

ETS Installation Guide

**For ETS4P, ETS8P, ETS16P, ETS16PR, ETS32PR,
and ETS422PR Multiport Device Servers**

The information in this guide may change without notice. The manufacturer assumes no responsibility for any errors which may appear in this guide.

AppleTalk, Chooser, and Macintosh are trademarks of Apple Computer Corp. LaserJet and Bitronics are trademarks of Hewlett Packard. Centronics is a registered trademark of Centronics Data Computer Corp. PostScript is a trademark of Adobe Systems, Inc. DEC and LAT are trademarks of Digital Equipment Corporation. Ethernet is a trademark of XEROX Corporation. NetWare is a trademark of Novell Corp. UNIX is a registered trademark of The Open Group. Windows for Workgroups, Windows 95, Windows 98, Windows 2000, and Windows NT are trademarks of Microsoft Corp.

Copyright 2000, Lantronix. All rights reserved. No part of the contents of this book may be transmitted or reproduced in any form or by any means without the written permission of Lantronix. Printed in the United States of America.

The revision date for this manual is **26 June, 2001**

Part Number: 900-194
Rev. B

WARNING

This product has been designed to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against such interference when operating in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with this guide, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause interference in which case the user, at his or her own expense, will be required to take whatever measures may be required to correct the interference.

Changes or modifications to this device not explicitly approved by Lantronix will void the user's authority to operate this device.

Cet appareil doit se soumettre avec la section 15 des statuts et règlements de FCC. Le fonctionnement est subjecté aux conditions suivantes:

- (1) Cet appareil ne doit pas causer une interférence malfaisante.
- (2) Cet appareil doit accepter n'importe quelle interférence reçue qui peut causer une opération indésirable.

Contents

1: Introduction.....	1-1
1.1 Supported Serial Protocols	1-1
1.1.1 RS-232	1-1
1.1.2 RS-423	1-1
1.1.3 RS-422	1-2
1.2 How to Use This Manual.....	1-2
2: Installation.....	2-1
2.1 ETSP Product Descriptions	2-1
2.1.1 ETSP Front Panels.....	2-1
2.1.2 ETS4P LEDs	2-2
2.1.3 ETS8P/ETS16P LEDs	2-2
2.1.4 ETS4P Back Panel.....	2-3
2.1.5 ETS8P Back Panel.....	2-3
2.1.6 ETS16P Back Panel.....	2-4
2.2 Installing the ETSP	2-5
2.3 ETSPR Product Descriptions.....	2-7
2.3.1 ETS16PR Front Panel.....	2-7
2.3.2 ETS32PR Front Panel.....	2-7
2.3.3 ETS422PR Front Panel.....	2-7
2.3.4 ETSPR LEDs.....	2-8
2.4 Installing the ETSPR	2-8
2.5 Was the Installation Successful?	2-10
3: Getting Started.....	3-1
3.1 Configuration Methods.....	3-1
3.1.1 EZWebCon.....	3-1
3.1.2 Using a Web Browser (ETSPR models)	3-1
3.1.3 Incoming Logins.....	3-2
3.1.4 Console Terminal	3-2
3.2 Services.....	3-2
4: Using the ETS	4-1
4.1 Console Server Example	4-1
4.1.1 Define the Menus	4-2
4.1.2 Enable Menu Mode	4-3
4.1.3 Configure Switches	4-3
4.1.4 Using Menus.....	4-4

4.2 Serial Tunnel Example	4-6
4.2.1 TCP Configuration	4-6
4.2.2 UDP Configuration	4-6
4.2.3 Multi-port Serial Tunnel Configuration	4-7
4.3 COM Port Redirector	4-7
5: TCP/IP Configuration.....	5-1
5.1 Setting the IP Address	5-1
5.1.1 Using EZWebCon.....	5-1
5.1.2 Using a Directed Ping Packet	5-1
5.1.3 Using a BOOTP, DHCP, or RARP Reply	5-3
5.1.4 Using the Command Line Interface.....	5-3
5.2 LPR Printing	5-3
5.2.1 LPR on Windows NT 3.5.1 (and later).....	5-4
5.2.2 LPR on UNIX Hosts	5-7
5.2.3 LPR on AIX Hosts.....	5-8
5.2.4 LPR on HP Hosts.....	5-9
5.2.5 LPR on SCO UNIX Hosts	5-10
5.2.6 RTEL Functionality	5-11
5.3 Unix Host Troubleshooting	5-11
6: NetWare Configuration.....	6-1
6.1 NDPS Printing	6-1
6.2 NDS Print Queues.....	6-1
6.2.1 Obtain an NDS License	6-1
6.2.2 Configure your ETS.....	6-2
6.3 NetWare Administrator Quick Setup Print Queues.....	6-2
6.4 PCONSOLE Print Queues	6-3
6.5 NetWare Host Troubleshooting.....	6-4
7: LAT Configuration	7-1
7.1 Printing Directly to a Port.....	7-1
7.2 LAT Host Troubleshooting.....	7-2
8: AppleTalk Configuration	8-1
8.1 Bitronics.....	8-1
8.2 Macintosh Services	8-1
8.3 AppleTalk Zones	8-1
8.4 AppleTalk Host Troubleshooting	8-2
9: DLC Configuration for LAN Manager	9-1
9.1 DLC Configuration	9-1
9.1.1 ETS Configuration.....	9-1
9.1.2 Host Configuration	9-1

A: Contact Information A-1

 A.1 Problem Report Procedure..... A-1

 A.2 Full Contact Information A-1

B: Troubleshooting..... B-1

 B.1 Power-up Troubleshooting..... B-1

 B.2 DHCP Troubleshooting B-2

 B.3 BOOTP Troubleshooting B-3

 B.4 RARP Troubleshooting..... B-3

 B.5 Modem Configuration Checklist..... B-4

 B.6 Entering Commands at the Boot Prompt B-4

C: Pinouts C-1

 C.1 Ethernet Connector C-1

 C.2 RJ45 Serial Connectors..... C-1

 C.2.1 RJ45 to DB25..... C-2

 C.2.2 RJ45 to DB9..... C-3

 C.3 ETS422PR Serial Connectors C-4

 C.4 Parallel Connectors C-4

D: Updating Software D-1

 D.1 Choosing the Right Software File..... D-1

 D.2 Obtaining Software D-1

 D.2.1 Via the Web D-1

 D.2.2 Via FTP..... D-2

 D.2.3 Via the Lantronix BBS D-3

 D.3 Reloading Software D-3

 D.3.1 Reloading Sequence D-4

 D.4 Troubleshooting Flash ROM Updates D-6

E: SpecificationsE-1

 E.1 Power InformationE-1

 E.1.1 Power RequirementsE-1

 E.1.2 Power Supply CordE-1

 E.2 Environmental Limitations.....E-1

 E.2.1 TemperatureE-1

 E.2.2 AltitudeE-2

 E.2.3 Relative HumidityE-2

F: Frequently-used Commands F-1

 F.1 Conventions F-1

 F.2 Server Commands F-2

 F.3 Port Commands F-5

 F.4 Protocol Commands F-7

Warranty Statement

Declaration of Conformity

Index

1: Introduction

The Lantronix ETSs (ETS4P, ETS8P, ETS16P, ETS16PR, ETS32PR, and ETS422PR) are multi-port device servers that provide shared network access to terminals, devices, console ports, and printers for a variety of network protocols and operating systems. The ETS supports the TCP/IP, IPX (NetWare), Local Area Transport (LAT), AppleTalk (EtherTalk), and Microsoft LAN Manager protocols.

Note: *In this manual, all ETS servers will be referred to as “the ETS” unless a distinction needs to be made between models.*

The ETS stores its executable software in Flash (rewritable) ROM, meaning that it does not have to download software from a host each time it boots. Software must only be downloaded when a new software version becomes available. See *Appendix D* for more information.

1.1 Supported Serial Protocols

The ETS models support the RS-423/232 serial protocol, and the ETS422PR supports the RS-422 serial protocol.

1.1.1 RS-232

The RS-232 line interface standard is a single-ended peer-to-peer interface. Today's personal computers typically have at least one RS-232 serial port. It is the most common serial protocol used today.

RS-232 is used for connecting devices across short distances, at speeds up to 230.4 kb/s. Faster speeds require shorter cabling to ensure error-free communications. The maximum cable length at a given speed is determined by many factors, including the immediate electrical environment and the quality of cable used, but is usually less than 15 meters at high speeds.

1.1.2 RS-423

All of the ETS models support the RS-423 line interface standard. RS-423 devices are interoperable with RS-232 devices. That is, RS-232 ports can receive data reliably from RS-423 ports and vice-versa.

The main difference between RS-423 and RS-232 is that RS-423 employs lower voltage signaling and differential receivers. RS-423 still uses single-ended transmitters for compatibility with RS-232 receivers.

RS-423 is generally rated at higher speeds over longer cabling runs than RS-232. Maximum data rates of 230.4 kb/s are possible on ETS-PR models, and 115.2 kb/s is the maximum on ETS-P models.

1.1.3 RS-422

The ETS422PR supports RS-422 on all of its ports. RS-422 is different from RS-232 or RS-423 in that it is a differential or balanced line interface standard. It is designed for longer cabling distances (approaching 4,000 feet) in noisier electrical environments, and it can be used in multi-drop networks with one driver and up to ten receivers.

The maximum speed of ETS422PR RS-422 ports is 230.4 kb/s, but this rate can be sustained over longer cable runs than possible on RS-232 or RS-423 connections.

1.2 How to Use This Manual

This guide is structured as follows:

- ◆ Chapter 2, *Installation* explains how to physically install the ETS.
- ◆ Chapter 3, *Getting Started* explains the minimum configuration needed.
- ◆ Chapter 4, *Using the MPS* explains some of the ways that you can use your ETS.
- ◆ Chapters 5 through 9 cover protocol-specific setup needed to install print queues and otherwise use the ETS.
 - Chapter 5, *TCP/IP Configuration*
 - Chapter 6, *NetWare Configuration*
 - Chapter 7, *LAT Configuration*
 - Chapter 8, *AppleTalk Configuration*
 - Chapter 9, *DLC Configuration for LAN Manager*
- ◆ Appendices A through F provide supplementary information.
 - Appendix A, *Contact Information*
 - Appendix B, *Troubleshooting*
 - Appendix C, *Pinouts*
 - Appendix D, *Updating Software*
 - Appendix E, *Specifications*
 - Appendix F, *Frequently-used Commands*

Read chapters 2 through 4 in order, then proceed to the protocol-specific chapter that relates to your network. Refer to Appendix F often. The *Device Server Reference Manual*, located on the CD-ROM and web site, provides additional information about configuring and using your ETS.

2: Installation

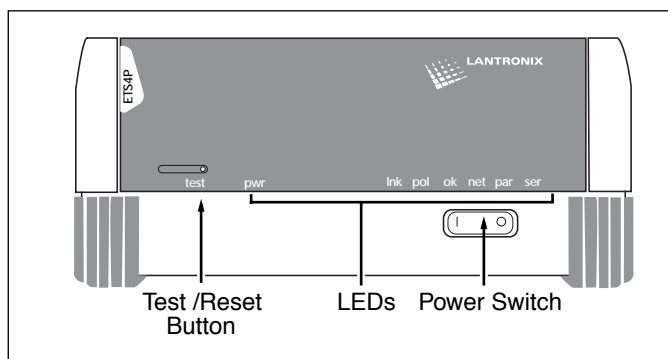
This chapter describes the various ETS models and shows how to install them into a basic network situation. The ETS-P models will be explained first. For ETS-PR descriptions and installation instructions, skip to Section 2.3.

2.1 ETSP Product Descriptions

2.1.1 ETSP Front Panels

The front panel of all ETSP models has a Test/Reset button (called Test/Reset on the ETS4P and simply Reset on the ETS8P and ETS16P), seven LEDs, and a power switch. Pressing the Reset button for 5 seconds while the unit powers up will flush NVR. Pressing the ETS4P Test button during operation will generate a status page on any parallel port that appears to be connected to a printer.

Figure 2-1: ETSP Front Panels



Note: *The ETS8P is slightly shorter than the ETS4P (pictured above) and ETS16P.*

2.1.2 ETS4P LEDs

The seven LEDs are explained in the following table.

Table 2-1: ETS4P LED Functionality

LED	Function
PWR	Lights to indicate the ETS has power
LNK	Lights to indicate a functional 10BASE-T network link
POL	Lights to indicate a swapped 10BASE-T cable
OK	Blinks to indicate that the ETS is functioning properly.
NET	Blinks to indicate Ethernet activity.
PAR	Blinks periodically to indicate parallel characters entering and exiting the ETS.
SER	Blinks periodically to indicate serial characters entering and exiting the ETS.

2.1.3 ETS8P/ETS16P LEDs

The seven LEDs are explained in the following table.

