

LATprint ThinWire Ethernet Interface

Owner's Manual

Order Number: EK-LATPR-OM. A01

First Printing, August 1992

The information in this document is subject to change without notice and should not be construed as a commitment by Digital Equipment Corporation. Digital Equipment Corporation assumes no responsibility for any errors that may appear in this document.

The software described in this document is furnished under a license and may be used or copied only in accordance with the terms of such license.

No responsibility is assumed for the use or reliability of software on equipment that is not supplied by Digital Equipment Corporation or its affiliated companies.

Restricted Rights: Use, duplication, or disclosure by the U.S. Government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013.

© Digital Equipment Corporation 1992.

All Rights Reserved.
Printed in U.S.A.

The postpaid Reader's Comments forms at the end of this document request your critical evaluation to assist in preparing future documentation.

The following are trademarks of Digital Equipment Corporation: A-to-Z, DECnet, DECprint, LATprint, MicroVAX, MicroVMS, PrintServer, Scholar, TK, ThinWire, ULTRIX, VAX, VAXcluster, VAXstation, VMS, VT, and the DIGITAL logo.

PCL and LaserJet are registered trademarks of the Hewlett-Packard Company, PostScript is a trademark of Adobe Systems Incorporated, which may be registered in certain jurisdictions, and Macintosh is a registered trademark of Apple Computer, Incorporated.

S2002

This document was prepared using VAX DOCUMENT, Version 2.0.

FCC NOTICE:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

Any changes or modifications made to this equipment may void the user's authority to operate this equipment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

This document was prepared using VAX DOCUMENT, Version 2.0.

Contents

Preface	ix
1 Installing the LATprint	
1.1 Inventory	1-2
1.1.1 LATprint ThinWire Ethernet Interface Optional Parts	1-4
1.1.2 LATprint ThinWire Ethernet Interface Components	1-6
1.2 Installing the LATprint ThinWire Ethernet Interface	1-8
1.2.1 Before You Begin	1-8
1.2.2 Attaching the LATprint to the DECclaser 2100/2200 Series Printers	1-9
1.2.3 Attaching the LATprint Interface to the DECclaser 3200 Series Printer	1-11
1.2.4 Attaching the LATprint to the LA324/424 Printer Stand	1-13
1.2.5 Connecting the LATprint ThinWire Ethernet Interface Cables	1-15
2 Constructing Print Queues	
2.1 Setting Up VMS Print Queues Using the Diskette	2-1
2.1.1 Loading From Networked PC's	2-1
2.1.2 Loading From VMS Systems	2-1
2.2 Setting Up VMS Print Queues Manually	2-4
2.2.1 Determining Prerequisite Information	2-4
2.2.2 Setting Up Print Queues for LATSYM	2-8
2.2.2.1 Modifying the LAT Startup File	2-9
2.2.2.2 Constructing the Reset Library	2-10
2.2.2.3 Creating the Queue Startup Information	2-11
2.2.3 Setting Up Print Queues Using DECprint Printing Services	2-14
2.2.3.1 Modifying the LAT Startup File	2-14
2.2.3.2 Modifying the DECprint Printing Services Startup File	2-15

2.3	How to Delete a LATprint Queue	2-15
2.4	LATprint Queue Setup Procedure for ULTRIX	2-17
2.4.1	Verifying That LAT is in Your System Configuration	2-18
2.4.2	Making Special Files for the LAT Ports	2-18
2.4.3	Setting Up LAT Ports for Use With Printers	2-19
2.4.4	Adding Printers With pcsamgr	2-20
2.5	Adding Printers With lprsetup	2-22
2.5.1	lprsetup Command	2-22
2.5.2	Modifying printcap Entries	2-25
2.5.3	Controlling ULTRIX Print Jobs	2-26

3 Managing LATprint

3.1	Remote Management	3-1
3.1.1	Managing LATprint from VMS	3-2
3.1.1.1	Accessing a LATprint interface Repeatedly	3-3
3.1.2	Managing LATprint From ULTRIX	3-4
3.1.3	Local Management	3-5
3.2	LATprint Security	3-5
3.3	Management Commands	3-6
3.4	SET Command	3-6
3.4.1	Setting Port Parameters	3-6
3.4.1.1	Setting Port Parameters from the Menu	3-8
3.4.1.2	Setting Port Parameters By Command Line	3-10
3.5	SHOW Command	3-10
3.5.1	SHOW PORTS	3-10
3.5.1.1	SHOW PORTS by Menu	3-12
3.5.1.2	SHOW PORTS by Command Line	3-12
3.5.1.3	Show Status of Selected Port by Menu	3-13
3.5.1.4	Show Status of Selected Port by Command Line	3-13
3.5.2	SHOW SERVER	3-14
3.5.2.1	SHOW SERVER by Menu	3-14
3.5.2.2	SHOW SERVER by Command Line	3-15
3.6	RESET Command	3-15
3.6.0.1	RESET Command by Menu	3-15
3.6.0.2	RESET Command by Command Line	3-15
3.7	The Command Line	3-16
3.7.1	Command Line Recall and Editing	3-18

4 Troubleshooting

5 Servicing LATprint

5.1	Digital Equipment Corporation Services	5-1
5.1.1	On-Site Service	5-1
5.1.2	Carry-In Service	5-1
5.1.3	Mail-In Service	5-1

A Specifications

A.1	Physical Dimensions	A-1
A.2	Environmental Specifications	A-2
A.2.1	Operating Environment	A-2
A.2.2	Shipping Environment	A-2
A.3	Power Specifications	A-3
A.3.1	Power Supply	A-3
A.3.2	LATprint ThinWire Ethernet Interface	A-3
A.4	LATprint Port Specifications	A-4
A.4.1	Connector Pinout	A-4
A.4.2	LATprint Port Characteristics	A-6

B Using LATprint As a Terminal Server

B.1	Using a Terminal or Personal Computer	B-1
B.1.1	Establishing a Terminal Session	B-1
B.1.2	Verify Ports	B-3
B.1.3	Verify Network	B-3
B.1.4	Ending a Terminal Session	B-3
B.1.5	Last Number Redial	B-4
B.1.6	Interrupting a Terminal Session	B-5
B.1.7	Resuming an Interrupted Terminal Session	B-6
B.1.8	Cycle Forward from an Interrupted Terminal Session	B-6
B.1.9	Cycle Backward from an Interrupted Terminal Session	B-7
B.1.10	Disconnecting an Interrupted Terminal Session	B-7
B.2	Using MOP Console Carrier	B-8
B.2.1	Operating as a Console Requester	B-8
B.2.2	Operating as a Console Server	B-9
B.3	LATprint Commands	B-10

C Related Documentation

C.1	Ordering Information	C-1
-----	--------------------------------	-----

Index

Figures

1	LATprint ThinWire Ethernet Interface Network Connection	x
1-1	Shipping Box Contents	1-3
1-2	LATprint ThinWire Ethernet Interface Options	1-5
1-3	LATprint ThinWire Ethernet Interface Parts Identification	1-6
1-4	Attaching Mounting Strips to the DEClaser 2100/2200 Printer	1-9
1-5	Attaching LATprint ThinWire Ethernet Interface to the DEClaser 2100	1-10
1-6	Attaching Mounting Strips to the DEClaser 3200	1-11
1-7	Attaching LATprint ThinWire Ethernet Interface to the DEClaser 3200	1-12
1-8	Attaching Mounting Strips to the LATprint ThinWire Ethernet Interface	1-13
1-9	Attaching LATprint ThinWire Ethernet Interface to the LA424	1-14
1-10	LATprint ThinWire Ethernet Interface Connections	1-15
1-11	Network Configuration Examples	1-16
1-12	Power Supply Connection and Indicators	1-17
1-13	Connecting the Serial Interface Cable	1-18
A-1	Port Circuit	A-5

Tables

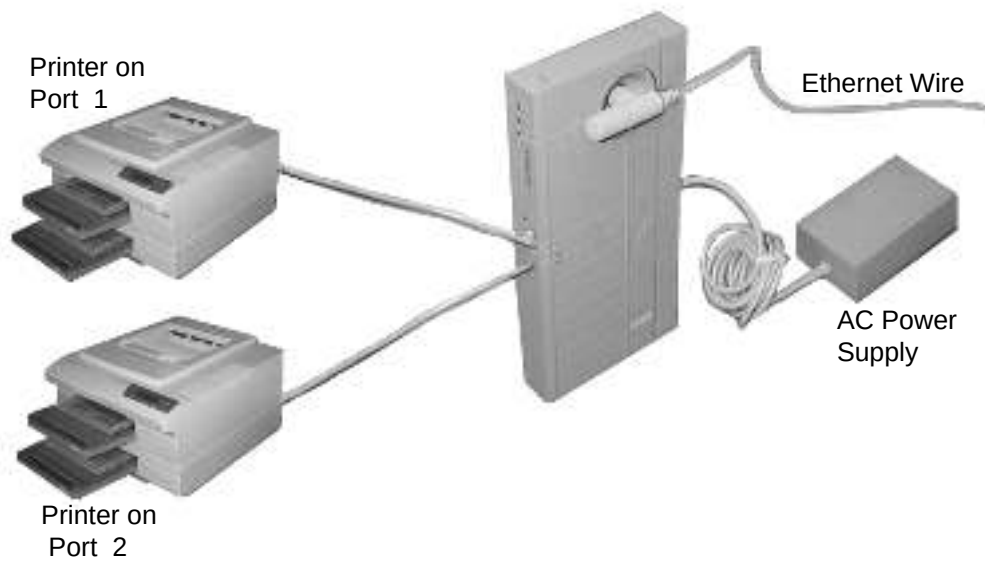
1-1	Optional Parts	1-4
1-2	LATprint ThinWire Ethernet Interface Components	1-7
1-3	Factory Default Port Settings	1-19
2-1	Files Created by LATprint Setup Procedure	2-3
2-2	Selecting a Printer Type	2-5
2-3	LATprint Setup Information	2-7

2-4	Selecting a Printer Type in pcsamgr	2-20
2-5	ADD A PRINTER QUEUE Example	2-21
2-6	Selecting a Printer Type in lprsetup	2-23
2-7	lprsetup Parameters	2-24
2-8	printcap Entry Suggestions	2-25
2-9	ULTRIX Programs that Control Print Jobs	2-26
3-1	Ethernet Circuit Lines for VMS-Based Systems	3-2
3-2	Ethernet Circuit Names for ULTRIX-Based Systems	3-4
3-3	Port Parameters	3-7
3-4	Port Status Description	3-11
3-5	SET, SHOW, and RESET Command Lines	3-17
3-6	Command Line Recall and Editing	3-18
4-1	LATprint ThinWire Ethernet Interface Troubleshooting	4-2
5-1	Questions to Consider Before You Call	5-2
A-1	MMJ Pin Out	A-4
A-2	LATprint Port Characteristics	A-6
B-1	Supported Terminal Characteristics	B-3
B-2	LATprint ThinWire Ethernet Interface User Commands	B-10

Preface

The LATprint ThinWire Ethernet Interface (LATprint interface) provides a direct network connection for one or two printers that have a serial port. The LATprint interface supports Digital's Local Area Transport (LAT) protocol and is designed to work in a ThinWire Ethernet local area network (LAN), as shown in Figure 1.

Figure 1 LATprint ThinWire Ethernet Interface Network Connection



MLO-008962C

Capabilities and Features

The following list highlights some of the many capabilities and features of the LATprint ThinWire Ethernet Interface.

- Plug-and-go installation allows you to connect the printer to the network quickly.
- Small size allows you to mount the LATprint interface directly to your printer.
- Two serial ports with speed selections up to 38.4 K bits per second
- Supports VMS and ULTRIX host operating systems.
- Supports IBM and IBM compatible personal computers and Macintosh computers via Digital's PATHWORKS print services.
- Compatible with LAT V5.0 or higher.
- LATprint management accomplished through the Maintenance Operation Protocol (MOP).
- Configured through either the built-in menu or command line entry.
- Can be used as a terminal server (see Appendix B).
- Indicator lights quickly show the LATprint interface status.

About This Manual

This manual covers the installation, operation, and management of the LATprint ThinWire Ethernet Interface on printers with serial ports.

This guide is organized as follows:

- Chapter 1, Installing the LATprint, describes how to install the LATprint ThinWire Ethernet Interface to the printer and Ethernet. Also covered in this chapter are descriptions of the LATprint interface components, and the prerequisites necessary before you begin the installation.
- Chapter 2, Constructing Print Queues, describes how to set up the printer queues from the VMS startup file on the diskette, or by entering commands manually for VMS or ULTRIX.
- Chapter 3, Managing LATprint, describes remote management, security, and management commands for configuring the LATprint ThinWire Ethernet Interface.
- Chapter 4, Troubleshooting, contains troubleshooting information to help you solve common installation and operating problems. It also contains information about how to obtain service for the LATprint ThinWire Ethernet Interface.
- Chapter 5, Servicing LATprint, describes how to request services by a qualified Digital Customer Services engineer.
- Appendix A, Specifications, describes the physical dimensions, environmental and electrical requirements.
- Appendix B, Using LATprint As a Terminal Server, covers the installation and basic operating information when the LATprint interface is used as a terminal server.
- Appendix C, Related Documentation, lists related documentation and ordering information.

Conventions

The following terms and conventions are used in this manual:

Term/Convention	Meaning
NOTE	Provides additional information.
CAUTION	Provides information for preventing equipment or software damage.
WARNING	Provides information for preventing personal injury.
Bullet (•)	A bulleted statement within a procedure describes a result after performing a step. For example: 1. Press the Pause key to place the printer off line. • The off-line indicator lights.
Arrow (→)	Indicates a special instruction. For example: 1. Stick a set of mounting strips near each end of the BACK side of the LATprint interface. → Peel the plastic backing off the mounting strips.
<i>italic</i>	Indicates a new term or, in command syntax examples, <i>italic words</i> represent elements of a command for which you supply a value. For example: <i>value-name</i>
Return	Key names appear in a box.
BOLD TEXT	Bold text represents literal user input. For example: SET Return
[]	The characters in brackets [] are optional. For example: D[ISCONNECT]

1

Installing the LATprint

This chapter describes how to install LATprint ThinWire Ethernet Interface and connect it to a printer. Also covered in this chapter are descriptions of the LATprint interface components.

Beyond the physical installation of the unit, you also need to know how to set up the print queues, and how to use and manage the LATprint interface. Print queue setup information is in Chapter 2, while management information is covered in Chapter 3.

Be sure to follow all installation instructions in the order given.

