will now power up and go through a self test.

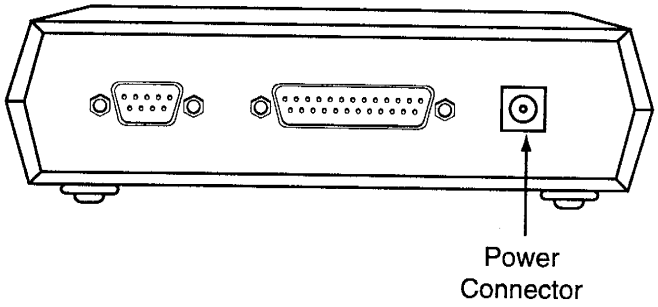

Figure 6: Power Outlet

Display Lights (LEDs)

1) When the printer server power supply module is plugged into the AC power outlet, the green POWER LED will illuminate.
2) Wait 15 to 20 seconds after power is applied. During this period, the printer server is performing its self test.
3) If the network is active, the printer server yellow LAN LED will flash with network activity.
4) If the UTP connector is used, the printer server green LINK LED will illuminate. If the BNC connector is used, this LED will not illuminate.

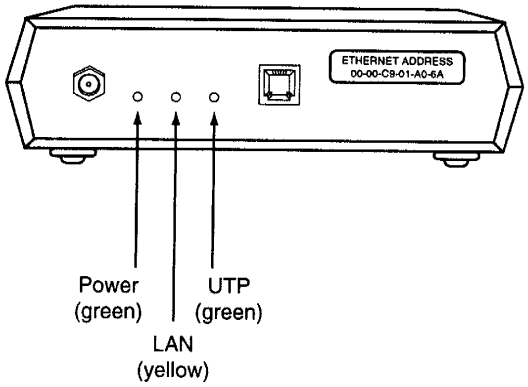

Figure 7: Printer Server Display LEDs

Print Test Page

The test page is a helpful tool that can be used to verify the connection between the printer server and the printer. The test page contains this data:

- Printer server name & default printer name
- Hardware, firmware and software revisions
- Network protocols
- Ethernet (MAC) Address
- Node name
- NOS information

To print the test page, perform these steps. Read the note following regarding Postscript commands which may appear in the printout.

1) Attach a printer to the parallel port and turn the printer ON.
2) With the LAN cable disconnected, apply AC power to the printer server.
3) The printout will occur within 90 seconds.
4) If no printout occurs, verify all connections and make sure printer shows power ON and **Ready**.

NOTE: If the printer is PCL or text only, the test printout may contain Postscript commands. See ***Appendix*** *for further information on disabling this feature.*

Print Configuration Parameters

Starting with software release 4.15, the user has the opportunity to print a copy of the current printer server configuration parameters. To obtain a printout of configuration parameters, enter this command:

▷ Server>> show server config **port n**

port n designates the port number. If no port is specified, the parameters will display on the terminal screen.

Reset to Factory Defaults

This method will reset the printer server to its factory defaults, but the IP address and subnet mask will remain intact until the next time the printer server is powered up. Issue the following command:

▷ Server>>Init Delay **n** Default

where **n** is the delay time in minutes prior to reset to factory default.

Factory Default Configuration

Parameter	*Default Setting*
Passwords	system (privilege mode) access (host login)
Printer server name	NQAxxxxxx (xxxxxx are the last six characters of the MAC Address)
Printer services	
• Remote printer names	NQAxxxxxx_1 (parallel port) NQAxxxxxx_2 (serial port)
• TCP port numbers	2501 (parallel port) 2502 (serial port)
• lpd service	parallel port only; TCP port 515
LAT port names	PORT_1 (parallel port) PORT_2 (serial port)
lpd Queues	
• ASCII files	TEXT
• PostScript or binary files	PASSTHRU
Serial port configuration	9600 bps, 8 data, 1 stop, no parity
Management Access	
• Telnet port number	23
• RCF port number	2048
• TES service name	NQAxxxxxx (xxxxxx are last six characters of MAC address)

Printer Server Specifications

Parameter	*Range*
Ethernet Compatibility	IEEE802.3, IEEE802.2, Ethernet Type 2 10base2, Thinwire (BNC) 10baseT, Unshielded Twisted-Pair (UTP) (RJ45)
Physical Dimensions	5 x 6.5 x 1.0 inches (12.7 x 16.5 x 2.54 cm)
Power Requirements	+ 5 VDC (5% variance) @ 1 Amp minimum
Temperature	Operating : 41 to 109.4 F (5 to 43 C), Storage: -40 to 140 F (-40 to 60 C),
Humidity	10% to 95% noncondensing
Agency Approval	FCC Class A; UL Listed to UL 1950, TUV Certified to EN60950; EN55022, CISPR22/85,Class A; CUL Listed to CSA22.2, No.950; Licensed by BZT, VFG 523/1969, Class A.

Optional Power Supply Specifications

Customers providing their own power supply will need to meet these specifications. This will prevent damage to the printer server and ensure reliable operation.

Parameter	*Range*
Output	+ 5 VDC $\pm$ 5% @ 1 Amp minimum
Connector	2.5 mm pin, 5.5 mm I.D. 12.0 mm shaft length
Polarity	Center positive

One of the following equipment /installation conditions are required for UL approval:

Either:

- Connect the equipment to a +5 VDC power source that is electrically isolated from the ac source. The +5 VDC source is to be reliably connected to earth.

OR

- Connect the equipment to a +5 VDC SELV source.

A power supply is provided for North American installations; no power supply is provided for international installations. Emulex offers the following optional power supplies:

- **Universal:** 90 - 260 VAC, 50/60Hz input. Requires user supplied detachable input power cord to match local power outlet configuration. Conforms to CSA, UL and TUVor VDE requirements.
- **VDE:** 230VAC, 50HZ input. Conforms to VDE or TUV requirements.
- **Australian:** 240 VAC, 50Hz input. Conforms to SAA requirements.
- **United Kingdom:** 240 VAC, 50 Hz input. Plug conforms to EN60950 requirements.

What's Next?

Once the printer server is connected and powered up, refer to the following checklist and configure the printer server for your Network Operating System.

Configure For Your NOS

Choose one or more operating systems.

- ❑ Novell NetWare - pg. 3-1
- ❑ Unix - pg. 4-1
- ❑ VAX/VMS-LAT - pg. 5-1
- ❑ AppleTalk - pg. 6-1
- ❑ DOS LAN Manager/T - pg. 7-1
- ❑ OS/2 LAN Server - pg. 8-1
- ❑ Windows NT 3.5 - pg. 9-1

Manage With NETWizard

Refer to NETWizard Printer Server Management Guide.

- ❑ Load software.- pg. 2-2
- ❑ Choose protocol - pg. 2-2
- ❑ Manage printer server - pg. 2-4

Novell NetWare

Chapter 3

Requirements

Before beginning, make sure the network adheres to these requirements:

Clients must support the NetWare protocol (version 1.20 or greater).

Before Installation

We recommend writing down the following parameters from the Setup section of this guide. You will refer to them within the installation procedure.

Default Server Name: ____ ____ ____ ____ ____ ____ ____ ____ ____

Default Printer Name: ____ ____ ____ ____ ____ ____ ____ ____ ____-___

Have the TES & LANMan/T diskette available for login.

Choosing PSERVER or RPRINTER

Novell NetWare versions 3.11, 3.12 and 4.xx may be configured to use the Emulex printer server. The printer server is capable of operating simultaneously within a PSERVER and RPRINTER environment. PSERVER is the Novell protocol used for printing from a file server. RPRINTER is the protocol used for printing to a remote printer.

When using Novell NetWare, all printing tasks must be queued through a file server.

Advantages of using the Emulex printer server within a Novell Print Server (PSERVER) environment:

- Requires no additional support.
- Faster throughput.
- Occupies one user slot per attached file server.
- Supports encrypted or unencrypted passwords.

Advantages of using the Emulex printer server within a Novell Remote Printer (RPRINTER) environment:

- Requires a Novell PSERVER module somewhere on the network.
- Slower throughput.
- Occupies one user slot.

- Passwords are handled by the PSERVER module.

Choose the best configuration to meet your needs.

Configuring for PSERVER

Prior to using the Emulex printer server as a Novell Netware PSERVER, the user must first select (or create) a print queue, add the printer server and the printer, select the print queue, and restart the printer server.

- Up to 128 file servers (default is 16) may service the Emulex printer server, with a maximum of 256 queues.
- If multiple file servers use the printer server, the printer server must be defined consistently on each of the file servers.

Select or Create the Print Queue

1) Log in to the Novell file server as supervisor:

   ▷ LOGIN file server\SUPERVISOR

> *NOTE A user with supervisor equivalency is not the same as a printer server operator. Create a printer server operator account to perform activities such as bringing down the printer server or obtaining full printer server status.*

2) At the DOS prompt, enter:

   ▷ PCONSOLE

3) Select **Print Queue Information** from the **Available Options** menu.

4) Select an existing **Print Queue** from the list, or create a new **Print Queue,** then select it.

> *NOTE: To create a new Print Queue, press the* **Insert** *key to display a dialog box, then enter the new Print Queue name. Press* **Enter** *to display the new Print Queue name, which can then be selected.*

5) Press **Esc** until the **Available Options** menu is displayed. Within the **Available Options** menu, follow the instructions below to add the printer server and printer.

Add the Printer Server

1) Select **Printer Server Information** from the **Available Options** menu.
2) Press the **Insert** key to define the Emulex default printer server as the **Printer Server.**

> *NOTE: The Emulex default server name is defined in the setup section in this manual.*

3) Select the newly defined printer server.

Add the Printer

1) Select **Printer Server Configuration** from the menu, then select **Printer Configuration.**
2) Select one of the **Not-Installed** printers from the list.
3) To define the printer name: enter the Emulex default printer server name combined with the printer server port number.

> *NOTE: The default printer server name is defined in the Setup section. The default printer server port is either 1, 2 or 3.*

4) Leave the printer type as **Defined Elsewhere.**
5) Save changes by pressing **Esc** and selecting **Yes** to confirm the save.
6) Press **Esc** to return to the **Printer Configuration** menu.

Select the Print Queue

1) Select **Printer Server Configuration** from the **Available Options** menu, then select **Printer Configuration.**
2) Select **Queues Serviced by Printer** from the **Printer server Configuration** menu.

3) Select the printer server printer name.

4) Press the **Insert** key to display the list of available queues. Select the queue to be serviced by the printer.

5) Enter a **Priority Level** for the printer. (Default is 1, highest). To service several queues with the printer, repeat Steps 3 and 4 for each additional queue.

6) Press **Esc** until the **Available Options** menu is displayed.

7) Press **Esc** until the message **Exit PCONSOLE** appears. Select **Yes** to exit **PCONSOLE**.

Restart the Printer Server

The following procedure allows the printer server to read the new configuration in the file server's bindery. Recycling power on the Emulex printer server will also initiate sending the file server's bindery.

1) Select **Printer Server Information** from the **Available Options** menu.

2) Select the printer server name.

3) Select **Printer Server Status and Control**. This option appears only if the printer server is powered up and connected to the network and the configuration was successful.

4) Select **Server Info**.

5) Select the current **Server Status Field**. Press **Enter** on the highlighted **Running** status to bring down the printer server.

6) Select **Going Down Immediately** or **Going Down After Current Jobs.**

7) Press **Esc** until the message **Exit PCONSOLE** appears. Select **Yes** to exit **PCONSOLE**.

8) The printer server re-reads its configuration from the file server.

This completes the printer server installation. Refer to the next section to change printer server configuration parameters.

Configuring for RPRINTER

Prior to using the Emulex printer server as a Novell Netware remote printer, the user must first select (or create) a print queue, add the printer server and the printer, and restart the printer server.

Select or Create the Print Queue

1) Log in to the Novell file server as supervisor:

   ▷ LOGIN fileserver\SUPERVISOR

> *NOTE: A user with supervisor equivalency is not the same as a printer server operator. Create a printer server operator account to perform activities such as bringing down the printer server or obtaining full printer server status.*

2) At the DOS prompt, enter:

   ▷ PCONSOLE

3) Select **Print Queue Information** from the **Available Options** menu.

4) Select an existing **Print Queue** from the list, or create a new **Print Queue**, then select it.

> *NOTE: To create a new Print Queue, press the **Insert** key to display a dialog box, then enter the new Print Queue name. Press **Enter** to display the new Print Queue name, which can then be selected.*

5) Press **Esc** until the **Available Options** menu is displayed. On the Available Options menu, follow the instructions below to add the printer server and printer.

Add the Remote Printer

1) Select **Printer Server Information** from the **Available Options** menu.
2) Press the **Insert** key to create a Novell print server or select an existing Novell print server as the **Printer Server.** If several Novell **Print Servers** are displayed, select the one desired to service the printer server.

NOTE: To create a new Novell printer server name, press the Insert key to display a dialog box and enter the new Novell printer server name. Press ***Enter*** *to display the new Novell Printer server Name, which can then be selected.*

CAUTION: ***DO NOT*** *name the Novell Print Server with the same name as the Emulex printer server.*

3) Select **Printer Server Configuration** from the menu, then select **Printer Configuration**
4) Select one of the **Not-Installed** printers from the list of displayed printers.
5) Enter the Emulex printer server printer name.
6) Press the ↓ key to select the **Type** field, then press **Enter** to display the printer types. Select **Remote Other/Unknown** printer type from the list.
7) Save changes by pressing **Esc** and selecting **Yes** to confirm the save.
8) Press **Esc** to return to the **Printer Configuration** menu.

Select the Print Queue

1) Select **Printer Server Configuration** from the menu, then select **Printer Configuration.**
2) Select **Queues Serviced by Printer** from **the Printer Server Configuration** menu.
3) Select the printer server printer name.

4) Press the **Insert** key to display the list of available queues. Select the queue to be serviced by the printer.

5) Enter a **Priority Level** for the printer. (Default is 1, the highest). To service several queues with the printer, repeat Steps 3 and 4 for each additional queue.

6) Press **Esc** until the **Available Options** menu is displayed.

7) Press **Esc** until the message **Exit PCONSOLE** appears. Select **Yes** to exit **PCONSOLE**.

Restart the Printer Server

If the printer server is already running, stop then restart it to enable the new configuration. Use one of the following procedures:

For 286 Non-Dedicated Servers (Value Added Process (VAP))

1) At the File Server console, enter:

   ▷ PSERVER STOP

   ▷ PSERVER START

For 386 Non-Dedicated Servers (NetWare Loadable Module (NLM))

1) At the File Server console, enter:

   ▷ UNLOAD PSERVER

   ▷ LOAD PSERVER pserver_name

   where **pserver__name** is the printer server's name as defined by NetWare.

For Dedicated Printer servers (286 or 386)

1) If the printer server is running, log in to the file server and run **PCONSOLE**

2) Select **Printer Server Information** from the menu, then select the **Printer Server** to shut down.

3) Select **Printer Server Status and Control** from the menu.

4) Select **Server Information**.

5) Select **Down** to perform an immediate shutdown.

6) From the dedicated printer server, enter:

   ▷ PSERVER = fserver_name pserver_name

   where **fserver_name** is the Novell file server name, and **pserver_name** is the printer server name as defined by Novell NetWare.

This completes the remote printer installation. Refer to the next section to change configuration parameters.

Configuring for PSERVER (Netware 4.xx)

When the Novell NetWare is configured to use the Emulex printer server:

- Up to 128 file servers (default is 16) may service the printer server, with a maximum of 256 queues.
- If multiple file servers use the printer server, the printer server must be defined consistently on each of the file servers.

Select or Create the Print Queue

1) Log in to the Novell file server as supervisor under bindery emulation:

   ▷ LOGIN fileserver\SUPERVISOR /b

2) At the DOS prompt, enter:

   ▷ C:\PCONSOLE

3) Select **Print Queues** from the **Available Options** menu.

4) Select an existing **Print Queue** from the list, or create a new **Print Queue**, then select it.

> *NOTE: To create a new Print Queue, press the* ***Insert*** *key to display a dialog box, then enter the new Print Queue name. Press* ***Enter*** *to display the new Print Queue name, which can then be selected.*

5) Press **Esc** until the **Available Options** menu is displayed. On the **Available Options** menu, follow the instructions to add the printer server and printer.

Add the Printer Server

1) Select **Printer Server Information** from the **Available Options** menu.
2) Press the **Insert** key to define the Emulex default printer server as the **Printer Server.**

> *NOTE: The Emulex default printer server name is defined in the Setup section in this manual.*

3) Select the newly defined **Printer Server.**

Add the Printer

1) Select **Printers** from the **Printer Server Information.**
2) Press the **Insert** key to add a new printer.
3) To define the printer name, enter the Emulex default printer server name combined with the Emulex printer server port number.

> *NOTE: The default printer server name is defined in the Setup section. The default printer server port is either 1, 2 or 3.*

4) Select the newly defined **Printer.** Press **Enter** to go to the **Printer Configuration** menu.

Select the Print Queue

1) Select **Printer Type** and press **Enter** to change it from **Parallel** to **Other/Unknown.**
2) Select **Print Queues Assigned,** then press **Enter.**
3) Press the **Insert** key to assign a print queue to this printer.
4) Press **F10** to save the changes. Select **Yes** to confirm the save.
5) Press **Esc** to return to the **Printer server Information** menu.

Restart the Printer Server

The following procedure allows the printer server to read the new configuration in the file server's bindery. Recycling power on the Emulex printer server will also initiate sending the file server's bindery.

1) Select **Information and Status** from the **Printer server Information** menu.

2) If **Current Server Status** is **Running** and highlighted, press **Enter** to bring down the Printer server and exit **PCONSOLE**.

Logging into the Printer Server

You can log into the printer server remotely from a Novell workstation using the TES terminal emulation program and the Kermit protocol or locally from a console terminal. These methods are described below.

Remote Login

Novell workstations require the TES terminal emulation program and the Kermit protocol in order to perform a remote login to the printer server. TES and Kermit are furnished on a DOS utilities diskette.

TES is a terminate-and-stay-resident (TSR) program that can be loaded at any DOS prompt or loaded from the AUTOEXEC.BAT file. TES must be loaded before starting the Kermit program.

The following procedure installs the TES and Kermit software on the system and establishes a connection to the printer server:

1) Login to a Novell workstation. Change to a DOS prompt.