Table 2-2: ETS8P/ETS16P LED Functionality

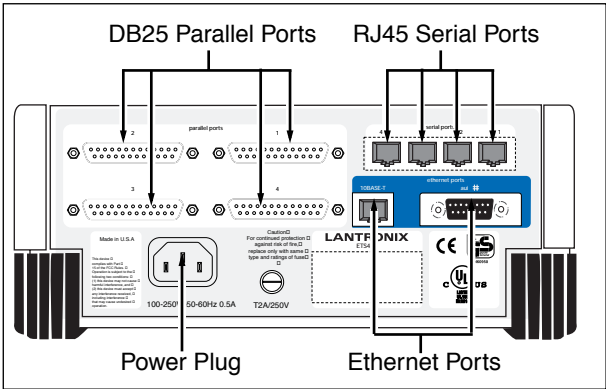
LED	Function
PWR	Lights to indicate the ETS has power
LNK	Lights to indicate a functional 10BASE-T network link
POL	Lights to indicate a swapped 10BASE-T cable
OK	Blinks to indicate that the ETS is functioning properly.
NET	Blinks to indicate Ethernet activity.
RCV	Blinks periodically to indicate serial characters entering the ETS.
XMT	Blinks periodically to indicate serial characters exiting the ETS.

2.1.4 ETS4P Back Panel

The back panel of the ETS4P has a power plug, an AUI Ethernet port, an RJ45 10BASE-T Ethernet port, four DB25 parallel ports, and four RJ45 serial ports.

Note: *The Centronics parallel ports on the back of the ETS4P are compatible with the Hewlett Packard Bitronics interface, which allows bi-directional communication on a parallel port.*

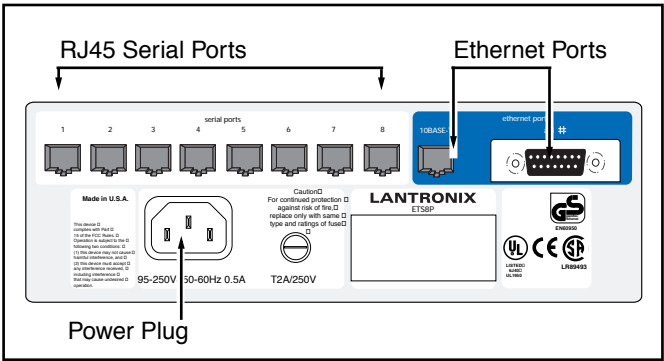
Figure 2-2: ETS4P Back Panel



2.1.5 ETS8P Back Panel

The back panel of the ETS8P has a power plug, an AUI Ethernet port, an RJ45 10BASE-T Ethernet port, and 8 RJ45 serial ports.

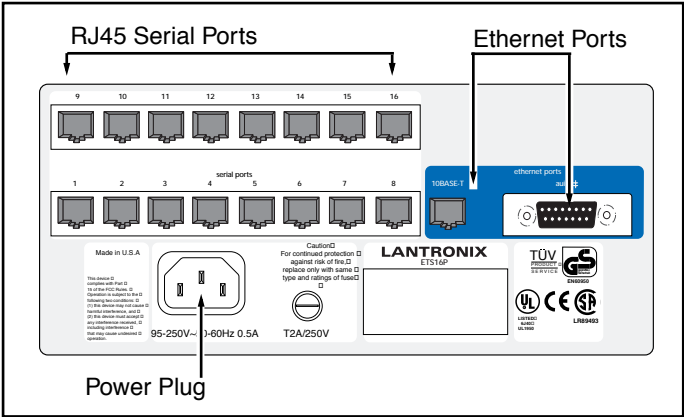
Figure 2-3: ETS8P and ETS16P Back Panels



2.1.6 ETS16P Back Panel

The back panel of the ETS16P has a power plug, an AUI Ethernet port, an RJ45 10BASE-T Ethernet port, and 16 RJ45 serial ports.

Figure 2-4: ETS16P Back Panel



2.2 Installing the ETSP

The following two diagrams shows properly-installed ETSP servers.

Figure 2-5: Sample ETS4P Network Layout

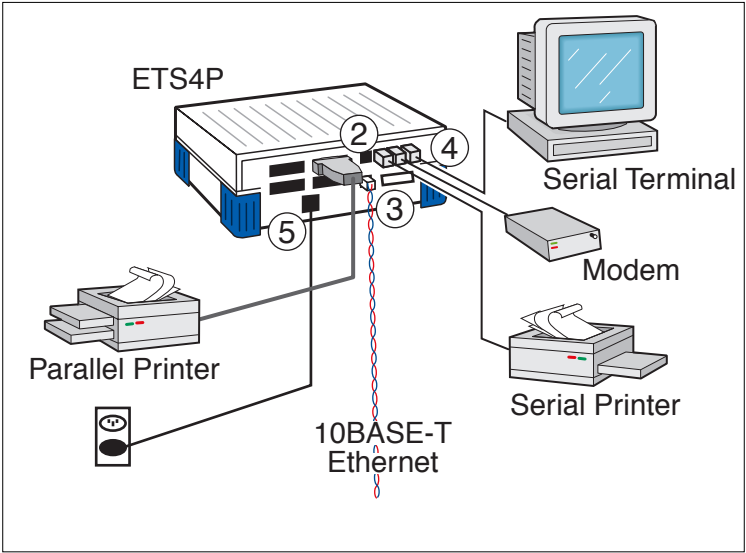
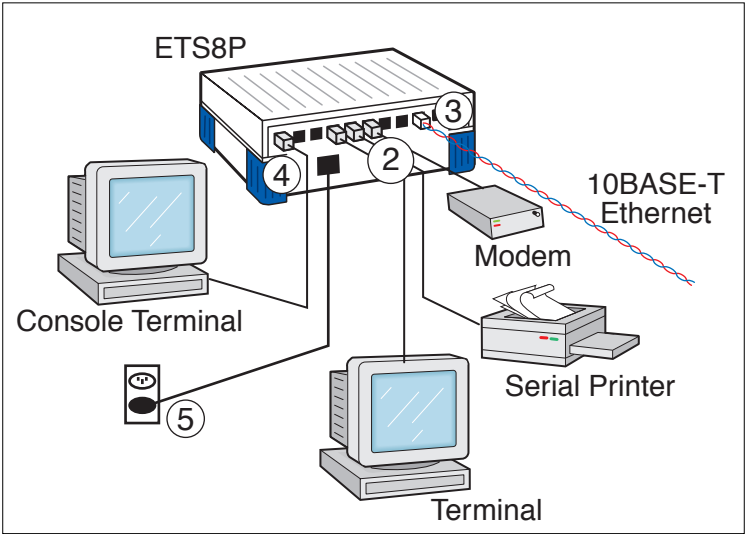


Figure 2-6: Sample ETS8P/ETS16P Network Layout (ETS8P pictured)



To install the ETS, complete the following steps in order. Refer to the numbers in the previous figure.

- 1 Select a location for the ETS.

When choosing a location, keep in mind the environmental restrictions discussed in Appendix E, *Specifications*.

- 2 Connect one or more serial and/or parallel devices to the ETS, as appropriate. See Appendix C, *Pinouts*, for information on what kinds of device attachments the ETS supports.
- 3 Connect an Ethernet cable to **either** the 10BASE-T port (shown) **or** a transceiver connected to the AUI port.

The ETS will boot without a valid Ethernet connection, but it will pause to print a message asking if you want to stop at the Boot> prompt. If you do not respond to this message, it will wait for 10 seconds and then finish booting.

- 4 If desired, connect a terminal to the ETS console port (port 1). This will enable you to receive diagnostic and initial configuration messages.

Note: *The default serial port settings are 9600 baud, 8 bit characters, and no parity. Refer to Appendix C for more information.*

- 5 Attach one end of the power cable to the ETS and plug the other end into an electrical outlet.
- 6 Flip the power switch to turn the unit ON. The ETS will go through two steps to begin normal operation:
 - A It runs through a set of power-up diagnostics for approximately 12 seconds. The LEDs show varying patterns corresponding to the tests being run.
 - B It tries to obtain TCP/IP configuration information via DHCP, BOOTP, and RARP. This may take as long as 15 seconds if no hosts answer the requests. During this step, the OK LED blinks approximately 3 times per second and the NET LED blinks occasionally.
- 7 Install EZWebCon on your 32-bit Windows PC, Apple Macintosh, or Solaris computer. The EZWebCon software is located on the distribution CD-ROM.

2.3 ETSPR Product Descriptions

2.3.1 ETS16PR Front Panel

The ETS16PR has 16 RJ45 serial ports, a Reset button, an AUI Ethernet port, an RJ45 Ethernet port for 10/100BASE-T, several LEDs, and a power switch.

Figure 2-7: ETS16PR Front Panel



Note: *The first RJ45 port is also the serial console port; however, in most situations connecting a terminal to this port will not be necessary.*

2.3.2 ETS32PR Front Panel

The ETS32PR has 32 RJ45 serial ports, a Reset button, an AUI Ethernet port, an RJ45 Ethernet port for 10/100BASE-T, several LEDs, and a power switch.

Figure 2-8: ETS32PR Front Panel

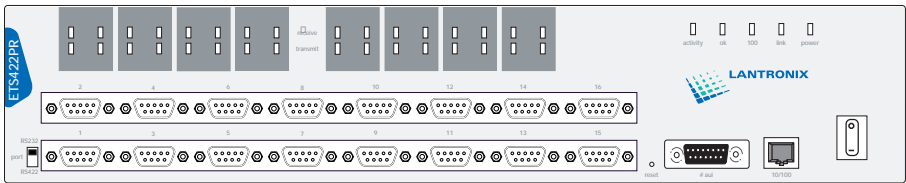


Note: *The first RJ45 port is also the serial console port; however, in most situations connecting a terminal to this port will not be necessary.*

2.3.3 ETS422PR Front Panel

The ETS422PR has 16 DB9 serial ports, a Reset button, an AUI Ethernet port, an RJ45 10/100BASE-T Ethernet port, several LEDs, and a power switch. In addition, port 1 includes a switch to set the port for RS-422 or RS-232 mode.

Figure 2-9: ETS422PR Front Panel



Note: *The first DB9 port is also the serial console port.*

2.3.4 ETSPR LEDs

Each ETSPR has 37 LEDs. Each serial port has one (ETS32PR) or two (ETS16PR and ETS422PR) corresponding LEDs that indicate receive and transmit activity. There are also five LEDs on the right side of the case. Their functionality is shown in Table 2-3.

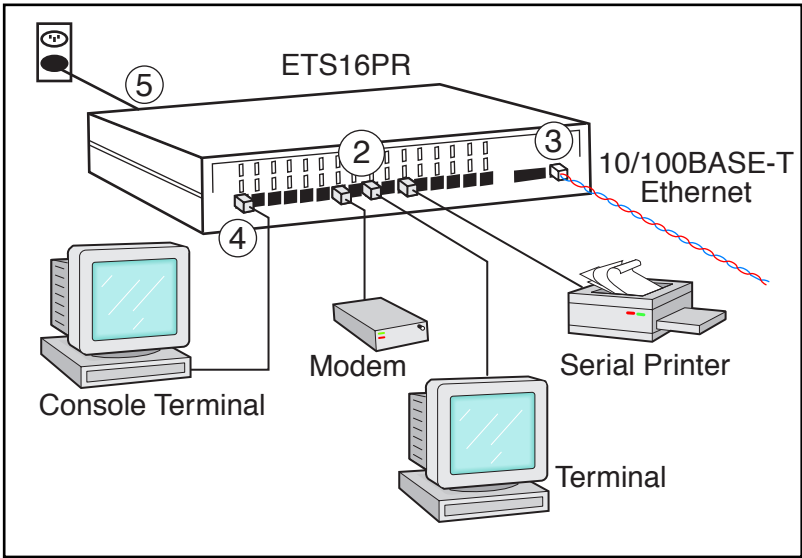
Table 2-3: ETSPR Port LED Functionality

LED	Function
activity	Blinks to indicate Ethernet activity.
ok	Blinks to indicate that the ETS is functioning properly.
100	Lights to indicate a 100BASE-T rather than 10BASE-T Ethernet link
link	Lights to indicate a functional Ethernet network link
power	Lights to indicate the ETS has power

2.4 Installing the ETSPR

The following diagram shows a properly-installed ETS16PR. Installation will generally be the same for all ETSPR models, the only difference being the type of serial ports available. See *ETSPR Product Descriptions* on page 2-7 for more information.

Figure 2-10: Sample ETSPR Network Layout (ETS16PR shown)



To install the ETS, complete the following steps in order.

2.5 Was the Installation Successful?

If the ETS appears to be working and the unit is connected to the network, there are a couple of ways to confirm that the unit is visible to network hosts:

- ◆ If the ETS has an IP address, ping it from a TCP/IP host.
- ◆ If the ETS has an IP address, use EZWebCon to log into the ETS.
- ◆ If the ETS does not have an IP address, assign one by following the instructions in Section 5.1 on page 5-1.

When you are satisfied that the ETS is working properly, proceed to Chapter 3, *Getting Started*. If the ETS does not boot properly, see Appendix B, *Troubleshooting*.

3: Getting Started

It is important to consider the following points before logging into and configuring the ETS:

- ◆ You must configure the ETS IP address before any TCP/IP functionality is available. (See *Setting the IP Address* on page 5-1) You cannot use the ThinWeb Manager until you have configured an IP address.
- ◆ Changing any server, service, or port setting requires privileged user status. The default privileged password is **system**.
- ◆ The login password is required for remote console logins. The default login password is **access**.

Note: *If you would like to change either the privileged or login password, either use EZWebCon or refer to the Device Server Reference Manual located on the CD-ROM.*

3.1 Configuration Methods

3.1.1 EZWebCon

The EZWebCon configuration software is the recommended way to configure the ETS. EZWebCon's graphical user interface guides first time users through the initial configuration process and allows experienced users to update any configurable parameters.