1.1 Inventory

Be sure you have the following items before you begin the installation (see Figure 1-1):

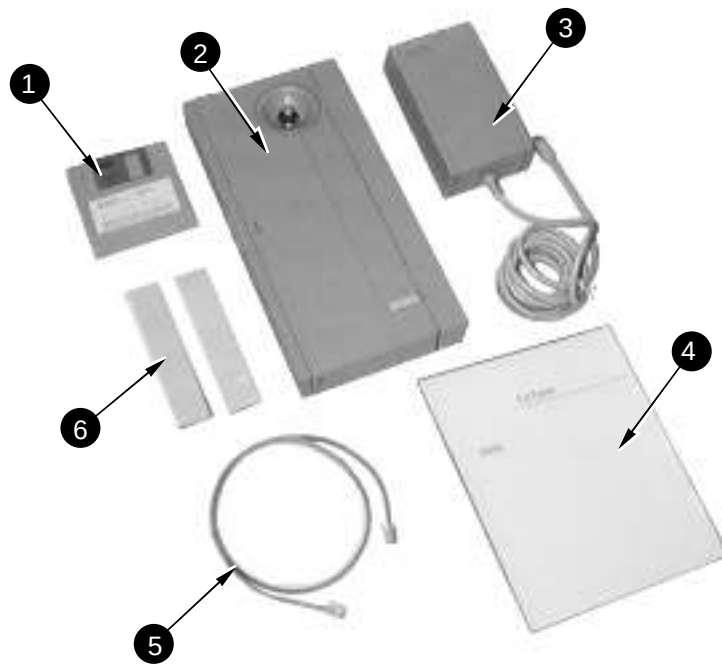
LATprint ThinWire Ethernet Interface shipping box contents:

1. 3.5 inch diskette
2. LATprint ThinWire Ethernet Interface unit
3. Power supply with attached cable (separate cable for non-U.S. versions)
4. Owner's manual
5. Serial interface cable (61 cm/2 feet)
6. Fastener kit (2 sets of hook and loop mounting strips)

NOTE

If an item from the shipping box is missing or damaged, contact your sales agent and delivery carrier immediately.

Figure 1-1 Shipping Box Contents



MLO-008961C

1.1.1 LATprint ThinWire Ethernet Interface Optional Parts

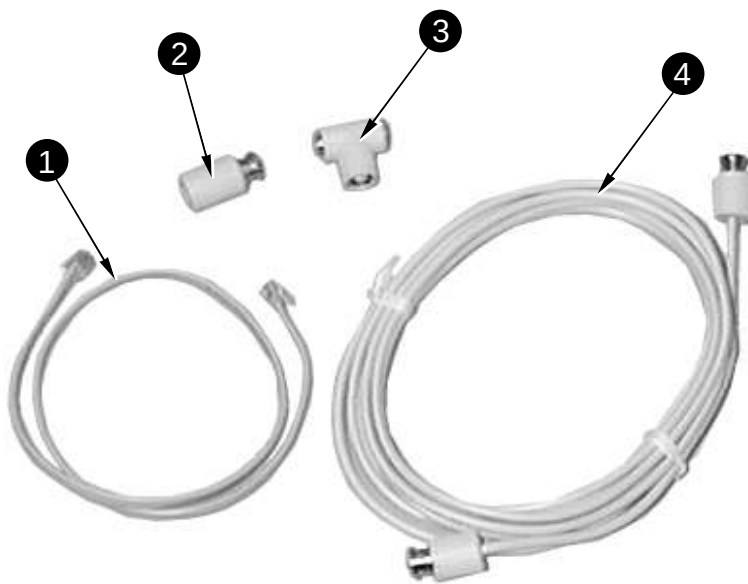
Depending on your particular installation, you may need to order some of the following optional parts:

Table 1–1 Optional Parts

Part	Length	Order Number
1. Serial Interface Cables	2ft (0.6m)	BC16E-02
	10ft (3.1m)	BC16E-10
	25ft (7.6m)	BC16E-25
	50ft (15.2m)	BC16E-50
	100ft (30.4m)	BC16E-A0
2. ThinWire Terminator	n/a	H8225-00
3. T-Connector	n/a	H8223-00
4. ThinWire Ethernet Cables	6ft (1.8m)	BC16M-06
	15ft (4.7m)	BC16M-15
	30ft (9.3m)	BC16M-30
5. MMJ to 25-Pin Female RS232 Adapter - LN03 type (not shown)	n/a	H8575-A
6. MMJ to 25-Pin Male RS232 Adapter - Industry Standard (not shown)	n/a	H8571-E

The options can be ordered by calling your Digital sales representative.

Figure 1-2 LATprint ThinWire Ethernet Interface Options

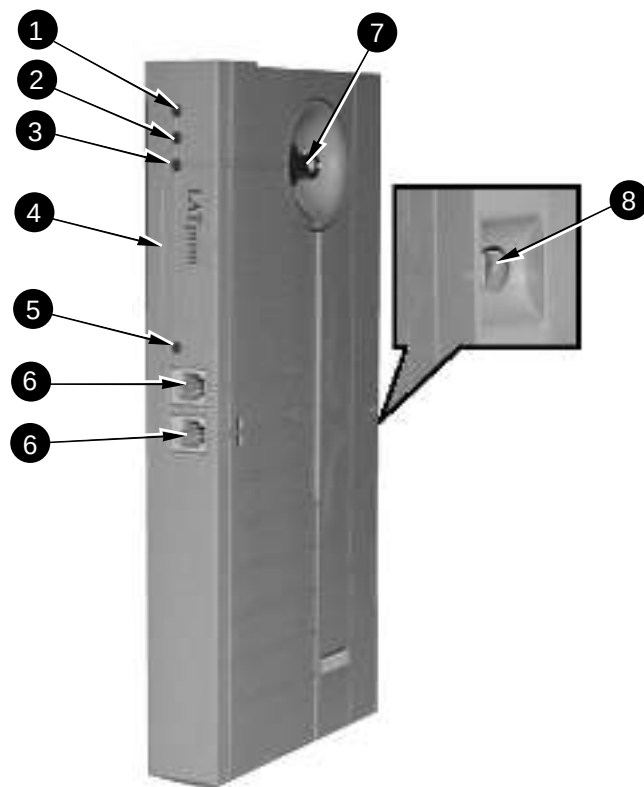


MLO-008963C

1.1.2 LATprint ThinWire Ethernet Interface Components

Figure 1-3 identifies the parts of the LATprint ThinWire Ethernet Interface with which you need to be familiar before installing the unit.

Figure 1-3 LATprint ThinWire Ethernet Interface Parts Identification



MLO-008967C

Table 1–2 LATprint ThinWire Ethernet Interface Components

Component	Function
1. Power Indicator	Lights when power (+5 volts) is supplied to the unit.
2. Self-Test OK Indicator	Lights when the unit has successfully completed its self-test diagnostics.
3. Network OK Indicator	Lights when the unit is connected to a properly terminated network.
4. Physical Address	This is the unique physical address of the LATprint ThinWire Ethernet Interface.
5. Activity Indicator	Lights when data is being transmitted or received by either port. For example, a quick glance at this indicator can tell you if a complex job is still being received by the printer.
6. Port Connectors	The serial interface cables (from the printers) are connected here.
7. Network Connector	The network cable is connected here.
8. Power Connector	The power supply cable is connected here providing +5 volts to the unit.

1.2 Installing the LATprint ThinWire Ethernet Interface

This installation procedure describes how to mount the LATprint ThinWire Ethernet Interface to the DEClaser series of printers, and to the LA324/424 printer.

- For the DEClaser 2100/2200 series of printers, see Section 1.2.2
- For the DEClaser 3200 series of printers, see Section 1.2.3
- For the LA324/424 printer, see Section 1.2.4

If you have a different printer (or you are connecting a terminal), you can mount the LATprint interface in a similar manner, or to a nearby wall.

CAUTION

If you are mounting the LATprint interface to a different device, be sure the LATprint interface does not cover any air vents.

1.2.1 Before You Begin

You should be aware of the following items before installing the LATprint interface.

- You must be running LAT V5.0 or higher.
- If you are using DECprint Printing Services (CPS), it must be V4.1 or higher.
- You need access to several AC outlets: one for the LATprint interface, and one for each printer.
- The physical address printed on the side of the unit.

Write the address in the diagram below:

0	0	0	0	2	8				
---	---	---	---	---	---	--	--	--	--

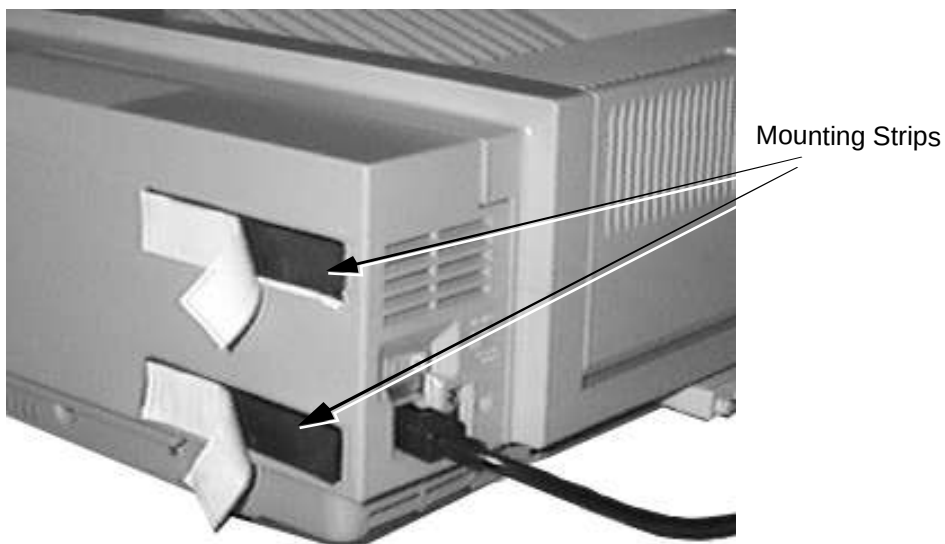
MLO-008965S

1.2.2 Attaching the LATprint to the DEClaser 2100/2200 Series Printers

Use this procedure to attach the LATprint interface unit to the DEClaser 2100 /2200 series printers. This procedure is illustrated using the DEClaser 2100 printer; the procedure is essentially the same for the DEClaser 2200 printer and other similar printers.

1. Peel the plastic backing off one side of each set of mounting strips from the fastening kit.
2. Stick a set of mounting strips to the back of the printer as shown in (Figure 1-4).
 - Peel the plastic backing off the other side of the mounting strips.

Figure 1-4 Attaching Mounting Strips to the DEClaser 2100/2200 Printer



MLO-009453C

3. Attach the LATprint interface to the printer (Figure 1–5).
 - The LATprint interface should be standing (resting) on the table when it is attached to the printer, to provide additional support.

Figure 1–5 Attaching LATprint ThinWire Ethernet Interface to the DEClaser 2100



MLO-008959C

4. Go to Section 1.2.5 to continue the installation.

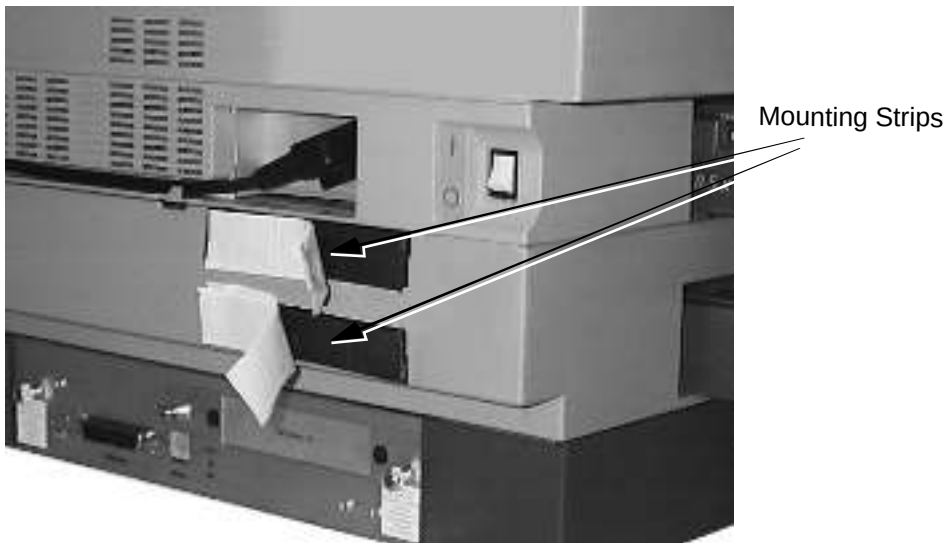
1.2.3 Attaching the LATprint Interface to the DEClaser 3200 Series Printer

To attach the LATprint unit to the DEClaser 3200 printer:

1. Peel the plastic backing off one side of each set of mounting strips from the fastening kit.
2. Stick a set of mounting strips below the power cord connector on the back of the printer (Figure 1-6).

→ Peel the plastic backing off the other side of the mounting strips.

Figure 1-6 Attaching Mounting Strips to the DEClaser 3200



MLO-008968C

3. Attach the LATprint interface to the printer as shown in Figure 1-7.
 - The LATprint interface should be standing (resting) on the table when it is attached to the printer, to provide additional support.

NOTE

The LATprint Interface can be removed easily to access the printer's power cable or circuit board.

Figure 1-7 Attaching LATprint ThinWire Ethernet Interface to the DEClaser 3200



MLO-008958C

4. Go to Section 1.2.5 to continue the installation.

1.2.4 Attaching the LATprint to the LA324/424 Printer Stand

To attach the LATprint unit to the LA324/424 printer stand:

1. Peel the plastic backing off one side of each set of mounting strips.
 2. Stick a set of mounting strips near each end of the **BACK** side of the LATprint interface (Figure 1–8).
- Peel the plastic backing off the mounting strips.