> *NOTE: The following steps assume that diskettes are loaded from drive A:\, and C:\ is the root directory.*

2) Insert the printer server diskette labeled **TES** into drive A: and enter this command to install the files on the diskette from drive A: to drive C:

   ▷ C:> a:\install a: c:

> *NOTE If the TSR program TES in Step 2 was already installed, do not repeat the installation.*

3) Go to the TES-Kermit subdirectory:

   ▷ C:> cd\tes-krmt

4) Run TES by entering:

   ▷ C:> tes

   TES will terminate but stay resident in the workstation.

5) Run Kermit by entering:

   ▷ C:> kermit

   The **Kermit>** prompt will appear.

6) Tell Kermit and TES which port to use by entering:

   ▷ C:>Kermit> set port tes **default server name**

7) To connect to the printer server, enter:

   ▷ C:>Kermit> connect

8) When the Kermit connection screen appears, press **Enter** until the printer server login screen displays the **Enter Username or Help>**. At the prompt, enter any two characters, then press **Enter**.

9) At the **Server>** prompt, obtain supervisor status by entering the following:

   ▷ Server> su

   ▷ Password> system

   ▷ Server>>

   where **system** is the default privileged password.

10) When finished, log out of the printer server:

   ▷ Server>> logout

11) To end the connection and return to the **Kermit>** prompt, enter:

   ▷ Ctrl-] C

12) To exit the Kermit connection screen and return to the DOS prompt, enter:

   ▷ C:Kermit> exit

13) To display information about TES commands, at the DOS prompt, enter:

▷ C:> tes help

Local Login

1) Connect a console terminal to the printer server serial or console port. Emulex recommends using a VT100-compatible terminal set for 9600 bps, 8 data bits, no parity, and 1 stop bit.

2) Press **Esc** twice to initiate communication between the console terminal and the printer server serial port.

3) When the connection is made, the printer server login screen displayed will be similar to the one shown here:

```
- NETQue AppleTalk/NetWare/TCP/LAT Printer Server --
-

Copyright 1988, 1989, 1990, 1992 EMULEX Corp.
All Rights Reserved.
Use of this product is subject to a software license
-------------------------------------date and time

Welcome to NETQue
Enter Username or Help>
Server>
```

4) At the **Enter Username or Help>** prompt, enter any two characters, then press **Enter**.

5) At the **Server>** prompt, obtain supervisor status:

   ▷ Server> su

   ▷ Password> system

   ▷ Server>>

   where **system** is the default privileged password.

6) When finished, log out of the printer server:

   ▷ Server>> logout

Configuring Specific Netware Parameters

IMPORTANT: This section contains advanced features. All parameters should be configured by the Network Administrator.

Add NetWare Password to Printer Server

When defining a password on the NetWare file server, the password must be entered in the printer server.

1) Log in to the printer server with supervisor privilege.
2) Enter:
   - ▷ Server>> change server netware ipx password
3) When prompted for the password, enter the eight-character NetWare file server password defined in **PCONSOLE**.

Define the Preferred Novell Netware File Server

Upon power up, the Emulex printer server normally does a broadcast to find the first available file server for configuration information. In a large network this may create unnecessary traffic and take some time. Use the following to specify a direct attachment to the Novell file server node that contains the bindery information:

1) Log in to the printer server with supervisor privilege.
2) Enter:
   - ▷ Server>>define node **node_name** nfserver

   where **node_name** is the preferred NetWare file server node name.
3) Enter:
   - ▷ Server>> sync
   - ▷ Server>> sync

   before turning power to the printer server off and on.

What's Next?

Upon successful configuration of your network operating system, you can either configure for another NOS or manage your Emulex printer server with NETWizard. Refer to the following checklist.

Configure For Your NOS

Choose one or more operating systems.

- ❑ Novell NetWare - pg. 3-1
- ❑ Unix - pg. 4-1
- ❑ AppleTalk - pg. 5-1
- ❑ VAX/VMS-LAT - pg. 6-1
- ❑ DOS LAN Manager/T - pg. 7-1
- ❑ OS/2 LAN Server - pg. 8-1
- ❑ Windows NT 3.5 - pg. 9-1

Manage With NETWizard

Refer to NETWizard Printer Server Management Guide.

- ❑ Load software.- pg. 2-2
- ❑ Choose protocol - pg. 2-2
- ❑ Manage printer server - pg. 2-4

UNIX TCP/IP

Chapter 4

Requirements

Before beginning, make sure the network conforms to these requirements:

- Clients must support **TCP/IP, TELNET, UDP** or **lpd**.
- Optional load hosts require **TFTP, RARP** or **BootP** protocols.
- An EMLX subdirectory must be created. All work is done in the EMLX subdirectory.

At this writing, the Enstall program supports installation of host utilities for the following operating environments:

- AT&T SYSTEM V Rel. 3.2, 4.0 *
- BULL B.O.S UNIX Rel. 2.00
- Data General DGux Rel. 5.4.1
- DEC Alpha axp150 OSF/1 Rel. 2.0
- Hewlett Packard HP-UX Rel. 8.05 & 9.0
- IBM AIX Rel. 1.0, 3.1, 3.2.5 , 4.1 *
- ICL SYSTEM V Rel. 4.0
- INTERACTIVE UNIX System V/386 Rel. 3.2
- Motorola System V Rel. 3.2 # (R32V3)
- SCO UNIX Rel. 3.2 *
- Sequoia SVR #3.2
- SOLARIS 1.1, 2.2, 2.3 *
- SUN OS Rel. 4.0, 4.1, #4.1.1, #4.1.3 *
- TADPOLE TPIX System V Rel. 3.2
- Tandem Rel. A21 NonStop-UX
- ULTRIX-32 Rel. 3.0, 4.0, 4.3
- Unisys S V Rel 3.00, 3.2.0
- USL (Unixware) SystemV Rel 4.2

* Pre-compiled binaries for these system types are included on the distribution media, the distribution files do not need to be compiled during Enstall.

NOTE: Check the file entitled ***release.notes*** *on the UNIX Utilities diskette for the latest program changes and other files.*

Before Installation

We recommend writing down the following parameters from the Setup section of this guide. You will refer to them during the installation procedure.

Default Server Name: ____ ____ ____ ____ ____ ____ ____ ____ ____

IP Address: ___ ___ ___-___ ___ ___ -___ ___ ___-___ ___ ___

Subnet Mask: ___ ___ ___-___ ___ ___ -___ ___ ___-___ ___ ___

TCP port _____(parallel port), TCP port _____ (parallel port)

TCP port _____ (serial port), TCP port _____ (serial port)

Telnet port number _____

RCF port number _____

Have the Unix Utilities diskette ready for automatic installation.

Automatic Installation

Emulex recommends running the **Enstall** utility. It is easy to use and will shorten the printer server installation process, as well as the time required to modify a UNIX TCP/IP network to use the printer server.

The **Enstall** utility does the following:

1) Analyze Host Configuration

2) If a "C" compiler is not available and the UNIX platform is hardware and software compatible, for the precompiled binaries supplied, then **Enstall** can extract the executable host utility binary files from the disk and install them on the user's system.

3) Choose Compilation Portability Options

   - **Enabled**

     To port the compiled binary executable files to identical hosts on which a "C" compiler is not supported.

   - **Disabled**

     Used when compiled binary files are not ported.

4) Install Remote Printer Interface (RPRINT)

   - Installation of the Emulex rprint utility program (RPRINT)

5) Build Remote Console Facility (TELRCF)

   - Building server Remote Console Facility interface program (TELRCF)

6) Identify Emulex printer server

7) Assign Internet Address (IP Address)

   - Consult **/etc/hosts** file to obtain an unused IP address. Specify printer server IP address in decimal dot notation: ***d.d.d.d*** The 'd' is a decimal number between 0 and 255 without leading zeros. Each number is separated from the next by a dot (.).

8) Identify LAN Hardware Address

   - The LAN hardware address must be entered in the **xxxxxxxxxxxx** form without dashes. The 'x' is a hexadecimal digit [0-9,a-f]. An example of a LAN hardware address is **0000c9010a64.**

9) Install Printer on printer server

   - Select Printer Interface
   - Assign Printer Name
   - Configuring a Serial Printer
   - Configuring a Remote Parallel Printer
   - Print Test File
   - Print Banner Page

10) Updates host spooler

Loading the Unix Utility Diskette

1) Load the UNIX Utility diskette into a 3.5 floppy disk drive. At the system prompt, log on as **root** and enter:

   ▷ tar xvf ***device_name*** . /emlx

   For example:

   ▷ tar xvf /dev/fd0 . /emlx

   This creates a subdirectory called emlx under the current working directory and copies the UNIX utilities into it.

2) Go to the **emlx** directory:

   ▷ cd emlx

3) Start the **Enstall** program as the root user and be in the **emlx** working directory to have the enstall script execute. Enter:

   ▷ enstall -s

   Follow the instructions and supply the requested information. When the **Enstall** program is complete, the Emulex printer server is ready for use on a UNIX TCP/IP network

Manual Installation

IMPORTANT: This section contains advanced features. All parameters should be configured by the Network Administrator. Emulex recommends running the ***Enstall*** *program instead of performing a manual installation.*

To manually install UNIX to use the printer server:

- Assign the IP address using ARP/Ping or RARP
- Configure the print queue environment

Assigning the IP Address Using ARP,BOOTP or RARP

NOTE: ARP/Ping and RARP procedures do not alter the subnet mask. If the assigned subnet mask is different from the default, log on to the printer server and change the subnet mask as described in the Appendix: Configuring Printer Server Parameters.

Using ARP

This method offers a convenient means of assigning the printer server's initial IP address. The IP address assigned with this method is stored in the printer server's permanent memory, as well as in RAM. Although the ARP command is standard on all UNIX platforms, its syntax may vary from one system to another.

Note:This method cannot be used to change a printer server's existing IP address. To change an exisiting IP address, log on to the printer server using telnet, enter the "define server IP ddd.ddd.ddd.ddd" command and then reboot the printer server.

1) Log in to the UNIX host as root user.
2) Make sure the desired IP address does not already exist. From the UNIX prompt enter:

   ▷ ping ***ddd.ddd.ddd.ddd***

   where ***ddd.ddd.ddd.ddd*** is the desired IP address in decimal dot notation. No response should be received. If a response is received, check with the network administrator to select another IP address.

   Issue the ARP command to assign the IP address. On most UNIX platforms the syntax is:

   ▷ arp -s ***ddd.ddd.ddd.ddd xx:xx:xx:xx:xx:xx***

   where ***ddd.ddd.ddd.ddd*** is the printer server's IP address in decimal dot notation, and ***xx:xx:xx:xx:xx:xx*** is the printer server's MAC address in hexadecimal [0-9,a-f] notation. For example:

   ▷ arp -s 138.239.252.183 0:0:c9:0:c1:a9

IMPORTANT: Do not use leading zeroes in the IP address or MAC address.

On an AIX system, include an additional argument to the ARP command to indicate the Ethernet interface:

▷ arp -s ether ***ddd.ddd.ddd.ddd. xx:xx:xx:xx:xx:xx***

On other systems, such as AT&T System V, the ARP command is:

▷ arpbypass -f1 set ***ddd.ddd.ddd.ddd 0xnn.0xnn.0xnn.0xnn.0xnn.0xnn***

where **n** represents hexadecimal digits.

3) Initialize the printer server by powering it off and on.

4) From the UNIX prompt enter:

▷ ping ***ddd.ddd.ddd.ddd***

The command interrupt key (usually **Ctrl-C**) will stop the ping command.

The printer server wrote the IP address in permanent and ram memory.

5) Optionally, to equate the printer server's IP address with a symbolic name, log in to the host and edit the file /etc/hosts (or /usr/etc/hosts) by adding a line describing the server_node_name, such as:

▷ **138.239.252.183 accounting_printer**

where **138.239.252.183** is the IP address just assigned, and **accounting_printer** is the symbolic name describing the server_node_name.

NOTE: If the /etc/hosts file is administered by NIS (formerly Yellow Pages), update the appropriate NIS master hosts database instead. Refer to host documentation for more information.

Using BOOTP

Emulex printer servers will accept and configure the following parameters from a TCP/IP Bootp Server host:

- Server IP address

- Server Subnet Mask
- Server Loadfile Path and Name
- Host IP Address
- Host IP Address
- Gateway IP address(es)
- time Server IP adress(es)
- Domain Name Server IP address(es)
- Server Node Name
- Server Domain Name

Any other BootP parameters supplied by a bootp server host will be ignored by the srver code without any error indication.

1) Determine if BootP is running on the host by entering:

   For BSD:

   ▷ ps -ax | grep bootp

   For System V:

   ▷ ps -e | grep bootp

   If BootP is defined for background operation, an active BootP daemon is displayed. If an active BootP daemon is not listed, enter:

   ▷ grep bootp/directory/inetd.conf

   where directory may be:

- /etc/*
- /usr/etc/*

   If a BootP is present, it will be listed with its parameters.

2) Enter server command:

   ▷ define server bootp **n m [temp]**

   where **n** is the number of times to request bootp information if the server IP address is not known (default = 2), **m** is the number of times to request BootP information if the server IP address is known (default = 1), and **temp** instructs the server to configure the acquired information in

RAM only. If this parameter is omitted, the information is made permanent by writing in EAROM. (default is permanent)

Using RARP

1) Determine if RARP is running on the host by entering:

   For BSD:

   ▷ ps -ax | grep -v grep | grep rarpd

   For System V:

   ▷ ps -ef | grep -v grep | grep rarpd

2) Edit the file, /etc/ethers or /usr/etc/ethers, by adding a line describing the server as follows:

   ▷ ***xx:xx:xx:xx:xx:xx server_node_name***

   where ***xx:xx:xx:xx:xx:xx*** is the printer server;s MAC address, and ***server_node_name*** is the symbolic name. For example,

   ▷ **0:0:c9:0:c1:a9 accounting_printer**

3) Edit the file /etc/hosts (or usr/etc/hosts) by adding a line describing the server as follows:

   ▷ ***ddd.ddd.ddd.ddd server_node_name***

   ▷ where ***ddd.ddd.ddd.ddd*** is the printer server's IP address. The ***server_node_name*** must match the name entered in the **/etc/ethers** file.

   *NOTE: If the **/etc/hosts** file is administered by NIS (formerly Yellow Pages), update the appropriate NIS master hosts database instead. Refer to host documentation for more information.*

4) When the printer server is booted, the host receives the RARP request from the printer server. It then sends the IP address in the /etc/hosts file to the printer server and stores it in RAM only.

Directly From Printer Server

To specify a new IP Address directly from the printer server, log in to the printer server, then enter the appropriate printer server commands. For more

information, see the sections in this chapter entitled ***Logging in to the printer server*** and in the ***Appendix: Configuring Printer Server Parameters.***

Configuring the Print Queue

The printer server provides remote printing via the Emulex **rprint** utility on all systems, and **lpd** on some platforms. **Enstall** automatically installs **rprint** and optionally supports **lpd**.

Rprint is a UNIX program that may be run from a print spooler, or invoked as a stand-alone module. The program takes data from standard input, connects to a server, and transmits the data. Various features and options make **rprint** well-suited to most printing applications. These include:

- Compatibility with BSD and System V hosts. **rprint** uses either the BSD sockets library or the System V Transport Level Interface (TLI).
- Log files automatically generated for ease in troubleshooting.
- Binary or Text data. Selection can be made from the command line or through an entry in the **printcap** file.
- Printer filters that may be called before the data is sent to the printer server.

The method for installing and configuring **rprint** is different for BSD and System V hosts. Choose the appropriate procedure for each system:

Configuring rprint for BSD Hosts

To configure a BSD host with **rprint**, initiate a print job:

1) Copy the Emulex utility **RPRINT.C** from the UNIX utilities diskette to a host system and change to the subdirectory where it is loaded (for example, **/usr/emlx).**
2) Edit the file **environ.h** to reflect the appropriate system type. The following are typical system parameters for Sun SparcStations:
   - ▷ #define SOCK 1
   - ▷ #define SYSV 0
   - ▷ #define LING 1
   - ▷ #define ROBUST 1
3) Compile and link **RPRINT.C** by entering:

RAM only. If this parameter is omitted, the information is made permanent by writing in EAROM. (default is permanent)

Using RARP

1) Determine if RARP is running on the host by entering:

   For BSD:

   ▷ ps -ax | grep -v grep | grep rarpd

   For System V:

   ▷ ps -ef | grep -v grep | grep rarpd

2) Edit the file, /etc/ethers or /usr/etc/ethers, by adding a line describing the server as follows:

   ▷ ***xx:xx:xx:xx:xx:xx server_node_name***

   where ***xx:xx:xx:xx:xx:xx*** is the printer server;s MAC address, and ***server_node_name*** is the symbolic name. For example,

   ▷ **0:0:c9:0:c1:a9 accounting_printer**

3) Edit the file /etc/hosts (or usr/etc/hosts) by adding a line describing the server as follows:

   ▷ ***ddd.ddd.ddd.ddd server_node_name***

   ▷ where ***ddd.ddd.ddd.ddd*** is the printer server's IP address. The ***server_node_name*** must match the name entered in the **/etc/ethers** file.

   *NOTE: If the **/etc/hosts** file is administered by NIS (formerly Yellow Pages), update the appropriate NIS master hosts database instead. Refer to host documentation for more information.*

4) When the printer server is booted, the host receives the RARP request from the printer server. It then sends the IP address in the /etc/hosts file to the printer server and stores it in RAM only.

Directly From Printer Server

To specify a new IP Address directly from the printer server, log in to the printer server, then enter the appropriate printer server commands. For more

information, see the sections in this chapter entitled ***Logging in to the printer server*** and in the ***Appendix: Configuring Printer Server Parameters.***

Configuring the Print Queue

The printer server provides remote printing via the Emulex **rprint** utility on all systems, and **lpd** on some platforms. **Enstall** automatically installs **rprint** and optionally supports **lpd**.

Rprint is a UNIX program that may be run from a print spooler, or invoked as a stand-alone module. The program takes data from standard input, connects to a server, and transmits the data. Various features and options make **rprint** well-suited to most printing applications. These include:

- Compatibility with BSD and System V hosts. **rprint** uses either the BSD sockets library or the System V Transport Level Interface (TLI).
- Log files automatically generated for ease in troubleshooting.
- Binary or Text data. Selection can be made from the command line or through an entry in the **printcap** file.
- Printer filters that may be called before the data is sent to the printer server.