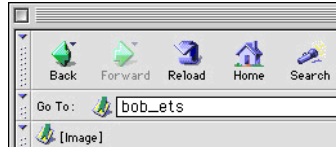
EZWebCon requires a Java Virtual Machine (JVM) on the client. Lantronix provides JVM installers for Solaris and 32-bit Windows users, as well as source code and instructions for compiling it for use on other systems.

The EZWebCon software is located on the distribution CD-ROM. All instructions for installing EZWebCon are provided in the README file. For assistance once EZWebCon is running, refer to the EZWebCon on-line help.

Note: *EZWebCon is also available from the Lantronix website and FTP server. See Appendix D for more information.*

3.1.2 Using a Web Browser (ETSPR models)

The ThinWeb Manager web browser interface allows you to log into and configure your ETS using a standard web browser with JavaScript enabled. Simply type the ETS IP address or resolvable text name into the browser's URL/Location field.

Figure 3-1: Sample Web Browser Login

Once you have connected to the ETS, you will see the Lantronix ThinWeb Manager interface. Use the left-hand menu to navigate to subpages where you can configure important settings as well as view statistics and other server information.

Figure 3-2: ThinWeb Manager Interface

3.1.3 Incoming Logins

Incoming logins made via EZWebCon can be used to configure the ETS. Incoming LAT and TCP/IP logins can also be used.

Incoming Telnet is only possible if your ETS has an IP address configured. Incoming Telnet is enabled by default to allow TCP/IP connections. To change this setting, use the **Define Server Incoming** command described in the *Command Reference* chapter of the *Device Server Reference Manual* located on the CD-ROM.

Incoming logins do not prompt for a login password, so you may wish to disable them for security reasons. If it is undesirable to disable incoming logins, the ETS can be configured to prompt for a password with the **Define Server Incoming Password Enabled** command.

3.1.4 Console Terminal

To configure the ETS via a console terminal, attach a terminal to the serial console port (port 1) and press the **Return** key. You will see a Local> prompt at which configuration commands can be entered.

3.2 Services

With few exceptions, a service must be created before print queues can be configured on the ETS. A service is a resource accessible to network hosts. A Lantronix service is also known as a **remote printer** name or **remote queue** name on many operating systems.

4: Using the ETS

The sections in this chapter show how to use the ETS in a variety of applications.

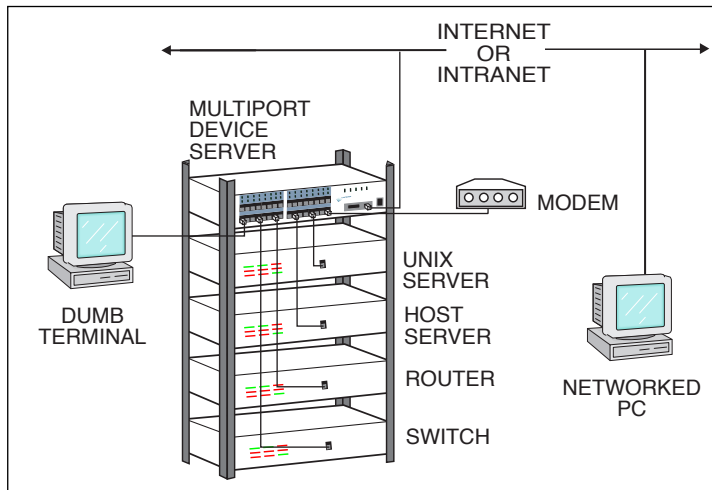
- ◆ For detailed instructions on how to set up the ETS as a console server, see Console Server Example on page 4-1.
- ◆ For instructions on how to use the ETS in serial tunnel mode, see Serial Tunnel Example on page 4-6.
- ◆ For information about using the ETS with the Lantronix Comm Port Redirector, see Comm Port Redirector on page 4-7.

Keep in mind that you must reboot the ETS after issuing a Define command. The command will take effect when the ETS reboots. The one exception is that Define Port commands take effect once the ports are logged out.

4.1 Console Server Example

When you use the ETS as a console server, you can remotely manage devices and equipment from anywhere on the network.

Figure 4-1: Console Server



To use the ETS as a console server, you must connect the ETS serial ports to the serial console/management ports of other equipment such as a UNIX servers, PBX switches, routers, network switches, or other similar devices.

Once you have completed the connections, you can establish a Telnet connection to the ETS IP address and socket number of the desired port. The ETS serial ports allow two types of socket connections: Telnet IAC interpretation at socket 200x, and raw TCP connections at socket 300x, where x is the port number. For example, to open a Telnet connection to port 4 of an ETS at IP address 192.0.1.168, you would issue the command “Telnet 192.0.1.168:2004” from your system prompt.

In addition to direct Telnet connections, you can use the ETS’ built-in menu feature. The ETS menu allows you to connect to the IP address of the ETS and be greeted with a menu with which to connect to each attached serial device. Menu choices are an easy way to let users access often-used hosts and services without needing to know any ETS command syntax, the IP addresses of the non-local devices, or the socket numbers involved.

Figure 4-2: Sample Menu

```
Lantronix Console Server
1) Cisco Router           5) PBX Switch
2) Sun Server             6) ETS Prompt
3) HPUX Server            7) Logout
4) Linux Server           8)

Enter Selection:
```

4.1.1 Define the Menus

You create menus with the **Set/Define Menu** command. Each menu entry is numbered. Each command includes a name for the menu item and a command that is executed on the ETS when that menu item is chosen. Users type the number of the command they wish to execute and press Return.

To give your menu a name, use a Define Menu Title command.

Figure 4-3: Menu Title

```
Local>> DEFINE MENU TITLE "Lantronix Console Server:"
```

There are three types of menu entries: those that connect users to devices on the network, those that connect users to devices attached to the ETS, and those that function locally on the ETS. The basic syntax of the **Define Menu** command includes a menu item number, a menu item name, and a command that is executed when the user chooses that menu item.

Figure 4-4: Generic Menu Command

```
Local>> DEFINE MENU n "Name" "command"
```

Note: *You must enclose both the menu item and the command in their own sets of quotation marks.*

To allow users to connect **to** a device on the network **from** a terminal connected to the ETS, use a Telnet command.

Figure 4-5: Menu Entries for Network Connections

```
Local>> DEFINE MENU 1 "Cisco Router" "telnet 192.0.1.250;kill"
Local>> DEFINE MENU 2 "Sun Server" "telnet 192.0.1.251;kill"
```

To allow users to connect **from** the network **to** a device connected to the ETS (or from one ETS port to another) add a **Connect Local** command.

Figure 4-6: Menu Entries for Local Connections

```
Local>> DEFINE MENU 3 "HPUX Server" "connect local port_3"
Local>> DEFINE MENU 4 "Linux Server" "connect local port_4"
Local>> DEFINE MENU 5 "PBX Switch" "connect local port_5"
```

To allow users to access a local service on the ETS, add a general ETS command.

Figure 4-7: Menu Entries for manipulating the ETS

```
Local>> DEFINE MENU 6 "ETS Prompt" "exit"
Local>> DEFINE MENU 7 "Logout" "logout"
```

Note: *The Exit command only works in menu mode. It allows users to return to the Local> prompt on the ETS on which the menu was configured. It is helpful to include this command in your menus until you have fully tested them - otherwise there is no way for users on menu mode ports to return to the Local> prompt.*

To review the menu you've just created, type **Show Menu** at the Local> prompt. The menu created by the previous commands would look like this:

Figure 4-8: New Menu

```
Local_1>> show menu
Title for the menu is "Lantronix Console Server"
1: Cisco Router --> "telnet 192.0.1.250;kill"
2: Sun Server --> "telnet 192.0.1.251;kill"
3: HPUX Server --> "connect local port_3"
4: Linux Server --> "connect local port_4"
5: PBX Switch --> "connect local port_5"
6: ETS Prompt --> "exit"
7: Logout --> "logout"
```

4.1.2 Enable Menu Mode

You must enable menu mode for all ports on which you wish the menu system to work. Ports 2-4 will be used for the examples in this section.

Figure 4-9: Enabling Menu Mode

```
Local>> DEFINE PORT 2-4 MENU ENABLED
Local>> LOGOUT PORT 2-4
```

If you want incoming logins from the network to be able to use the menu, you must enable menu mode on **port 0**. Users who Telnet into the ETS would see the menu rather than the Local> prompt.

Note: *Administrators can bypass the menu and get to the ETS command line by forming a Telnet connection to **port 7000**.*

4.1.3 Configure Switches

Switches allow users to move around within open sessions and return to the ETS Local> prompt if needed. It is important to set switches if you intend to allow serial port users to hold multiple sessions to remote servers. You must set switches for all of the ports for which menu mode was enabled in Section 4.1.2.

Any key may be used for a switch, provided that the chosen keys do not interfere with the sessions. To use a control key, type a carat (^).

Figure 4-10: Configuring Switches

```
Local>> DEFINE PORT 2-4 LOCAL SWITCH ^X
Local>> DEFINE PORT 2-4 FORWARD SWITCH ^F
Local>> DEFINE PORT 2-4 BACKWARD SWITCH ^B
Local>> DEFINE PORT 2-4 BREAK LOCAL
```

Note: *Define Port Break Local allows the ETS to recognize the switches you just configured.*

To check switch configurations, enter the **Show/List Port** command and specify the ports that are used for menu mode.

Figure 4-11: Show Port Screen

```
Local_1>> show po 2

Port 2 : Username:                Physical Port 2 (Idle)

Char Size/Stop Bits:      8/1    Input Speed:          9600
Flow Ctrl:                Xon/Xoff Output Speed:          9600
Parity:                   None    Modem Control:        None

Access:                   Dynamic  Local Switch:          ^X
Backward:                 ^B      Port Name:            Port_2
Break Ctrl:               Local   Session Limit:        4
Forward:                  ^F      Terminal Type:        Soft()

Characteristics: Menu
```

4.1.4 Using Menus

When you log into a port with menu mode enabled, you will be presented with an initial login screen.

Figure 4-12: Login Screen

```
Lantronix ETSxx Version B3.6/3 (000410)

Type HELP at the 'Local_10> ' prompt for assistance.

Username>
```

- 1 Enter your user name (in this case, Bob) and press Return.

Figure 4-13: Login Screen, part 2

```
Username> Bob

Press <CR> to continue...
```

- 2 As instructed, press the Return key once more to see the actual menu.

Figure 4-14: Login Menu

```
Lantronix Console Server
1) Cisco Router          5) PBX Switch
2) Sun Server            6) ETS Prompt
3) HPUX Server           7) Logout
4) Linux Server          8)
Enter Selection:
```

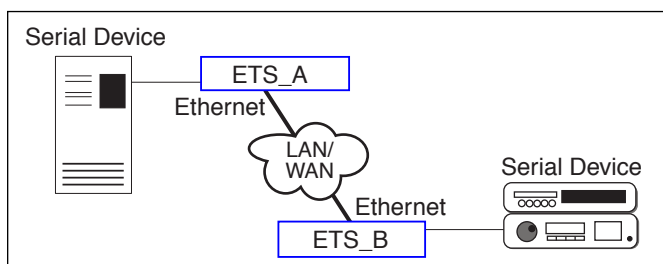
- 3 Choose a menu option. Type the number of the desired option and press Return. For example, to connect to the Linux server, you would press 2 and then press Return.
- 4 To return to the menu from your Linux session, press the configured Local Switch key. In this case, the Local Switch is Ctrl-X (see Figure 4-9).

Note: *Switch keys only work within sessions. They do not work from the menu screen - you must enter a menu number to go to a session from the menu screen.*

4.2 Serial Tunnel Example

Two ETS's can be connected to emulate a direct serial connection across a LAN or WAN. Servers connected in this way can pass data only—they will not be able to pass status signals (DSR/DTR, CTS/RTS, etc.) or preserve timing between characters. The basic network configuration for this virtual serial line is shown in Figure 4-14.

Figure 4-15: Back-to-Back ETS Connections



4.2.1 TCP Configuration

Assuming the ETS serial port parameters have been configured properly, the ETS's would be configured as follows.

```

ETS_A      Local>> DEFINE PORT 2 DEDICATED TELNET 192.168.5.10:3001T
            Local>> DEFINE PORT 2 AUTOSTART ENABLED

ETS_B      Local>> DEFINE PORT 3 ACCESS REMOTE
            Local>> DEFINE PORT 3 DEDICATED NONE
            Local>> DEFINE PORT 3 AUTOSTART DISABLED
  
```

Note: *If the ETSs are on different IP subnets, configure the default gateway on each unit with the Change Gateway command.*

The above commands create a raw (8-bit clean) TCP connection between **ETS_A** port 2 and **ETS_B** port 3 once the units have been power-cycled. The commands for **ETS_A** ensure that it will automatically connect to **ETS_B** each time it is booted. The commands for **ETS_B** ensure that it is always available to accept connections from **ETS_A**.