Figure 1–8 Attaching Mounting Strips to the LATprint ThinWire Ethernet Interface



MLO-008966C

3. Attach the LATprint interface to the left side of the printer stand as shown in Figure 1-9

Figure 1-9 Attaching LATprint ThinWire Ethernet Interface to the LA424



MLO-008960C

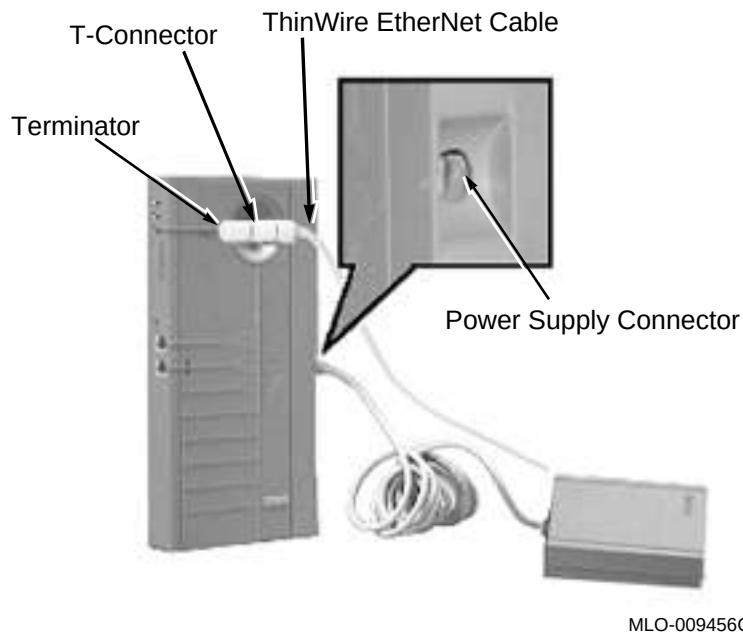
4. Go to Section 1.2.5 to continue the installation.

1.2.5 Connecting the LATprint ThinWire Ethernet Interface Cables

To connect the cables to the LATprint interface:

1. Connect the power supply cable to the LATprint interface power connector.
2. Connect the T-Connector to the LATprint interface network connector.
3. Connect the terminator to the T-Connector.
4. Connect the ThinWire Ethernet wire to the T-Connector.

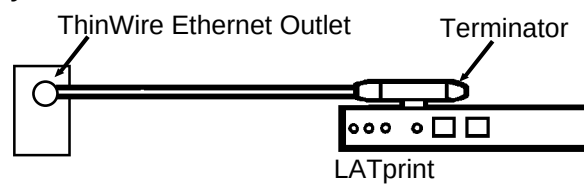
Figure 1–10 LATprint ThinWire Ethernet Interface Connections



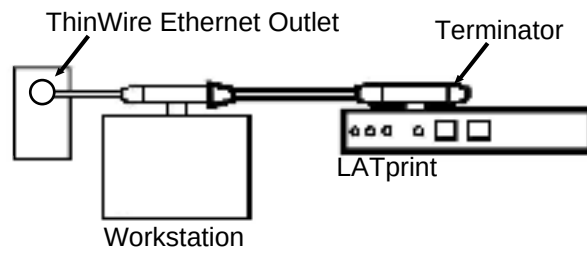
5. Connect the ThinWire Ethernet cable(s) and 50 Ohm terminator according to your particular network configuration (examples A, B, or C) as shown in Figure 1–11.

Figure 1-11 Network Configuration Examples

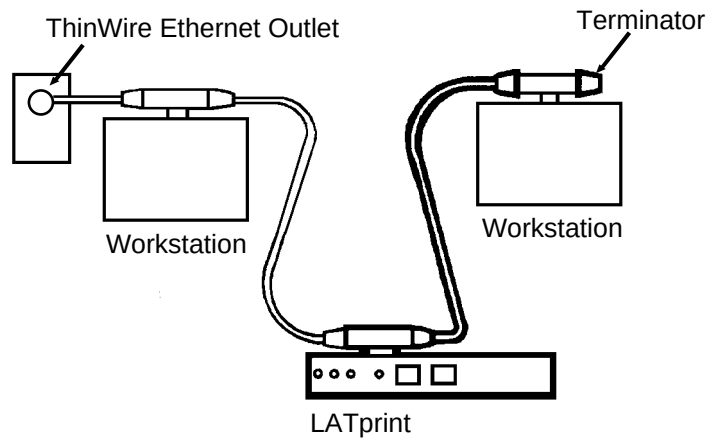
A. Only Device Connected



B. Last Device Connected



C. Connected Between Devices



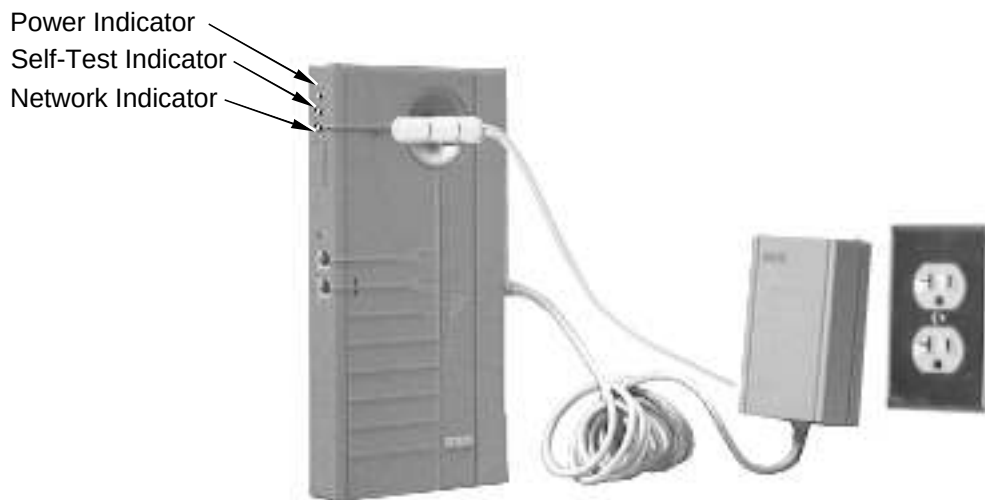
MLO-008964S

6. Plug the power supply unit into the AC wall outlet.
 - The power indicator lights.
 - The self-test indicator lights after the self-test is completed (about 5 seconds).
 - The network indicator lights.

NOTE

See Chapter 5 for troubleshooting information if the LATprint interface did not turn on as described in this step.

Figure 1-12 Power Supply Connection and Indicators



MLO-008979C

7. Connect the serial interface cable from the printer to the appropriate port connector (see Figure 1–13).
 - Table 1–3 lists the power-up factory default settings for each of the ports.
 - If you are connecting a terminal to the LATprint interface, go to Appendix B for information to establish a terminal session.

Figure 1–13 Connecting the Serial Interface Cable

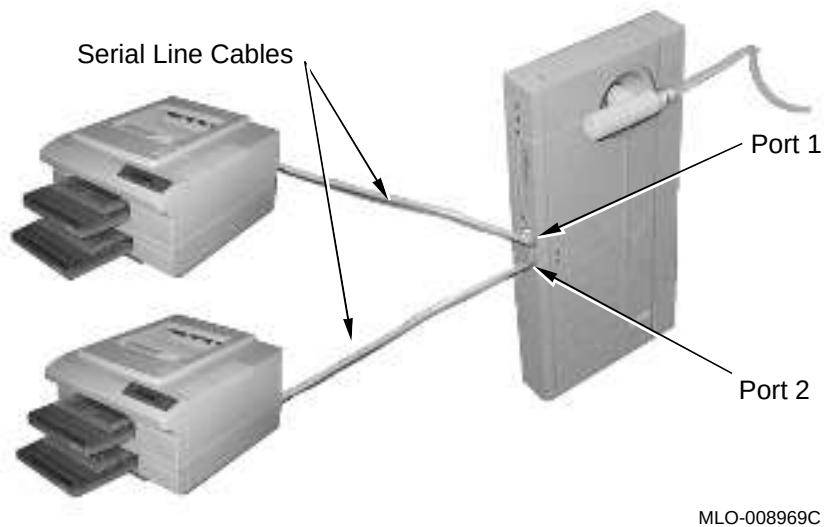


Table 1–3 Factory Default Port Settings

Feature	Default Settings PORT_1	Default Settings PORT_2
Port Name	PORT_1 ¹	PORT_2 ²
Transmit/Receive Speed	19.2K baud	38.4K baud
Input Flow Control ³ (XON/XOFF)	Enable	Enable
Output Flow Control (XON/XOFF)	Enable	Enable

¹PORT_1 is factory set to 19.2K baud to support the DEClaser 1100, 2100, 2200, LA324/424 series printers, and other printers that have a maximum baud rate of 19.2K.

²PORT_2 is factory set to 38.4K baud to support the DEClaser 3200 series printers, and other printers that have a maximum baud rate of 38.4K.

³Input Flow Control should be Disabled if you are using a printer data type other than PostScript or Digital.

For optimal throughput, use the highest baud rate your printer allows (up to 38.4K baud). The printer baud rate setting must match the LATprint interface baud rate. In addition, the printer must be set to:

- 8 bits
- no parity
- one stop bit
- XON/XOFF flow control

If you need to change the setting of any LATprint interface feature, see Chapter 3 for instructions. If you need to change the setting of any printer feature, see your operator's guide for your printer for additional information.

This completes the installation of the LATprint interface to the printer. Refer to Chapter 2 for information about constructing print queues.

Constructing Print Queues

Once the LATprint ThinWire Ethernet Interface is installed, you need to set up print queues that allow users to print files to the printers connected to the LATprint interface. This chapter describes how to set up print queues using the program on the diskette and manually, by entering commands.

See Section 2.1 for information if you are using the diskette to set up VMS print queues. Section 2.2 contains the procedure to manually enter commands to set up VMS print queues. Both LATSYM and DECprint Printing Services procedures are covered in these sections.

See Section 2.4 for the procedures to set up ULTRIX print queues.

2.1 Setting Up VMS Print Queues Using the Diskette

To set up VMS print queues using the diskette you must first copy the setup file from the diskette to a VMS directory.

2.1.1 Loading From Networked PC's

To load from networked PC's, copy the files to your VMS directory using PATHWORKS or the Network File Transfer (NFT) utility. For example:

- For PATHWORKS:
`M:\ > copy b:\vms\setup.com`
- For NFT:
`C:\ > nft copy b:\vms\setup.com vmsnode "username password"::`

2.1.2 Loading From VMS Systems

To load from VMS systems that have a 3.5 inch disk drive, copy the files to your VMS directory using the PCDISK utility. The following example describes this procedure.

1. Enter PCDISK.
`$ MCR PCDISK`

2. Copy the file to your VMS drive.

```
pcdisk> use a: dka500:
```

In the example, dka500 is the VMS device specification of an RX23, or RX23S, 3.5 inch disk drive.

3. Export the file.

```
A:\> export vms\setup.com
```

After completing the export command, the set.com file is automatically transferred to your current directory.

4. Exit PCDISK.

```
A:\> exit
```

5. After the setup file is transferred to your directory, run the setup procedure by entering this command:

```
$ @SETUP
```

The setup procedure collects information by prompting you to enter information needed to construct print queues for printers connected to the LATprint ports.

After successfully running the setup procedure the following files are created in your current directory.

Table 2–1 Files Created by LATprint Setup Procedure

File Name	Function
CQ.COM	Constructs LATprint queues.
DQ.COM	Deletes LATprint queues that were created by the corresponding CQ.COM file.
MOP.COM	Establishes a LATprint management session.

You or your network manager can use the command in the MOP.COM file to manage your LATprint interface. If you are not the system manager, deliver the CQ.COM and DQ.COM files to your system manager.

NOTE TO SYSTEM MANAGER

To construct and start LATprint queues, incorporate commands from CQ.COM into your system startup procedures. To stop or delete LATprint queues created by CQ.COM, use the commands in DQ.COM which provide a convenient means of "undoing" the actions of CQ.COM. Commands in DQ.COM are provided for reference or utility use only.

2.2 Setting Up VMS Print Queues Manually

The following procedure may be used to manually set up print queues on VMS systems for LATprint ThinWire Ethernet Interface connected printers. The procedure takes you through the following tasks:

- Determining prerequisite information, Section 2.2.1
- Setting up print queues using LATSYS, Section 2.2.2
- Setting up print queues using DECprint Printing Services, Section 2.2.3

To set up VMS queues manually, you can type in command lines. Use the procedure outlined in Section 2.2.1 to obtain the necessary prerequisite information, and then write the results in Table 2–3. The information from this table is used to set up the print queues.

NOTE

You must have VMS OPER and PHY_IO privileges to execute the commands used to set up the print queues. If you do not have these privileges, ask your system manager to set up the print queues.

2.2.1 Determining Prerequisite Information

Use the following procedure to obtain the information necessary to set up VMS print queues, and write the results from each step in Table 2–3.

1. Obtain the physical address that you recorded in Chapter 1.
Example: 08-00-2B-27-11-55
2. Derive the LATprint interface LAT node name from the physical address.
Example: LAT_08002B271155
→ Unless you or your network manager have changed the LATprint interface LAT node name, the name is the physical address with the prefix LAT_, without the hyphens.
3. Perform the following steps for each port you intend to configure.
 - a. Determine the LATprint interface port name.
Example: PORT_1
→ Unless you or your network manager have changed the LATprint interface port names, the port name is PORT_1 for port 1, or PORT_2 for port 2.

- b. Choose a VMS LAT Port Name (LTA`nnnn`).

Example: LTA9999

- A VMS LAT port name is needed for each LATprint port. The required name has the form LTA`nnnn`, where `nnnn` is a unique number. Choose a number between 1 and 9999. It is conventional to number LAT printer ports downward from 9999, because LAT port numbers for terminal services generally proceed upward from 1.

To show the VMS LAT port names already in use, type:

\$ SHOW DEVICE LTA

- c. Create a queue name.

Example: LATPR1

- The queue name may be a string of 1 to 31 characters. The character string can include any letters, digits, the dollar sign (\$), and the underscore (_), and must include at least one alphabetic character. To see a list of queue names already in use, type:

\$ SHOW QUEUE/ALL

- d. Determine the printer data type.

- Use the following table as a guide to determine the printer data type.

Example: Digital

Table 2–2 Selecting a Printer Type

Digital Printer	Printer Data Type ¹
DEClaser Series Printers	PostScript HP (LJ2D, PCL) Digital
LA Series Printers (LA424/324 /210/75...)	IBM (Proprinter) Digital
PostScript Printers	PostScript
Other Printers	HP, IBM, Digital, other

¹For data types other than PostScript or Digital be sure to disable input flow control (Section 3.4.1).

- e. Determine the queue processor.

Example: LATSYM

- With printer data types other than PostScript, select LATSYM (see Section 2.2.2).
- For printers employing the PostScript data type, your choices for queue processor include LATSYM and DECprint Printing Services (CPS). If the printer has a DECprint license, choose DECprint Printing Services, (see Section 2.2.3) otherwise select LATSYM to obtain basic PostScript-only printing capability. DECprint Printing Services offers additional printing features such as multiple data types, user notification of printer error and status messages, and more.

- f. Create a description string.

Example: Dick's printer

- The description string may contain up to 255 characters.