The method for installing and configuring **rprint** is different for BSD and System V hosts. Choose the appropriate procedure for each system:

Configuring rprint for BSD Hosts

To configure a BSD host with **rprint**, initiate a print job:

1) Copy the Emulex utility **RPRINT.C** from the UNIX utilities diskette to a host system and change to the subdirectory where it is loaded (for example, **/usr/emlx).**
2) Edit the file **environ.h** to reflect the appropriate system type. The following are typical system parameters for Sun SparcStations:
   - ▷ #define SOCK 1
   - ▷ #define SYSV 0
   - ▷ #define LING 1
   - ▷ #define ROBUST 1
3) Compile and link **RPRINT.C** by entering:

- ▷ cc rprint.c -o rprint

> ***NOTE:*** *The compile command can vary greatly on different systems. If the compile command fails, check your host documentation for the correct syntax and libraries to include for SOCKETs programming.*

4) Create a dummy device file for the remote printer with the following commands:

   - ▷ mknod /dev/*printer_name* c 3 2
   - ▷ chown daemon /dev/*printer_name*
   - ▷ chmod 666 /dev/*printer_name*

> ***NOTE:*** *Some systems may also require a chgrp command. Refer to your system manual for more information. Also note that the major and minor numbers used in the mknod command may be different. Check for the major and minor numbers in the /dev/null file and use those.*

5) Create the directory for the spooled files. For example:

   - ▷ mkdir /usr/spool/*printer_name*
   - ▷ chown daemon /usr/spool/*printer_name*
   - ▷ chmod 755 /usr/spool/*printer_name*

6) Edit **/etc/printcap** to add an entry for the printer server printer. For example, the following entry defines a LaserJet IIIsi printer named emlx_ps with the Postscript option:

   - ▷ emlx_ps|LaserJet_IIIsi|parallel _port:\
   - ▷ :lp=/dev/emlx_ps:\ (dummy device name)
   - ▷ :sd=/usr/spool/emlx_ps:\ (dir for spooled files)
   - ▷ :of=/usr/emlx/rprint:\ (rprint program)
   - ▷ :emlx_n=ddd.ddd.ddd.ddd:\ (server IP address)

- ▷ :mx#0:\ (unlimited buffer space)
- ▷ :sh:\ (suppress burst pg headersheet)
- ▷ :sf:\ (suppress form feeds)
- ▷ :emlx_text=disable:\ (required for non-text files)
- ▷ :emlx_p=250: (TCP port number)

7) Initialize the new spool device by using the name in the printcap file. For example:

   - ▷ lpc start emlx_ps

8) Print a test file using a command similar to the following:

   - ▷ lpr -Pemlx_ps ***postscript_filename***

Configure a System V host to initiate a print job by:

1) Copying the Emulex utility RPRINT.C from the **UNIX utilities** diskette to the host system, then change to the subdirectory where it's loaded (for example, **/usr/emlx**).

2) Edit the file **environ.h** for the appropriate system type. The following are typical system parameters for a generic System V system:

   - ▷ #define SOCK 1 (0, if sockets are not supported)
   - ▷ #define SYSV 1
   - ▷ #define LING 1
   - ▷ #define ROBUST 1
   - ▷ #define PRINTCAP "/usr/emlx/printcap"

3) Compile and link **RPRINT.C** as follows:

   If sockets are available, enter:

   - ▷ cc rprint.c -o rprint -lsocket

   If sockets are not available, enter:

   - ▷ cc rprint.c -o rprint -lnsl_s

NOTE: Compile commands will vary on different UNIX systems. Some will not require libraries on the command string. Others will require one or more libraries on the compile command.

TYPICAL LIBRARIES TO USE ARE:
-lsocket
-lnsl_s (System V Rel 3.X)
-lnsl (System V Rel 4.X)
-lnet

4) Edit the **/usr/emlx/printcap** file to include an entry for the printer server printer(s). For example, the following entry defines a LaserJet IIIsi printer named emlx_txt on the parallel port (port 1, TCP port 2501):

```
▷ emlx_txt | LJIII_1 | LaserJetIIIsi:\
▷ :lp=emlx_txt:\                    (dummy device name)
▷ :emlx_n=ddd.ddd.ddd.ddd:\         (server IP addr.)
▷ :emlx_p= 2501:                    (TCP port number)
```

The following is an example for a Postscript printer named emlx_ps.

```
▷ emlx_ps | LJIII_1 | LaserJetIIIsi:\
▷ :lp=emlx_ps:\                     (dummy device name)
▷ :emlx_n=ddd.ddd.ddd.ddd:\         (server IP addr.)
▷ :emlx_txt=disable:\
▷ :emlx_p= 2501:                    (TCP port number)
```

5) Edit the printer interface script file. First, copy the sample Emulex printer interface file, **lp_dumb**, to another file that corresponds to the selected printer name. For example:

```
▷ cp lp_dumb lp_emlx
```

6) Edit the **lp_emlx** file to specify the correct path to the **rprint** program. Assuming the **rprint** program is kept in **/usr/emlx**, enter the second to the last line of the **lp_ emlx** file as follows:
(shell commands)

```
▷ /usr/emlx/rprint `basename $0` $1        exit status
```

Using UNIX bourne shell script programming, edit the **lp_emlx** file and modify the banner page that precedes the printed output.

7) Install the printer into the System V spooler system. Most System V spoolers do not require shutting down the spooler to install a printer, an exception being HPUX.

*Note:For HPUX, before shutting down the spooling system, check to see that there are no print jobs running (enter **lpstat -o**). If jobs are running, wait until they are completed. Then, enter the following:*

- /usr/lib/lpshut (HPUX only)
- /usr/lib/lpadmin -pemlx -v/dev/null -i/usr/emlx/lp_emlx
- /usr/lib/lpsched (HPUX only)
- /usr/lib/accept emlx
- enable emlx

Some systems require that the second line use the string:

- -v/dev/emlx

8) To make the printer the default system printer, enter:

- /usr/lib/lpadmin -demlx

9) Test the printer spooler operation by entering:

- lp -demlx ***file_name***

If the host is configured correctly, a banner page (if enabled) and the contents of the ***file_name*** will be printed. If the test fails, refer to a UNIX system administration manual for information on printer spooler operation.

Installing Manual Pages for rprint

Detailed technical information on **rprint** is provided on the distribution diskette as manual_pages (**rprint.1** and **rprintv.1**). If the host supports MANPAGES, **Enstall** will offer to install them.

To choose manual installation, use the following steps to install the manual_pages:

1) Locate the MANPAGES source directory on the host. This is usually a subdirectory of **/usr/man.**

2) Copy the file **rprint.1** or **rprintv.1** from the directory containing the printer server files (e.g., **/usr/emlx**) to the MANPAGES directory.

3) To read the file at the host system prompt enter:

   ▷ man rprint

NOTE: The man pages are in NROFF format.

LPD

The printer server implementation of **lpd** has the following limitation:

In most cases, local print options such as header and trailer banner pages, and input or output filters are ignored.

If this limitation is NOT acceptable, install the printer using the Emulex **rprint** remote printing utility.

Configuring LPD on a BSD UNIX Host

The following procedure uses native **lpd** print protocol on a BSD UNIX host (SunOS or ULTRIX) with the printer server. The procedure for other UNIX systems such as Solaris, AIX or SCO is completely different (See UNIX documentation for details).

Important: This procedure assumes you want to print to a single port using the LPD protocol. See Appendix for printing to multiple ports using the LPD protocol.

First, determine if **lpd** is supported on the system by entering:

   ▷ ps -ax | grep -v grep | grep lpd

If the system does not return a process number for **lpd**, use **rprint** as described above.

If LPD is supported, proceed as follows:

1) On the host, edit the **/etc/printcap** file to contain an entry similar to the following:

   For sending text (non-PostScript) files to port 1:

   - LJ4_PCL|HP_LaserJet_4|port_1:\
   - :lp=:\
   - :rm=*node_name*:\
   - :rp=TEXT:\
   - :mx#0:\
   - :lf=/usr/spool/lpd/ERRORLOG:\
   - :sd=/usr/spool/lpd/LJ4_PCL:

   For sending PostScript or graphics files to port 1:

   - LJ4_PS|HP_LaserJet_4|port_1:\
   - :lp=:\
   - :rm=*node_name*:\
   - :rp=PASSTHRU:\
   - :mx#0:\
   - :lf=/usr/spool/lpd/ERRORLOG:\
   - :sd=/usr/spool/lpd/LJ4_PS:

   where LJ4_PCL and LJ4_PS are the example printer names. Valid default queue names are:

TEXT	Adds a carriage return after each linefeed in the file. Use this queue for standard UNIX text.
PASSTHRU	Passes the file directly to the printer without modification. Use this queue for all non-text files

NOTE: Do not use the TEXT queue for Postscript, HPGL or any non-text files.

2) Create the spooling directory. For example:

   ▷ mkdir /usr/spool/lpd/LJ4_PCL

3) Add the server's node_name to the **/etc/hosts** file. For example:

   ▷ ***ddd.ddd.ddd.ddd. node_name***

4) where ***ddd.ddd.ddd.ddd*** is the printer server IP address in decimal dot notation. Be sure the ***node_name*** is the same entered in the **/etc/printcap** file in Step 1.

5) Start the printer queue by entering:

   ▷ lpc start ***printer_name***

6) To print via the spooler, use the command:

   ▷ lpr -***Pprinter_name file_name***

   where ***printer_name*** is the remote printer queue name and ***file_name*** is any text file name.

Configuring LPD for Non-UNIX Hosts

Many non-UNIX hosts using TCP/IP support printing via the **lpd** protocol. Refer to the hosts TCP/IP documentation to configure printers using **lpd**. General requirements to configure the printer server are:

1) The IP address of the printer server
2) The remote queue (printer) name is needed.
3) **TEXT** and **PASSTHRU** as the printer server's default queue names
4) Either default TCP or acceptable TCP ports are needed as per host environment requirements.

LPSTAT

To determine the current status of a printer connected to the printer server, issue the following command from any host terminal:

▷ lpstat -o ***printer_name***

where ***printer_name*** is user defined.

The screen displays the number of jobs in the queue and a line for each job, listing the job name and origination. For example:

▷ lpstat -o emlx _txt

There are 3 jobs for emlx:

nq001 from host king - printing

nq002 from host queen

nq003 from host king

If there are no jobs in the queue, the command returns a blank line.

Logging into the Printer Server

You can log into the printer server remotely from a UNIX workstation or locally from a console terminal. These methods are described below.

Remote Login

1) Log on to a UNIX TCP/IP workstation. The prompt may appear different than the one shown below.

2) At the # prompt, connect to the printer server by entering:

   ▷ # telnet ***ddd.ddd.ddd.ddd*** 2048

   where ***ddd.ddd.ddd.ddd*** is the printer server IP address in decimal dot notation, and **2048** is the default printer server RCF port.

   NOTE: Printer server parameters may be changed. After logging in, change the passwords. See ***Appendix.***

   ---

3) When the **#** prompt appears, enter the password:

   ▷ # access

   where **access** is the default printer server remote login password.

   NOTE: The password does not appear when typed.

   ---

4) When the connection is made, the printer server login banner is displayed, similar to the one shown.

```
- NetWare/TCP/LAT Printer Server ----------
Copyright 1988, 1989, 1990, 1992 EMULEX Corp.
All Rights Reserved.
Use of this product is subject to a software license
------------------------------current date and time
Welcome to printer server
Enter Username or Help>
Local>
```

5) At Local>, enter **su** to obtain supervisor status. Then enter **system** at Password>

   ▷ Local> su

   ▷ Password> system

   ▷ Local>

   where **system** is the default privileged password, which does not echo back.

6) When finished, log out of the printer server.

   ▷ Local> logout

Local Login

1) Connect a console terminal to the printer server serial or console port. Emulex recommends using a VT100-compatible terminal set for 9600 bps, 8 data bits, no parity, and 1 stop bit.

2) Press **Esc** twice to initiate communication between the console terminal and the printer server serial port.

3) When the connection is made, the printer server login banner is displayed, similar to the one shown:

```
- NetWare/TCP/LAT Printer Server ---------
Copyright 1988, 1989, 1990, 1992 EMULEX Corp.
All Rights Reserved.
Use of this product is subject to a software license
-------------------------------current date and time
Welcome to printer server
Enter Username or Help>
Server>
```

NOTE: The line Enter Username or Help> requires an alphanumeric character string.

4) At **Server>,** enter **su** to obtain supervisor status. Then enter **system** at **Password>**

   ▷ Server> su

   ▷ Password> system

   ▷ Server>>

   where **system** is the default privileged password which does not echo back.

5) At the **Server>>** prompt, enter printer server commands described in the ***Appendix*** in the section ***Configuring Printer Server Parameters.***

6) When finished, log out of the printer server:

   ▷ Server>> logout

Troubleshooting

While running a TCP/IP network, or if problems occur only for TCP/IP nodes, check the following:

1) Log on to the printer server and enter:

   ▷ Server>> show server tcp

   Make a note of the IP address and server name.

2) If using **lpd**, verify that the correct server node name (i.e., **default printer server name**) and the IP address are entered in the **/etc/hosts** file.

3) If printing from a BSD host, examine the **/etc/printcap** file.

   – If using **rprint**, verify the printer name, IP address, and TCP port number are correct.

   – If using **lpd**, verify the correct printer name, server name, and queue name are entered. Also verify the server node name matches the name entered in the **/etc/hosts** file. Ensure the correct queue for the type of file being printed is used. **PASSTHRU** for Postscript or binary files and **TEXT** for ASCII files. Both are case sensitive.

4) If using the **rprint** utility, error events are written to a default log file named:

   ▷ /tmp/rpn[pid].log

   where **[pid]** is a process number.

   If errors are not reported or if the error log doesn't exist, issue the BSD command **lpc**, or the System V command **lpstat -t,** to display the printer status.

5) If the file does not print after issuing the BSD command **lpr** or the System V command **lp**:

   – Check the printer port configuration and port state. Before printing, the port must be idle.

   – Log in to the printer server and enter:

     ▷ Server>>test **port n**

where **n** is the printer port. The 23-line ASCII test pattern should be printed.

- If the test pattern doesn't print using the above command, enter:

  ▷ Server>>show **port n**

  to verify that the port parameters are properly configured.

- If the test pattern above prints correctly, check the host configuration and examine the file **/tmp/rpn[pid].log** for error messages. If the file does not exist, enter:

  ▷ Server>>cat filenamel /usr/emlx/bin/rprint ***printer_name*** job=1 -ld

- Verify that permissions are set correctly. Ensure that queue and printer names match in the appropriate files.

6) Log file contains "no printcap entry for the printer".

   - Verify the printcap file exists and that its path is correct in the log file.
   - Verify the printer name in the printcap file.
   - Delete the printer and re-install it using **Enstall**.

7) Log file **/tmp/rpn[pid].log** contains an entry **waiting for lock**.

   - If multiple printers are defined for a single host, check the device file attributes for each printer. They should be similar to the following:

     First printer:

     ▷ crw-rw-rw- owner size date /dev/ emlx1

     Second printer:

     ▷ crw-rw-rw- owner size date /dev/ emlx2

8) Log file **/tmp/rpn[pid].log** contains an entry **snoozing.**

   - Verify the server is running and the appropriate IP address is assigned. Log on to the printer server and enter:

     ▷ Server>> show server tcp

     to check the address.

   - Verify the entry **emlx_p=xxxx** in the printcap file matches the service TCP port number on the server. Enter:

▷ Server>> show service local char

to check the service TCP port number.

– Verify that the printer service is configured with Telnet disabled, and TCP port number between 2500 and 5000.

Enter:

▷ Server>> show queue

to see if connection entries exist for the printer. Remove any entries by entering:

▷ Server>> remove queue all

Log out the printer port and try printing again.

What's Next?

Upon successful configuration of your network operating system, you can either configure for another NOS or manage your Emulex printer server with NETWizard. Refer to the following checklist.

Choose another NOS

- ❑ Unix - pg. 4-1
- ❑ AppleTalk - pg. 5-1
- ❑ VAX/VMS-LAT - pg. 6-1
- ❑ DOS LAN Manager/T - pg. 7-1
- ❑ OS/2 LAN Server - pg. 8-1
- ❑ Windows NT 3.5 - pg. 9-1

Manage with NETWizard (refer to NETWizard Printer Server Management Guide)

- ❑ Load software.- pg. 7
- ❑ Choose protocol - pg. 8
- ❑ Manage printer server - pg. 16

VAX/VMS DECnet LAT

Chapter 5

Requirements

Before beginning, make sure the network adheres to these requirements:

Clients must support the LAT protocol under the VAX/VMS (version 4.5 or greater) or ULTRIX 32 operating systems.

Vax/VMS is not supported on the NetQueMate or NetQue Token Ring printer servers.

Before Installation

We recommend writing down the following parameters from the Setup section of this guide. You will refer to them within the installation procedure.

Default Server Name: _____ _____ _____ _____ _____ _____ _____ _____ _____

Circuit ID number _____

Port_n _____(parallel port) Port_n_____ (parallel port)

Port_n _____ (serial port) Port_n _____ (serial port)

RCF port number _____

Setting Up Printer Queues

The following is an example that can be used to set up each printer queue on the host. The actual commands will vary according to system configuration, type of printer, and application requirements.

1) To set up a printer queue and a VMS application port, enter:

   - $ run sys$system:latcp
   - LATCP> create port lta901: /log
   - LATCP> set port lta901: /application/node=**default printer server name** /port=**PORT_n**
   - LATCP> exit

   The **default printer server name** can be found at the beginning of this chapter, or in the setup section in this guide. **PORT_n** is the printer server parallel or serial port, either 1, 2, or 3. Be sure to match the case (upper/lower) of the node and port names.

2) To set up the terminal parameters, enter:

   ▷ $ set terminal lta901: /perm /device=unknown/width=80 /page=66 /lowercase /nobroadcast /passthru /passall /nowrap

   ▷ $ set protection= (s:rwlp, o, g, w:rwlp) /device lta901:

   ▷ $ set device lta901: /spooled=(queue_name, sys$sysdevice:)

   To initialize each printer queue for text documents enter:

   ▷ $ initialize /queue /start /processor=latsym/retain=error /on= lta901: /default=(noburst, flag=one, notrailer) /record_blocking queue_name

   To initialize each printer queue for PostScript documents enter:

   ▷ $ initialize /queue /start /processor=latsym/retain=error /on= lta901: /default=(noburst, noflag, nofeed) /record_blocking queue_name/separate(reset=reset)

Logging into the Printer Server

You can log into the printer server remotely from a DEC workstation using the VAX NCP utility or locally from a console terminal. These methods are described below.

Remote Login

1) Login to the DEC workstation.
2) Run the VAX NCP utility:

   ▷ $ run sys$system:NCP

3) When the NCP prompt appears, connect to the printer server RCF port:

   ▷ NCP> connect via QNA-0 physical address 00-00-c9-xx-xx-xx

   where **QNA-0** is the circuit ID, and **00-00-c9-xx-xx-xx** is the printer server's Ethernet (MAC) address.