Note: *You must log out the ETS ports after configuring them so that the commands can take effect.*

4.2.2 UDP Configuration

When the UDP protocol is used, there is no connection; each ETS must be told explicitly which hosts it is allowed to accept packets from. Each ETS would have to be configured to both send packets to and accept packets from the other ETS.

```
ETS_A      Local>> DEFINE PORT 2 DEDICATED TELNET 192.168.5.10:4096U
            Local>> DEFINE PORT 2 AUTOSTART ENABLED
            Local>> DEFINE PORT 2 ACCESS DYNAMIC
```

```
ETS_B      Local>> DEFINE PORT 3 DEDICATED TELNET 192.168.5.2:4096U
            Local>> DEFINE PORT 3 AUTOSTART ENABLED
            Local>> DEFINE PORT 3 ACCESS DYNAMIC
```

Setting up Dedicated hosts ensures that the units will always talk to each other. Enabling Autostart for both units enables one ETS to send data to the other ETS without having to wait for a serial carriage return to start the session. **ETS_B** knows exactly which other ETS to accept connections from. Finally, when Autostart is enabled, the access mode must be either Local or Dynamic (Dynamic is more flexible).

4.2.3 Multi-port Serial Tunnel Configuration

You can create serial tunnels for any available ports on the ETS. Each serial tunnel must point from one ETS port to one different serial device port (such as a serial port on an ETS or MSS server).

4.3 Comm Port Redirector

The Lantronix Comm Port Redirector application allows PCs to share modems and other serial devices connected to an ETS using Microsoft Windows or DOS communication applications. The Redirector intercepts communications to specified Comm ports and sends them over an IP network connection to the ETS serial port. This enables the PC to use the ETS serial port as if it were one of the PC Comm ports. Using their existing communications software, PC users dial out to a remote host through a modem connected to the ETS.

The Comm Port Redirector software and installation instructions are included on the distribution CD-ROM and web site.

5: TCP/IP Configuration

The EZWebCon configuration software is the easiest way to configure the ETS. The following sections cover IP address configuration and print configuration methods for TCP/IP hosts.

5.1 Setting the IP Address

The ETS IP address must be configured before any TCP/IP functionality is available. Use one of the following methods to set the IP address: EZWebCon; a directed Ping packet; a BOOTP, DHCP, or RARP reply; or commands entered via the command line interface.

5.1.1 Using EZWebCon

Use the following steps to assign an IP address using the EZWebCon Expert Shell.

- 1 From the **Action** menu, select **Assign IP Address**.
- 2 Enter or change the IP-related settings:
 - A For **Ethernet Address**, enter the number that appears on the bottom label of your ETS.
 - B For **IP Address**, enter the desired IP address to use for this ETS.
 - C For **Subnet Mask**, change the values provided only if you wish to use a mask other than the default. The default value should be correct in most cases.
 - D For **Loadhost**, enter the IP address of the loadhost where you intend to store your operating code and SDK files (if used).
- 3 Click **OK**.
- 4 Reboot the ETS. EZWebCon will let you know whether the configuration was successful.

Note: *If you have an older version of EZWebCon, refer to the Readme that was included with it.*

5.1.2 Using a Directed Ping Packet

The ARP/ping method is available under UNIX and Windows-based systems. If the ETS has no IP address, it will set its address from the first directed IP packet it receives.

On a **UNIX** host, create an entry in the host's ARP table and substitute the intended IP address and the hardware address of the ETS, then ping the ETS. This process typically requires superuser privileges.

Figure 5-1: ARP and Ping on UNIX

```
# arp -s 192.0.1.228 00:80:a3:xx:xx:xx
% ping 192.0.1.228
```

In order for the ARP command to work on **Windows**, the ARP table on the PC must have at least one IP address defined other than its own. If the ARP table is empty, the command will return an error message. Type **ARP -A** at the DOS command prompt to verify that there is at least one entry in the ARP table.

Figure 5-2: ARP and Ping on Windows

```
C:\ ARP -S 192.0.1.228 00-80-A3-XX-XX-XX
C:\ PING 192.0.1.228
```

Note: *There should be replies from the IP address if the ARP command worked.*

When the ETS receives the ping packet, it will notice that its IP address is not set and will send out broadcasts to see if another node is using the specified address. If no duplicate is found, the ETS will use the IP address and will respond to the ping packet.

The ETS will not save the learned IP address permanently; this procedure is intended as a temporary measure to enable EZWebCon to communicate with the ETS, or allow an administrator to Telnet into the ETS. Once logged in, the administrator can enter the **Change IPaddress** command to make the address permanent.

Figure 5-3: Configuring Permanent IP Address

```
% telnet 192.0.1.228

Trying 192.0.1.228

Lantronix ETSx Version n.n/n (yyymmdd)
Type Help at the 'Local_>' prompt for assistance.

Enter Username> gopher
Local> SET PRIVILEGED
Password> system (not echoed)
Local>> DEFINE IPADDRESS 192.0.1.228
```

Any host wishing to access the ETS will have to be told the ETS's IP address. This is typically configured in the unix file **/etc/hosts** or via a nameserver. Refer to the host's documentation for additional information.

5.1.3 Using a BOOTP, DHCP, or RARP Reply

At boot time a host-based DHCP, BOOTP, or RARP server can respond to an ETS request for an available IP address. For information about configuring the DHCP, BOOTP, or RARP server, see your host documentation.

5.1.4 Using the Command Line Interface

- 1 Connect to the serial port (Port_1) using a console terminal or a terminal emulation program, and press **Return**. The serial port settings are 9600 baud, 8 bits, 1 stop bit, no parity.
- 2 Become the privileged user.

Figure 5-4: Becoming the Privileged User

```
Local> SET PRIVILEGED
Password> system (not echoed)
Local>>
```

- 3 Enter the new IP address.

Figure 5-5: Configuring the IP Address

```
Local>> define server ipaddress 192.0.1.201
```

5.2 LPR Printing

The ETS provides two major methods of printing via TCP/IP: Berkeley remote LPR and RTEL host software.

Two parameters **must** be configured for LPR printing:

- 1 The IP address or host name of the ETS.
- 2 The remote output queue (the name of the service on the ETS).

In addition, there are a few important things to note about LPR printing:

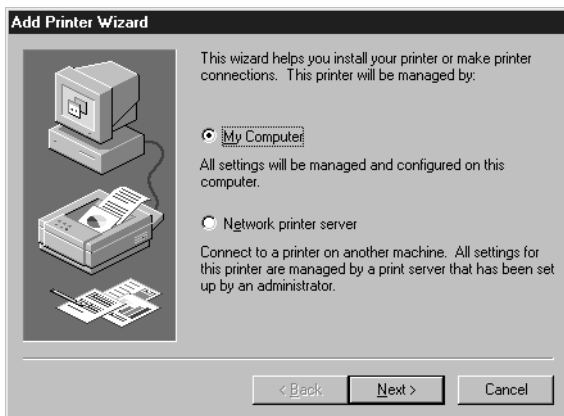
- ◆ Windows for Workgroups, Windows 95, and Windows 98 do not support LPR directly; however, Lantronix has provided a peer-to-peer printing solution on the distribution CD-ROM.
- ◆ Because of the way the LPR protocol is typically implemented on the host, the processing options and banner page are sent after the job data itself. The ETS will print a banner page at the end of a job, and cannot support most of the LPR options. If it is necessary to have the banner page at the beginning of the printout, install and use the RTEL software. If banners are not needed, they can be disabled.

- ◆ The ETS cannot print multiple copies of the print job when using the “-#n” lpr option.
- ◆ If two print queues on the host refer to two services on the same ETS, they must use separate spooling directories.
- ◆ No special purpose input or output filters can be used when printing via LPR. If this functionality is necessary, use the named pipe interface program in the RTEL print queue configuration software.

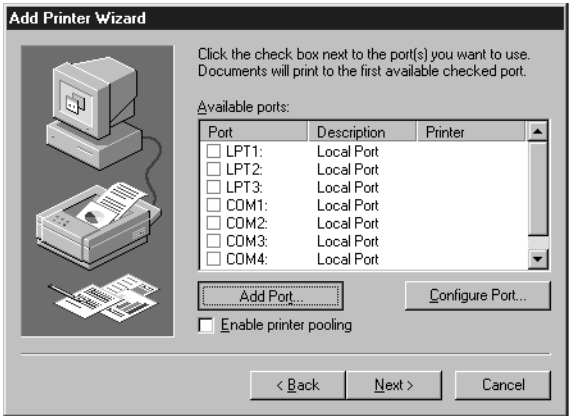
5.2.1 LPR on Windows NT 3.5.1 (and later)

This section assumes that TCP/IP, Simple TCP/IP, and Microsoft TCP/IP printing have been installed on the Windows NT host.

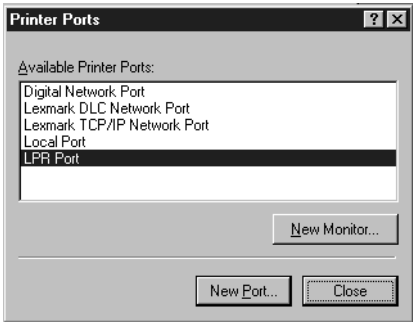
- 1 In the Control Panel, double-click the **Printers** icon.
- 2 Double-click the **Add Printer** icon.
- 3 In the window that appears, choose **My computer** and click **Next**.



- 4 Select the **Add Port** button and click **Next**.



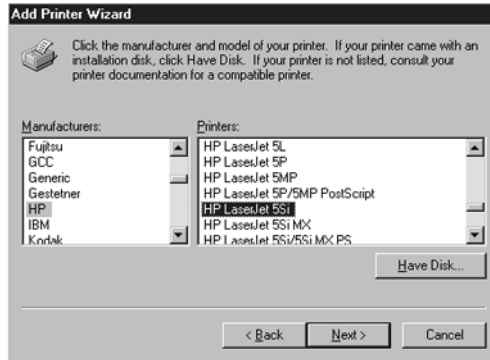
- 5 Select **LPR Port**.



Note: *If LPR Port is not an option, open the Network Control Panel and add “Microsoft TCP/IP Printing” to the List of services.*

- 6 Enter the name or IP address of your ETS on the first line, and enter the name of your ETS print service on the second line.

7 Select the manufacturer and printer type.



8 Enter the queue name.



9 If applicable, choose **Shared** and select the type of operating system that the printer will be working with. (First confirm that the print queue is working.)



- 10 Test the printer by choosing **Yes** and clicking **Finish**.



5.2.2 LPR on Windows 95/98

To enable LPR printing on Windows 95/98, you must download and install the LPR for Windows 95/98 application from the Lantronix FTP site (<ftp://ftp.lantronix.com>).

- 1 Go to the FTP home page and click on **pub**.
- 2 Click on **lpr_win32**.
- 3 Download the file **ltxlpr.exe**.
- 4 Install the file **ltxlpr.exe**. Once installation is complete, a readme file will open automatically.
- 5 Follow the directions in the readme file to configure LPR on your PC.

5.2.3 LPR on UNIX Hosts

The Berkeley remote printing system is supported on many machines, and is simple to configure. This section describes how to configure LPR print queues on generic UNIX hosts such as SUN hosts. There are slight variations in LPR configuration for AIX, HP, and SCO hosts, as will be explained in the following sections.

- 1 Install a print queue on your host by adding the ETS name and IP address to the **/etc/hosts** file:

Figure 5-6: Adding /etc/hosts Entry

xxx.xxx.xxx.xxx	ETS_XXXXXX
-----------------	------------

- 2 Add the host print queue to the `/etc/printcap` file. The punctuation shown in Figure 5-7 is required, and no extra spaces should be added.

Figure 5-7: Adding `/etc/printcap` Entry

```
ets_prt|Printer on LAB ETS:\  
:rm=ETS_XXXXXX:\  
:rp=ETS_XXXXXX_TEXT:\  
:sd=/usr/spool/lpd/ets_prt:
```

This will create a host queue named `ets_prt`. The `rm` parameter is the name of the ETS in the host's address file, the `rp` parameter is the name of the service as it exists on the ETS, and the `sd` parameter specifies the name of a directory used to hold temporary spooling files.

- 3 Create a world-writable spooling directory using the **mkdir** command.

Figure 5-8: Creating Spooling Directory

```
# mkdir /usr/spool/lpd/ets_prt  
# chmod 777 /usr/spool/lpd/ets_prt
```

- 4 If desired, use the **mx** option to allow unlimited size files to be printed and the **sh** option to prevent header pages from being generated. See the host's documentation or man pages for more information on the format of the printcap file and how to create the spool directory.
- 5 Print to the queue using normal `lpr` commands:

Figure 5-9: Printing to Queue

```
% lpr -Pets_prt /etc/hosts
```

5.2.4 LPR on AIX Hosts

The System Management Interface Tool (SMIT) allows you to enable LPD printing and create print queues. LPR has only been tested on AIX versions 3.2 and higher.

To create a print queue:

- 1 At the host prompt, type **smit**.
- 2 Choose **Print Spooling**.
- 3 Choose **Manage Print Server** and **Start the Print Server Subsystem (lpd daemon)**.
- 4 In the **Start the Print Server Subsystem** dialog box, type **both** in the first field.
- 5 The message "The lpd subsystem has been started" will appear. Click **Done**.

To add a print queue:

- 1 From the main window, choose **Print Spooling**.
 - 2 Choose **Manage Print Server** and **Manage Print Queues**.
 - 3 Choose **Add a print queue**.
 - 4 From the dialog box that appears, choose **remote**.
 - 5 From the next dialog box, choose **Remote Printing**.
 - 6 The **Add a Standard Remote Print Queue** dialog box will appear. Enter the following information.
 - The name of the print queue,
 - The name of the ETS unit,
 - The name of the ETS service,
 - The type of print spooler on the remote server, and
 - A description of the printer on the remote server.
 - 7 A dialog box will appear: “Added print queue **ets_prt**”. Click **Done**.
- Note:** *If you are unable to use SMIT, see the Device Server Reference Manual on the CD-ROM for UNIX commands used to set up print queues.*
- 8 Print to the queue using normal lp syntax.