Table 2–3 LATprint Setup Information

Step	Parameter	Example	Your Value
1	LATprint Physical Address	08-00-2B-27-11-55	08-00-2B-_____
2	LATprint LAT Node Name	LAT_08002B271155	_____
3	PORT 1		
a	LATprint Port Name	PORT_1	_____
b	VMS LAT Port Name	LTA9999	_____
c	Queue Name	LATPR1	_____
d	Printer Data Type	DEC PPL3	_____
e	Queue Processor	LATSYM	_____
f	Description String	Dick's printer	_____
3	PORT 2		
a	LATprint Port Name	PORT_2	_____
b	VMS LAT Port Name	LTA9998	_____
c	Queue Name	LATPR2	_____
d	Printer Data Type	PostScript	_____
e	Queue Processor	DECprint (CPS)	_____
f	Description String	Jane's printer	_____

2.2.2 Setting Up Print Queues for LATSYM

Use the following procedure to determine the commands you need to place in system startup files to set up LATSYM print queues for LATprint interface connected printers. Use the prerequisite information from Table 2–3 when performing this procedure.

LAT startup information is usually located in a LAT startup file and queue startup information in either a queue startup file or in the site-specific startup file, typically SYS\$MANAGER:SYSTARTUP_V5.COM.

Depending on your system configuration, the LAT startup file that you need to modify is usually named LAT\$SYSTARTUP.COM or LTLOAD.COM. This file is typically located in the SYS\$STARTUP: or SYS\$MANAGER: directory.

Ensure that SYSTARTUP_V5.COM invokes LTLOAD.COM or LAT\$STARTUP.COM, which in turn invokes LAT\$SYSTARTUP.COM. The LAT\$STARTUP.COM or LTLOAD.COM file must be executed after DECnet is running.

To assure that each print job begins with the printer in a known state, it is necessary to instruct LATSYM to send a printer reset command between jobs. A device control library containing reset commands for various printer data types will be located in SYS\$LIBRARY directory.

2.2.2.1 Modifying the LAT Startup File

This section describes the commands that you will need to place in your LAT startup file. The name of the file is usually LTLOAD.COM or LAT\$SYSTARTUP.COM, depending on your system configuration.

1. Create the VMS LAT port.

Example: \$ MCR LATCP CREATE PORT LTA9999

In the example, LTA9999 is the VMS LAT port name.

Format: \$ MCR LATCP CREATE PORT *vms-port-name*

→ The CREATE PORT command of the LAT Control Program (LATCP) creates a VMS logical port to connect with a physical port on a LAT node.

2. Map the VMS LAT port to the LATprint node and port.

Example:

```
$ MCR LATCP SET PORT LTA9999 -  
  /NODE=LAT_08002B271155 /PORT=PORT_1 -  
  /QUEUED /APPLICATION
```

In the example, LTA9999 is the VMS LAT port name, LAT_08002B271155 is the LATprint interface LAT node name, and PORT_1 is the LATprint interface port name.

Format:

\$ MCR LATCP SET PORT *vms-port-name* -
 /NODE=*lat-node-name* /PORT=*lat-port-name* /QUEUED /APPLICATION

→ The SET PORT command maps a VMS logical port to a physical port on a LAT node.

2.2.2.2 Constructing the Reset Library

This section describes the commands you need to construct the LATprint interface reset library. Because you need to enter the <ESC> and ^D characters, Digital suggests you first use an editor such as EDT to create a temporary file containing the commands and then execute the resulting file.

NOTE

In EDT, an easy way to insert ^D is to press **PF1**, **4** on the main keyboard, and then **PF1**, **3** on the numeric keypad.

In EDT, an easy way to insert <ESC> is to press **Ctrl** + **[** twice.

1. Enter the editor. For example:

```
$ EDIT CONSTRUCT_RESET_LIB.COM
```

2. Copy the following commands into the file.

```
$ LIBRARY /TEXT /CREATE SYS$LIBRARY:LATPRINT
$ LIBRARY /TEXT /REPLACE SYS$LIBRARY:LATPRINT SYS$INPUT /MODULE=RESET_PS
$DECK
^D
$EOD
$ LIBRARY /TEXT /REPLACE SYS$LIBRARY:LATPRINT SYS$INPUT /MODULE=RESET_DEC
$DECK

<ESC>[!p<ESC>[<SP>s
$EOD
$ LIBRARY /TEXT /REPLACE SYS$LIBRARY:LATPRINT SYS$INPUT /MODULE=RESET_HP
$DECK

<ESC>]VMS;2<ESC>\<ESC>P<ESC>E<ESC>\
$EOD
$ LIBRARY /TEXT /REPLACE SYS$LIBRARY:LATPRINT SYS$INPUT /MODULE=RESET_IBM
$DECK

<ESC>]VMS;2<ESC>\<ESC>P<ESC>@<ESC>\
$EOD
```

3. Exit the editor.
4. Type @CONSTRUCT_RESET_LIB.COM to execute the commands.

2.2.2.3 Creating the Queue Startup Information

This section describes the commands you need to place in your queue startup file or in your site-specific file to construct LATprint interface queues.

1. Construct a default form for LATprint interface queues.

Example:

```
$ DEFINE/FORM LATPRINT_DEFAULT 1 -  
  /NOTRUNCATE /WIDTH=80 /MARGIN=BOTTOM=0 /STOCK=DEFAULT -  
  /DESCRIPTION="LATprint default"
```

In the example, LATPRINT_DEFAULT is the name of the form, and 1 is the number of the form.

Format:

```
$ DEFINE/FORM form-name, form-number -  
  /WIDTH=80 /MARGIN=BOTTOM=0 /STOCK=DEFAULT -  
  /DESCRIPTION="LATprint default"
```

- LATprint interface queues requires a default form. In VMS each form has a name and a number. Digital recommends the name LATPRINT_DEFAULT for the default form of LATprint interface queues. You need to select the number. A reasonable convention for form numbers is to choose the lowest available form number.

To display the form numbers already in use type:

```
$ SHOW QUEUE/FORM
```

Form name	Number	Description
-----	-----	-----
DEFAULT	0	System-defined default
CPS\$DEFAULT (stock=DEFAULT)	1114	CPS default

- For compatibility with a wide range of printers and application software, the LATprint interface default form differs somewhat from the typical system-defined default form. The width is 80 columns instead of 132, there is no bottom margin instead of the usual 6 lines, and there is no line truncation.

2. Set the VMS LAT port to receive no broadcast messages.

Example: `$ SET TERMINAL /NOBROADCAST /PERMANENT LTA9999:`

In the example, LTA9999 is the VMS LAT port name.

Format: `SET TERMINAL /NOBROADCAST /PERMANENT vms-port-name`

Note

The VMS operating system considers LAT ports to be terminals. The SET TERMINAL command sets characteristics of a terminal.

3. Spool the queue to the system disk.

Example: `SET DEVICE/SP00LED LTA9999`

In the example, LATPR1 is the queue name, and SYS\$SYSDEVICE: is the system disk for spooling.

Format: `$ SET DEVICE/SP00LED vms-port-name`

4. Initialize and start the print queue.

Example:

```
$ INITIALIZE/QUEUE LATPR1 /START -  
  /PROCESSOR=LATSYM /LIBRARY=LATPRINT -  
  /FORM_MOUNTED=LATPRINT_DEFAULT -  
  /SEPARATE=RESET=RESET_DEC /ON=LTA9999
```

In the example,

- LATPR1 is the queue name
- LATPRINT_DEFAULT is the form name
- RESET_DEC is the name of the reset module
- LTA9999 is the VMS LAT port name

Format:

```
$ INIT/QUEUE queue-name/START -  
  /PROC=LATSYM /LIB=LATPRINT -  
  /FORM_MOUNTED= form-name -  
  /SEPARATE=RESET= reset-module /ON=vms-port-name
```

- The INITIALIZE/QUEUE command creates the queue if it does not already exist, it associates a name with the queue, and makes other necessary associations with the queue such as the processor, a library for setup and reset modules, a mounted form, a specific reset module, and a port.

5. Set the queue description.

Example:

```
$ SET QUEUE LATPR1 /DESCRIPTION="LATprint Node LAT_08002B271155 port 1"
```

In the example, LATPR1 is the queue name, LAT_08002B271155 port 1 is the node name and port you want to set up.

Format: SET QUEUE *queue-name* /DESCRIPTION=*description-string*

- The SET QUEUE command changes the attributes of a queue. The /DESCRIPTION qualifier specifies a string of up to 255 characters used to provide information about the queue.

6. Set the queue default job separators and form options.

Example:

```
$ SET QUEUE LATPR1 /DEFAULT=(NOFEED,FORM=LATPRINT_DEFAULT)
```

In the example, LATPR1 is the queue name, and LATPRINT_DEFAULT is the form name.

Format: \$ SET QUEUE *queue-name* -
/DEFAULT=(*option*,NOFEED,FORM=*form-name*)

- The SET QUEUE command changes the attributes of a queue. The /DEFAULT qualifier establishes defaults for certain options of the PRINT command. Defaults are specified by the list of options.
- NOFEED instructs the queue processor to omit sending a form feed character automatically when the printer reaches the bottom margin of the form. The FORM option specifies the default form for jobs submitted without a specific form request.

7. Start the queue.

8. The queue name can now be used in the print command.

Example: PRINT/QUEUE=LATPR1 TEST_FILE.TXT

In the example, LATPR1 is the queue name.

- Refer to your VMS documentation, or online help for more information about the PRINT command and its qualifiers.

2.2.3 Setting Up Print Queues Using DECprint Printing Services

Use the following procedure to determine the commands you need to set up DECprint Printing Services print queues for LATprint interface connected printers. Use the prerequisite information from Table 2–3 when performing this procedure.

2.2.3.1 Modifying the LAT Startup File

This section describes the commands that you will need to place in your LAT startup file. The name of the file is usually LTLOAD.COM or LAT\$SYSTARTUP.COM, depending on your system configuration. This file is typically located in the SYS\$STARTUP: or SYS\$MANAGER: directory.

1. Create the VMS LAT port.

Example: \$ MCR LATCP CREATE PORT LTA9998

In the example, LTA9998 is the VMS LAT port name.

Format: \$ MCR LATCP CREATE PORT *vms-port-name*

→ The CREATE PORT command of the LAT Control Program (LATCP) creates a VMS logical port to connect with a physical port on a LAT node.

2. Map the VMS LAT port to the LATprint node and port.

Example:

```
$ MCR LATCP SET PORT LTA9998 -  
  /NODE=LAT_08002B271155 /PORT=PORT_2 -  
  /QUEUED /APPLICATION
```

In the example, LTA9998 is the VMS LAT port name, LAT_08002B271155 is the LATprint interface LAT node name, and PORT_2 is the LATprint interface port name.

Format:

\$ MCR LATCP SET PORT *vms-port-name* -
 /NODE=*lat-node-name* /PORT=*lat-port-name* /QUEUED /APPLICATION

→ The SET PORT command maps a VMS logical port to a physical port on a LAT node.

2.2.3.2 Modifying the DECprint Printing Services Startup File

Place the following command in your CPS\$STARTUP.COM file and then execute the command.

1. Place the execution queue command in your CPS\$STARTUP.COM file.

Example: CPS\$EXECUTION_QUEUE LATPR1 LTA9998

In the example, LATPR1 is the queue name and LTA9998 is the VMS LAT port name.

Format: CPS\$EXECUTION_QUEUE *queue-name vms-port-name*

2. Execute the command by typing:

\$ @SYS\$STARTUP:CPS\$STARTUP

2.3 How to Delete a LATprint Queue

Use the following procedure when you want to delete a currently established print queue.

1. Stop and reset the queue.

Example: \$ STOP/QUEUE/RESET LATPR1

In the example, LATPR1 is the queue name.

→ This command abruptly stops the print queue and returns control to the system. Any jobs that are currently executing are stopped immediately.

2. Delete the queue.

Example: \$ DELETE/QUEUE LATPR1

In the example, LATPR1 is the queue name.

→ The DELETE/QUEUE command takes effect only if the specified queue (LATPR1) has been stopped first (Step 1.). Any pending jobs in the queue will be deleted when the queue is deleted.

3. Unspool the device.

Example: \$ SET DEVICE LTA9999 /NOSPOOL

In the example, LTA9999 is the VMS LAT port name.

→ This command controls whether files are spooled to an intermediate disk. The /NOSPOOL qualifier stops the files from being spooled to the disk.

4. Delete the VMS LAT port name assigned to the applications port.

Example: \$ MCR LATCP DELETE PORT LTA9999

In the example, LTA9999 is the VMS LAT port name.

→ This command deletes a logical port from a VMS node.

5. Delete the LATPRINT_DEFAULT form.

Example: \$ DELETE/FORM LATPRINT_DEFAULT

In the example, LATPRINT_DEFAULT is the name of the form.

→ This command deletes a form for the printer queue previously established with the DEFINE/FORM command.

→ The print queue is now removed. See Section 2.2 for the procedure to establish a new print queue.

2.4 LATprint Queue Setup Procedure for ULTRIX

The following procedure may be used to manually set up print queues on ULTRIX systems for LATprint interface connected printers. The procedure takes you through the following tasks:

- Defining LAT terminal lines
- Creating device special files using the MAKEDEV command
- Updating the terminal initialization file (/etc/ttys), printer capability database (/etc/printcap), using the lprsetup command

NOTE

You must be logged in as a superuser in order to configure print queues. If you do not have these privileges, see your system manager to set up the print queues.

The lta terminal driver provides support for remote terminals (which includes printer terminal lines) using Local Area Transport (LAT) protocol. The LAT protocol allows you to access printers connected to either port on the LATprint interface. LAT lines are created in sets of 16, and the ULTRIX software provides a default of 16 LAT lines, which corresponds to lta0. The LATprint interface will use up to two of those lines; one for each port.

2.4.1 Verifying That LAT is in Your System Configuration

Use the following procedure to verify that LAT is in your system configuration.

1. Type the following command:

```
# egrep 'LAT|lat|lta'
/usr/sys/conf/vax/[hostname]

# egrep 'LAT|lat|lta'
/usr/sys/conf/mips/[hostname]
```

In the example, the pathname of the system configuration file is `/usr/sys/conf/vax`, or `/usr/sys/conf/mips`, depending on whether you are configuring a VAX or MIPS machine, and the system configuration file name is the host name of the machine in uppercase.

- You should observe the following output:

```
options      LAT
pseudo-device lat
pseudo-device lta
```

If the above command does not yield the output as shown, you must add LAT devices to your system configuration by including the following lines in the system configuration file, if they are not already there:

```
options      LAT
.
.
.
pseudo-device lat
pseudo-device lta
```

After changing the system configuration file, use the “doconfig” command to reconfigure your system. For more information on adding LAT devices to your system see the *Guide to System and Network Setup*.