   To see the available circuit IDs, enter:

   ▷ show known circuit

4) When the following message appears, press **Enter** to proceed:

   ▷ Console connected (Ctrl-D when finished)

5) When the # prompt appears, enter the password:

   ▷ **# access**

   where **access** is the default remote login password.

> ***NOTE:*** *The password does not appear when typed.*

When the connection is made, the printer server login banner is displayed.

```
- NetWare/TCP/LAT Printer Server ----------
Copyright 1988, 1989, 1990, 1992 EMULEX Corp.
All Rights Reserved.
Use of this product is subject to a software license
----------date and time
Welcome
Enter Username or Help>
Local>
```

6) At the **Enter Username or Help>** prompt, enter any two characters, then press **Enter**.

7) At the **Local>** prompt, obtain supervisor status:

   ▷ Local> su

   ▷ Password> system

   ▷ Local>

   where **system** is the default privileged password.

8) At the **Local>** prompt, you may enter printer server commands as needed. These are described in the ***Appendix***.

9) When finished, log out of the printer server:

   ▷ Local> logout

Local Login

1) Connect a console terminal to the printer server serial or console port. Emulex recommends using a VT100-compatible terminal set for 9600 bps, 8 data bits, no parity, and 1 stop bit.
2) Press **Esc** twice to initiate communication between the console terminal and the printer server serial port.
3) When the connection is made, the printer server login banner is displayed, similar to the one shown.

```
-----NetWare/TCP/LAT Printer Server ---------
Copyright 1988, 1989, 1990, 1992 EMULEX Corp.
All Rights Reserved.
Use of this product is subject to a software license
----------------------------------------------date and time
Welcome
Enter Username or Help>
Server>
```

4) At the **Enter Username or Help>** prompt, enter any two characters, then press Enter.
5) At the **Server>** prompt, obtain supervisor status:
   - ▷ Server> su
   - ▷ Password> system
   - ▷ Server>>

   where **system** is the default privileged password.
6) At the **Server>>** prompt, you may enter printer server commands as needed. These are described in the Appendix.
7) When finished, log out of the printer server:
   - ▷ Server>> logout

Troubleshooting

> *NOTE: This section contains advanced features. Printer server troubleshooting should be performed by network personnel.*

If on a VAX/VMS network, or if problems occur only for VAX/VMS nodes, first make sure that the queue was set up and is running. Some common symptoms and suggested solutions are listed below.

Print Queue Pauses

If the print queue pauses immediately after the PRINT/QUEUE Command, this indicates the LTA port cannot connect to the server. Check the following:

1) From the VMS terminal enter:
   - ▷ $ run sys$system:latcp
   - ▷ LCP> show port lta (get node & port name)
   - ▷ LCP> show characteristics (get group codes)
   - ▷ LCP> exit
2) From the printer server terminal enter:
   - ▷ Server> show port (get port name and access)
   - ▷ Server> show port lat (get group codes)
   - ▷ Server> show server net (get server name)
   - ▷ Server> show service **service_name** char (verify; only if service defined in latcp.)
3) Verify the following information between the host and printer server:
   - – Server name matches LATCP node name.
   - – Port or service name match on server and LATCP.
   - – Port authorized group codes are included in LATCP group codes.
   - – Server port access is either dynamic or remote.

4) To change any of the printer server parameters, log on with supervisor privilege, enter the appropriate command and reset the printer server for the changes to take effect:

   - Server>> change port access **remote**
   - Server>> change port name **port_name**
   - Server>> change port **n** auth group **n_n**
   - Server>> define server name **default server name**

5) To change any of the LATCP parameters from the host, enter the following commands:

   - $ stop/queue/reset **queue_name**
   - $ set device **ltannn:** /nospool
   - $ run sys$system:latcp
   - LCP>delete port ltannn:
   - LCP>create port ltannn: /nolog
   - LCP>set port ltannn: /node= **default server name**/port=**PORT_n**
   - LCP>exit
   - $ copy/log sys$login:login.com ltannn:

6) If the copy is successful, the print queue can be created. If an error occurs, the port is not mapped to the server correctly. Repeat the procedure described above.

7) If changes were only made to the server, enter:

   - Server>> logout port **n**
   - $ stop/reset **queue_name**
   - $ start/queue **queue_name**

8) If the problem persists, call Emulex Technical Support as described in ***Chapter 10: Contacting Emulex.***

Printer Queue Stalls

The connection is queued because other host jobs are printing, or a flow condition or printer error exists. To correct this:

1) Verify the printer is on line and error free.
2) Check the server connection queue to determine if the desired print job is in the queue:

   ▷ Server>> show server queue

3) Enter:

   ▷ Server>> show port **n** status

   and examine the screen.

   - If **State** is not **connected**, call Emulex Technical Support.
   - Check **Printer Status** for errors. If **Ready**, the printer is working on another print job.

   For a printer connected to the serial port:

   - If **State** is not **idle** or **connected**, call Emulex Technical Support.
   - If **Input XOFFed** is **yes**, the server input buffer is full because of noise on the line, incorrect baud rate, etc.
   - If **Output XOFFed** is **yes**, the print buffer is full and has directed the server to stop transmitting. Reset the printer and try again.
   - If **DSRlogout** and **Signal Check** are enabled, and DSR does not appear in **Active Modem Controls**, check printer cable for correct wiring.

Printer Queue Stops

The printer port was logged out during the print request.

1) Be sure a privileged user did not log out the port.
2) Disable **DSRlogout** and **Signal Check** and retry.
3) If the problem persists, call Emulex Technical Support.

What's Next?

Upon successful configuration of your network operating system, you can either configure for another NOS or manage your Emulex printer server with NETWizard. Refer to the following checklist.

Configure For Your NOS

Choose one or more operating systems.

- ❑ Novell NetWare - pg. 3-1
- ❑ Unix - pg. 4-1
- ❑ AppleTalk - pg. 5-1
- ❑ VAX/VMS-LAT - pg. 6-1
- ❑ DOS LAN Manager/T - pg. 7-1
- ❑ OS/2 LAN Server - pg. 8-1
- ❑ Windows NT 3.5 - pg. 9-1

Manage With NETWizard

Refer to NETWizard Printer Server Management Guide.

- ❑ Load software.- pg. 2-2
- ❑ Choose protocol - pg. 2-2
- ❑ Manage printer server - pg. 2-4

AppleTalk

Chapter 6

Requirements

Before beginning, make sure the network conforms to these requirements:

- AppleTalk Phase 2
- System 6 or System 7
- LaserWriter driver 7.0 or newer.
- LaserWriter drivers 8.0 and GX are not supported.

> ***NOTE:*** *Some applications have functioned correctly with LaserWriter 8.0 drivers. However, that substitute is application dependent.*

Before Installation

We recommend writing down the following parameters from the setup section of this guide. You will refer to them within the AppleTalk installation procedure.

Default Server Name: ____ ____ ____ ____ ____ ____ ____ ____ ____

Default Printer Name: ____ ____ ____ ____ ____ ____ ____ ____ ____-___

IP Address: ___ ___ ___-___ ___ ___-___ ___ ___-___ ___ ___

Selecting the Printer Name from Chooser

The printer server's default configuration parameters support AppleTalk services for both printer ports. Connect the printer server to the network and printer. Power up the printer and printer server, then select the printer name:

1) Click on Chooser from the Apple menu.
2) Select the LaserWriter or LaserJet icon
3) Select the appropriate Zone, if available.
4) To define the printer name: enter the Emulex default printer server name combined with the Emulex printer server port number. The default printer server port is either 1, 2 or 3.
5) Close **Chooser** and return to the application to print the file.

Logging into the Printer Server

You can log into the printer server remotely from a UNIX workstation or locally from a console terminal. These methods are described below.

Remote Login

1) Log on to a TCP/IP workstation
2) Start the Telnet program. Go to the shell prompt.
3) At the Telnet program prompt, connect to the printer server by entering:

   ▷ telnet> open 138.239.254.254 2048

   where **138.239.254.254** is the default printer server IP address, and **2048** is the default printer server RCF port.

4) When the **#** prompt appears, enter the password:

   ▷ # access

   where **access** is the default printer server remote access password.

   When the connection is made, the printer server login banner is displayed.

```
--AppleTalk/NetWare/TCP/LAT Printer Server ----------
Copyright 1988, 1989, 1990, 1992 EMULEX Corp.
All Rights Reserved.
Use of this product is subject to a software license
----------current date and time
Welcome
Enter Username or Help>
Server>
```

5) At the **Enter Username** or **Help>** prompt, enter any two characters, then press **Enter**.
6) At the **Server>** prompt, obtain supervisor status:

   ▷ Server> su

   ▷ Password> system

▷ Server>>

where **system** is the default privileged password.

7) View/change AppleTalk parameters. When finished, log out of the printer server:

▷ Server> logout or lo

Local Login

1) Connect a console terminal to the printer server serial or console port. Emulex recommends using a VT100-compatible terminal set for 9600 bps, 8 data bits, no parity, and 1 stop bit.
2) Press Esc twice to initiate communication between the console terminal and the printer server serial port.
3) When the connection is made, the printer server login banner is displayed.

```
- AppleTalk/NetWare/TCP/LAT Printer Server ----------
Copyright 1988, 1989, 1990, 1992 EMULEX Corp.
All Rights Reserved.
Use of this product is subject to a software license
----------date and time
Welcome
Enter Username or Help>
```

4) At the **Enter Username or Help>** prompt, enter any two characters, then press **Enter**.
5) At **Server>**, enter **su** to obtain supervisor status. Then enter **system** at **Password>**

▷ Server> su

▷ Password> system

▷ Server>>

where **system** is the default privileged password which does not echo back.

6) At the **Server>>** prompt, view/change AppleTalk parameters.
7) When finished, log out of the printer server:

▷ Server>> logout

Configuring Specific AppleTalk Parameters

IMPORTANT: *This section contains advanced features. All parameters should be configured by the Network Administrator.*

1) Log in to the printer server with supervisor privilege.
2) Enter the following command:

   ▷ Server>> show server appletalk

   This command displays a screen containing information on the AppleTalk parameters. The following parameters **may be changed**:

Checksum Generation

Checksum generation enables or disables the generation of checksums in DDP packets. The factory default setting is disabled. It may be enabled with the commands:

▷ Server>> define server appletalk checksum enabled

▷ Server>> sync

▷ Server>> init delay 0

Zone

The zone identifies the desired AppleTalk zone to be used during server boot. This zone must be the one provided by an AppleTalk router. The factory default setting is none, and can be set using the commands:

▷ Server>> define server appletalk zone **zone_name**

▷ Server>> sync

▷ Server>> init delay 0

Flow Quantum

Flow quantum is the number of blocks (512-bytes) that may be received from the client without an acknowledgment. The factory default is 8, with a valid range of 1 to 8. It can be set using the commands:

- Server>> define server appletalk quantum **new_number**
- Server>> sync
- Server>> init delay 0

Troubleshooting

CAUTION:	*This section contains advanced features. Printer server parameters should be configured by network administrators.*

While on an AppleTalk network, if problems are occurring with AppleTalk nodes, check the following:

1) Verify the printer is capable of and set for PostScript printing.
2) Verify the printer and printer server are powered on and connected.
3) Verify the computer is using AppleTalk Phase 2.
4) Examine the **Chooser** menu. Be sure the correct zone and printer name are selected.
5) Log in to the printer server and examine the AppleTalk configuration with the command:
   - Server>> show server apple.
6) Verify the **printer_name** shows up under Printers and has an address and port number. Then verify the server name, zone, and network number are correct.
7) Try redefining the **zone** on the printer server with the command:
   - Server>> define server appletalk zone **zone_name**

NOTE:	*If the printer is still not printing, reboot both the printer server and printer to resolve the fault.*

What's Next?

Upon successful configuration of your network operating system, you can either configure for another NOS or manage your Emulex printer server with NETWizard. Refer to the following checklist.

Configure For Your NOS

Choose one or more operating systems.

- ❑ Novell NetWare - pg. 3-1
- ❑ Unix - pg. 4-1
- ❑ AppleTalk - pg. 5-1
- ❑ VAX/VMS-LAT - pg. 6-1
- ❑ DOS LAN Manager/T - pg. 7-1
- ❑ OS/2 LAN Server - pg. 8-1
- ❑ Windows NT 3.5 - pg. 9-1

Manage With NETWizard

Refer to NETWizard Printer Server Management Guide.

- ❑ Load software.- pg. 2-2
- ❑ Choose protocol - pg. 2-2
- ❑ Manage printer server - pg. 2-4

LAN Manager/T

Chapter 7

Requirements

Emulex LAN Manager/T allows up to 16 print queue connections per server (OS/2 limitation) and an unlimited number of LAN Manager servers to redirect their output to an unlimited number of printer servers.

This allows for the sharing of printers between LAN Manager clients operating under DOS, Windows, Windows NT, Windows for Workgroups, or OS/2, and the Emulex communications or printer server via the LAN Manager file server.

Before beginning, be sure to check the following:

- LAN Manager version 2.1 or higher
- Microsoft OS/2 version 1.3.
- TCP/IP running on each LAN Manager file server making a direct connection to an Emulex server.
- Version 2.2 of LAN Manager includes the required TCP/IP module.
- Verify the printer server software release of 4.1 or later.

LAN Manager/T Distribution Files

The utilities diskette in this package contains the following files:

EMLX.EXE - the OS/2 Presentation Manager program that installs and configures printers. It also starts and stops the printing process on servers and provides real-time statistics for each printer.

EMLXST.EXE - may be used to start the print process automatically when the PC is booted.

EMLX.INI - the LAN Manager/T configuration file is created on the system the first time it runs EMLX.EXE.
This file is updated each time a printer is added, removed, or modified.

EMLX.INF - the Program Manager's information file used to install LAN Manager/T on the system.

NOTE: Do not modify the contents of the ***EMLX.INI*** *or* ***EMLX.INF*** *files.*

INSTALL.EXE - the installation utility creates the required directories and copies the appropriate files to the system.

RPRINT.EXE - implements the print process to run in the background. This process is created when printing to a printer then redirecting the output of an associated print queue to the Emulex printer server.

TELRCF.EXE - allows a configuration of the Emulex server from the LAN Manager server.

Before Installation

We recommend writing down the following parameters from the Setup section of this guide. You will refer to them during the installation procedure.

Default Server Name: _____ _____ _____ _____ _____ _____ _____ _____ _____

Default Printer Name: _____ _____ _____ _____ _____ _____ _____ _____ _____-_____

IP Address: _____ _____ _____-_____ _____ _____ -_____ _____ _____-_____ _____ _____

TCP port _____(parallel port), TCP port _____ (parallel port)

TCP port _____ (serial port), TCP port _____ (serial port)

Telnet port number _____

RCF port number _____

Have the TES & LAN Manager/T diskette ready for installation.

Certain LAN Manager/T files must be installed on the LAN Manager server and the printer server must be properly configured.

To configure printers to be shared on the network, log into the LAN Manager server as **admin** and verify the following:

- OS/2 LAN Manager is installed with the TCP/IP protocol stack.

  Go to the LANMAN directory and run **Setup**. Select **Configuration** and then Network Drivers. An entry **MS TCP / IP** should be listed. If this entry is not present, refer to LAN Manager documentation for information on installing and enabling the TCP/IP protocol stack. When finished, exit setup.

- The file SOCKDRV.OS2 is installed.

Use the OS/2 System Editor to examine CONFIG.SYS in the LAN Manager root directory. Verify that the LAN Manager section includes a line similar to:

▷ DEVICE = LanRoot\ARPA\SOCKDRV.OS2

where **LanRoot** is the LAN Manager root directory.

- The NumSockets parameter is correct.

  Use the OS/2 System Editor to examine TCPUTILS.INI in the LAN Manager root directory. This parameter is located in the SOCKETS section. LAN Manager/T uses 1 socket for each active printer.

Installation

To install the files, use the following procedure:

1) Insert the distribution diskette into a drive and open an OS/2 Window. Select the drive housing the diskette (e.g., A:).
2) Run the installation program by entering **install**.
   When the dialog box appears, supply the following information:

   Drive where the files will be installed (e.g., C:)

   Directory for the files (default is C: \emulex)

   Click the Install box.
3) When the following message appears, click the Exit box:

   Installation Completed Successfully

Logging into the Printer Server

You can log into the printer server remotely from a UNIX workstation or locally from a console terminal. These methods are described below.

Remote Login

1) Log on to a UNIX TCP/IP workstation. The prompt may appear different than the one shown in step 2.
2) At the # prompt, connect to the Emulex printer server by entering:

   ▷ # telnet **ddd.ddd.ddd.ddd** 2048

where **ddd.ddd.ddd.ddd** is the printer server IP address in decimal dot notation, and **2048** is the default printer server RCF port.

3) When the # prompt appears, enter the password:

   ▷ *# access*

   where **access** is the default printer server remote login password.

> *NOTE: The password does not appear when typed.*

4) When the connection is made, the printer server login banner is displayed.

```
- NetWare/TCP/LAT Printer Server ---------
Copyright 1988, 1989, 1990, 1992 EMULEX Corp.
All Rights Reserved.
Use of this product is subject to a software license
----------------------------------------current date and time
Welcome to printer server
Enter Username or Help>
Local>
```

5) At **Local>**, enter **su** to obtain supervisor status. Then enter system at **Password>**

   ▷ Local> su

   ▷ Password> system

   ▷ Local>

   where **system** is the default privileged password which does not echo back.

   When finished, log out of the printer server:

   ▷ Local> logout

Local Login

1) Connect a console terminal to the printer server serial or console port. Emulex recommends using a VT100-compatible terminal set for 9600 bps, 8 data bits, no parity, and 1 stop bit.

2) Press **Esc** twice to initiate communication between the console terminal and the printer server serial port.

3) When the connection is made, the printer server login banner is displayed, similar to the one shown below:

```
- NetWare/TCP/LAT Printer Server ---------
Copyright 1988, 1989, 1990, 1992 EMULEX Corp.
All Rights Reserved.
Use of this product is subject to a software license
----------------------------------------current date and time
Welcome to printer server
Enter Username or Help>
Server>
```

NOTE: The line **Enter Username or Help>** *requires an alphanumeric character string.*

4) At **Server>**, enter **su** to obtain supervisor status. Then enter system at **Password>**

   ▷ Server> su

   ▷ Password> system

   ▷ Server>>

   where **system** is the default privileged password which does not echo back.