Figure 5-10: Printing to Queue

```
% lp -dets_prt filename
```

5.2.5 LPR on HP Hosts

The System Administration Manager (SAM) allows you to create print queues.

Note: *If you are unable to use SAM, the Device Server Reference Manual located on the CD-ROM describes UNIX commands that can be used to set up print queues.*

To create a print queue:

- 1 At the HP prompt, type **sam**.
- 2 From the main application window, choose **Printers and Plotters**.
- 3 In the **Printers and Plotters** window, choose **Printers/Plotters**.
- 4 In the pull-down menu, select **Remote Printer/Plotter** from the **Actions** menu.

5 The **Add Remote Printer** window will appear. SAM will prompt you for:

- The printer name (the name of the print queue),
- The remote system name (the ETS name),
- The remote printer name (the ETS service),
- The remote cancel model, and
- The remote status model.

5.2.6 LPR on SCO UNIX Hosts

LPR is supported in SCO V3.2 release 4 with TCP/IP Version 1.2 and greater.

To configure a print queue using LPR, issue the **mkdev rlp** command. This will install the Berkeley remote printing files and executable programs.

Note: *The **mkdev rlp** command should only be issued once, or serious problems will occur. If this happens, contact SCO technical support.*

You can print to this queue using normal lp syntax once the remote printer is set up. To create a remote printer:

- 1** Issue the **rlpconf** command.

2 Answer the questions that follow.

Figure 5-11: Configuring Remote Printer

```
Remote Printing Configuration
Enter information for remote printers or local printers accepting remote
printing requests
Please enter the printer name (q to quit): backupprinter
Is printer backupprinter a remote printer or a local printer? (r/l) r
Please enter the name of the remote host that backupprinter is attached
to: ETS_XXXXXX
The backupprinter is connected to host ETS_XXXXXX.
Is this correct? (y/n) y
Would you like this to be the sys.default printer? (y/n) y
Make sure your hostname appears in ETS_PRT's /etc/hosts.equiv or /etc/
hosts:lpd file.
Make sure backupprinter appears in /etc/printcap (in BSD format).
Make sure backupprinter has a spool directory on ETS_PRT.
Putting the printer in printer description file and creating spool direc-
tory... done
Updating LP information... done
```

In the example, the printer name is your ETS service name, and the remote host name is the name of your ETS as it is listed in your hosts file.

During initial configuration, the queue name must be the same as the remote printer name. However, you may change the queue name later by manually editing the printcap file.

5.2.7 RTEL Functionality

If the LPR method of printing is not adequate for an application (for example, if you need banners before jobs, or more flexibility), configure the Lantronix-supplied RTEL software on the host. After installing the software configuring the connections to the ETS, you can use normal UNIX print commands and queue utilities such as **lpc** and **lpstat**.

Note: *RTEL binaries are provided for many systems. Source code is also provided for use on non-supported systems.*

To print to the ETS using special formatting or using third-party software packages, you may have to create **print pipes** on the host. The RTEL software provides this functionality by providing a UNIX named-pipe interface.

To recreate the RTEL source files:

- 1 Copy the file **RTEL_SRC.TAR** in binary mode from the distribution CD-ROM to the UNIX host.
- 2 Untar the archive.
- 3 See the README files in the created directories that describe the contents of the RTEL distribution and man pages that describe the actual software functionality.

5.3 Unix Host Troubleshooting

Table 5-1: TCP Troubleshooting

Area to Check	Explanation
The ETS IP address and name are entered in the host file	Telnet to the ETS using the name in the host file and verify that the ETS name is resolvable and that the ETS is reachable via the network.
Jobs that appear in the host queue reach the ETS	From within the LPC administrative utility, enter these commands to clear and reset the host queue: abort <i>queue</i> clear <i>queue</i> enable <i>queue</i> start <i>queue</i>

6: NetWare Configuration

The EZWebCon configuration software is the easiest way to configure the ETS. The following sections cover print configuration methods for NetWare hosts.

Note: *The ETS needs an IP address before you can use EZWebCon. See Setting the IP Address on page 5-1 for instructions.*

This chapter explains creating NDS print queues with NetWare Administrator and with the PCONSOLE Quick Setup option. To create NDS print queues, you must be running NetWare version 4.x with NDS capabilities.

If you are running NetWare versions 2.x, 3.x, or version 4.x with bindery emulation, you may configure bindery print queues using QINST (bindery only) or PCONSOLE. For more information, see the *NetWare* chapter of the *Device Server Reference Manual* located on the CD-ROM.

6.1 NDPS Printing

Lantronix Terminal and Print Servers support Novell's NDPS for printing using the Novell NDPS Gateway. For instruction on setting up NDPS, refer to your Novell documentation. Lantronix also provides information on setting up NDPS in our FAQs on our support web site (<http://www.lantronix.com/support/>).

6.2 NDS Print Queues

6.2.1 Obtain an NDS License

If you wish to create NDS print queues, you must read and complete an NDS registration form via one of the following methods:

- ◆ Using a forms-capable Internet browser, navigate to the Lantronix World Wide Web site (**www.lantronix.com**), go to the Technical Support section, and find the **Novell NDS Registration** link.
- ◆ Send email to **support@lantronix.com**. You will receive a blank registration form that can be completed and returned to Lantronix.
- ◆ If you don't have Internet access, contact a Lantronix technical support representative for assistance. Contact information is provided in *Appendix A*.

6.2.2 Configure your ETS

- 1 License NDS on your ETS using the string obtained from Lantronix.

Figure 6-1: Licensing NDS

```
Local>> DEFINE PROTOCOL NETWARE DSLICENSE licensestring
```

- 2 Define the directory service tree in which the ETS is located.

Figure 6-2: Defining Directory Service Tree

```
Local>> DEFINE PROTOCOL NETWARE DSTREE foodco
```

Note: *For an explanation of the structure of the NetWare Directory Service tree, see your host documentation.*

- 3 Define the directory service context in which the ETS is located.

Figure 6-3: Defining Directory Service Context

```
Local>> DEFINE PROTOCOL NETWARE DSCONTEXT ou=kiwi.ou=exotic.o=fruit
```

- 4 Enter the **List Protocol NetWare Access** command to ensure that at least one of the file servers in the directory service tree is in the access list.
- 5 If desired file server is not in the access list, add it.

Figure 6-4: Defining Access List

```
Local>> DEFINE PROTOCOL NETWARE ACCESS fileserver
```

- 6 Reboot the ETS.

Figure 6-5: Rebooting

```
Local>> INITIALIZE DELAY 0
```

6.3 NetWare Administrator Quick Setup Print Queues

The NetWare Administrator management utility allows you to manage network resources, such as queue-based print services, in a tree structure. You can either use the Quick Setup option or individually create printing-related objects.

Note: *NetWare Administrator can be used for both NDS and bindery print queues.*

To create a print queue with the Quick Setup option:

- 1 Start the NetWare Administrator.
- 2 In the **Directory Tree** windows, select the context in which to install the printer.
- 3 From the Menu Bar, select **Tools: Print Services Quick Setup**.
- 4 In the **Print Server Name** field, enter the name of your ETS (viewable by entering the **Show Server** command at the Local> prompt).
- 5 In the **Printer Name** field, enter the name of the desired print **service** configured on your ETS. For example, ETS_XXXXXX_.
- 6 In the **Print Queue Name** field, enter the name of the print queue to create. The name should be meaningful to you; it will not affect ETS configuration.
- 7 Click **Create**.
- 8 Reboot the ETS.

6.4 PCONSOLE Print Queues

- 1 Log in as Admin on the file server you will be changing.
- 2 At the prompt, type **PCONSOLE** to start the utility.

For example, if your file server is mapped to the F: drive, you would use the **F:** prompt.
- 3 From the main menu, choose **Quick Set-Up**.
- 4 When prompted by PCONSOLE, enter the information with which to configure the print queue.
 - The print server name (ETS_XXXXXX),
 - The new printer name (service name, such as ETS_XXXXXX_),
 - The new print queue name, and
 - The print queue volume (the name of the file server from which the printer receives print requests).

The remaining fields can be left in their default settings.

- 5 Press the **F10** key to save the print queue information.
- 6 Reboot the ETS.

6.5 NetWare Host Troubleshooting

Table 6-1: NetWare Host Troubleshooting (Bindery Mode)

Area to Check	Explanation
The print server names in PCONSOLE match the ETS name and its service name	Use PCONSOLE to check.
The ETS NetWare access table	Use the Show Protocols NetWare Access command. Scanning too many file servers can cause a delay between jobs. Configure the access list to only scan for jobs on the file servers of interest.

Table 6-2: NetWare Host Troubleshooting (NDS)

Area to Check	Explanation
The ETS NetWare access table	Use the Show Protocols NetWare Access command. By default, only local file servers are scanned for queues.
The ETS login password and the queue password on the file server	The passwords must match or the ETS will not be able to log into the file servers to scan for jobs.
The ETS has successfully attached to the queue	Type NETSTAT at the Local> prompt. This will display information about file servers, printers, and queues that the ETS has found. If a queue is in JobPoll, the ETS has successfully attached to the queue.
The DSTree, DSContext, and DSLicense	Type Show Protocol NetWare NDS . This command shows the tree and the context that you have configured, a failure code, and an NDS error code for each server. DSTree is the directory service tree on which the ETS is located. DSContext is the context where the ETS is located; it must match the context on the file server (The DSContext must be of the following form: ou=fruit.o=exotic). DSLicensed should be yes .
Printer and queue changes have propagated through the NDS tree	It may take a few minutes for the changes to propagate. If the ETS doesn't attach, reboot the ETS.

Table 6-3: NDS Errors from the File Server

Code	Meaning	Remedy
0xffffda7	Object could not be found in the given context	Check the ETS server name, DScontext, and DStree to ensure the printer server is set up correctly with PCONSOLE.
0xffffda5	Requested attribute could not be found	Use PCONSOLE to ensure that the ETS has associated printers and the printers have associated queues.
0xffffd69	DS Database is locked	An administrator is probably updating the database. Wait a few minutes and issue the Set Protocol NetWare Reset command.
0xffffd63	Invalid password	The password for the print server object under PCONSOLE must match the ETS login password. If the login password on the ETS is left as the default (access), there should be no password for the print server object.
0xffffd54	Secure NCP violation	Turn down the NCP packet signature level so that it is not required.

Table 6-4: NDS Printing Errors

Bit	Meaning	Remedy
1	Server out of memory	Turn the ETS off, wait a few seconds, and turn it back on. Disable unused protocols and/or remove file servers without print queues from the NetWare access list.
2, 3	Unexpected response from file server	Report the problem to Lantronix Technical Support.
4	No printers found for the ETS	Ensure that there are printers for the ETS, and the printer names match the service names on the ETS.
5	No printer queue found	Ensure that the printers have associated queues.
6	Login failed	Ensure there is a print server object configured with the same name as the ETS.
7	Authentication failed	Ensure the ETS login password is the same as the print server object password. If the ETS is using the default password (access), there should be no print server object password.
8	Server cannot attach to queue	Check the NDS partitions, replicas, and volumes to ensure the file server where the queue lives has the correct information.



7: LAT Configuration

The EZWebCon configuration software is the easiest way to configure the ETS. The following sections cover print configuration methods for LAT hosts.

Note: *The ETS needs an IP address before you can use EZWebCon. See Setting the IP Address on page 5-1 for instructions.*

To use LAT you must obtain a LAT license from your dealer or Lantronix and use the Set/Define Protocol LAT License command on your ETS. LAT print queues can be created by printing to a port or printing to a service. Printing directly to a port requires no ETS configuration.

Note: *Printing directly to a port is the easiest method for printing to the ETS. If you would like instructions for printing to a service, see the Device Server Reference Manual located on the CD-ROM.*

7.1 Printing Directly to a Port

- 1 Create a LAT application port that references the ETS port.

Figure 7-1: Creating LAT Application Port

```
$ RUN SYS$SYSTEM:LATCP
LATCP> CREATE PORT LTAnnn/APPLICATION
LATCP> SET PORT LTAnnn/NODE=ETS_XXXXXX/PORT=Port_n
LATCP> EXIT
```

- 2 Create and start a print queue that uses the LAT application port.

Figure 7-2: Creating and Starting Print Queue

```
$ INITIALIZE/QUEUE/START/ON=LTAnnn:/PROCESSOR=LATSYM
/RETAIN=ERROR queue_name
```

- 3 Add the commands to the SYS\$MANAGER:LAT\$STARTUP.COM file so the required LAT devices will be recreated after each host reboot.

Note: *LAT terminal device characteristics may have to be changed to correctly print certain files. See your VMS documentation for more information.*

- 4 Print to the queue.