2.4.2 Making Special Files for the LAT Ports

Use the following procedure to make the special files for `lta0`.

1. Enter this command:

```
# cd /dev ; MAKEDEV lta0
```

→ If the special files already exist, the `MAKEDEV` command will have no effect. If the special files do not exist, `MAKEDEV` will create them.

2.4.3 Setting Up LAT Ports for Use With Printers

Use the following procedure to select the LAT Terminal Line(s) to use with your printer(s), for example /dev/tty15.

1. Modify the LAT printer terminal lines listed in the /etc/ttys file that correspond to the terminal lines you are using for your printer. For example, you may already have an entry similar to the following:

```
tty15 "/etc/getty std.9600" vt100  on  nomodem # LAT
```

If you have a similar entry (or no entry at all), modify it (or insert one) to read as follows:

```
tty15 "/etc/getty 8bit.9600" vt100  off  nomodem # LAT printer
```

Modify one or two LAT terminal entrys, depending on the number of printers you have connected to the LATprint ThinWire Ethernet Interface.

2. Using the following example as a guide, place an lcp entry in the /etc/rc.local file. Be sure the new entry appears after the "local daemons" section:

```
if [ -f /etc/lcp ]; then
    /etc/lcp -s -h /dev/tty14:LAT_08002Bxyyzz:PORT_1 >/dev/console
fi

if [ -f /etc/lcp ]; then
    /etc/lcp -s -h /dev/tty15:LAT_08002Bxyyzz:PORT_2 >/dev/console
fi
```

In the example, tty14 and tty15 are the selected terminal, LAT_08002Bxyyzz is the LAT node name, and PORT_1 and PORT_2 are the LAT port names.

3. To immediately effect the changes, you can enter the following command or reboot the system:

```
# /etc/lcp -s -h /dev/tty14 ; /etc/lcp -s -h /dev/tty15 ; kill -HUP 1
```

2.4.4 Adding Printers With pcsamgr

The “pcsamgr” command allows you to add printers to your system using PATHWORKS for ULTRIX. Use the following procedure to add printers to your system.

NOTE

You must have PATHWORKS for ULTRIX V1.x in order to use this procedure. If you don't have PATHWORKS, see Section 2.5.

Within the pcsamgr program, use the arrow keys to move around the menu selections, and use RETURN to activate the selection.

1. Enter the following command:
pcsamgr
2. From the VIEW menu select Print Queues.
3. From the PRINTER QUEUES form select <ADD>.
4. Using the following table as a guide, determine the printer type to select.

Table 2–4 Selecting a Printer Type in pcsamgr

Digital Printer	Data Type	Printer Type
DEClaser Series Printers	PostScript	declaserps
	HP (LJ2D, PCL)	declaserhp
	Digital	declaserdc
LA Series Printers (LA424/324/210/75...)	IBM (Proprinter)	la75std
	Digital	la75dec

Your printer may not be listed in the table. Select an appropriate printer type from the choices given.

5. From the Printer Type Form, select a printer type and then select <ADD>.

6. Create a unique name for your printer queue, for example `laser1`.
Fill out the ADD A PRINTER QUEUE Form using the following example as a guide.
- Substitute your chosen printer queue name for all occurrences of `laser1`.
 - Substitute your LAT port special file name for `/dev/tty15` in the Device Name field.

Table 2–5 ADD A PRINTER QUEUE Example

Item	Value
Printer Queue Name	<code>laser1</code>
Spool Directory	<code>/usr/spool/laser1</code>
Device Name	<code>/dev/tty15</code>
Baud Rate	9600 ¹
Page Length	66
Page Width	80 ²
Accounting Pathname	<code>/usr/adm/laser1_acct</code>
Accounting Text Filter	leave unchanged
Output Filter	leave unchanged
Error Log Filename	<code>/usr/adm/laser1_err</code>
Comment	Laser printer in secretary's office ³

¹Leave the value of the baud rate item in the table at 9600 even though the printer baud rate may be different.

²For narrow format printers such as DEClaser or LA75, choose 80. For wide format printers such as LA424, choose 132.

³The comment is an arbitrary text string inserted in the printcap file as a comment associated with the printer queue.

2.5 Adding Printers With lprsetup

If you are not using PATHWORKS for ULTRIX, you can use the `lprsetup` command to add printers to your system. The `lprsetup` command allows you to add printers to your system. With information you provide, the `lprsetup` command does the following:

- Creates an `/etc/printcap` entry
- Creates a spooling directory
- Creates accounting files
- Creates error log files

NOTE

The `lprsetup` command is a component of the optional software subset `ULTPRINTxxx` (for VAX machines) or `UDTPRINTxxx` (for MIPS machines). If you have not added the optional subset, you must do so before using the `lprsetup` command. See the *Guide to System Environment Setup* and the `setld(8)` reference page for information on adding software subsets.

2.5.1 lprsetup Command

Before running the `lprsetup` command, you should determine the type of printer you are adding. The `lprsetup` command provides default settings based on the type of printer you specify.

The `lprsetup` command allows you great flexibility in setting up parameters for your printer. For an explanation of the printer parameters, see the *Guide to System and Environment Setup*, and the "printcap(5)" reference page. For sample `/etc/printcap` entries, see the `/etc/printcap.examples` file.

NOTE

At any point during the following procedure, you can terminate `lprsetup` with no modifications to the system files by pressing CTRL/C.

1. Type the following command:

```
# lprsetup
```

2. Select the "add" option from the menu.

ULTRIX Printer Setup Program

Command < add modify delete exit view quit help >: **add**

3. Enter the printer name to add.

→ To accept the default, press **RETURN**.

The `lprsetup` command uses an internal numbering scheme and, by default, assigns the next available number to the printer you are adding. It then automatically assigns the number and `lpdefault-`number (ie `lp7`) as printer names.

4. Using the following table as a guide, enter the type of printer you are adding.

Table 2–6 Selecting a Printer Type in `lprsetup`

Printer	Data Type	Printer Type
DEClaser Series Printers	PostScript	ln03r
	Digital	ln03s
LA424/324/210	Digital	la210

If your printer model is not listed in the table, then select an appropriate printer type from the choices given by `lprsetup`.

5. Enter printer synonyms by which you want the printer known, for example `laser1`.

→ Press **Return** after entering each synonym.

→ When you are finished entering all synonyms, press **Return** again.

6. Accept the defaults or specify the appropriate values for the various printer parameters when `lprsetup` prompts you. Refer to the following table as a guide.

→ Substitute your chosen printer queue name for all occurrences of `laser1`.

→ Substitute your LAT port special file name for `/dev/tty15` in the Device Name field.

Table 2–7 lprsetup Parameters

Item	Value
device pathname	/dev/tty15
accounting file	/usr/adm/laser1_acct
spooler directory	/usr/spool/laser1
printer error log file	/usr/adm/laser1_err
printer connection type	dev ²
printer baud rate	9600 ¹

¹Select 9600, even though the printer baud rate may be different.

²Although lprsetup offers you the opportunity to specify lat as printer connection type, you can specify dev since you have already set up a LAT node name and port name association in your etc/tty15/rc.local file (Section 2.4.3).

7. Type **q** at the “Enter symbol name” prompt.
8. Press Return at the “Are these the final values” prompt.
9. Add a comment, for example:
 # Laser printer in the secretary’s office
 Press Return on empty line to terminate the comment.
 → The comment is an arbitrary text string inserted in the printcap file as a comment associated with the printer queue.
10. To add another printer queue type **add**, otherwise type **exit**.

2.5.2 Modifying printcap Entries

Regardless of whether you used `pcsamgr` or `lprsetup` to add printers, you can use `lprsetup` to modify printcap entries. For example, if you want to suppress the printing of the normal burst page header, you can change the value of the printcap symbol `sh` from off to on using the following procedure.

1. Type the following command:
lprsetup
2. Select “modify” option from the menu.
3. Enter the printer name to modify.
Example: laser1
4. Enter the symbol name to modify.
Example: sh
5. Enter a new value.
Example: on

Table 2–8 printcap Entry Suggestions

printcap Symbol	Value	Description
sh	on	To suppress printing of banner page heading.
fs	03	Recommended if printer data type is PostScript or Digital.
fs	042	Recommended if printer data type is other than PostScript or Digital.
xs	044000 ¹	Recommended value.

¹If `pcsamgr` or `lprsetup` has set a different value, change it to 044000.

6. Press **[Return]** to confirm the new value.
7. Type **q** if you are finished modifying symbol values, otherwise enter another symbol name to modify.
8. Press **[Return]** at the “Are these the final values” prompt.
9. To modify another printer queue, type **modify**.
If you are finished modifying print queues, type **exit**.

For information about additional printcap symbols that you can modify, refer to the printcap manual page.

2.5.3 Controlling ULTRIX Print Jobs

The programs that control the ULTRIX print jobs are shown below. Examples are shown specifically for the LATprint laser1 printer configured in the previous example using the lprsetup command:

Table 2–9 ULTRIX Programs that Control Print Jobs

Program	Description
/usr/lib/lpd	This program, the line printer daemon, is a print spool handler. Normally, the program is invoked at boot time from the "rc" file. The daemon works with several system programs and files to coordinate and synchronize printer activity. The ULTRIX operating system supplies this file. Although you cannot modify the file, you can specify spooling, logging, and locking activities. You must have superuser privileges to access this program.
/etc/lpc	This program lets you control the operation of the line printer system. While most control functions are available only to the superuser, some functions can be accessed by general users.
/usr/ucb/lpr	This program lets you queue files for printing. For example: % lpr -Plaser1 memo.txt or % cat memo.txt lpr -Plaser1
/usr/ucb/lpq	This program lets you examine the status of jobs currently on a print queue. For example: % lpq -Plaser1 If there is a job in the queue, you will observe output similar to the following: laser1 is ready and printing via dev Rank Owner Job Files Total Size active root 25 memo.txt 3410 bytes
/usr/ucb/lprm	This program lets you remove jobs from the print queue. For example: % lprm -Plaser1 25 In the example, 25 is the job number located using the "lpq" command.
/etc/pac	This program generates accounting information about printer use at your site. You must have superuser privileges to use this program.

3

Managing LATprint

You can manage your LATprint ThinWire Ethernet Interface either locally or from a remote device on the network. To manage LATprint interface locally, a terminal is connected to one of the ports on the LATprint interface. To manage it from a remote device, use the Maintenance Operations Protocol (MOP) console carrier. MOP is a maintenance protocol specified in the Digital Network Architecture (DNA) that is used to implement the remote console facility and to perform remote management and loopback tests.

Managing the LATprint interface includes:

- Examining port and server parameters and network counters
- Setting port parameters
- Setting server name, prompt, and zeroing counters
- Security
 - Setting and clearing authorized mode
 - Enabling and disabling manager mode
 - Changing the password

3.1 Remote Management

You can manage the LATprint ThinWire Ethernet Interface from a remote node on the network using NCP from VMS, or the console carrier from ULTRIX. Once the management session is established, use the SET and SHOW commands to examine and set the various port and server parameters. Use the RESET command to reset ports and the server to the power-up state.

3.1.1 Managing LATprint from VMS

The Maintenance Operation Protocol (MOP) facility, used to establish remote management sessions is included as part of the Network Control Program (NCP) facility on VMS operating systems. You need a DECnet license to operate NCP.

You do not need increased user privileges to use NCP to establish a management session. To establish a management session, you must know the following:

- Ethernet address of the LATprint interface to be managed (recorded in Chapter 1)
- Ethernet name of the circuit that contains the LATprint interface

The Ethernet address is on the label of the LATprint interface side panel. You need the circuit name because a VMS operating system may have more than one Ethernet interface. To find out the circuit line name on your system type the following commands:

```
$ MCR NCP
$ NCP> SHOW KNOWN LINES
```

Known Line Volatile Summary as of 14-JUL-1992 15:21:28

Line	State
BNA-0	on

BNA-0 is the line name.

Table 3–1 is a partial list of Ethernet circuit lines, based on system type.

Table 3–1 Ethernet Circuit Lines for VMS-Based Systems

System	Ethernet Circuit Name
VAX 6000 and VAX 9000 XMI computers	MNA-0
BI-based systems (VAX 6300 and VAX 6400 computers)	BNA-0
VAX 4000 computers	ISA-0
MicroVAX/3600/3900 computers	QNA-0
VAXstation 2000 and 3000 computers	SVA-0
VAX–11/780 and VAX–11/785 computers (UNIBUS)	UNA-0

NOTE

MOP will not work across network bridges because the LAT protocol cannot be passed. Both the LATprint interface and the host must be on the same Ethernet segment.

The following example demonstrates the VMS command that is used to establish a management session from a VAXstation 3100 system to a LATprint interface. The Ethernet address of the LATprint interface in this example is 08-00-2B-08-32-2B, and SVA-0 identifies the system's Ethernet circuit name.

```
$ MCR NCP
$ NCP> CONNECT VIA SVA-0 PHY ADDR 08-00-2B-08-32-2B
Console connected (press CTRL/D when finished)
->
```

3.1.1.1 Accessing a LATprint interface Repeatedly

If you need to access a specific LATprint interface repeatedly, you can enter the Ethernet address for it in the NCP database. This is usually done by choosing an arbitrary address in area 13. DECserver names in the NCP database can have a maximum of six characters. The user must have VMS OPER and PHY_IO privileges to modify the NCP database.

For example, if you define your LATprint interface as LATPR on address 13.1 and then access it from a VAX 6400 (Ethernet circuit name BNA-0), you would use the following commands:

```
$ NCP> DEFINE NODE LATPR ADDRESS 13.1 HARDWARE ADDRESS 08-00-2B-08-32-2B SERVICE CIR BNA-0
NCP> SET NODE LATPR ALL
```

To access the LATprint interface, type the following:

```
$ NCP CONNECT NODE LATPR
```

3.1.2 Managing LATprint From ULTRIX

On ULTRIX operating systems, the console carrier (that allows you to establish a remote management session) is a separate utility included as part of the MOP option. The option is part of the regular distribution but is not selected by default and is not included in the basic installation. You can install MOP from the original distribution media by using the `setld` utility. You must have superuser privileges to invoke console carrier.

NOTE

After the console connect, `ccr` for ULTRIX freezes the process. You must have DECnet Phase 5 patched `ccr` executable to operate properly.