5) At the **Server>>** prompt, enter printer server commands.

6) When finished, log out of the printer server:

   ▷ Server>> logout

Adding New Printers

Before adding printers, the appropriate printer drivers must be installed through the OS/2 Print Manager. Also the following information is needed:

- IP address of the Emulex server
- Service name for the remote printer
- TCP port number of the printer service.

To add a printer, use the following procedure:

1) Open **Emlx Prn Mgr** in the Desktop Manager Group.
2) Select the **Emlx** icon to open the **Emlx Print** window.
3) Open the **Install** menu and select **Add Printer.**
4) When the **Add New Printer** window opens, supply the following information:
   - **Name** - used to create an OS/2 printer and default print queue (e.g., **rljet4**). Be sure the name entered, was not entered previously.
   - **Share Printer on Network** - permits automatic sharing of the printer under LAN Manager. This option is the default and only works if logged on as **admin**.
   - **Comment** - optional field for comments (e.g., laserjet4 -remote).
   - **Driver** - printer driver for the printer. Use MSNULL or IMBNULL if the files do not require formatting (e.g., text files). MSNULL is provided with LAN Manager and may be installed from the **LanRoot\DRIVERS** directory.
   - **Service Name** - This is the **default printer server name** combined with the Emulex printer server port number. (The Emulex printer server port is either 1, 2, or 3)
   - **IP address** - the printer server IP Address, e.g., 138.239.245.248
   - **Port Number** - The TCP port number for the printer server port.

5) The printer is ready for use. Close the windows and test the printer as follows:

   - Verify the printer and Emulex server are powered up and the printer is on-line.
   - From the **OS/2 File Manager** select a text file (e.g., readme.txt) and drag the file to the **Print Manager** icon using the right mouse button.
   - Highlight the printer name just created and select **Formatted**.
   - The file should appear on the printer.

NOTE: LAN Manager/T does not validate the Server Name, IP Address, or Port Number parameter values. If the printer changes to the Off-line state when attempting to print, check that the above parameters have been entered correctly.

Telrcf

The Telrcf utility logs in to the printer server from the LAN Manager server and issues server commands to the printer server. The Telrcf utility must be configured. However, it is automatically installed along with other LAN Manager/T files.

Configuring Telrcf

The following steps configure Telrcf for a single connection, but this procedure may used to configure multiple connections.

1) Open the **Emlx Prn Mgr** and highlight (single click) the Telrcf icon.
2) Pull down the **Program** menu and select **Copy**. In the Copy Program window, enter a name in the **Change title** to: field (e.g., Telrcf 138.239.18.2).
3) Click on **Copy** to create a new icon with the title just entered.
4) Highlight the new icon. Next, pull down the **Program** menu and select **Properties** to open the Properties window.

5) Enter desired Telrcf options in the Parameters box from the following list:

   -h **server_name** or **ip_address**

   -p **rcf_tcp_port_number** (default is 2048)

   -f **script_file_name**

   -t **output_file_name**

   -e **escape_character** (default is Ctrl-])

6) Select either **OS/2 Full Screen** or **OS/2 Window**.

7) Click the **Change** button to close the window. Telrcf is configured and ready for use.

Using Telrcf

Telrcf may be used to log into the printer server to issue configuration commands. In addition, Telrcf provides a convenient method for downloading an entire configuration script to the printer server.

To use telercf, simply open the **Emulex Prn Mgr** window and double-click the new icon in the section above. This opens the Telrcf window and connects to the specified server with the IP address or server name.

To terminate the session, press **Ctrl-Break**. This disconnects the session and closes the window.

For information on using the Telrcf options, open an OS/2 window and change to the Emulex directory (cd\emulex). Next, enter the command Telrcf to display the command line syntax and a description of the options.

For example, to send a configuration script called servcnfg to the printer server with IP address 138.239.18.24:

1) Using a text editor, create the script and save it with the name servcnfg.scr. Be sure the first line of the script contains the login password, followed by **a set type softcopy** command. If needed, add the **set privilege** extra command, followed by the privileged password to execute privileged commands. Also, be sure the last line of the script is the logout command.

   The following is an example of a server command script. This command configures a new service name, 1j4a, for remote printing on a printer server parallel port. It uses TCP port 3001 and configures the port's baud rate to 19200.

access

set type softcopy

set privilege

system

change service 1j4a 3001 telnet disabled port 1

change port 1 access remote speed 19200

logout

2) Create an icon called Telrcf **ddd.ddd.dd.dd**
In the parameters field, enter:

▷ -h **ddd.ddd.dd.dd** -f \emulex\servcnfg.scr

where **ddd.ddd.dd.dd** is the IP address and emulex is the directory containing the file.

3) To send the file, double-click the icon labeled TelRcf 138.239.18.24. The file is sent and Telrcf terminates when completed. Open the **EmIx Prn Mgr** and highlight (single click) the TelRcf icon.

Troubleshooting

If unable to connect to the printer server on the network, verify the following points:

- Verify that TCP/IP and LAN Manager are authorized on the server. Use the printer server command:

  ▷ Server>> show server key

- Verify the TCP/IP protocol stack is correctly installed on the LAN Manager server and that the correct IP address is used. Also verify the subnet mask, if any.

- Ensure there is a low level TCP/IP connection between the LAN Manager server and LAN Manager/T by using the ping utility.

- If other applications are using the TCP/IP sockets, ensure that the NumSockets value is configured correctly. This value may also be increased to add multiple printers. NumSockets is located in the {SOCKETS} section of TCPUTIL.INI.

- The Emulex LAN Manager/T printer process uses one TCP/IP socket for each active printer.
- Ensure the value of the TCP Connection in the PROTOCOL.INI is the sum total of:
  - TCP/IP Netbios sessions
  - +sockets sessions
  - +telnet sessions

The correct values for these are given in the LAN Manager documentation. The Emulex LAN Manager/T printer process uses one socket session for each active printer.

If experiencing difficulty locating the problem, use Log File or Trace Mode options. These options should not be changed from their defaults unless instructed to do so by Emulex Technical Support personnel.

In the **Add New Printer** window, when selecting the **More...** box, the following options are displayed:

- **Trace Mode** - when enabled, the RPRINT process is started in a PM session allowing a dialogue between RPRINT and the printer server. EMLXST.EXE, which starts the printer process automatically, cannot be used with this option.
- **Use Log File** - enables creation of a log file containing the dialogue between RPRINT and the printer server.
- **Verbose Log** - adds information to the log file.
- **Timeout On Server Response** - the number of seconds the print process waits while making a connection before it time out (default is 10).
- **Times To Send Job Request** - the number of attempts the server is unsuccessful at sending a print job before canceling (default is 15).
- **Retries For Server Response** - the number of times the print processor retries when a connection cannot be established with the printer server (default is 5).

For additional information, contact Emulex Technical Support.

What's Next?

Upon successful configuration of your network operating system, you can either configure for another NOS or manage your Emulex printer server with NETWizard. Refer to the following checklist.

Configure For Your NOS

Choose one or more operating systems.

- ❑ Novell NetWare - pg. 3-1
- ❑ Unix - pg. 4-1
- ❑ AppleTalk - pg. 5-1
- ❑ VAX/VMS-LAT - pg. 6-1
- ❑ DOS LAN Manager/T - pg. 7-1
- ❑ OS/2 LAN Server - pg. 8-1
- ❑ Windows NT 3.5 - pg. 9-1

Manage With NETWizard

Refer to NETWizard Printer Server Management Guide.

- ❑ Load software.- pg. 2-2
- ❑ Choose protocol - pg. 2-2
- ❑ Manage printer server - pg. 2-4

LAN Server

Chapter 8

Requirements

Make sure the LAN Server is properly equipped before installing the printer server on it. The following minimum hardware and software components are required:

Hardware

- Intel 80386 PC (100%) IBM compatible CPU platforms supported by OS/2.
- MB Hard Disk Drive with at least 50MB free disk space.
- High Density Floppy Disk Drive -- 3.5 inch or 5.25 inch.
- VGA Monitor
- Mouse or pointing device.
- 8 MB RAM
- Ethernet Network Interface Card. Refer to the IBM Transmission Control Protocol/Internet Protocol Version 2.0 for OS/2, Installation and Administration Manual, IBM part number SC31-6075, for a list of supported network adapters.
- If access for the Emulex Software Bulletin Board is required; Hayes AT compatible modem, supporting 1200 to 38,400 baud rates. For more information about the Emulex Bulletin Board System (BBS), see the chapter ***Contacting Emulex.***

Software

The required software components listed here include LAN Server software and the embedded software stored in FLASH memory on the printer server.

- OS/2 Operating System, Version 2.0 or higher.
- OS/2 LAN Server, Version 3.0 or higher.
- TCP/IP for OS/2, Version 2.0 or higher.
- Print Server software, Revision 4.12 or higher.

Before Installation

We recommend writing down the following parameters from the Setup section of this guide. You will refer to them during the installation procedure.

Default Server Name: ____ ____ ____ ____ ____ ____ ____ ____ ____

IP Address: ___ ___ ___-___ ___ ___ -___ ___ ___-___ ___ ___

TCP port _____(parallel port), TCP port _____ (parallel port)

TCP port _____ (serial port), TCP port _____ (serial port)

Telnet port number _____

Assigning IP Address and Node Name

This section describes assigning the printer server's IP address and node name. This procedure also includes the use of the ping command, which performs a partial test of the address assignments.

1) Ensure that power to the printer server is OFF.

   It is possible for the printer server to be assigned an IP address over the network at any time. However, it is important that this happens only at the appropriate time.

2) From the LAN Server, assign a node name for the printer server IP address.
   Open the **TCP/IP Configuration** icon (inside the **TCP/IP** icon) , then click the **Services** tab and select **page 3 of 3.**

3) Select the host table box (even if no entries are present), then edit the list of node name entries. The format of a node name entry is:

   ▷ **IP_address** <tab> **node_name**

   For example, to assign the printer server node name GRP1PRNTR to IP address 138.239.157, enter:

   ▷ 138.239.18.157 <tab> GRP1PRNTR

   A prompt appears to save the changes. These host table entries are then stored in the file **tcpip/etc/hosts.**

4) Assign the printer server IP address to the printer server's Ethernet (MAC) address. Open the OS/2 **Windows** icon and enter the following at the OS/2 prompt:

   ▷ arp -s **MAC_address node_name**

   If a server node name is not assigned, the IP address assigned by the system administrator can be used in its place. For example, to assign the IP address of 138.239.18.157 with the node name of GRP1PRNTR to the Ethernet (MAC) address of 0:0:c9:0:2:12, enter either one of the following:

   ▷ arp -s 0:0:c9:0:2:12 GRP1PRNTR

   or

   ▷ arp -s 0:0:c9:0:2:12 138.239.18.157

5) Check that the correct node name or IP address has been assigned to the printer server's Ethernet (MAC) address. Enter the following at the OS/2 prompt:

   ▷ arp -a

   If the address information is correct, proceed to Step 6.

   If the IP address or the node name listed for the printer server Ethernet (MAC) address is incorrect, enter one of the following and then repeat Steps 4 and 5 as required:

   ▷ arp -d **incorrect _node _name**

   or

   ▷ arp -d **incorrect _IP_address**

6) Turn **ON** power to the printer server.

7) Transmit a test packet of data to the printer server IP address by entering:

   ▷ ping **node_name** 32 2

   For example:

   ▷ ping GRP1PRNTR 32 2

   The following example will appear, except the IP address will be different for your network:

   ▷ ping 138.239.18.157 56 data bytes

▷ 40 bytes from 138.239.18.157 icmp seq=o. time=0. ms

▷ 40 bytes from 138.239.18.157 icmp seq=1. time=0. ms

▷ ---138.239.18.157 PING Statistics----

2 packets transmitted, 2 packets received, 0% packet loss, round trip (ms) min/avg/max =0/0/0

Print /Test Connection

This section describes using the **lpr** command to functionally test the address assignments and the complete printer connection via the printer server.

1) Generate or determine the name of a test file to send to the printer. For example, the following OS/2 command can be entered to generate a text file named **arp.hlp** that describes the arp command:

   ▷ arp -? > arp.hlp

2) Print a file using the following OS/2 command at the LAN Server prompt:

   ▷ lpr -**pprinter_name -snode_name FILENAME**

   where **printer_name** is either:

NOTE: There is no space between the -p and the printer_name or between the -s and the node_name.

TEXT	for standard text files (such as **arp.hlp** from Step 1).
PASSTHRU	for files other than text files, such as PostScript files.

where **node_name** is the node name or IP address assigned as described in the previous section, and where **filename** is a standard OS/2 or DOS filename.

For example:

▷ lpr -pTEXT -sGRP1PRNTR arp.hlp

If necessary, the remote queue name **TEXT** or **PASSTHRU** can be changed.

Logging into the Printer Server

You can log into the printer server remotely from a UNIX workstation or locally from a console terminal. These methods are described below.

Remote Login

1) Log on to the LAN Server workstation. The prompt may appear different than the one shown below.

2) At the # prompt, connect to the printer server by entering:

   ▷ **# telnet IP_address 2048**

   where **IP_address** is the printer server IP address, and **2048** is the default printer server RCF port.

   NOTE: Parameters may be changed. See ***Appendix.***

3) When the # prompt appears, enter the password:

   ▷ *# access*

   where **access** is the default printer server remote access password.

   NOTE: The password does not appear when typed.

   When the connection is made, the printer server login banner is displayed, similar to the one shown:

```
- NetWare/TCP/LAT Printer Server --------
Copyright 1988, 1989, 1990, 1992 EMULEX Corp.
All Rights Reserved.
Use of this product is subject to a software license
----------current date and time
Welcome to printer server
Enter Username or Help>
Local>
```

4) At the **Enter Username or Help>** prompt, enter any two characters, then press **Enter**.

5) At the **Local>** prompt, obtain supervisor status:

   ▷ Local> su

   ▷ Password> system

   ▷ Local>

   where **system** is the default privileged password.

6) At the **Local>** prompt, enter the printer server commands described in the ***Appendix*** section.

7) When the session is finished, log out of the printer server:

   ▷ Local> logout

Local Login

1) Connect a console terminal to the printer server serial or console port. Emulex recommends using a VT100-compatible terminal set for 9600 bps, 8 data bits, no parity, and 1 stop bit.

2) Press **Esc** twice to initiate communication between the console terminal and the printer server serial port.

3) When the connection is made, the printer server login banner is displayed, similar to the one shown:

```
- NetWare/TCP/LAT Printer Server ---------
 Copyright 1988, 1989, 1990, 1992 EMULEX Corp.
All Rights Reserved.
Use of this product is subject to a software license
----------current date and time
Welcome to printer server
Enter Username or Help>
Server>
```

NOTE: The line Enter Username or Help> requires an alphanumeric character string.

4) At **Server>**, enter **su** to obtain supervisor status. Then enter **system** at **Password>**

   ▷ Server> su

   ▷ Password> system

   ▷ Server>>

   where **system** is the default privileged password which does not echo back.

5) At the **Server>>** prompt, enter printer server commands described in the ***Appendix*** in the section ***Configuring Printer Server Parameters***.

6) When finished, log out of the printer server:

   ▷ Server>> logout

What's Next?

Upon successful configuration of your network operating system, you can either configure for another NOS or manage your Emulex printer server with NETWizard. Refer to the following checklist.

Configure For Your NOS

Choose one or more operating systems.

- ❑ Novell NetWare - pg. 3-1
- ❑ Unix - pg. 4-1
- ❑ AppleTalk - pg. 5-1
- ❑ VAX/VMS-LAT - pg. 6-1
- ❑ DOS LAN Manager/T - pg. 7-1
- ❑ OS/2 LAN Server - pg. 8-1
- ❑ Windows NT 3.5 - pg. 9-1

Manage With NETWizard

Refer to NETWizard Printer Server Management Guide.

- ❑ Load software.- pg. 2-2
- ❑ Choose protocol - pg. 2-2
- ❑ Manage printer server - pg. 2-4

Windows NT

Chapter 9

Requirements

Before beginning, make sure the network conforms to these requirements:

- Version 3.5 of Windows NT is the minimum version required to install the Emulex printer server as described in this manual, since customers with earlier versions do not have LPR/LPD.
- See Tech Note TN_50.TXT on the Emulex BBS for information on how to run the printer server with Windows NT 3.1, which requires the use of additional software or AppleTalk.
- Emulex printer server software version 4.12 and above.

Before Installation

We recommend writing down the following parameters from the Setup section of this guide. You will refer to them during the installation procedure.

Default Server Name: ____ ____ ____ ____ ____ ____ ____ ____ ____

IP Address: ___ ___ ___-___ ___ ___ -___ ___ ___-___ ___ ___

TCP port _____(parallel port) TCP port _____ (parallel port)

TCP port _____ (serial port) TCP port _____ (serial port)

Telnet port number _____

RCF port number _____

Installation

Any Windows NT computer can be used to created a TCP/IP printer if TCP/IP is installed with TCP/IP printing support. Follow the steps below to configure a Windows NT computer for TCP/IP printing:

1) Start the **Network** option in **Control Panel**. When the **Network Settings** dialog box appears, choose the **add software** button to display the **Add Network Software** dialog box.
2) Select **TCP/IP Protocol and Related Components** in the **Network Software** list box, and then choose the **Continue** button.

3) In the Windows NT TCP/IP **Installation Options** dialog box, check the **TCP/IP Network Printing Support** option.

   If TCP/IP is not already installed on this computer, check the other desired options, as described in the ***Windows NT System Guide.***

4) Choose the **OK** button. Windows NT **Setup** displays a message asking for the full path to the Windows NT distribution files. Provide the appropriate location, and choose the **Continue** button. All necessary files are copied to the hard disk.

5) If the **Enable Automatic DHCP Configurations** option is not checked in the Windows NT TCP/IP **Installation Options** dialog box, all required procedures for manually configuring TCP/IP must be completed as described in the ***Windows NT System Guide.***

6) When the **Network Settings** dialog box reappears after TCP/IP configuration is finished, choose the **Close** button, then restart the computer for the changes to take effect. A TCP/IP printer can now be created on this Windows NT computer.

Before Installing a Printer (TCP/IP)

Use **Print Manager** to create a TCP/IP printer, just as any printer is created to be used on a Windows NT network. The following information is required to create a TCP/IP printer:

1) The IP identifier of the host where the printer is connected. This can be the DNS name or the IP address. A direct-connect printer has its own IP identifier. For a printer connected to a UNIX computer, this is the computer's IP identifier.

2) The printer name as it is identified on the host. This is the name defined on the UNIX computer or the name defined by the manufacturer for the direct-connect printer.