Figure 7-3: Printing to Queue

```
$ PRINT/QUEUE=queue_name filename.txt
```

7.2 LAT Host Troubleshooting

By default, the LAT error message codes on the host are not translated into text error messages. If a LAT job fails and appears in the queue with an eight-digit hex result code, the code can be translated by issuing the following commands:

Figure 7-4: Translating LAT Error Codes

```
$ SHOW QUEUE/FULL/ALL queue_name
(note the error code nnnnnnnn)
$ SET MESSAGE SYS$MESSAGE:NETWRKMSG.EXE
$ EXIT %Xnnnnnnnn
```

Table 7-1: Troubleshooting LAT Configurations Using a Port

Area to check	Explanation
The specified node name matches the ETS node name	Use the Show Server command to verify.
The specified port name matches the port's name	Use the List Port 1 command to verify.

8: AppleTalk Configuration

The EZWebCon configuration software is the easiest way to configure the ETS. The following sections cover print configuration methods for AppleTalk hosts.

Note: *The ETS needs an IP address before you can use EZWebCon. See Setting the IP Address on page 5-1 for instructions.*

Note: *Macintoshes that do not support EtherTalk will need either an Ethernet card or a LocalTalk-to-EtherTalk router to use the ETS.*

8.1 Bitronics

Printing from a Macintosh is only possible with a PostScript printer and bi-directional communication between the ETS and that printer. The ETS supports the Bitronics interface, an extension to the standard Centronics interface. Printers that support Bitronics allow bi-directional communication. To enable Bitronics on an ETS port, use the **Define Port 2 Bitronics Enabled** command.

Note: *MacOS 8.1 can also print via LPD. See the Device Server Reference Manual located on the CD-ROM and web site for configuration instructions.*

8.2 Macintosh Services

Before attempting to print from a Macintosh, ensure that AppleTalk and PostScript are both enabled on at least one service. Once a PostScript AppleTalk service is configured, the service will appear in the Chooser as a LaserWriter in the same zone as the ETS. Select the service in the Chooser and complete the appropriate setup options. Then close the Chooser window and print a test page of text to the Macintosh service.

8.3 AppleTalk Zones

If there is a router on the network, the ETS will appear in the default zone specified by the router. To change the default zone use the **Define Protocol AppleTalk Zone** command.

If the ETS is attached to a network without an AppleTalk router, all AppleTalk devices (including the ETS) will appear in the default zone in the Chooser.

Note: *If no router is present on the network, the ETS will not accept AppleTalk print jobs for 60 seconds after booting.*

8.4 AppleTalk Host Troubleshooting

Table 8-1: AppleTalk Host Troubleshooting

Area to Check	Explanation
The printer is available to be selected in the Chooser	Make sure the printer is in the right zone.
Bidirectional communication	Lock the printer in PostScript mode and issue the Test Service PostScript Count n command. This sends a job to the printer and waits for the response.

9: DLC Configuration for LAN Manager

The EZWebCon configuration software is the easiest way to configure the ETS. This chapter explains DLC/Digital Network Port configuration for Windows NT 4.x hosts.

Note: *The Server needs an IP address before you can use EZWebCon. See Setting the IP Address on page 5-1 for instructions.*

Printing using an LPD client is the preferred method for sending print jobs to the ETS. Windows 95 does not support DLC printing (see *Chapter 5* for more information).

9.1 DLC Configuration

9.1.1 ETS Configuration

To use the DLC protocol, you must have one service with the DLC characteristic enabled. The DLC characteristic may be associated with only one service on a given ETS.

Figure 9-1: Enabling DLC

```
Local>> DEFINE SERVICE ETS_XXXXXX_ DLC ENABLED
```

9.1.2 Host Configuration

To send print jobs from a Windows NT host to the ETS, add the ETS as a Windows NT printer.

- 1 Double-click the **Printers** icon in the Control Panel.
- 2 Double-click the **Add Printer** icon.
- 3 In the window that appears, select **My Computer** and click **Next**.
- 4 Select the **Add Port** button.
- 5 Select **Hewlett-Packard Network Port** and click **New Port**.

If Hewlett-Packard port is not one of the available options, you must install DLC printing from your Windows NT system disks. DLC is not installed by default.

- 6 Enter the ETS hardware address. It is printed on the ETS bottom label.

- 7** Select **Job-based**.
- 8** Select the manufacturer and printer type.
- 9** Enter the queue name.
- 10** If applicable, choose **Shared** and select the operating system the printer will be working with. (First confirm that the print queue is working.)
- 11** Test the printer.

A: Contact Information

If you are experiencing an error that is not listed in Appendix B: or if you are unable to fix the error, contact your dealer or Lantronix Technical Support at 800-422-7044 (US) or 949-453-3990. Technical Support is also available via Internet email at **support@lantronix.com**.

A.1 Problem Report Procedure

When you report a problem, please provide the following information:

- ◆ Your name, and your company name, address, and phone number
- ◆ Lantronix ETS model number
- ◆ Lantronix ETS serial number
- ◆ Software version (use the **Show Server** command to display)
- ◆ Network configuration, including the information from a **Netstat** command
- ◆ Description of the problem
- ◆ Debug report (stack dump), if applicable
- ◆ Status of the unit when the problem occurred (please try to include information on user and network activity at the time of the problem)

A.2 Full Contact Information

Address: 15353 Barranca Parkway, Irvine, CA 92618 USA

Phone: 949/453-3990

Fax: 949/453-3995

World Wide Web: <http://www.lantronix.com>

North American Direct Sales: 800/422-7055

North American Reseller Sales: 800/422-7015

North American Sales Fax: 949/450-7232

Internet: sales@lantronix.com

International Sales: 949/450-7227

International Sales Fax: 949/450-7231

Internet: intsales@lantronix.com

Technical Support: 800/422-7044 or 949/453-3990

Technical Support Fax: 949/450-7226

Internet: support@lantronix.com



B: Troubleshooting

This Appendix discusses how to diagnose and fix errors quickly yourself without having to contact a dealer or Lantronix. It will help to connect a terminal to the serial port while diagnosing an error to view any summary messages that are displayed.

When troubleshooting, always ensure that the physical connections (power cable, network cable, and serial cable) are secure. If you have trouble with wireless networking, it may help to connect the ETS to a wired Ethernet network to verify that it is working properly and to check the wireless settings.

Note: *Some unexplained errors may be caused by duplicate IP addresses on the network. Make sure that your ETS IP address is unique.*

B.1 Power-up Troubleshooting

Problem situations and error messages are listed in Table B-1. If you cannot find an explanation for your problem, try to match it to one of the other errors. If you cannot remedy the problem, contact your dealer or Lantronix Technical Support.

Table B-1: Power-up Problems and Error Messages

Problem/Message	Error	Remedy
The ETS is connected to a power source, but there is no LED activity.	The unit or its power supply is damaged.	Contact your dealer or Lantronix Technical Support for a replacement.
The ETS is unable to complete power-up diagnostics.	This generally indicates a hardware fault. One of the LEDs will be solid red for three seconds, followed by one second of another color.	Note the blinking LED and its color, then contact your dealer or Lantronix Technical Support. The ETS will not be operational until the fault is fixed.
The ETS completes its power-up and boot procedures, but there's no noticeable serial activity.	There is a problem with the serial connection or the set-up of the serial device.	Check the terminal setup and the physical connections, including the cable pinouts (see Appendix C). Try another serial device or cable, or cycle power on the ETS.
	A rapidly-blinking OK LED may signal boot failure.	Reboot the unit. When the ETS is running normally, the OK LED blinks every two seconds.

Table B-1: Power-up Problems and Error Messages, cont.

Problem/Message	Error	Remedy
The terminal shows a Boot> prompt rather than a Local> prompt.	The ETS is not connected properly to the Ethernet.	Ensure that the ETS is firmly connected to a functional and properly-terminated network node.
	The ETS Ethernet address is invalid.	The ETS Ethernet address is located on the bottom of the unit. Use the Change Hardware command to set the correct address, then reboot.
	Init Noboot command was entered.	See <i>Entering Commands at the Boot Prompt</i> on page B-4.
The ETS passes power-up diagnostics, but attempts to download new Flash ROM code from a network host.	If the OK LED blinks rapidly, the Flash ROM code may be corrupt.	Reboot the unit. If you get the same message, you will need to reload Flash ROM. See <i>Reloading Software on page D-3</i> .
	If you did not request a TFTP boot, the flash ROM code is corrupt. The unit will remain in boot mode.	

B.2 DHCP Troubleshooting

Table B-2: DHCP Troubleshooting

Area to Check	Explanation
DHCP is enabled on the ETS	Use the Set Server DHCP Enabled command. If you manually enter an IP address, DHCP is automatically disabled.
Make sure the DHCP server is operational.	Check to see that the DHCP server is on and is functioning correctly.
The ETS gets its IP address from the DHCP server	Refer to the DHCP Manager on your DHCP server for information about addresses in use. If the DHCP server doesn't list your ETS IP address, there may be a problem.

B.3 BOOTP Troubleshooting

If the BOOTP request is failing and you have configured your host to respond to the request, check these areas:

Table B-3: BOOTP Troubleshooting

Area to Check	Explanation
BOOTP is in your system's <i>/etc/services</i> file	BOOTP must be an uncommented line in <i>/etc/services</i> .
The ETS is in the loadhost's <i>/etc/hosts</i> file	The ETS must be in this file for the host to answer a BOOTP or TFTP request.
The download file is in the correct directory and is world-readable	The download file must be in the correct directory and world-readable. Specify the complete pathname for the download file in the BOOTP configuration file, or add a default pathname to the download filename.
The ETS and host are in the same IP network	Some hosts will not allow BOOTP replies across IP networks. Either use a host running a different operating system or put the ETS in the same IP network as the host.

B.4 RARP Troubleshooting

Table B-4: RARP Troubleshooting

Area to Check	Explanation
The ETS name and hardware address in the host's <i>/etc/ethers</i> file	The ETS name and hardware address must be in this file for the host to answer a RARP request.
The ETS name and IP address in the <i>/etc/hosts</i> file	The ETS name and IP address must be in this file for the host to answer a RARP request.
The operating system	Many operating systems do not start a RARP server at boot time. Check the host's RARPD documentation for details, or use the ps command to see if there is a RARPD process running.

B.5 Modem Configuration Checklist

Most modem problems are caused by cabling mistakes or incorrect modem configuration. However, the following items should be verified after any modem configuration, and re-checked when there is modem trouble.

- ◆ The modem must disconnect immediately when DTR is de-asserted.
- ◆ The modem must assert CD (or DSR, if connected) when connected to another modem. It must not assert CD when disconnected. The modem may optionally assert CD during outbound dialing.
- ◆ The modem and ETS must agree on the flow control method and baud rate scheme.
- ◆ The modem must not send result codes or messages to the ETS except optionally during outgoing calls.
- ◆ The modem should be set to restore its configuration from non-volatile memory when DTR is dropped.
- ◆ The modem should be configured to answer the phone if incoming connections are to be supported. Generally this is done with the **ats0=1** command.
- ◆ The modem should not be configured to answer the phone unless the ETS asserts DTR.
- ◆ ETS Modem control must be enabled. Using modems on ports without modem control enabled will lead to security problems.
- ◆ The ETS Autobaud feature should be enabled only when required.

B.6 Entering Commands at the Boot Prompt

If the **Boot>** prompt appears on the serial console instead of the **Local>** prompt, one of two things may be wrong. Either the ETS does not have enough information to boot, or the network or flash boot has failed. If pressing the **Return** key does not display a prompt, press any other key. The **Boot>** prompt should appear.

If the ETS does not have enough information to boot, or the network or flash boot has failed, it will print a message to the console and wait ten seconds for serial port activity. If it detects serial port activity, it will continue booting provided the flash is good. However, if the user presses a key during that time period, the ETS will display the **Boot>** prompt.

Note: *If you see the message “Will attempt another download in x minutes,” press any key for the **Boot>** prompt.*

A series of commands called Boot Configuration Program (BCP) commands can be entered at the Boot> prompt to configure the ETS. These commands are a subset of the entire ETS command set. For example, a typical TCP/IP configuration might use the following commands:

Figure B-1: BCP Command Examples

```
Boot> Set IPADDRESS 192.0.1.229
Boot> Set SOFTWARE /tftpboot/ETS*.SYS
Boot> Set LOADHOST 192.0.1.188
Boot> Set SECONDARY 192.0.1.22
Boot> FLASH
% Initialization begins in 5 seconds.....
```

These commands set the Server's address, the software loadfile, and the loadhost's IP address (as well as that of a backup loadhost). The server then reboots using the **Flash** command and will attempt to load the file ETS*.SYS from the host at 192.0.1.188.

Flush NVR

This command is used to restore the ETS's non-volatile RAM to its factory default settings. It will reset everything that is configurable on the server, including the unit's IP address.

Flash

This command will force the ETS to download new operational code and reload it into Flash ROM. This is necessary when a new version of software is released and you wish to upgrade your unit. If the server cannot download the file, the code in Flash ROM will still be usable.

Help

Displays a one-page summary of available commands and what they do.

Init 451

Reboots the ETS after it has been configured. If the ETS can find and load the specified software loadfile, it will restart itself with full functionality. If the loadfile is not found, the server will attempt to reload continuously. If there is an error, or if the console's **Return** key is pressed, the ETS will re-enter the Boot Configuration Program.

Set BOOTP {Enabled, Disabled}

Enables or disables the sending of BOOTP queries during the boot sequence. It is enabled by default.