After the MOP option is installed, give the LATprint interface a name and a dummy node number, using the `addnode` utility. For example:

```
# addnode 13.1 LATPR
```

After the name and node number are assigned, you can establish the link at any time by using the `ccr` command. For example:

```
# ccr -n LATPR -h 08-00-2B-08-32-2B -c sva-0
```

In this example, the `-h` qualifier is followed by the station address of the LATprint interface unit to be attached. The `-c` qualifier is followed by the name of the Ethernet circuit to use for the connection. Table 3–2 is a partial list of Ethernet circuit names, based on system type.

Table 3–2 Ethernet Circuit Names for ULTRIX-Based Systems

System	Ethernet Circuit Name
VAX 6000 and VAX 9000 XMI computers	mna-0
BI-based systems (VAX 6300 and VAX 6400 computers)	bn-a-0
VAX 4000 computers	isa-0
MicroVAX/3600/3900 computers	qna-0
VAXstation 2000 and 3000 computers	sva-0
DECstation 3000 and 5000 computers	sva-0
VAX–11/780 and VAX–11/785 computers (UNIBUS)	una-0

3.1.3 Local Management

Perform local management of the LATprint interface by connecting a terminal to one of its ports and using the SET, SHOW, and RESET commands. Refer to Appendix B for additional information about using the LATprint interface as a terminal server.

3.2 LATprint Security

Security for the LATprint ThinWire Ethernet Interface is provided by a password-protected management mode. This mode of operation is called *authorized mode* and can be set and cleared as required. When authorized mode is set, the following conditions exist:

- Terminal users can only set the parameters of their own port and show the server's parameters.
- Manager mode must be enabled (password required) to set server parameters or port parameters on a port other than the one to which you are connected.
- Manager mode must be enabled to change the password.

When the LATprint interface is first installed, authorized mode is not set, and you can use either port to set the other port's parameters and the server's parameters. Setting authorized mode requires physically accessing the unit, entering a password, and verifying the password.

NOTE

The unit's power must be cycled (turned off and then on) within one minute of entering the password for authorized mode to be set. Cycling power verifies that you have access to the unit and causes the password to be saved in the unit's Non-Volatile Random Access Memory (NVRAM).

The self-test indicator flashes during the minute you have to power cycle the LATprint interface when changing to authorized mode.

3.3 Management Commands

To manage the LATprint ThinWire Ethernet Interface you use the SET, SHOW, and RESET commands. Use the SET and SHOW commands from the menu to show or set parameters. A command line mode is available for use by network management software, or by users that want to bypass the menu interface. Refer to the Section 3.7 at the end of this chapter, for more detailed information about using command lines to communicate with the LATprint interface.

The following sections show how to use the SET, SHOW, and RESET commands using the menu or the command line.

3.4 SET Command

The SET command allows you to set port or server parameters, zero network counters, and enable and use the LATprint ThinWire Ethernet Interface security features.

3.4.1 Setting Port Parameters

Port parameters can be set from the menu or by a command line entered at the prompt.

The following port parameters can be set for each port:

- Port name
- Port speed (baud rate)
- Input flow control
- Output flow control
- Device type (terminal or printer)
- Local or remote break
- Remote modify
- Test (loopback) operation

Table 3-3 describes each of these port parameters.

Table 3–3 Port Parameters

Field	Description
Port Name	Maximum of six characters. You can use the hyphen (-), underscore (_), dollar sign (\$), or alpha-numeric characters.
Speed	Sets the receive/transmit speed of the port. The speed can be set to one of six values. 1 = 38400 baud ¹ 2 = 19200 baud ² 3 = 9600 baud 4 = 4800 baud 5 = 2400 baud 6 = 1200 baud
Input Control	Enables and disables input flow control (XON/XOFF). E = Enable ³ D = Disable ⁴ C = Clear (send XON)
Output Control	Enables and disables output flow control (XON/XOFF). E = Enable ³ D = Disable C = Clear (send XON)
Terminal /Printer	Selects the type of device connected to the port. T = Terminal P = Printer ³
Break	Determines whether a break is acknowledged locally or remotely. L = Local R = Remote ³
Remote Modify	Enables and disables modification of the port's characteristics by the host system. E = Enable D = Disable ³

¹PORT_2 default²PORT_1 default³Default⁴Input flow control should be Disabled if you are using a data type other than PostScript or Digital.

(continued on next page)

Table 3–3 (Cont.) Port Parameters

Field	Description
Test	Places the selected port into loopback mode. Loopback mode can be used to verify that a port is receiving and sending characters. A port cannot put itself in loopback mode. Y = Yes (loopback mode) N = No ³
³ Default	

3.4.1.1 Setting Port Parameters from the Menu

The following example shows how to change (set) two of the port parameters for PORT_2 from the default settings.

Port name: Change to PRINT
Speed: Change to 9600
Input control: Remains unchanged
Output control: Remains unchanged
Terminal/Printer: Remains unchanged
Break: Remains unchanged
Remote modify: Remains unchanged
Test: Remains unchanged

These changes are reflected in the diagram on the next page (user entries are bolded). To set port parameters from the menu:

1. Type **SET** at the LATprint interface prompt and press Return.
2. Select the port by entering **2** and press Return.

3. Set the parameters in response to the prompts.

- The setting of each parameter is terminated with a Return.
- Entering a Return with no input for a parameter leaves the field unchanged.
- If an incorrect entry is made, the LATprint interface signals the error and waits for a correct entry.

-> **SET** Return

```
1 PORT_1
2 PORT_2
AUTH Authorized
AUTO AutoConfigure
D Dedicated Service
M Manager
O On-Demand Loading
PA Password
PO Port
PR Preferred Service
S Server
```

2 Return

Name	Speed	Input Control	Output Control	Terminal/Printer	Break	Remote Modify	Test
PORT_2*	1 38400*	E Enable*	E Enable*	T Term	L Local	E Enable	Y Yes
	2 19200	D Disable	D Disable	P Printer*	R Remote*	D Disable*	N No*
	3 9600	C Clear	C Clear				
	4 4800						
	5 2400						
	6 1200						

Print 3 9600 | E Enable | E Enable | P Printer | R Remote | D Disable | N No

-> %LATPR-100, Parameters Have Been Changed

->

3.4.1.2 Setting Port Parameters By Command Line

Command line mode allows a port's parameters to be set with a single entry. If you do not want to change a parameter, you do not have to enter data for that particular field.

The format for the command line is as follows:

```
-> SET  
port, name, speed, IFC, OFC, device, break, rem_mod, test
```

Using the same example as above, the command line to change the port name (to PRINT) and baud rate (to 9600), the command line is:

```
-> SET 2,PRINT,9600,,,P,R,, Return  
-> %LATPR-100, Parameters Have Been Changed  
->
```

3.5 SHOW Command

The SHOW command allows you to show port or server parameters, status, and counters. The SHOW command lets you to examine the status of all ports or a selected port. The LATprint ThinWire Ethernet Interface provides additional information when examining an individual port.

3.5.1 SHOW PORTS

The SHOW PORTS command displays the status for each of the LATprint interface ports. The SHOW PORTS command can be entered from the menu or by a command line. Table 3–4 describes each of the fields in the port status display.

Table 3–4 Port Status Description

Field	Description
Name	Shows the name of each port.
Speed	Shows the receive/transmit speed.
In Flow	Tells if the input flow control is enabled or disabled and gives its current state (on/off).
Out Flow	Tells if the output flow control is enabled or disabled and gives its current state (on/off).
Type	Tells if the device type is set for a terminal or printer.
Break	Tells if the port is set for local or remote break.
Rem Mod	Tells if remote modify is enabled or disabled.
Test	Tells if the loopback test is active.
AutoConf	Tells if AutoConfigure is enabled or disabled.
ODL	Tells if On Demand Loading of fonts is enabled or disabled.
Status	Tells if the port is connected to a service, local (the terminal is at the LATprint interface prompt), or off.
Service	Tells the name of the service to which a port is connected.
Node	Gives the name of the node to which a port is connected.
Port	Gives the name of the port to which the LATprint interface is connected.
MOP CC	Gives the address to which a port is connected if a remote management session exists.
Dedicated	Displays the service, node and port parameters if a dedicated service is set.
Preferred	Displays the service, node and port parameters if a preferred service is set.
Frame Err	A counter that gives the number of framing errors for a port.
Queued	Printer ports only. Lists jobs queued to the port (maximum of seven plus one active).

3.5.1.1 SHOW PORTS by Menu

The following example shows the SHOW PORTS command used to examine the status of all the ports. The example shows the command entered interactively.

1. Type **SHOW** at the LATprint interface prompt and press **Return**.
2. Select Ports by entering **P** and press **Return**.

```
-> SHOW Return  
1 PORT_1  
2 PORT_2  
P Ports  
S Server  
D Dedicated/Preferred Service  
P Return
```

Name	PORT_1	PORT_2
Speed	19200	38400
In Flow	ENA/on	ENA/on
Out Flow	ENA/on	ENA/on
Type	PRINTER	PRINTER
Break	REMOTE	REMOTE
Rem Mod	DIS	DIS
Test	NO	NO
AutoConf	DIS	DIS
ODL	DIS	DIS
Status	LOCAL	LOCAL
Fram Err	0	0

3.5.1.2 SHOW PORTS by Command Line

The command line to show ports is:

```
-> SHOW P Return
```

3.5.1.3 Show Status of Selected Port by Menu

The following example shows how to examine the status of a selected port using menu mode.

1. Type **SHOW** at the LATprint interface prompt and press **[Return]**.
2. Select **1** and press **[Return]**.

-> **SHOW** **[Return]**

```
| 1 Port_1
| 2 Port_2
| P Ports
| S Server
| D Dedicated/Preferred Service
|
```

1 **[Return]**

```
Name      Port_1
Speed     19200
In Flow   ENA/on
Out Flow  ENA/on
Type      PRINTER
Break     REMOTE
Rem Mod   DIS
Test      NO
AutoConf  DIS
ODL       DIS
Status    CONN
Service   *
Node      MYNODE
Port      LTA9999
Fram Err  0
```

3.5.1.4 Show Status of Selected Port by Command Line

The command line to show status of a selected port, in this case Port 1, is:

-> **SHOW 1** **[Return]**

3.5.2 SHOW SERVER

The SHOW SERVER command displays the server type, protocol it runs, Ethernet address, server name, network counters, current prompt, status of security, NVRAM, and the network connection.

3.5.2.1 SHOW SERVER by Menu

The SHOW SERVER command can be entered interactively or by a command line. The following example shows the SHOW SERVER command entered interactively.

1. Type **SHOW** at the LATprint interface prompt and press `[Return]`.
2. Select Server by entering **S** and press `[Return]`.

```
-> SHOW [Return]
1 PORT_1
2 PORT_2
P Ports
S Server
D Dedicated/Preferred Service
S [Return]

LATprint V1.0 BL1.0                               Address: 08-00-2B-XX-XX-XX
Protocol: LAT V5.2                                Name: LAT_08002BXXXXXX

Frames Received:          4430  Seconds Since Zeroed:      394
Frames Sent:              710   Send Failures:              0
Multicast Frames Rcv'd:   3333  Receive Failures:          0
Multicast Frames Sent:    5     Unrecognized Destination:  0
Frames Sent, Deferred:    4     Data Overrun:              0
Frames Sent, 1 Collision: 0     User Buffer Unavailable:    0
Frames Sent, 2+ Collisions: 0   System Buffer Unavailable:  0

Messages Received:        170   Duplicates Received:        0
Messages Transmitted:     98    Messages Re-Transmitted:    0
Solicitations Accepted:   8     Illegal Messages Rcv'd:     0
Solicitations Rejected:   0     Illegal Slots Rcv'd:        0
Multiple Node Addresses:  0     Illegal Multicasts Rcv'd:   0

Keepalive Timer:          20    Security:                    Disabled
Retransmit Limit:         8     NVRAM:                        OK
Prompt:                   MYPROMPT> Network:                        OK
```

3.5.2.2 SHOW SERVER by Command Line

The command line to show server is:

```
-> SHOW S 
```

3.6 RESET Command

The RESET command allows you to reset individual ports or server parameters to their power-up state and run the unit's self-test. Resetting the server sets all port and server parameters to their power-up state, disconnects all sessions, and runs a self-test.

NOTE

When the LATprint interface is in authorized mode, the port you are using must be in manager mode to reset another port or the server.

3.6.0.1 RESET Command by Menu

The following example shows the RESET command used to reset port 1. The example shows the command entered interactively.

1. Enter **RESET** at the LATprint interface prompt and press .
2. Enter **1** and press .

```
-> RESET 
```

```
| 1 PORT_1  
| 2 PORT_2  
| S Server  
|
```

```
| 1 
```

```
-> %LATPR-110, Port Has Been Reset  
->
```

3.6.0.2 RESET Command by Command Line

The command line to reset is:

```
-> RESET 1 
```

```
-> %LATPR-110, Port Has Been Reset  
->
```

3.7 The Command Line

The LATprint ThinWire Ethernet Interface user interface provides a command line interpreter as an alternate means to SET, SHOW, or RESET port and server parameters. The command line interpreter helps with the control of the LATprint interface by network management software and by users who want to bypass the menu interface.

For command line entries, the commands and parameters are not entered through a menu. Rather, your input is echoed and the complete command is processed after a Return is entered. Note that any error in parsing a command will cause the entire command to be ignored.

A space is required between the command (SET, SHOW, or RESET) and its parameters. The command line interpreter uses a comma (,) as a delimiter to separate the different fields in a command line. To make the command line interpreter easier to use, the current value (default) for a field will be used when:

- There is no entry for a field.
- A Return is pressed before all the parameters are entered.

Table 3-5 lists the command lines that can be entered at the LATprint interface prompt (->) to SET, SHOW, or RESET parameters.