   The computer where the TCP/IP printer is created must have TCP/IP installed and configured with the TCP/IP Network Printing Support option, as described in the ***Windows NT System Guide.***

Installing a Printer (TCP/IP):

1) From the **Printer** menu in **Print Manager**, choose **Create Printer** to view the **Create Printer** dialog box:

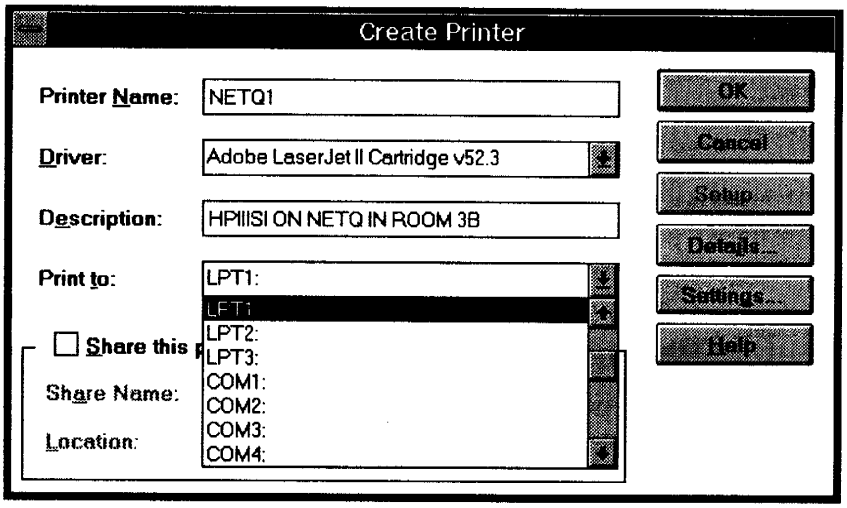

Figure 1: Print Menu

2) In the **Printer Name** box, type a name of up to 32 characters. This name appears in the title bar of the printer window, and Windows NT users see this name when connecting to this printer if it is shared.

   This name can be the same as the printer name as it is identified on the printer's UNIX host, but it does not have to be. For a direct-connect printer, see the hardware documentation to find the name by which the network printer identifies the print queue.

3) In the **Driver** list, select the appropriate driver. Optional text may be entered to inform network users about the printer in the **Description** box.

4) In the **Print To** box, select **Other** to display the **Print Destinations** dialog box:

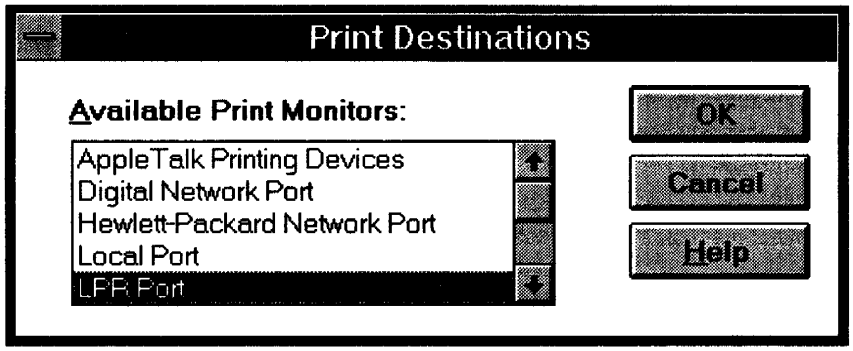

Figure 2: Available Print Monitors List

5) In the Available Print Monitors list, select **LPR Port**, then choose OK. The following dialog box will appear:

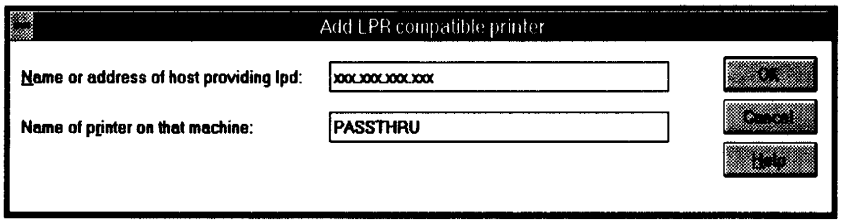

Figure 3: Add LPR Compatible Printer

IMPORTANT: *Read through Steps 6, 7, and the NOTE following Step 7 before proceeding*

6) In the **Name or Address Of Host Providing LPD** box of the **Add LPR Compatible Printer** dialog box, type the DNS name or IP address of the host for the printer being added.

   This can be the DNS name or IP address of the direct-connect TCP/IP printer or of the UNIX computer to which the printer is connected. The DNS name can be the name specified for the host in the HOSTS file.

NOTE: *LPR stands for Line Printing Utility, and LPD stands for Line Printing Daemon, which is how these elements are known on UNIX.*

7) In the **Name Of Printer On That Machine** box, type the name of the printer as it is identified by the host, which is either the direct-connect printer itself or the UNIX computer.

   For example, there might be a UNIX computer running the print server component (**lpd**) that the TCP/IP printer being created will interact with. If **lpd** recognizes a printer attached to the UNIX computer by the name Crisp, type the name **Crisp** in this box.

   For a direct-connect printer, this is whatever name was used to create the printer while running **lpd**.

> *NOTE: Although not mandatory, the printer (queue) names TEXT and PASSTHRU are printer server defaults. To define a unique printer (queue) name on the* ***Add LPR Compatible Printer*** *dialog box, log to the printer server software and follow the bulleted steps below.*

- The **lpd** service cannot have a physical port number assigned to it. If it does, then printer names TEXT or PASSTHRU must be used.
- The unique printer name must have a TCP port number other than 515 assigned to it. Lower case names are acceptable when enclosed within double quotes (").
- The following commands must be executed in supervisor mode to configure unique printer names:
  - ▷ Server>> change service **lpd** port **all** disable
  - ▷ Server>> change service **printer_name**
  - ▷ **TCP_port_n** PORT **n** telnet disable filter enable/disable

  where:

  printer_name is the unique printer name to assign.

  TCP_port_n is the TCP port name other than 515. Emulex suggests starting at 3000.

  n is the physical parallel port of the printer server.

enable/disable is when **enable,** insert <CR> with each <LF>, equivalent to TEXT. When **disable,** sends data with no changes, equivalent to PASSTHRU.

For example, enter the following commands on the printer server to change the name of the printer on the parallel port to be PARALLEL to support a PostScript capable printer:

- ▷ Server>> change service lpd port all disable
- ▷ Server>> change service parallel 3001 port 1

telnet disable filter disable To include an ID for the newly created printer, enter the following command:

- ▷ Server>> change service parallel id "HP4si on default printer server name in Room 1231"

Return to Windows NT to complete the remaining steps:

- When the **Create Printer** dialog box reappears, check the **Share This Printer On The Network** option if this definition is being created on a Windows NT computer that will serve as a print server for others to access this printer.

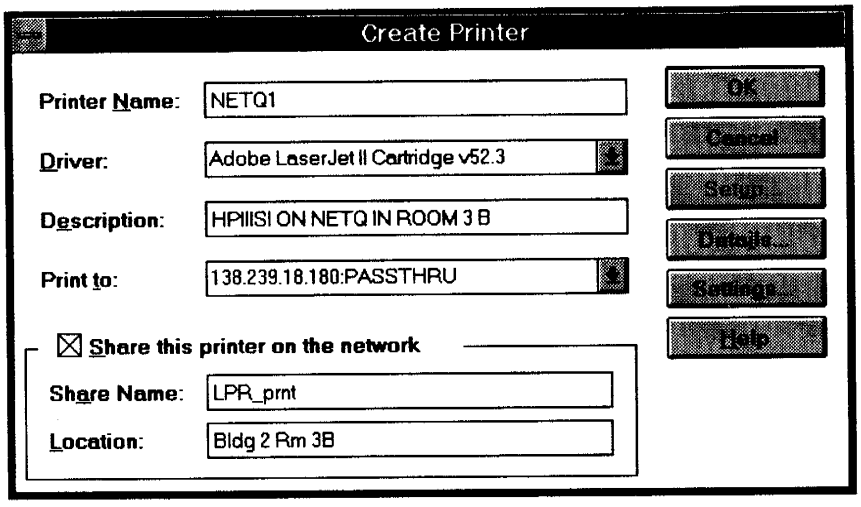

Figure 4: Create Printer

- By default, **Printer Manager** creates a shared resource name, up to eight characters, in the **Share Name Box**. This name, which users see when browsing to find this printer on the network, can be edited.
- Optionally, in the **Location** box, enter information about where this printer is located. Users can see this location information when they connect to the printer.
- Complete any other configuration information in the **Create Printer** dialog box, as described in Chapter 6 of the ***Windows NT System Guide***, and then choose the **OK** button.

  In **Print Manager**, the printer name specified in the **Create Printer** dialog box appears in the title bar of the printer's window, as shown:

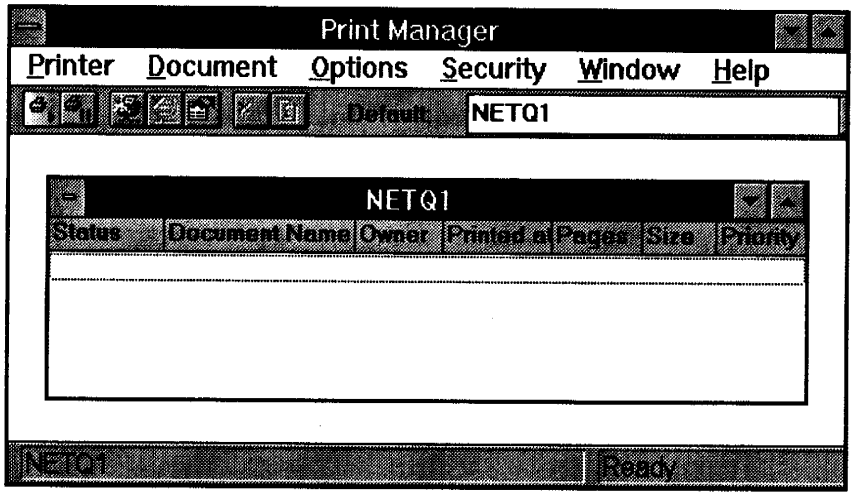

Figure 5: Print Manager

For client computers configured with Microsoft Network Client version 2.0 for MS-DOS, users will see only the shared name, not the printer name. Users who connect to this TCP/IP printer can select it and print to it from applications just as if it was any other printer. Users and administrators can use **Print Manager** to secure and audit the use of the printer and change its properties.

Tip: Use the **lpr** connectivity utility at the command prompt to print a file to a host running an LPD server. The **lpq** diagnostic utility can also be used to obtain the status of a print queue on a host running the LPD server. For more

information, see the entries for **lpr** and **lpq** in the ***Windows NT System Guide.***

Printing to Windows NT from UNIX

The **Lpdsvc** service is the server side of TCP/IP printing for UNIX clients. If any UNIX clients on the network want to print to a printer connected to a Windows NT computer, this service needs to be running on the Windows NT computer so it can accept requests from UNIX clients.

The **Lpdsvc** service supports any print format, including plain-text. It does not perform any additional processing.

There are two different ways to start or stop the **Lpdsvc** service:

1) At the command prompt, type **net start Lpdsvc** or **net stop Lpdsvc** and press **Enter**.

2) In **Control Panel**, choose the **Services** option. Then select **Lpdsvc** in the service list and choose the **Start** button.

   On the UNIX computer, use the Windows NT printer by typing.

   ▷ lpr -S NTHost - P LpdPrinter myfile.txt

   where:

   NTHost is the Windows NT Server running the Lpdsvc service. This Windows NT computer should be listed in the HOSTS file on the UNIX computer or on the DNS server.

   LpdPrinter is the name of the printer created on **NTHost**.

   myfile.txt is the file to be printed.

   The **Lpdsvc** service is independent of the **Lprmon** service. The **Lprmon** service runs automatically to allow a Windows NT computer (and all clients who can access this computer) to print to a printer connected to a UNIX system, as described in the previous section.

Logging into the Printer Server

You can log into the printer server remotely from a UNIX workstation or locally from a console terminal. These methods are described below.

Remote Login

1) Log on to a UNIX TCP/IP workstation. The prompt may appear different than the one shown below.

2) At the # prompt, connect to the printer server by entering:

   ▷ # telnet **ddd.ddd.ddd.ddd** 2048

   where **ddd.ddd.ddd.ddd** is the printer server IP address in decimal dot notation, and **2048** is the default printer server RCF port.

   NOTE: Printer server parameters may be changed. After logging in, change the passwords. See ***Appendix***.

3) When the **#** prompt appears, enter the password:

   ▷ # access

   where **access** is the default printer server remote login password.

   NOTE: The password does not appear when typed.

4) When the connection is made, the printer server login banner is displayed, similar to the one shown:

```
- NetWare/TCP/LAT Printer Server ---------
Copyright 1988, 1989, 1990, 1992 EMULEX Corp.
All Rights Reserved.
Use of this product is subject to a software license
----------------------------------current date and time
Welcome to printer server
Enter Username or Help>
Local>
```

5) At Local>, enter **su** to obtain supervisor status. Then enter **system** at Password>

   ▷ Local> su

- ▷ Password> system
- ▷ Local>

where **system** is the default privileged password, which does not echo back.

6) When finished, log out of the printer server.

- ▷ Local> logout

Local Login

1) Connect a console terminal to the printer server serial or console port. Emulex recommends using a VT100-compatible terminal set for 9600 bps, 8 data bits, no parity, and 1 stop bit.
2) Press **Esc** twice to initiate communication between the console terminal and the printer server serial port.
3) When the connection is made, the printer server login banner is displayed, similar to the one shown:

```
- NetWare/TCP/LAT Printer Server ---------
Copyright 1988, 1989, 1990, 1992 EMULEX Corp.
All Rights Reserved.
Use of this product is subject to a software license
----------------------------------current date and time
Welcome to printer server
Enter Username or Help>
Server>
```

NOTE: The line Enter Username or Help> requires an alphanumeric character string.

4) At **Server>**, enter **su** to obtain supervisor status. Then enter **system** at **Password>**

- ▷ Server> su
- ▷ Password> system

▷ Server>>

where **system** is the default privileged password which does not echo back.

5) At the **Server>>** prompt, enter printer server commands described in the ***Appendix*** in the section ***Configuring Printer Server Parameters***.

6) When finished, log out of the printer server:

▷ Server>> logout

What's Next?

Upon successful configuration of your network operating system, you can either configure for another NOS or manage your Emulex printer server with NETWizard. Refer to the following checklist.

Configure For Your NOS

Choose one or more operating systems.

- ❑ Novell NetWare - pg. 3-1
- ❑ Unix - pg. 4-1
- ❑ AppleTalk - pg. 5-1
- ❑ VAX/VMS-LAT - pg. 6-1
- ❑ DOS LAN Manager/T - pg. 7-1
- ❑ OS/2 LAN Server - pg. 8-1
- ❑ Windows NT 3.5 - pg. 9-1

Manage With NETWizard

Refer to NETWizard Printer Server Management Guide.

- ❑ Load software.- pg. 2-2
- ❑ Choose protocol - pg. 2-2
- ❑ Manage printer server - pg. 2-4

Contacting Emulex

Chapter 10

Technical Assistance

If you experience problems and cannot resolve them, contact Emulex Technical Support.

Prior to calling, have available the following information:

1) Type of printer and interface (e.g., laser with parallel port).
2) Type of host, operating system, and release level (e.g., SparcStation II with SunOS 4.1.1).
3) Network operating system (Novell, TCP/IP, etc.) and release level.
4) Type of connection to the network (UTP).
5) Contents of the following host files:
   - For Novell: PRINTDEF
PRINTCON
   - For TCP: /etc/printcap
/etc/hosts
/etc/ethers
6) MAC address
7) Contents of any error log files, such as /tmp/emlx[pid].log

NOTE: *If possible, call Technical Support from a phone next to a terminal with access to the network.*

After gathering required information contact:

From the U.S. including Alaska and Hawaii:
Emulex (USA)
Technical Support
3535 Harbor Boulevard
Costa Mesa, CA 92626
Telephone: (800) 854-7112, ext. 8270 or (714) 662-5600, ext 8270
FAX: (714) 513-8269
BBS (714) 662-1445 (24 hr)
EmuFax (714) 513-8276 or (714) 513-8277
ftp: ftp.emulex.com (24 hr)
Internet: tech_support@emulex.com (24 hr)
Support Services (714) 513-8061

Emulex Limited (Europe)
Technical Support
Mulberry Business Park
Fishponds Road
Wokingham, Berkshire
RG11 2QY, England
Telephone: (011) 44-734-772-929 (8:30a.m. - 6:00 p.m.)
FAX: (011) 44-734-773-237 (24 hr)
BBS: (011) 44-734-773-298 (24 hr)
ftp: ftp.europe.emulex.com

If Emulex Technical Support personnel determine the unit is defective, they will provide information to return the printer server to an authorized Emulex repair center for service. If return is required, a Return Materials Authorization (RMA) number and shipping instructions will be issued.

Emulex Network Systems has facilities throughout the world. Contact corporate headquarters for the closest office or regional center.

24 - Hour Support

Technical Support within the USA is available 24 hours a day.

Telephone: (800) 854-7112, ext. 8270 or (714) 662-5600, ext 8270

After normal working hours, dial the following number:

Automatic Call Distribution: (714) 513-8270 (6:00 a.m. - 5:00 p.m.)

The after-hours answering service, will ask for a name, company name, telephone number and product type. The answering service will page the on-call technical support specialist, who will return the call as soon as possible.

Product Service

If a customer experiences difficulties with an Emulex product and is unable to resolve the problem with Emulex Technical Support, a Return Materials Authorization (RMA) number will be issued. Shipping instructions to the nearest Repair Center will also be provided. Following receipt of the RMA number, the customer is responsible for returning the product to Emulex, freight prepaid. For additional information please refer to the Warranty Registration Card.

Bulletin Board System

The Emulex Bulletin Board System (BBS) allows the user to download Emulex software and documentation files, upload files, and send or receive messages. Connection to the Emulex BBS may be made through modem or the Internet.

1) Prior to downloading software, check the following:

   Communication software supports one of the following file transfer protocols:

   Xmodem, K-modem, Z-modem, SEAlink, Telink, or Kermit.

2) Configure the communication software to operate at 2400 -14.4K bps, 8 data bits, no parity, and 1 stop bit.

3) Set the software to dial:

(714) 662-1445.