Set DHCP {Enabled, Disabled}

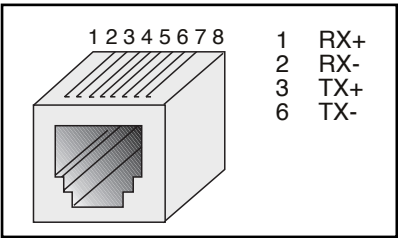
Enables or disables the sending of DHCP queries during the boot sequence. It is enabled by default.

Set Hardware xx-xx-xx	<p>Specifies the last three numbers of the server's Ethernet address. The first three numbers will be supplied automatically.</p> <p>The Ethernet address should have been set at the factory. Setting an incorrect address could cause serious network problems.</p>
Set IPAddress ip_address	<p>Specifies this server's IP address. Uses the standard numeric format.</p>
Set Loadhost ip_address	<p>Specifies the host to attempt to load the file from. The IP address should be in standard numeric format (no text names are allowed).</p>
Set RARP {Enabled, Disabled}	<p>Enables or disables the sending of RARP queries during the boot sequence. It is enabled by default.</p>
Set Secondary ip_address	<p>Specifies a backup loadhost. The IP address should be in standard numeric format (no text names are allowed). The backup loadhost will be queried if the primary host cannot load the server.</p>
Set Software filename	<p>Specifies the name of the file to load. The ETS will automatically add .SYS to the filename you specify. Note that all protocols must have a filename specified (either the default or set by the user). For more information, see <i>Appendix D</i>.</p> <p>TCP/IP users must use the Software option to specify the loadhost, the loadfile, and their own network address.</p> <p>TFTP users can specify a complete path name (up to 31 characters) if the file is located in a directory other than the default. The case of the filename must match that of the filename loaded onto the host computer.</p>
Show Server	<p>Use this command when issuing other commands to view the current ETS setup.</p>

C: Pinouts

C.1 Ethernet Connector

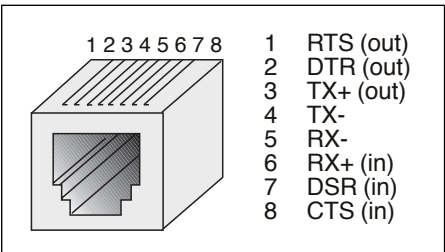
Figure C-1: RJ45 Ethernet Connector



C.2 RJ45 Serial Connectors

ETS servers are RS-423 compliant, and are thus limited by the equipment at the remote end of the serial line. If the is connected to an RS-232 device, it is subject to RS-232 limits: 15m (50 ft.) in length at 9600 baud, and to 2m (6 ft.) at 115.2K baud, although longer lengths will generally work.

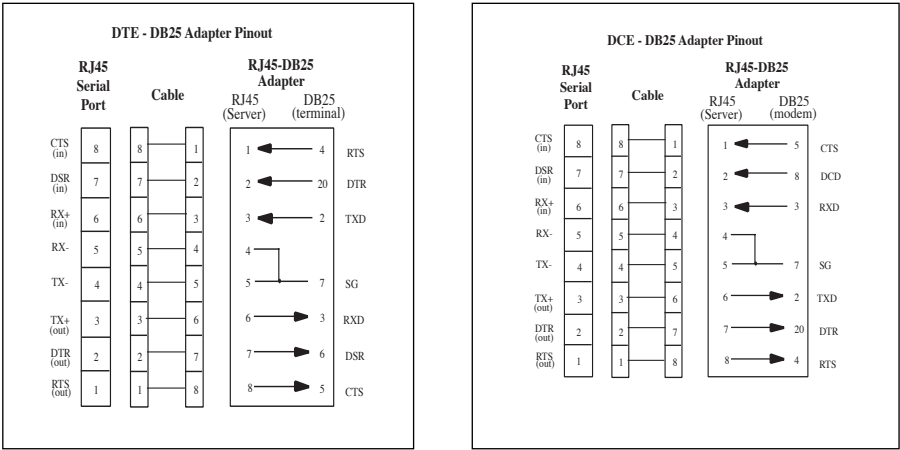
Figure C-2: RJ45 Serial Connector



C.2.1 RJ45 to DB25

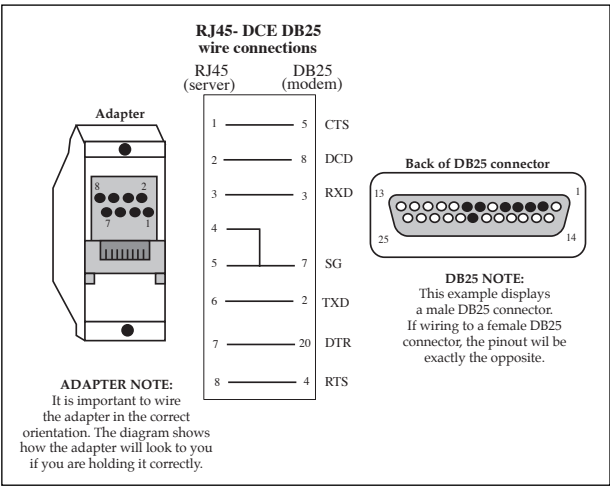
If you are connecting an RJ45 port to a DTE device (such as a terminal) that has a DB25 connector, you will need to use an RJ45-DTE DB25 adapter. To connect an RJ45 port to a DB25 connector on a DCE device, you will need an RJ45-DCE DB25 adapter. The pinout information for both connections is shown in Figure C-3.

Figure C-3: Pinouts of RJ45-DB25 Connections



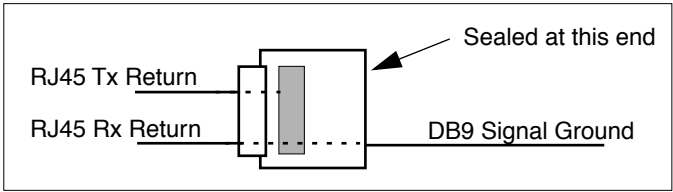
The arrows in Figure C-3 represent the direction of the signal. The pinouts assume that the 8-conductor cable connecting the ETS and the adapter block is a swapped cable. Both the transmit and receive ground signals on the ETS connector are wired to the signal ground on a DB25 adapter.

Figure C-4: RJ45 to DCE DB25 Adapter



You can use a crimper block to connect both transmit and receive grounds from the RJ45 cable to the single signal ground on the DB25. The connector internally “splices” the two wires together and provides one wire into the DB25 connector as shown below.

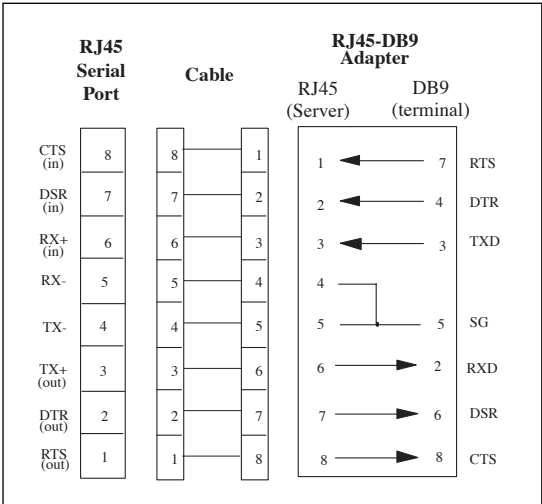
Figure C-5: Wire Splicer



To splice the wires, cut off the end of the wire that **does not** extend through the connector and insert both wires into the connector. Make sure that the wire that **does not** extend through the connector is in as far as possible to ensure a solid connection. Make sure that the wire that **does** extend through the connector extends far enough on the other side to be inserted in to the DB25 connector. Carefully squeeze the connector using a pair of pliers to make sure it is fully latched.

C.2.2 RJ45 to DB9

Figure C-6: RJ45-DTE DB9 Adapter



The arrows in Figure C-6 represent the direction of the signal. The pinouts assume that the 8-conductor cable connecting the ETS and the adapter block is a swapped cable. Both the transmit and receive ground signals on the ETS connector are wired to the signal ground on a DB9 adapter.

The information about crimping the RJ45 ground wires in Section C.2.1, *RJ45 to DB25* applies to the DB9 connector as well.

C.3 ETS422PR Serial Connectors

The ETS422PR has 16 DB9 serial ports. Port 1 is switchable between RS-422 and RS-232 serial modes. Ports 2-16 are RS-422 only.

Figure C-7: DB9 RS-232/RS422 Serial Connector

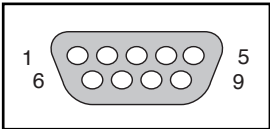


Table C-1: ETS422PR DB9 Serial Connector Signals

Pin	RS-422 mode	RS-232 mode
1	GND	
2	RTS+	RX
3	RTS-	TX
4	CTS+	
5	CTS-	GND
6	RX-	
7	RX+	RTS
8	TX-	CTS
9	TX+	

Note: *In the idle state, TX- should have a lower voltage than TX+, and RTS- should have a lower voltage than RTS+.*

C.4 Parallel Connectors

Lantronix uses standard Centronics parallel connectors.

For optimum performance of your ETS, Lantronix recommends the use of high quality parallel cables. Choose one of the following:

- ◆ A Lantronix parallel port cable, part number #500-011 (6 feet).
- ◆ Any other brand of **IEEE Std. 1284-1994** compliant cable. Compliant cables can easily be identified by the permanent label “IEEE Std. 1284-1994 compliant” printed on the cable.

Note: *Non-compliant cables have the same type of connectors but different electrical characteristics.*

D: Updating Software

D.1 Choosing the Right Software File

Lantronix intends to provide multiple software files for the ETS models. Each software file will contain the core ETS operating code for that particular model.

Table D-1: Available ETS Software

Software File Name	Models Supported
ETS.SYS	Old, do not use this file
ETSP.SYS	ETS8P, ETS16P, ETS4P
ETS16PR.SYS	ETS16PR
ETS32PR.SYS	ETS32PR
ETS422PR.SYS	ETS422PR

D.2 Obtaining Software

Current software files (ETS*.SYS) are available on the distribution CD. You can obtain software updates and release notes for the ETS from the Lantronix World Wide Web site (www.lantronix.com), or by using anonymous FTP through the Internet ([ftp.lantronix.com](ftp://ftp.lantronix.com)).

D.2.1 Via the Web

The latest version of ETS*.SYS can be downloaded from the Lantronix Web site. At the time of this writing, the exact location of the files on the re-designed site was unknown.

Note: *As a result of Netscape Navigator's configuration, it may try to open the file as an ASCII text file. To avoid this, hold down the shift key when choosing the software file.*

D.2.2 Via FTP

The ETS software resides on the Lantronix FTP server ([ftp.lantronix.com](ftp://ftp.lantronix.com)). Most of these files are binary data, so the binary option must be used to transfer the files. All released files are in the **pub** directory. Always download the README file in the pub directory before downloading anything else; it contains a list of available software files.

To log into the FTP server, enter a username of **anonymous** and enter your full email address as the password. The following text will be displayed:

Figure D-1: Sample FTP Login

```
230-Welcome to the Lantronix FTP Server.
230-
230-IMPORTANT: Please get the README file before proceeding.
230-IMPORTANT: Set BINARY mode before transferring executables.
220-
230-Direct questions to support@lantronix.com or 800-422-7044 (US) or
949-453-3990
230-
230 Guest login ok, access restrictions apply.
Remote system type is [your type will be displayed here].
ftp>
```

D.3 Reloading Software

The ETS stores software in Flash ROM to control the initialization process, operation, and command processing. The contents of Flash ROM can be updated by downloading a new version of the operational software via NetWare, TCP/IP, or MOP. Regardless of which protocol is used to update Flash ROM, the following points are important:

- ◆ The Flash ROM software file name, **ETS*.SYS**, should not be changed.
- ◆ The download file should be world-readable on the host.
- ◆ There is a sixteen character length limit for the path name.
- ◆ There is a twelve character limit for the filename.
- ◆ Define commands must be used because Set configurations are cleared when the ETS boots. Use the **List Server Boot** command to check settings before rebooting.

Note: *It is important to check ETS settings before using the Initialize Reload command to ensure that you are reloading the correct software file.*

D.3.1 Reloading Sequence

If DHCP, BOOTP, or RARP is enabled on the ETS, the ETS will request assistance from a DHCP, BOOTP, or RARP server before starting the download attempts. The ETS will then try TFTP, NetWare, and MOP booting (in that order) provided that it has enough information to try each download method.

Downloading and rewriting the Flash ROM will take approximately two minutes from the time the **Initialize** command is issued. If the download file cannot be found or accessed, the ETS can be rebooted with the code still in Flash ROM. The OK/ACT LED will blink quickly while the ETS is booting (and reloading code) and then slowly when it returns to normal operation.

Note: *If you experience problems reloading Flash ROM, refer to Troubleshooting Flash ROM Updates on page D-5.*

D.3.1.1 TCP/IP

Before the ETS downloads the new software, it will send DHCP, BOOTP, and/or RARP queries (all are enabled by default). Next, the ETS will attempt to download the ETS*.SYS file using TFTP (Trivial File Transfer Protocol).

Note: *EZWebCon can also be used to reload software.*

If a host provides DHCP, BOOTP, or RARP support, it can be used to set the ETS IP address (all methods) and loadhost information (BOOTP and RARP only).

Some BOOTP and TFTP implementations require a specific directory for the ETS*.SYS file. See your host's documentation for instructions.

To manually configure the ETS IP parameters for software reload, use the following commands.