Table 3–5 SET, SHOW, and RESET Command Lines

Command	Format
SET	
Set Port Parameters	-> SET <i>port, name, speed, IFC, OFC, device, break, rem_mod, test</i>
Set Server Parameters	-> SET S[erver], <i>name, actions</i>
Set Authorized Mode	-> SET AUTH[orized], S[et], <i>password</i>
Clear Authorized Mode	-> SET AUTH[orized], C[lear]
Enable AutoConfigure Mode	-> SET AUTO[configure], <i>port, E[nable]</i>
Enable AutoConfigure Mode	-> SET AUTO[configure], <i>port, E[nable]</i>
Disable AutoConfigure Mode	-> SET AUTO[configure], <i>port, D[isable]</i>
Enable Dedicated Service Mode	-> SET D[edicated], <i>port, E[nable], service[, node[, port]]</i>
Disable Dedicated Service Mode	-> SET D[edicated], <i>port, D[isable]</i>
Enable Manager Mode	-> SET M[anager], <i>E[nable], password</i>
Disable Manager Mode	-> SET M[anager], <i>D[isable]</i>
Enable On-Demand Loading Mode	-> SET O[n-demand], <i>port, E[nable]</i>
Disable On-Demand Loading Mode	-> SET O[n-demand], <i>port, D[isable]</i>
Set Password	-> SET PA[ssword], <i>old_password, new_password</i>
Enable Port Mode	-> SET PO[rt], <i>port, E[nable]</i>
Disable Port Mode	-> SET PO[rt], <i>port, D[isable]</i>
Enable Preferred Service Mode	-> SET PR[eferred], <i>port, E[nable], service[, node[, port]]</i>
Disable Preferred Service Mode	-> SET PR[eferred], <i>port, D[isable]</i>
SHOW	
Show Port Parameters	-> SHOW P[orts]
Show Server Parameters	-> SHOW S[erver]
Show Dedicated/Preferred Parameters	-> SHOW D[edicated]
RESET	
Reset Port Parameters	-> RESET <i>port</i>
Reset Server Parameters	-> RESET S[erver]

3.7.1 Command Line Recall and Editing

The LATprint interface supports both command line recall and editing of the command line. Only insert mode is supported. Lines can be recalled and edited using the keys described in Table 3–6.

Table 3–6 Command Line Recall and Editing

Keys	Function
 	Cancels input
 	Moves to the beginning of the field
 	Moves to the end of the field
 , 	Moves backward and forward within the buffer
 , 	Recalls previous and subsequent commands in the buffer

4

Troubleshooting

This chapter describes how to troubleshoot the LATprint ThinWire Ethernet Interface. To troubleshoot your unit:

1. Verify that the unit is properly installed.
2. Note the fault condition.
3. Isolate the problem. Use Table 4–1 as a guide to determine the probable cause and the suggested solution.

Table 4–1 LATprint ThinWire Ethernet Interface Troubleshooting

If...	Then...	Do this...
The power indicator is not lit.	The LATprint interface is not receiving proper voltage.	Check the AC power connection and verify that the AC outlet is working. Be sure the power cable is properly connected to the LATprint interface.
The self-test indicator is not lit.	The unit did not pass self-test.	Call Digital for service (Chapter 5).
The network indicator is not lit.	The unit's network cable is not properly connected.	Be sure the network cable is properly connected to the LATprint interface.
	The unit's T-Connector is not properly terminated.	Terminate the T-Connector with the proper 50 ohm terminator (see Section 1.1.1).
	There is a network problem.	Disconnect the network cable from the T-Connector. Terminate each end of the T-Connector with a 50 ohm terminator. If the indicator lights, it is a network problem; if the indicator does not light, the LATprint interface is faulty (call Digital for service, Chapter 5).
You cannot connect to the service	The service is not available.	Check for service availability (Section 3.5.1).
	LAT is not installed on the host system.	Verify with your system manager that LAT Version 5.0 or higher is running on the host system.
	The LATprint interface and host are not on the same system.	LAT protocol cannot be passed across network bridges.

(continued on next page)

Table 4–1 (Cont.) LATprint ThinWire Ethernet Interface Troubleshooting

If...	Then...	Do this...
The printer does not work	It is a network problem.	Check the network indicator, it should be on. If the network indicator is not on, be sure the network cable is properly connected to the LATprint interface. If the indicator is on, you can check network connectivity by running a MOP console carrier session (Section 3.1).
	The port is not set for a printer.	Set the port for "PRINTER" (Section 3.4)
	The baud rates are incompatible.	Check printer and port baud rates (Section 3.5).
	The port and/or server name does not match with the host.	Verify that the names match (Section 3.5).
You are using a data type other than PostScript or Digital and the printer's image data is garbled	The data protocol type does not match.	Verify that the data protocol type (PostScript, PCL, etc.) matches that of the printer (Section 2.2.1).
	The flow control is not set as required by the application.	Make sure to set the flow control for disabled (Section 3.4.1).

Servicing LATprint

If you cannot correct a problem with the LATprint ThinWire Ethernet Interface, request servicing by a qualified Digital Customer Services engineer.

5.1 Digital Equipment Corporation Services

Digital Equipment Corporation provides a wide range of maintenance programs that cover small systems, terminals, and printers. These include on-site, carry-in, and mail-in maintenance services. You can use these programs to select a plan that meets your service needs, from complete Digital support to self-maintenance.

5.1.1 On-Site Service

Digital Equipment Corporation offers fast, low-cost, quality maintenance performed at your site by Digital-trained service specialists. Whether you take advantage of our DECservice or Basic Service Agreements, or choose our Time and Materials service, you can be sure that your small system, terminal or printer receives the best possible maintenance.

5.1.2 Carry-In Service

There are more than 150 Digital carry-in service centers in major cities around the world. These service centers offer convenient, fast, and dependable maintenance, at a savings over on-site service.

5.1.3 Mail-In Service

If you prefer self-maintenance, you can mail in your module or subassembly for repair through our fast-turnaround DECmailer repair service.

For more information on any of Digital Equipment Corporation's maintenance services, call the Digital Customer Services office in your area during normal business hours. Refer to the following list of questions to consider before calling the service center.

Table 5-1 Questions to Consider Before You Call

<i>Is the call necessary?</i>	Check Chapter 4. Often you can solve the problem yourself.
<i>Who should call for service?</i>	Typically, the system manager should place the call for service.
<i>Where should you call?</i>	In the continental United States, call Digital at 1-800-DEC-8000. In Alaska, Hawaii, Canada, and Europe, call your local sales office for service.
<i>What does the service center need to know?</i>	Write down the serial and model numbers located on the unit.
<i>How should you describe the problem?</i>	Summarize the problem. Make a note of: • What you were doing when the LATprint ThinWire Ethernet Interface failed • Which indicators are on or off Stay by the printer/LATprint interface if possible, because the service engineer may ask you to recreate the problem.

Specifications

Specifications for the LATprint ThinWire Ethernet Interface are divided into the following categories:

- Physical dimensions
- Environmental specifications
- Power specifications
- LAT specifications

A.1 Physical Dimensions

The physical dimensions of the LATprint interface are as follows:

Dimension	Value
Height	3.18 cm (1.25 in)
Width	27.31 cm (10.75 in)
Depth	12.70 cm (5.0 in)
Weight	.77 kg (1.7 lb)

A.2 Environmental Specifications

The LATprint interface is designed to operate in an office environment or equipment room environment, such as telephone closets or satellite equipment rooms. It is not intended to operate in an air plenum.

A.2.1 Operating Environment

The operating environment for the LATprint interface is as follows:

Item	Value
Temperature	5° C to 50° C (41° F to 122 ° F)
Maximum rate of change	20° C/hr (68° F/hr)
Relative humidity	10 % to 95 % (non-condensing)
Wet-bulb temperature	32° C (90° F) maximum
Dew point	2° C (36° F) minimum
Altitude	Sea level to 2.4 km (8000 ft)
Air flow	Convectively cooled. A minimum of 10 cm(4 in) of space must be provided on both ends of the unit for adequate air flow.

A.2.2 Shipping Environment

The shipping environment for the LATprint interface is as follows:

Item	Value
Temperature	-40° C to 66° C (-40 ° F to 151 °F)
Relative humidity	10 % to 95 % (non-condensing)
Altitude	Sea level to 4.9 km (16000 ft)

A.3 Power Specifications

The following sections describe the power specifications for the LATprint interface.

A.3.1 Power Supply

Item	Value
Voltage (North American)	104 VAC to 128 VAC (nominal 120 VAC)
Voltage (International)	208 VAC to 256 VAC (nominal 240 VAC)
Current at 120 volts	.25 A
Current at 240 volts	.125 A
Frequency	50 Hz to 60 Hz
Power consumption	16 Watts
Output voltage	5.1 VDC
Output current	1.8 A

A.3.2 LATprint ThinWire Ethernet Interface

Item	Value
Input voltage	4.75 to 5.25 VDC
Input current	1.0 A

A.4 LATprint Port Specifications

This section contains connector pinout and characteristics of the LATprint ports.

A.4.1 Connector Pinout

Table A–1 describes the pinout of the MMJ connectors on the LATprint interface.

NOTE

The LATprint interface does not provide modem control signals.

Table A–1 MMJ Pin Out

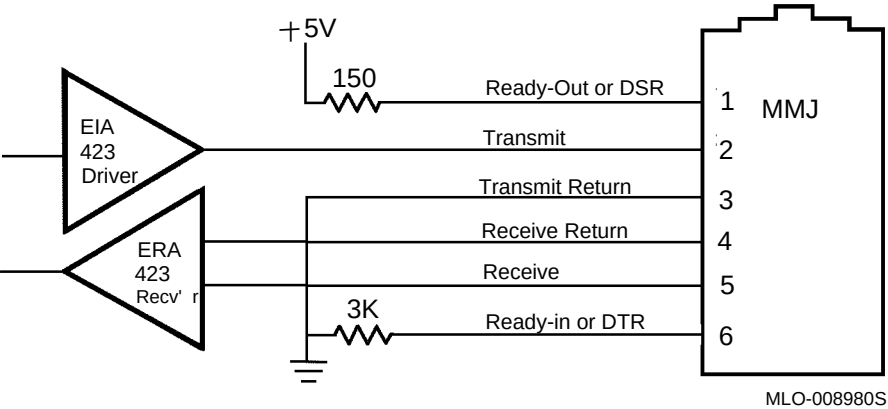
Pin	Signal Name
1	Ready-Out or DSR ¹
2	Transmit (TXA)
3	Transmit return (RC)
4	Receive return (RXB)
5	Receive (RXA)
6	Ready-In or DTR ²

¹This signal is pulled high when power is applied to the LATprint interface .

²This signal is tied to ground through a 3K ohm resistor.

Figure A–1 shows the circuit connections for each port.

Figure A-1 Port Circuit



A.4.2 LATprint Port Characteristics

This section provides a description of the LAT implemented by the LATprint interface. Table A–2 lists the port characteristics.

Table A–2 LATprint Port Characteristics

Characteristic	Setting
Character size	8
Flow control	XON/XOFF or disabled
Parity	None
Speed (Input = Output)	1.2K to 38.4K
Name	6 characters (settable)
Break	Local, remote (settable)
Session limit	4

B

Using LATprint As a Terminal Server

Although the LATprint ThinWire Ethernet Interface is designed primarily as a printer server, it can also be used as a terminal server when a terminal is connected to one of its ports. This chapter describes how to start a terminal session and covers basic terminal server operation. For additional information about using the LATprint interface as a terminal server, refer to the *DECserver 90L+ Owner's Manual* (see Appendix C for ordering information).

B.1 Using a Terminal or Personal Computer

This section explains how to use the LATprint ThinWire Ethernet Interface with a terminal or personal computer (PC) running terminal emulation software.

B.1.1 Establishing a Terminal Session

1. Define a terminal port using MOP.
 - a. Use another system terminal and NCP to establish a MOP session to the LATprint interface (see Section 3.1.1 or Section 3.1.2).
 - b. Change one of the LATprint interface ports to the following settings (see Section 3.4).
 - Type = TERM
 - Break = LOCAL
 - AutoConf = ENA
2. Establish a terminal session.
 - a. Connect a terminal or a PC with a terminal emulation software to the LATprint interface port.

NOTE

To connect a PC communication port to the LATprint interface, use the DECconnect adapter, H8571-J and a BC16E cable. To connect a terminal with a 25-pin D-sub mail connector to the LATprint interface, use the DECconnect adapter, H8575-A and a BC16E cable.

- b. Press the `[Return]` key twice to see the LATprint interface prompt: `->`.
- c. At the prompt `(->)`, type your *service name* and press `[Return]`. The LATprint interface indicates that it is attempting to connect by displaying a string of dots `"...."` on the screen.

The following example shows the connection to a service named RED.

```
-> RED [Return]
.....
%LATPR-108, RED session 1 established
        Welcome to MYNODE running VMS 5.4

Username:
```

Note

The LATprint interface does not require the configuration of group codes. The first time it connects to a service, it learns the service name. This can take up to 60 seconds.

The terminal session is established and control is passed to the specified host. If you do not know the services offered by your host(s), ask your system manager.

When a terminal session is established, most systems start some type of log in sequence, such as prompting you for username and password. Refer to the documentation for your specific system for information about starting a session.

B.1.2 Verify Ports

You can verify the operation of the port by typing a character on the terminal while watching the Activity indicator on the LATprint interface. The indicator should blink on and off, indicating activity on the port.

Refer to Table B-1 for supported terminal characteristics.

Table B-1 Supported Terminal Characteristics

Characteristic	Setting
Transmit speed	1.2K to 38.4K BPS
Receive speed	Receive = Transmit
Flow control	XON/XOFF or None
Data and parity	8 Bits, No Parity
Stop bits	1

B.1.3 Verify Network

You can verify the operation of the network by entering **SHOW S** at the prompt (->) and then pressing Return. The server characteristics screen will verify if the network is "OK" or "Failed". If Failed, make sure the server is on a properly configured network.

B.1.4 Ending a Terminal Session

A terminal session is ended by logging off or disconnecting from the system where your terminal session was running. Logging off a system ends your terminal session and returns you to the LATprint interface prompt. The following example shows what happens when a user logs off the service RED.

```
$ L0 Return
USER logged out at 01-JAN-1992 16:55:00.00
-> %LATPR-107, RED session 1 disconnected
->
```

B.1.5 Last Number Redial

Last number redial allows a port to connect to the last service accessed without entering the service or node name. This is done by entering the CONNECT command C[ONNECT] at the LATprint interface prompt and pressing . The following example shows how to use the *last number redial* feature to reconnect to service RED.

```
$ L0 
USER logged out at 01-JAN-1992 16:55:00.00
-> C 
%LATPR-108, RED session 1 established
      Welcome to MYNODE running VMS 5.4

Username:
```

Note

The use of a preferred service overrides the last number redial feature.

B.1.6 Interrupting a Terminal Session

You can interrupt a terminal session and return to the LATprint interface prompt by pressing the **Break** key on the terminal. When you press the **Break** key, the session is interrupted, not ended, and the LATprint interface prompt appears (->).

At this point you can issue a SHOW or SET command, resume the interrupted session, cycle forward or backward to other sessions, or end the session. The following is an example of displaying the sessions active for Port 1. The asterisk next to the service name of session 1 shows it as the default session to which you are returned.