(714) 662-1582

(714) 662-1630

The following file areas are available on the BBS:

File	*Area Description*
#1	Files for Everyone
#2	NetJet - Utilities & Load Image Files
#3	NetJet - Additional Files
#5	NETQue Mate - Utilities & Load Image Files
#6	NETQue Mate - Additional Files
#8	Persyst Products - Drivers
#9	Persyst Products- Diagnostics
#10	Persyst Products- Switch & Jumper Settings
#11	DCP Products - Diagnostics
#12	DCP Products - Switch & Jumper Settings
#13	Technotes: Technical Bulletins
#15	Performance Products - Utilities & Misc Files
#18	Rconnect Files
#19	LANManager Software
#22	Emulex Printer Server Documentation
#23	Emulex Communication Server Documentation
#24	Emulex DCP Products Documentation

NOTE: *The file EMULEX.LST in area #1 describes the files in each area.*

Internet

The Emulex BBS has Internet access via Anonymous ftp, an Internet service that allows connection to a remote host without being a registered user on the host.

1) Userid: Anonymous

   The IP address for the BBS is:

   - standard-name ftp.emulex.com
   - numeric-version 138.239.224.1

2) At the main directory, view the readme file for file locations.

3) Go to the desired directory to get the required files.

The following sub-directories under J:/MAILBOX/FILES are available.

NJ	NetJet - Utilities and Load Image Files
NJ/01	NetJet - Additional files
NQ	NETQue Mate - Utilities and Load Image Files
NQ/01	NETQue Mate - Additional files
PERSYST/DRVR	Persyst Products - Drivers
PERSYST/DIAGS	Persyst Products - Diagnostics
PERSYST/INSTL	Persyst Products - Switch & Jumper Settings
DCP/DIAGS	DCP Products - Diagnostics
DCP/INSTL	DCP Products - Switch & Jumper Settings
TSNOTES	Technotes: Technical Bulletins
XXXX	Performance Products - Utilities & Misc. files
RCONNECTR	Connect Software
LANMAN	LANManager Software
BBS: EVERYONE	Files for Everyone
MANUALS/PSERV	Emulex printer server documentation
MANUALS/CSERV	Emulex communication server documentation
MANUALS/DCP	Emulex DCP products documentation

NOTE: The file EMULEX.LST in the EVERYONE directory describes the files located in each directory.

EmuFax

EmuFax is an automated document retrieval system that sends Emulex documents or catalogs to your fax machine.

To use EmuFax, dial: (714) 513-8276 or (714) 513-8277

When prompted during the EmuFax recording, enter the document number of the document or catalog you want, as well as the number of your fax machine. The document(s) requested will be faxed within minutes.

Appendix

Viewing Printer Server Parameters

IMPORTANT: This section contains advanced features. All parameters should be configured by the Network Administrator.

This section of the appendix describes procedures for communicating with the printer server to monitor system parameters, changing parameters from their factory defaults, or configuring the ports for different devices.

The commands **show, list**, and **monitor** are significant when examining current printer server parameters. The differences between these three commands are described in the following chart:

show	Displays current printer server information including stored parameter values. Display screens vary according to specific parameter.
monitor	Provides the same information as **show**, except the display screen is updated every 10 seconds (every 1-2 seconds for privileged users). Press **Enter** to exit the display.
list	Displays the printer server permanent parameter settings

At login to the printer server, the **Server>** prompt appears and the **show, monitor**, or **list** commands become available. The most useful of these commands are presented below. To display additional information about any of these commands and their options, enter **help show server** or **help show port**. Server characteristics are addressed first, followed by port characteristics.

Show Server Characteristics

The **show server characteristics** screen reveals information about print server hardware configuration such as IP and MAC address, displayed in a stack of seven overlapping screens.

show server hardware	software revision level, amount of memory and self-test results.
show server local	overall server configuration and start-up parameter settings.
show server network	overall network configuration including MAC and IP addresses and protocols currently supported.
show server netware	network configuration parameters for a Novell NetWare environment.
show server TCP	network configuration parameters for a TCP/IP environment including the subnet mask.
show server apple	network configuration parameters for an Apple environment.
show server lat	network configuration parameters for a LAT environment.

Show Port Characteristics

This command displays information about the specified parallel, serial and RCF ports. Supervisor privilege is not required. The command uses the following syntax:

- Server> show port **port_n** characteristics

Specify the desired port number by entering **port_n.** See the following table for port numbers:

Acceptable Port numbers:

Port numbering is dependant on the total number of ports available on the printer server. Refer to the following table for numbering convention:

Port Number	1 Printer Port	2 Printer Ports	3 Printer Ports
1	Parallel Port	Parallel Port	Parallel Port
2	Virtual Port	Serial Port	Parallel Port
3	Not installed	Virtual Port	Serial Port
4	RCF Port	Not installed	Virtual Port
5		RCF Port	Not Installed
6			RCF Port

The information changes depending upon the port. (parallel, serial, or RCF). If the user terminal is not VT100-compatible, the following subcommands can be used:

show port hardware	displays printer options such as interface type for a parallel port or number of bits, flow control and other parameters for a serial port.
show port local	displays type of access (local, remote, or dynamic), type of interface (parallel only) and port identification
show port network	displays protocols enabled for the port.
show port TCP	for serial and virtual ports only, telnet options are displayed; used only with a modem, or with login to printer server from this port.

This command displays the status of all printer server ports.

▷ Server> **show ports summary**

Configuring Printer Server Parameters

IMPORTANT: This section contains advanced features. All parameters should be configured by the Network Administrator.

With the exception of the password, IP address, and subnet mask, most of the printer server's default parameters do not need to be changed unless the network administrator determines a potential conflict exists with another device on the network. To change parameters, use the following commands:

set	Temporarily changes a parameter to a given value. The change is valid until the port is logged out or printer server is turned off.
define	Permanently changes a parameter to a given value. The change takes effect after next initialization.
change	Permanently changes a parameter to a given value. The change takes effect immediately.

Changing various printer server parameters are described in the following pages. These modifications take effect when they are performed.

Changing the Password

The printer server provides two passwords to prevent access by unauthorized persons and the changing of printer server parameters.

Login password	permits access to the printer server via a host connection. The default login password is **access**.
Privileged password	permits changes to printer server parameters, such as the IP address. The default privileged password is **system.**

Privileged status is required to change passwords. These next steps should be performed by the network administrator.

1) Log in to the printer server.
2) At the **Server>** prompt, enter these commands to obtain privileged status:

- ▷ Local> su
- ▷ Password> system
- ▷ Server>>

system is the privileged password.

3) To change the login password, enter:

   - ▷ Server>> change server login password **"password_1"**

   "password_1" is the new login password.

> *NOTE: To mix upper and lower-case characters they must be enclosed in quotes, as in **"password_1".***

4) To change the privileged password, enter:

   - ▷ Server>> change server privilege password **"password_2"**

   "password_2" is the new privileged password.

5) Enter **sync**. The new passwords are now in effect.

Disabling a Protocol

With revision 4.5, all protocols are enabled by default. We suggest disabling all unused protocols. This will reduce the amount of traffic on the network. Disable protocols with the following command:

- ▷ Server>> change server authorized protocol **"protocol"** disable

Changing the IP Address and Subnet Mask

If the RARP daemon was not found on the system, or if a subnet mask is required that is different from the default, log in directly to the printer server.

1) Log in to the printer server with supervisor privilege.
2) Change the IP address:

   - ▷ Server>> define server ip **ddd.ddd.ddd.ddd**

   where **ddd.ddd.ddd.ddd** is the IP address assigned by the network administrator. For example:

   - ▷ Server>> define server ip 138.239.252.183

3) If the network uses subnet routing, the subnet mask may need to be changed from its default setting:

   ▷ Server>> define server subnet **mmm.mmm.mmm.mmm**

   where **mmm.mmm.mmm.mmm** is the subnet mask.

   For example,

   ▷ Server>> define server subnet 255.255.240.0

4) After entering the IP Address and subnet mask, enter:

   ▷ Server>> sync

   ▷ Server>> init delay 0

   ▷ Server>> logout

5) Disconnect and then reconnect the power.

6) Log in to the host and edit the file **/etc/hosts** (or **/usr/etc/hosts**) by adding a line describing the server as follows:

   ▷ Server>> **ddd.ddd.ddd.ddd server_node_name**

   where **ddd.ddd.ddd.ddd** is the assigned IP address from Step 2 and **server_node_name** is the symbolic name describing the printer server.

   For example,

   ▷ 138.239.252.183 **my_printer**

Changing the Default Server Name

This name begins with a three digit prefix unique to the type of printer server. The remaining digits are taken from the last six characters of the MAC address, without the dashes. For example, the prefix for the NETQue Pro2 is NP2. Combined with a MAC address such as 00-00-C9-00-02-E6, the default server name for this printer server will be NP20002E6.

1) Log in to the printer server with supervisor privilege:

2) To change the server name, enter:

   ▷ Server>> define server name "**name**"

   where **name** is the new server name.

3) Enter **sync** and initialize the printer server.

- ▷ Server>> sync
- ▷ Server>> init Delay 0

Changing the Default Printer Name

To change the printer server default name, create a new name, then delete the original name.

Create New Name

1) Log in to the printer server with supervisor privilege.
2) To view the current service configuration, enter:
   - ▷ Server>> show service local
3) Enter the following command:
   - ▷ Server>> change service **"Emulex_1"** protocol **protocol** enable

   where **Emulex_1** is the service_name and **protocol** is the name of the protocol the network is using.

> ***NOTE:*** *To mix upper and lower-case characters they must be enclosed in quotes (i.e., "Emulex_1")*

Deleting the Default Printer Server Name

Creating a new printer name does not overwrite the existing printer name. To avoid possible confusion, delete the original printer name.

1) To delete the default printer server name, enter:

   ▷ Server>> change service **default printer server name** protocol **protocol** disable

> *IMPORTANT: Include the* ***disable*** *parameter in the above command; otherwise, all protocols* ***except*** *the one you designate will be disabled for this service.*

2) To view the current service configuration, enter:

   ▷ Server>> show service **service_name** char

   This displays the service configuration, including port number, service name, and protocol.

Specify Service Name

Use the following command to assign a TCP port number and service name to the remote printer service:

▷ Server>> change **service_name tcp_port** port **n** telnet disabled

where **service_name** is determined by you (e.g., **laser_printer**), **tcp_port** is the TCP port number (e.g., **3002**) **n** is the physical printer server port number.

Changing Service Priority

Services operate on a First-In-First-Out (FIFO) basis. As files are sent to the printer server whre they are processed and sent to the printer in the order in which they are received, regardless of their source or protocol.

In some situations, it is beneficial to establish a priority system in which files from a certain host or those using a particular protocol will be processed first. To change a service priority, perform the following steps:

1) Log in to the printer server with supervisor privilege.

2) To change the service priority, enter:

   ▷ Server>> change service **service_name tcp_port** priority **n**

   where **n** is the priority value from 0 (lowest) to 15 (highest):

   All files sent to this new service take priority over files sent to the default services. The highest priority files are processed first, followed by files sent to the default services.

Changing the Parallel Port

The printer server parallel port is capable of supporting the Boise (IEEE 1284) bi-directional interface as well as the default Centronics interface type. In addition the port name can be changed.

Enable or Disable Bi-Directional Interface:

1) Log in to the printer server with supervisor privilege.
2) To enable bi-directional operation enter:

   ▷ Server>> change port 1 bi-di enable

3) To disable bi-directional operation enter:

   ▷ Server>> change port 1 bi-di disable

4) To verify, enter:

   ▷ Server>> show port 1 hardware

Changing Port Name:

1) Log in to the printer server with supervisor privilege.
2) Enter the following:

   ▷ Server>> change port 1 name **port_name**

   where **port_name** is the desired new name.

   For example:

   ▷ Server>> change port 1 name **Laser_Printer**

3) To verify, enter:

   ▷ Server>> show port 1 local

Changing the Serial Port

The printer server serial port may be configured in three ways:

1) Serial Printer/Temporary Console Terminal Port (default)
2) Permanent Console Terminal Port
3) Host Serial Port

NOTE: The serial port number is 3 for the Emulex NetQuePro2. The serial port number is 2 for all other Emulex printer servers..

Serial Printer/Temporary Console Terminal Port

The default serial port configuration supports a serial printer/plotter and accepts temporary operation of a console terminal. To configure the port for a serial printer with a baud rate other than the default 9600, enter:

▷ Server>> change port_**n** speed **baud_rate**

where **baud_rate** is the desired rate.

To assign a different name to the port, enter:

▷ Server>> change port_**n** name **printer_name**

where **printer_name** is the desired name.

NOTE: For LAT printing, be sure to disable autoprompt:

▷ Server>> change port_**n** autoprompt disable

For example, to set up a high-speed plotter with a unique name that supports 38,400 baud and requires CTS flow control, you would enter the following commands:

▷ Server>> change port_**n** name "**Plotter_1**"

▷ Server>> change port_**n** speed **38400**

▷ Server>> change port_**n** flow control **cts**

NOTE: Quote marks are required when mixing upper and lower case characters.

To return the port to its default configuration, enter the following commands:

- Server>> change port_**n** speed 9600 parity none
- Server>> change port_**n** flow control xon
- Server>> change port_**n** access dynamic autobaud disabled

When using the serial port for a temporary console terminal, all printer connection requests for that port are rejected until log out.

Permanent Console Terminal Port

The serial port may also be configured as a permanent console terminal port. To configure a permanent console port, use the following commands:

- Server>> change server **console** port_**n**
- Server>> change port_**n** access **local**
- Server>> change port_**n** autobaud **enabled**

To change the baud rate, character (word) size, or parity, enter a command similar to the following:

- Server>> change port_**n** speed **9600** character **8** parity **none**

NOTE: The printer server will still advertise its default print services for this port. If a file is sent, the queue may hang up because the access is not local. If the port is configured this way, ensure all users on the network are aware that printer services are not available for the serial port.

Host Serial Port

A host serial port allows for the connection of a serial port of a host (HP 3000, PC, SparcStation, etc.) directly to the printer server.

In this configuration, files sent via the serial port are time-shared with files sent via the Ethernet connection. Flow control is used to control printing and to prevent a single source from tying up the printer server.

To configure the serial port to receive files directly from a host's serial port, use the following commands:

- ▷ Server>> change port_**n** access **slprt**
- ▷ Server>> change port_**n** autobaud **disabled**

For the HP 3000, the required commands are:

- ▷ Server>> change port_**n** access **slprt** flow control **hp3000**
- ▷ Server>> change port_**n** autobaud **disabled**

Changes can also be made to the baud rate, character (word) size, parity, or flow control to match the port characteristics of your host's serial port. For example, if the host is capable of 38,400 bps with even parity, enter the following:

- ▷ Server>> change port_**n** speed **38400** parity **even**

NOTE: The printer server will still advertise its default print services for this port. Because no printer is connected, the user will receive a message that the printer is stalled or unavailable. If the port is configured in this way, ensure all users on the network are aware that printer services are not available for the serial port.

Specify Multiple LPD Services

Beginning with printer server software release **4.12**, multiple **LPD** services can be configured for a printer server.

1) Log on to the printer server as a privileged user.
2) Enter:

▷ Server>> change service lpd port **n** disable

where port **n** is the physical port number on the printer server.

This effectively configures the physical port on the default lpd service as "NONE" which allows redirecting of the **LPD** service to other service records.

To define a new service for each **LPD** printer queue (**queue_name**), enter:

▷ Server>> change service **queue_name TCP_port n** port **n** telnet disable

▷ Server>> show port **n**

where **queue_name** is the printer name on the host, **TCP_port n** is the virtual TCP port and port **n** is the hardware port number. By default, no filtering (PASSTHRU) is performed on the data stream, so the TEXT filter must be entered if carriage return insertion is desired.

On the TCP host, the new printer queue is referenced by the service name. For example, on a BSD UNIX, the printcap "rp" field would be assigned the service name (**queue_name**).

For example, to configure a text printer named HPLJ4 on physical port 1 using TCP port 3001, enter:

▷ Server>> change service **HPLJ4 3001** port **1** filter **enable** telnet **disable**

NOTE: *The TCP port specified (3001) is required mainly for syntactical purposes to define a new TCP/IP service. The LPD protocol will still use TCP Port 515. However, any print jobs sent to TCP Port 3001 (e.g., via rprint) will also use the "HPLJ4" service and be directed to physical port 1.*

Example of LPD Printcap File

```
LJ4_PCL|HP_LaserJet_4|port_1:\
:lp=:\
:rm=node_name:\
:rp=HPLJ4:\
```

```
:mx#0:\
:lf=/usr/spool/lpd/ERRORLOG:\
:sd=/usr/spool/lpd/LJ4_PCL:
```

Specify a Single LPD Service

1) Log on to the printer server as a privileged user.

   Enter:

   ▷ Local> change service lpd **port_n** disable

   where **port_n** is the printer server's hardware port.
   This effectively configures the physical port on the default **lpd** service as "NONE," which allows redirecting of the **lpd** service to other service records.

2) To define a new service for each **lpd** printer queue **(queue_name),** enter:

   ▷ Local> change service **queue_name TCP_port n**
   port **n** filter **enable** telnet **disable**

   By default, no filtering (PASSTHRU) is performed on the data stream, so the TEXT filter must be entered if carriage return insertion is desired. On the TCP host, the new printer queue is referenced by the service name, that is, the "-p" argument in the lpd command would be assigned the service name **(queue_name).**

   For example, to configure a text printer named HPLJ4 on physical port 1 using TCP port 3001, enter:

   ▷ Local> change service **HPLJ4 3001**port **1** filter **enable** telnet **disable**

NOTE: The specified TCP port (3001) is required mainly for syntactical purposes to define a new TCP/IP service. The LPD protocol will still use TCP Port 515. However, any print jobs sent to TCP Port 3001 (e.g., via rprint) will also use the "HPLJ4" service and be directed to physical port 1.

For example, using the new queue name HPLJ4 on a printer server with node name GRP1PRNTR, enter:

▷ lpr HPLJ4 -sGRP1PRNTR **filename**

where **filename** is the name of the test file to be printed.

Specify Gateway

If the network uses a gateway or router to connect networks together, specify the gateway node in the printer server configuration. Otherwise, hosts not on the local network (relative to the printer server) will not be able to send print jobs.

1) Log in to the printer server.
2) Define the gateway using one of the following commands:

▷ Server>> change node IP **ddd.ddd.ddd.ddd** gateway **default**

or

▷ Server>> change node **node_name** IP **ip_address** gateway **default**

The keyword **default** is used to specify the default node in case no other route can be found to a remote node. In addition to the IP address, a **node_name** can be supplied.