-> **SHOW** **Return**

```
| 1 Port_1*
| 2 Port_2
| P Ports
| S Server
| D Dedicated/Preferred Service
|
| 1 Return
```

Name	Port_1			
Speed	38400			
In Flow	ENA/on			
Out Flow	ENA/on			
Type	TERM			
Break	LOCAL			
Rem Mod	DIS			
Test	NO			
AutoConf	ENA			
ODL	DIS			
Status	CONN			
Service	RED*	YELLOW	GREEN	BLUE
Node	MYNODE	MYNODE	YOURNODE	YOURNODE
Port	LTA123	LTA456	LTA789	LTA790
MOP CC	08-00-2B-12-35-56			
Preferred	ULTRIX	DECSTATION		
Fram Err	0			

B.1.7 Resuming an Interrupted Terminal Session

To resume the current interrupted terminal session, type the connect command `☐` or RESU[ME] at the LATprint interface prompt. To resume a specific session, type the command and specify the session number. In the case of a MOP session, type **M** in place of the session number. The following is an example of resuming terminal session 2 for a port.

```
-> > 2 Return  
-> %LATPR-112, YELLOW session 2 resumed
```

When you resume an interrupted session, control is returned to the point at which the session was interrupted.

B.1.8 Cycle Forward from an Interrupted Terminal Session

After you interrupt a terminal session, you can cycle forward to the next session. This is done by entering the FORWARD (F) command at the LATprint interface prompt and pressing Return. The following is an example of having interrupted session 2 and forwarding to session 3.

```
-> F Return  
-> %LATPR-112, GREEN session 3 resumed
```

B.1.9 Cycle Backward from an Interrupted Terminal Session

After you interrupt a terminal session, you can cycle backward to the session before the session that was interrupted. This is done by entering the BACKWARD command B[ACKWARD] at the LATprint interface prompt and pressing Return. The following is an example of having interrupted session 2 and cycling backward to session 1.

```
-> B Return  
-> %LATPR-112, RED session 1 resumed
```

Note

There are no definable switch characters to immediately go forward and backward between sessions as in other Digital terminal servers.

The FORWARD and BACKWARD commands are circular, that is, they "loop" or "cycle" through the number of established sessions.

B.1.10 Disconnecting an Interrupted Terminal Session

After you interrupt a terminal session, you might change your mind and decide not to resume the session. In this case, you can disconnect the session by typing the disconnect symbol < or D[ISCONNECT] at the LATprint interface prompt.

To disconnect a specific session, type the command and specify the session number. In the case of a MOP session, type **M** in place of the session number. The following is an example of disconnecting terminal session 4 for a port.

```
-> < 4 Return  
-> %LATPR-112, BLUE session 4 disconnected
```

When you disconnect an interrupted session, your session is stopped and the LATprint interface prompt appears on your terminal.

Note

Entering the DISCONNECT command when there is no interrupted session to resume causes the port to enter its power-up state (non-autobaud state).

B.2 Using MOP Console Carrier

Maintenance Operations Protocol (MOP) is a maintenance protocol specified in the Digital Network Architecture (DNA) that is used to implement the remote console facility and to perform remote management and loopback tests.

The LATprint ThinWire Ethernet Interface supports the *remote console facility* also known as *console carrier*. Within console carrier there are two components: *console requester*, and *console server*.

B.2.1 Operating as a Console Requester

The LATprint interface can operate as a *console requester*. As a console requester, the LATprint interface establishes a MOP console carrier session with another console server on the same network. This is done by using the M[OP] command and the network device's Ethernet address. The LATprint interface also supports a verification code if required by the console server. The following is an example of establishing a connection from a LATprint interface to another LATprint interface. The Ethernet address of the device is 08-00-2B-19-8B-AF.

```
MYSERVER> MOP 08-00-2B-19-8B-AF Return  
-> %LATPR-113, Console connected (press Ctrl/D when finished)  
-> (prompt from connected device)
```

Note

The RESUME and DISCONNECT commands can be used for a MOP session by typing RESU[ME] M or D[ISCONNECT] M.

If a MOP session is active, use of the F[ORWARD] and B[ACKWARD] commands will cycle through the MOP session.

B.2.2 Operating as a Console Server

The LATprint interface can also operate as a *console server*. A console server allows another requester to connect to its console port. This function is used for remote management of the LATprint interface. The following shows how a VMS system can establish a console carrier session with a LATprint interface. The Ethernet address of the LATprint interface in this example is 08-00-2B-08-32-2B and SVA-0 identifies the VMS system's Ethernet circuit name.

```
$ MCR NCP
$ NCP> CONNECT VIA SVA-0 PHY ADDR 08-00-2B-08-32-2B
Console connected (press CTRL/D when finished)
-> (LATprint interface PROMPT)
```

B.3 LATprint Commands

The commands used to establish and control a terminal session and to manage the LATprint ThinWire Ethernet Interface are described in Table B–2. Chapter 3 provides a detailed description of the SET and SHOW commands and how they are used to manage the LATprint interface.

Table B–2 LATprint ThinWire Ethernet Interface User Commands

Symbol/Command	Function
<i>service</i>	At the prompt (->), enter the name of the <i>service</i> (maximum of 16 characters) with which you want to establish a terminal session.
<i>service [node [port]]</i>	Establishes a terminal session with the <i>service</i> , <i>node</i> (maximum of 16 characters), and <i>port</i> (maximum of 8 characters) specified. The <i>node</i> and <i>port</i> are optional.
C[ONNECT] ¹ <i>service [node [port]]</i>	Establishes a terminal session with the <i>service</i> , <i>node</i> , and <i>port</i> specified. The <i>node</i> and <i>port</i> are optional. This command should be used to establish a terminal session when a service name conflicts with one of the LATprint interface commands.
M[OP] ¹ <i>Ethernet address [verification code]</i>	Establishes a MOP session with the device owning the specified Ethernet address. The Ethernet address must be entered as 6 hex bytes, separated by hyphens. The verification code is an optional field. It may be used as a password by the device with which you are trying to establish a MOP session. If used, the verification code must be entered as 8 hex bytes, separated by hyphens.
Break	Interrupts a terminal session.
>	Resumes last interrupted session.
> n	Resumes session specified by n. n={1,2,3,4,M ² }.
RESU[ME] ¹	Resumes last interrupted session.
RESU[ME] ¹ n	Resumes session specified by n. n={1,2,3,4,M ² }.

¹The characters in brackets [] are optional and do not need to be entered for the LATprint interface to recognize the command.

²M represents a MOP session.

(continued on next page)

Table B–2 (Cont.) LATprint ThinWire Ethernet Interface User Commands

Symbol/Command	Function
F[ORWARD] ¹	Cycles forward to the next session.
B[ACKWARD] ¹	Cycles backward to the last session.
[<]	Disconnects an interrupted terminal session or disconnects the port if no sessions are active. Disconnecting the port returns the port to the power-up state (non-autobaud).
[<] n	Disconnects an interrupted terminal session specified by n. n={1,2,3,4,M ² }.
D[ISCONNECT] ¹	Disconnects an interrupted terminal session or disconnect the port. Disconnecting the port returns the port to the power-up state (non-autobaud).
D[ISCONNECT] ¹ n	Disconnects an interrupted terminal session specified by n. n={1,2,3,4,M ² }.
SE[T] ¹	Sets port or server parameters.
SH[OW] ¹	Shows port or server parameters.
RESE[T] ¹	Resets port or server parameters to power-up state.
[?] or H[ELP]	Lists LATprint interface commands.

¹The characters in brackets [] are optional and do not need to be entered for the LATprint interface to recognize the command.

²M represents a MOP session.

C

Related Documentation

Document Title	Order Number
<i>DECserver 90L+ Owner's Manual</i>	EK-DSRVG-OM
<i>VMS LAT Control Program (LATCP) Manual</i>	AA-LA32B-TE
<i>Guide to System and Network Setup</i>	AA-ME88B-TE/CA
<i>Guide to System and Environment Setup</i>	AA-ME89B-TE/CA

C.1 Ordering Information

Customers can order documents by phone or mail.

Continental USA and Puerto Rico

Call 1-800-Digital or mail to:

Digital Equipment Corporation
Peripherals and Supplies Group
P.O. Box CS2008
Nashua, NH 03061

New Hampshire, Alaska, and Hawaii

Call 1-603-884-6660.

Outside the USA and Puerto Rico

Mail to:

Digital Equipment Corporation
Attn: Accessories and Supplies Business Manager
c/o Local Subsidiary or Digital-Approved Distributor

Digital Personnel

Digital personnel can order these documents from:

- Digital Equipment Corporation
444 Whitney Street
Northboro, MA 01532
Attn: Publishing and Circulation Services (NRO2)
Order Processing Section
- VMS mail to ORDER::NEST
- ALL-IN-1 mail to ORDER @NRO

Index

A

Activity indicator, 1–7
Adding printers
 with `lprsetup`, 2–22
 with `pcsamgr`, 2–20
Attaching the LATprint
 DECclaser 2100/2200, 1–9
 DECclaser 3200, 1–11
 LA324/424, 1–13

B

Before you start
 using the `lprsetup` command, 2–22

C

Cabilities, xi
Cable connections, 1–15
Circuit names, 3–2
Command line, 3–16
 recall and editing, 3–18
Commands
 for management, 3–6
 INITIALIZE/QUEUE, 2–12
 RESET, 3–15
 SET command, 3–6
 SET DEVICE, 2–12
 SET PORTS, 2–9, 2–14
 SET QUEUE, 2–13
 SET TERMINAL, 2–12
 SHOW, 3–10
 SHOW SERVER, 3–14

Commands (cont'd)

 symbols and functions table, B–10
 to establish and control a terminal
 session, B–10
 to manage a terminal session, B–10
 user, B–10
Components, 1–6
Connectors
 MMJ pin out, A–4
 network, 1–7
 port, 1–7
 power, 1–7
Controlling ULTRIX print jobs
 `lprsetup` command, 2–26
Conventions, xiii
CPS, 2–6
 Print queues, 2–14

D

Default queue form, 2–11
Deleting the print queue, 2–15
Description string, 2–6
Documentation
 related documentation, C–1

E

Environmental specifications, A–2
 operating, A–2
 shipping, A–2
Error, fault conditions, 4–1
Ethernet address, 3–2
 see physical address, 1–8

F

Fault conditions, 4–1
Features, xi
Forms, 2–11

I

Indicators
 activity, 1–7
 network ok, 1–7
 power, 1–7
 self-test ok, 1–7
 troubleshooting, 4–1
INITIALIZE/QUEUE command, 2–12
Initializing the print queue, 2–12
Installation
 for printers, 1–1
 physical procedure, 1–8
 prerequisites, 1–2
Inventory, 1–2

L

LAN (local area network), ix
Last number redial, B–4
LAT
 verifying in your system, 2–18
LAT (Local Area Transport), ix
LAT characteristics, A–6
LAT devicename, 2–5
LAT ports
 setting up, 2–19
 special files, 2–18
LAT specifications
 LAT port characteristics, A–6
LATprint ThinWire Ethernet Interface
 power specifications, A–3
LATSYS, 2–6
Loading the diskette files
 from PC's, 2–1
 from VMS systems, 2–1
Local management, 3–5
lprsetup
 adding printers, 2–22

M

Maintenance Operations Protocol
 See MOP
Management
 commands, 3–6
 local, 3–5
 remote, 3–1
Managing LATprint, 3–1
 accessing repeatedly, 3–3
 from ULTRIX, 3–4
 from VMS, 3–2
Mapping the VMS LAT port, 2–9, 2–14
MOP, 3–1, B–8
 accessing from ULTRIX, 3–4
 accessing from VMS, 3–2
 console carrier, B–8
 operating as a console requester, B–8
 operating as a console server, B–9
MOP (Maintenance Operations Protocol), ix

N

NCP, 3–2
Network
 connector, 1–7
 ok indicator, 1–7
 troubleshooting, 4–2
Node name, 2–4

O

Operating as a console server, B–9
Optional parts, 1–4
Ordering information
 options, 1–4

P

Parts, 1–6
 optional, 1–4
pcsamgr<adding printers>, 2–20
Personal Computer
 how to use the LATprint ThinWire
 Ethernet Interface with a, B–1

Physical address, 2–4
location of, 1–7
Physical dimensions, A–1

Port

RESET, 3–15
setting parameters, 3–6
by command line, 3–10
SHOW STATUS, 3–10, 3–13
status descriptions, 3–11

Port connector, 1–7

Port specifications

LATprint, A–4

Power

connector, 1–7
indicator, 1–7
specifications, A–3
troubleshooting, 4–2

Power supply

specifications, A–3

Prerequisites

VMS, 2–4

Print queue

deleting, 2–15

Print queues, 2–1

LATSYM, 2–8

VMS prerequisites, 2–4

printcap

modifying entries, 2–25

Printer

troubleshooting, 4–3

Q

Queue form

default, 2–11

Queue name, 2–5

R

Redial, last number, B–4

Remote management, 3–1

RESET command, 3–15

by command line, 3–15

by menu, 3–15

Reset library

constructing, 2–10

S

Security, 3–5

Self-test

ok indicator, 1–7

troubleshooting, 4–2

SET command, 3–6

SET DEVICE command, 2–12

SET PORT command, 2–9, 2–14

SET QUEUE command, 2–13

SET TERMINAL command, 2–12

Setting parameters

from the menu, 3–8

Setting port parameters, 3–8

by command line, 3–10

Setting the queue description, 2–13

Setup

print queues, 2–1

SHOW command, 3–10

SHOW PORTS, 3–10

by command line, 3–12

by menu, 3–12

SHOW SERVER

by command line, 3–15

by menu, 3–14

SHOW STATUS

by command line, 3–13

by menu, 3–13

Special files

for LAT ports, 2–18

Specifications, A–1

physical dimensions, A–1

Spooling, 2–12

T

Terminal

how to use the LATprint interface with a,
B–1

supported characteristics, B–3

Terminal session

commands, B–10

Terminal session (cont'd)

- cycling backward, B-7
- cycling forward, B-6
- disconnecting an interrupted session, B-7
- ending a session, B-3
- establishing a session, B-1
- interrupting a session, B-5
- resuming an interrupted session, B-6

Troubleshooting

- determining cause and solution, 4-1 to 4-4

U

ULTRIX

- setting up LAT ports, 2-19
- #### ULTRIX print queues

- using command lines, 2-17

V

Verification

- network, B-3
- ports, B-3

VMS directory files

- LATPRINT_STARTUP.COM
- MOP.COM
- DQ.COM, 2-2

VMS LAT port

- creating, 2-9, 2-14

VMS print queue prerequisites, 2-4

VMS print queues

- diskette, 2-1
- using command lines, 2-4