Only a single gateway node may be defined per command line. To define more than one node (up to eight), enter the above command for each node. Only one node can be the default. For example, the following commands define two separate gateway nodes, with one as the default:

▷ Server>>change node **king** IP 138.239.245.1gateway **default**

or

▷ Server>>change node IP 138.239.245.248 gateway netip **1.2.3.0**

The second gateway will be used for routing to network **1.2.3.0** and **king** will be used for all other routes.

Change Test Parameters

A printout of the printer server test parameters is a useful reference when modifying the network to use the printer server or when troubleshooting. A new option has been added to the **Set Server** command in software release **4.15** which prevents unintentional printing of test sheets (e.g., to special

purpose printers). The default is **Enable**, which will ensure availability on initial installation. To change this option, use this syntax:

▷ Server>> **Change** Server Printconfig **Disable**

To revert back to the default,

▷ Server>> **Change** Server Printconfig **Enable**

A new addition to the Show Server display indicates whether the configuration printing is enabled or disabled.

▷ Server> show server

Set Server Print Configuration

A printout of the printer server configuration parameters is a useful reference when modifying the network to use printer server or when troubleshooting. A new option has been added to the **Set Server** command in software release 4.15 which prevents unintentional printing of configuration sheets (e.g., to special purpose printers). The default is **Enable**, which will ensure availability on initial installation. To change this option, use the following syntax:

▷ Server>> **Change** Server Printconfig **Disable**

To revert back to the default,

▷ Server>> **Change** Server Printconfig **Enable**

A new addition to **show | list | monitor** display indicates whether the configuration printing is enabled or disabled.

Printing with PS & PCL

Many printers may be equipped with both PostScript (PS) and Printer Command Language (PCL) instruction sets. Switching between PostScript and PCL is relatively easy. However, problems may arise when a printer's settings are changed and those modifications are not communicated to other users on the network. Ideally, if both types of printing are required, two printers; one set for PCL and the other for PostScript printing, may be the best solution.

Some printers such as Hewlett Packard's LaserJet 4 and 4Si have automatic PostScript sensing which allow PostScript and PCL files to print without changing parameters. Most printers allow switching languages through front

panel controls. For these features, consult the instruction manual for the printer.

Using Printer Control Codes

Printer control codes may be entered into host configuration files, but the procedure varies with each system. If control codes are used, observe these cautions:

- A network printer's settings should be changed as little as possible.
- If modes are changed between PCL and PS, all users should use the printer's internal scaleable typefaces to avoid potential problems with downloadable fonts.
- For PostScript job configurations, enter: NO BANNER/ NO FORM FEED/NO TABS.

The following instructions give guidance for changing printer definitions and configuration files within particular Network Operating Systems.

Printer Control Codes in Novell NetWare

The network administrator or appointee with similar access and expertise is normally responsible for changing printer definitions and configuration files. On Novell networks, utilities such as PRINTDEF and PRINTCON are used to create two different definitions, one PostScript and one PCL. The same printer can have two different configuration names. PRINTDEF may already have devices called "PCL" and "PS" as part of its Defined Print Devices menu.

To create a printer definition, enter the correct escape sequences on the Function Definition form. The following examples are used for the HP LaserJet 4. The symbol <Esc> represents the Escape key. Enter all spaces exactly as shown.

To switch to PCL, use the following codes:

▷ <Esc>%-12345X@PJL enter language = PCL<LF>

To switch to PostScript, use the following codes:

▷ < Esc >%-12345X@PJL enter language =postscript<LF>

For the Universal Exit Language, use these codes:

▷ <Esc>%-12345X

Printer Control Codes in TCP/IP

Some systems have utilities which permit sending control codes directly to the printer. The PRINTCAP file can be used to create printer definitions. Use the PCS parameter to send a prefix control string and SCS to send a suffix control string.

To switch a LaserJet 4 printer to PCL in PRINTCAP, enter this string exactly as shown on a single line:

▷ :emlx_pcs=\033%-12345X@PJL enter language = PCL\012:\

Network Management & SNMP

Network management and performance evaluation features are available on the printer server through the Simple Network Management Protocol (SNMP) and an Emulex Private Management Information Base (MIB). The use of SNMP requires that the TCP/IP protocol is enabled on the printer server.

SNMP

SNMP (Simple Network Management Protocol) is a standard by which a network manager may acquire statistics and configuration information from the printer servers and other devices on the network. This is accomplished through a Network Management Station (NMS). Printer servers can send alarms to the NMS to inform the manager of critical server events. This information goes to the trap host. The manager can analyze data from the trap host and make adjustments to enhance overall network performance.

A MIB is a management information base that contains related information (such as that from the counters) which a device makes available to SNMP. The printer server supports the following standard MIBs:

- MIB II (defined in RFC 1213)
- Character Device MIB (defined in RFC 1316)
- RS-232-like device MIB (defined in RFC 1317)
- Parallel Printer-like device MIB (defined in RFC 1318)

- Emulex Private MIB (described in the **emulex.mib** file on the distribution diskette)

For further information on SNMP and MIB refer to the following:

- RFC 1155 - Structure and Identification of Management Information for TCP/IP-based Internets (SMI)
- RFC 1156 -Management Information Base for Management of TCP/IP internets (MIB)
- RFC 1157 A Simple Network Management Protocol (SNMP)
- The Simple Book An Introduction to Management of TCP/IP-based Internets

The Emulex MIB is fully described in the **readme.mib** file located on the UNIX distribution diskette.

The procedures in this section depend upon the user possessing a working knowledge of SNMP. Emulex recommends careful study the above documents before continuing. Privileged status for the printer server and supervisor privileges on the hosts are required.

Printer Server SNMP Setup

The network administrator must configure the SNMP parameters for each printer server as follows:

- Verify each printer server is installed and configured for the network. Because SNMP is a part of the TCP/IP protocol, the printer servers must be correctly configured for that protocol.
- Define SNMP community name and associated access mode with the command:

  ▷ **Server>>** change snmp community **name** access **mode**

  Name is the community name and **mode** is the access mode for the community. Access modes may be read, read/write, or none. These parameters must match those configured in the NMS. The factory defaults are: community name of **public** and access mode of **read**.

- Define the IP address of an SNMP trap host in the printer server's internal SNMP table by entering this command:

  ▷ **Server>>** define snmp trap ip **ddd.ddd.ddd.ddd**

ddd.ddd.ddd.ddd is the IP address of the trap host. This step is optional. The following traps are currently supported:

- ▷ coldStart(0)
- ▷ authenticationFailure(4)

- If the Network Management Station (NMS) and the printer server are on different networks or different subnets, verify routing is correct.

NMS Setup

To install and configure SNMP on the NMS, follow the instructions below. Specific procedures will vary for different network management software running on different hosts.

1) Install the network management software on the NMS host according to the documentation for the application package.
2) Compile the Emulex MIBs contained in the file **emulex.mib**. This file was placed on the host when the host software was installed.
3) Set up SNMP community names and their associated access rights to match those that will be used by the printer servers. The default community name is usually **public** and the default access is usually **read-only**.
4) Set up the node name of each printer server and its associated IP address in the NMS host. On a UNIX host, this is usually done by making an entry for each server in the **/etc/hosts** file.
5) If the NMS and the printer server are on different networks or subnets, enter routing information for each server in the NMS' routing table. Refer to the NMS host documentation for further information.

Emulex Private MIB

The complete definition of the Emulex Private MIB is provided in the **readme.mib** file on the UNIX distribution diskette. The MIB is provided in ASN.1 syntax and may be run through any standard MIB compiler. ASN.1 stands for Abstract Syntax Notation One. This syntax is used in Requests for Comment (RFCs) to define management information bases (MIBs). The MIB compiler converts ASN.1 definitions to C code.

The Emulex private MIB provides the Network manager with access to most of the information that is normally accessible via the printer server command

set for configuring the server via SNMP. Some of the objects identified by this MIB are not applicable to the printer server.

Enabling/Disabling SNMP Sets

For security purposes, the SNMP sets are disabled to prevent unauthorized access and use. In order to use these sets, the network administrator must enter the following command to enable or disable the SNMP sets as necessary:

- Server>> change **snmp set** enabled
- Server>> change **snmp set** disabled

Connectors & Cabling

UTP Connector Pinout

1	Transmit High
2	Transmit Low
3	Receive High
4	No Connection
5	No Connection
6	Receive Low

Parallel Connector Pinout

The following chart shows the wiring and signal/pin assignments for the parallel cable.

> ***NOTE:*** *This pinout must be maintained for bi-di to operate correctly.*

1	Data Strobe	**14**	Auto Feed
2	Data Bit 1	**15**	Error
3	Data Bit 2	**16**	Initialize
4	Data Bit 3	**17**	Select Inhibit
5	Data Bit 4	**18**	Logic Ground
6	Data Bit 5	**19**	Ground (Data Strobe Return Data Bit 1 Return)
7	Data Bit 6	**20**	Ground (Data Bit 2 & 3 Return)
8	Data Bit 7	**21**	Ground (Data Bit 4 & 5 Return)
9	Data Bit 8	**22**	Ground (Data Bit 6 & 7 Return)
10	Acknowledge	**23**	Ground (Data Bit 8 & Acknowledge Return)
11	Busy	**24**	Ground (Busy Return & Paper End Return)
12	Paper End	**25**	Logic Ground
13	Select		

Serial Connector Pinout

The following chart shows the wiring and signal/pin assignments for the serial cable.

1	**DCD**	Data Carrier Default
2	**RXD**	Receive Data
3	**TXD**	Transmit Data
4	**DTR**	Data Terminal Ready
5	**GND**	Ground
6	**DSR**	Data Set Ready
7	**RTS**	Request To Send
8	**CTS**	Clear To Send
9	**RI**	Ring Indicator

Console Connector Pinout

The following chart shows the wiring and signal/pin assignments for the console port connector.

1	**DTR**	Data Terminal Ready
2	**TXD**	Transmit Data
3	**GND**	Ground
4	**RXC**	Receive Data Common
5	**RXD**	Receive Data
6	**DSR**	Data Set Ready

Basic Troubleshooting

When printing problems occur, first check to see if:

1) The printer is turned on and on line
   - On printers with a display panel, the LCD displays **READY**.
   - If the printer's LCD reports an error, refer to the printer User's Guide for further information.
   - Print a test page. This will verify that the printer's internal functions are operating.
   - Print a config page. This will describe the printer's configuration.
   - If the printer or plotter does not have an LCD, ensure that the unit has paper and the paper supply is not jammed.
2) The printer server is properly connected to both the printer and the LAN cable.
   - The green **Power** LED indicates the power supply is working.
   - The yellow **LAN** LED flashes to indicate network activity. If this LED is always off, verify the network is active and is connected to both the host computer and the printer server.
   - The green **UTP** LED indicates a valid 10baseT connection. If this LED is off, examine the twisted-pair cable (if used) for breaks or shorts.
3) Attempt a remote login to the RCF. If unsuccessful, the problem may be with the network facility or in the printer server configuration parameters.
   - If a remote login is possible, the problem may be with the print queue definitions.
   - Connect a terminal and verify that the IP address and subnet mask are correct.

Alarms and Counters

The printer server is capable of monitoring all traffic on the LAN including number of connections, unsuccessful connection attempts, and statistical

data on all transmission packets. When an event occurs, appropriate counters are updated and the event is recorded by an alarm on the console terminal.

If a problem occurs, the network manager can troubleshoot by examining appropriate screens to identify probable cause and take the appropriate action.

Alarms

Alarms indicate the number of nonfatal errors which have occurred since the last server initialization. To examine details of the last 16 alarms, use the command:

▷ Server> show server alarms

The resultant display gives the most recent 16 alarm events, the error number and date and time of the occurrence. To determine the cause of the alarm, contact Emulex Technical Support.

NOTE: An nonfatal error alarm is also a way of communicating information and recording actions on the net. Such an alarm may or may not be an indication of problems.

Counters

Counters provide a record of the total number of bytes and packets handled by the server, and the number and type of errors which have occurred. Three counter displays are available: the Ethernet group, the LAT group, and the TCP/IP group.

If the port is set to PAUSE ENABLED and has a VT100 or ANSI compatible terminal, all three groups may be displayed with the command:

▷ Server> show server counters

Use the keyboard **Up** and **Down** arrow keys to switch between screens. If PAUSE is DISABLED, the desired keyword must be supplied to show a specific group of counters. For example:

▷ Server> show server counters **ethernet**

▷ Server> show server counters **tcp**

▷ Server> show server counters **lat**

Ethernet Counters

The **Ethernet counters** screen contains the following information:

- **Seconds since zeroed** -- time since the server was reinitialized or the command **zero counters all** was issued.
- **Directly Addressed** --- statistics about data sent directly to and from the server. The following fields may be used to determine if the network is overloaded or does not conform to the Ethernet specification:
  - The values reported in **Bytes Received** and **Bytes Transmitted** are the total number of bytes transmitted or received since startup.
  - The value reported in **Frames Sent, Def** is the number of times the server deferred a transmission because the network was busy. In general, this value should be less than 20 percent of the value reported in Frames Transmitted.
  - The values reported in **Frames Sent, 1 col** and **Frames Sent, 2+ col** are the number of frames that have received one or 2+ collisions while trying to transmit. The combined total should be less than 1% of the value reported in Frames Transmitted.
- **Ethernet Failures** - show the number of send or receive failures and identify the possible cause. These fields include:
  - **Send Failures** -- the number of times the server canceled a transmission. It should be zero. If this number is greater than zero, Send Failure Cause gives the reason for the cancellations.
  - **Send Failure Cause** -- the reason transmissions were canceled if Send Failures is greater than zero. This value is a collection of binary flags and more than one bit might be set. For example, the value 100001 indicates that bits 0 (right-most) and 5 are set. Each bit has the following meaning and will remain set until the server is reinitialized or the command **zero counters all** is given.

Bit	*Meaning*
0	The transmission failed after 16 attempts. Indicates either the network is too busy or there is a hardware problem on the network.

1	Carrier was lost during transmission. Indicates a transceiver, cable, or other hardware failure.
4	The frame exceeded the maximum allowed length. Indicates faulty host software.
5	A late collision. Indicates LAN cable is too long.
8	Heartbeat error. If server heart beat is enabled, this message will normally occur up to 200 times per day.
9	Data underflow. Server could not retrieve information from internal memory fast enough. Indicates a hardware problem.

- **Receive Failures** - indicates the number of Ethernet frames received with errors. It should be zero. If this number is greater than zero, Receive Failure Cause indicates the nature of the error.
- **Receive Failure Cause** - indicates the nature of received data errors if Receive Failures is greater than zero. This value is a collection of binary flags, and more than one bit might be set. Each bit has the following meaning (bit 0 is the right-most bit) and will remain set until the server is reinitialized or until the command **zero counters all** is given.

Bit	*Meaning*
0	CRC error.
1	Framing error.
2	Frame length error. The frame exceeded 1518 bytes or is less than 64 bytes.

The Ethernet protocol often produces receive errors. If the number of errors increases, this may indicate the violation of a network configuration rule or a hardware failure somewhere on the network. Additional information is found under these options:

- **Unrecognized Dest** - displays the number of multicast messages the server discarded (e.g., because of an invalid type code).
- **Data Overrun** - displays the number of times the server lost data because of inadequate memory. It indicates a server hardware problem.

- **No Rx Buffer** and **No Tx Buffer -** indicate the number of times the server rejected messages from other nodes due to inadequate internal memory.
- **Broadcast Addressed** - displays bytes and frames transmitted to the broadcast address.

LAT Counters

Server LAT-compatible counters provide this information:

- **Seconds since zeroed** - the number of seconds since the server was reinitialized or the command zero counters all was issued. This time in the format ddd hh:mm:ss is also provided in parentheses ( ).
- **ELT Messages** - shows the number of LAT-compatible packets sent and received by the server, the number of packets that were retransmitted, and the maximum number of consecutive retries.

  The number of retransmitted packets should be less than 1% of the total transmitted packets. The **Max Consec Retry** shows the number of times the server has consecutively retried the transmission.
- The **Retry Disconnects** is the number of times the server terminated a connection because it reached the maximum number of retries
- **ELT Errors** --the number of times specific events occurred. These include:
  - **Discarded Nodes and Serv** -- the number of Ethernet nodes and services that could not be identified by the server because the resource allocation did not permit them to be stored in the server's memory.
  - **Duplicates Rec'd** --the number of LAT-compatible packets received twice by the server. This value should be less than 0.1% of the total received packets.
  - **Illegal Messages Slots**, and **Multicasts** -- the number of badly-formatted LAT-compatible packets received by the server. These values should be zero.
- **Mult Node Addr** -- the number of times that node addresses have changed. This number is incremented if the server receives a multicast announcement from a particular node name and discovers that its address is different from the last time it received an announcement.

To determine the number of times a particular node address has changed, examine the **Address Errors** field in the show node status display.

- **Solicitations** -- the number of host-initiated requests that the server has accepted and rejected from all nodes. An **Accepted** request is one in which the request was placed in the server's queue or the connection was made immediately. **Rejected** requests are ones which were discarded because the queue was full or the group codes (authorized vs. current) did not match.

  To display the number of solicitations accepted and rejected from individual nodes, issue the command:

  ```
  Server> show node counters
  ```

TCP/IP Counters

The server TCP/IP counters screen contains the following information:

- **Seconds since zeroed** -- is the number of seconds since the server was reinitialized or since the command zero counters all was issued. This time in the format **ddd hh:mm:ss** is provided in parentheses ( ).
- **IPDatagrams** -- shows the total number of complete and fragmented transmissions the server has received from all nodes, as well as the total number transmitted.

IP errors include:

- **Datagrams Discarded** -- the number of times a received datagram was discarded due to a bad checksum.
- **Reassembly Errors** -- the number of errors encountered when reassembling receive packets.
- **Routing Failures** -- the number of times a datagram was undeliverable. This occurs when no route to the destination is on the routing table, or an incoming packet was not intended for the server and could not be forwarded.
- **Lifetime Expired** is the number of packets that were transmitted by the server, but expired before reaching their destination.
- **Source Quench Tx** -- the number of times a remote node requested a local node to stop data transmission because the remote node ran out of buffer memory.

- **TCP Packets** -- the number of different packet types transmitted or received by the server. For troubleshooting, see these fields:
  - **Fin** -- the total number of connections that were made and completed (closed).
  - **Retransmits** -- the number of times a packet required retransmission. This value should be less that 1% of the total transmissions.
  - **TCP Errors** -- the number of packets transmitted or received with different types of sequence errors.