Figure D-2: Configuring TCP/IP Reload

```
Local> SET PRIVILEGED
Password> SYSTEM (not echoed)
Local>> DEFINE SERVER IPADDRESS nnn.nnn.nnn.nnn
Local>> DEFINE SERVER SOFTWARE "/tftpboot/ETS*.SYS"
Local>> DEFINE SERVER LOADHOST nnn.nnn.nnn.nnn
Local>> LIST SERVER BOOT
Local>> INITIALIZE RELOAD
```

Note: *For instructions on how to log into the ETS to enter these commands, see the Getting Started chapter.*

The path and filename are case-sensitive and must be enclosed in quotation marks. When attempting to boot across an IP router, you must configure the router to proxy-ARP for the ETS, or use the bootgateway feature. For more information, see **Set/Define Bootgateway** in the *Commands* chapter of the *Device Server Reference Manual* located on the CD-ROM.

D.3.1.2 NetWare

The ETS*.SYS file should be placed in the login directory on the NetWare file server. The ETS cannot actually log into the file server (since it knows no username/password); it can only access files in the login directory itself. On the ETS, specify the file server name, filename, and path.

Figure D-3: Configuring NetWare Reload

```
Local> SET PRIVILEGED
Password> SYSTEM (not echoed)
Local>> DEFINE SERVER NETWARE LOADHOST fileserver
Local>> DEFINE SERVER SOFTWARE SYS:\LOGIN\ETS*.SYS
Local>> INITIALIZE RELOAD
```

D.3.1.3 MOP

The ETS*.SYS filename is the only parameter that the ETS needs to reload via MOP. Make sure the service characteristic is enabled on the host's Ethernet circuit, copy the ETS*.SYS file to the MOM\$LOAD directory, and reload the ETS using the **Initialize Reload** command. Be sure to use binary mode for the file transfer.

D.4 Troubleshooting Flash ROM Updates

Many of the problems that occur when updating the Flash ROM can be solved by completing the following steps:

Table D-2: Flash ROM Troubleshooting

Protocol	Area to Check
NetWare	Ensure the file is in the login directory. Since the ETS cannot actually log into the file server, it has very limited access to the server directories.
TFTP	Check the file and directory permissions. Ensure the loadhost name and address are specified correctly and that their case matches that of the filenames on the host system. Ensure the file and pathnames are enclosed in quotes to preserve case. Ensure that TFTP is enabled on the host; several major UNIX vendors ship their systems with TFTP disabled by default.
MOP	The Ethernet circuit must have the service characteristic enabled. Ensure that the MOM\$LOAD search path includes the directory containing the ETS*.SYS file.

E: Specifications

E.1 Power Information

E.1.1 Power Requirements

Voltage:	95 - 250 Volts AC, 3-wire single phase, auto-ranging
Frequency:	47-63 Hz
Operating Current:	300 mA @ 120 V
Power Consumption:	40 Watts (maximum)
Fuse Rating	1.6A, 250 Volts

E.1.2 Power Supply Cord

Cord type:	3 conductors, 1.0 mm ² minimum conductor size (approximately 18 AWG)
Rated for:	250 Volts AC, 10 Amps
Length:	3.0 meters

E.2 Environmental Limitations

E.2.1 Temperature

Operating range:	5° to 50° C (41° to 122° F)
Storage range:	-40° to 66° C (-40° to 151° F)
Max temp. change/hr:	20° C (36° F)

Rapid temperature changes may affect operation. Therefore, do not operate the ETS near heating or cooling devices, large windows, or doors that open to the outdoors.

E.2.2 Altitude

Operating maximum: 2.4 km (8,000 ft)

Storage maximum: 9.1 km (30,000 ft)

If operating the ETS above 2.4 km (8000 ft.), decrease the operating temperature rating by 1° F for each 1000 ft.

E.2.3 Relative Humidity

Operating range: 10% to 90% noncondensing, 40% to 60% recommended

Storage range: 10% to 90% noncondensing

F: Frequently-used Commands

This appendix lists some of the most frequently-used commands of the Multiport Device Server command set. More information about the command set, including additional options, can be found in the *Device Server Reference Manual* located on the CD-ROM.

F.1 Conventions

Please note the following before continuing:

- ◆ Commands are divided into Server (general), Port, and Protocol sections. Within each section, commands are listed alphabetically.
- ◆ Commands may require privileged user status. Enter **Set Privileged**, then enter the privileged password when prompted.
- ◆ When you enter a Define (or Purge) command, you must reboot the ETS for the command to take effect. Alternately, you can issue several Set commands and then a Save command to make the Set commands take effect without rebooting.
- ◆ When the abbreviated syntax “**{EN/DIS}**” is shown, you must choose either **Enabled** or **Disabled** to complete the command.
- ◆ When nn is shown, enter a single port number, a list of port numbers separated by commas, a range of port numbers separated by dashes, or the word all.

F.2 Server Commands

Table F-1: Frequently-used Server Commands

Command	Option(s)	Description
CONNECT option	servicename	Makes a connection to a LAT service.
	LOCAL num	Makes a connection to the specified local port.
	RLOGIN host	Makes an Rlogin connection to the specified host (text name or numeric IP address).
	TCP host	Makes a raw TCP connection to the specified host (text name or numeric IP address).
	TELNET host	Makes a Telnet connection to the specified host (text name or numeric IP address).
DEFINE SERVER BOOTP {EN/DIS}		Enables or disables querying for a BOOTP host at system boot time.
DEFINE SERVER DHCP {EN/DIS}		Enables or disables querying for a DHCP host at system boot time.
DEFINE SERVER GATEWAY ipaddr		Specifies the host to be used as a TCP/IP gateway to forward packets between networks. Enter an IP address.
DEFINE SERVER INCOMING option	BOTH	Enables incoming LAT and Telnet connections.
	LAT	Enables only incoming LAT connections.
	NONE	Disables incoming connections.
	TELNET	Enables only incoming Telnet connections.
	PASSWORD	Causes the ETS to prompt for a password for all incoming connections.
	NOPASSWORD	Allows connections to be established without prompting for a password.
DEFINE SERVER IPADDRESS ipaddr		Sets the ETS's network IP address.
DEFINE SERVER LOADHOST ipaddr		Specifies the TCP/IP host from which the ETS requests its run-time code.
DEFINE SERVER LOGIN PASSWORD		Sets a new password that will be required before incoming logins are accepted. You will be prompted for the new password (up to 6 alphanumeric characters, case-insensitive).
DEFINE SERVER NAME "newname"		Specifies a new name for the ETS. Names are restricted in length; generally a name of 11 or fewer characters is permissible.

Table F-1: Frequently-used Server Commands, cont.

Command	Option(s)	Description
DEFINE SERVER NETWARE LOADHOST server		Specifies the NetWare host from which the ETS requests its run-time code. Enter a file server name of up to 11 characters.
DEFINE SERVER PRIVILEGED PASSWORD		Sets a new password that will be required for privileged user status. You will be prompted for the new password (up to 6 alphanumeric characters, case-insensitive).
DEFINE SERVER RARP {EN/DIS}		Enables or disables querying for a RARP host at system boot time.
DEFINE SERVER SOFTWARE "filename"		Specifies the name or path (TCP) of the software download file. The filename can be up to 11 characters, and the pathname can be up to 26. The ETS will add a ".SYS" extension.
DEFINE SERVER SUBNET MASK ipmask		Specifies the subnet mask to be used for the ETS. The ipmask must be in n.n.n.n format.
HELP option	<nothing>	Displays a list of top-level (general) Help topics.
	<keyword>	Displays information about the keyword(s) entered. Multiple keywords must be specified in the order they occur in a command.
DEFINE SERVICE "name" PORT num		Creates a new service and associates it with the specified port.
DEFINE SERVICE "name" option	APPLETALK {EN/DIS}	Toggles whether the named service can be used to service networks running the specified protocol. RTTEL applies to TCP/IP networks.
	LANMAN {EN/DIS}	
	LAT {EN/DIS}	
	NETWARE {EN/DIS}	
	RTTEL {EN/DIS}	

Table F-1: Frequently-used Server Commands, cont.

Command	Option(s)	Description
DEFINE SERVICE “name” option	DLC {EN/DIS}	Specifies which service will handle print requests from DLC hosts. DLC can be enabled on one service per ETS.
	BANNER {EN/DIS}	When Enabled, causes the ETS to print a banner page before jobs.
	BINARY {EN/DIS}	When Enabled, the ETS will not process data passed through the service. This characteristic should be enabled when printing PCL data.
	EOJ string	Causes the ETS to send an end-of-job string to the attached device after every job. Enter an end string or the word none .
	FORMFEED {EN/DIS}	When Enabled, causes the ETS to append a formfeed to the end of LPR print jobs.
	POSTSCRIPT {EN/DIS}	When Enabled, causes the ETS to assume the attached device is a PostScript device and act accordingly.
	PS CONVERT {EN/DIS}	When Enabled, causes the ETS to place a PostScript wrapper around each job.
	SOJ string	Causes the ETS to send a start-of-job string to the attached device before every job. Enter a start string or the word none .
DEFINE SERVICE “name” option	TCP PORT string	Specifies a raw TCP listener socket for the service. Enter a socket number (4000 to 4999) or the word none .
	TELNET PORT string	Specifies a TCP listener socket for the service. Unlike TCP port, this option performs Telnet IAC interpretation on the data stream. Enter a socket number (4000 to 4999) or the word none .
INITIALIZE option	DELAY num	Schedules a reboot after num minutes. Enter a value from 0 to 120.
	CANCEL	Cancels an impending initialization.
	FACTORY	Reboots the ETS to its factory default settings.
	NOBOOT	Forces the ETS to stop in Boot Configuration Mode rather than fully rebooting.
	RELOAD	Forces the ETS to download new operational code and reprogram its flash-ROM.

Table F-1: Frequently-used Server Commands, cont.

Command	Option(s)	Description
LOGOUT option	<nothing>	Logs out the current port (the port that issued the command).
	PORT num	Logs out the specified port.
PURGE SERVICE option	LOCAL	Removes the definitions of all local services.
	“service”	Removes the definition of the specified service.
SET PRIVILEGED		Enters privileged mode, provided the user enters the proper privileged password when prompted.
{SHOW/MONITOR} QUEUE		Displays the status of ETS queues once (Show) or continually every three seconds (Monitor).
{SHOW/MONITOR} SERVER	<nothing>	Displays ETS information once (Show) or continually every three seconds (Monitor).
	COUNTERS	Displays characteristics related to the various counters kept by the ETS.
{SHOW/MONITOR} SERVICE option	<nothing>	Displays characteristics about all configured services once (Show) or continually every three seconds (Monitor).
	“service”	Displays only characteristics related to the named service.
ZERO COUNTERS option	ALL	Zeroes all port, node, and server counters.
	PORT num	Zeroes port counters for the specified port.

F.3 Port Commands

In the following commands, “1” can be a single port number, a list of port numbers separated by commas, a range of port numbers separated by dashes, or the word all.

Table F-2: Port Commands

Command	Option(s)	Description
DEFINE PORT 2 ACCESS option	DYNAMIC	The port can initiate and receive connection requests.
	LOCAL	The port can initiate connection requests, and local logins are permitted.
	NONE	The port is unusable.
	REMOTE	The port can receive host-initiated connection requests.

Table F-2: Port Commands, cont.

Command	Option(s)	Description
DEFINE PORT 2 BITRONICS {EN/DIS}		When Enabled, ensures bidirectional functioning of the parallel port. The attached printer must also support Bitronics mode.
DEFINE PORT 2 CHARACTER size		Toggles the port between 7-bit and 8-bit characters (the default). Enter either 7 or 8 .
DEFINE PORT 2 DSRLOGOUT {EN/DIS}		When Enabled, the port will be logged out automatically whenever DSR is deasserted.
DEFINE PORT 2 DTRWAIT {EN/DIS}		When Enabled, the ETS will not assert DTR on the port when it is idle (no user logins or connections).
DEFINE PORT 2 FLOW option	CTS	Specifies CTS/RTS (hardware) flow control.
	{EN/DIS}	Activates or deactivates the currently-configured flow-control method.
	NONE	Removes the current flow control settings.
	XON	Specifies XON/XOFF (software) flow control.
DEFINE PORT 2 NAME “newname”		Enter a name of up to 16 alphanumeric characters for the specified port.
DEFINE PORT 2 PARITY option	parity	Enter even , odd , mark , or space . Specifying mark or space will change the character size to 7 bits.
	NONE	Specifies that no parity will be used (the default).
DEFINE PORT 2 SPEED baudnum		Sets the port’s baud rate. Acceptable baudnum values range from 300 to 230000 baud.
{SHOW/MONITOR} PORT 2		Displays the port’s configuration characteristics once (Show) or continually every three seconds (Monitor). Counters and Status keywords can be added.
TEST PORT 2 option	COUNT rows WIDTH cols	Sends an ASCII data stream to the port for the specified number of rows and/or columns.
	POSTSCRIPT	Sends a PostScript test page to the port.

F.4 Protocol Commands

In the following table, **PROTO** is an abbreviation for the optional keyword **PROTOCOL**.

Table F-3: Protocol Commands

Command	Option(s)	Description
DEFINE PROTO APPLETALK option	{EN/DIS}	Enables or Disables the AppleTalk protocol for the ETS.
	ZONE newzone	Places the ETS in a zone other than the default.
DEFINE PROTO IP option	{EN/DIS}	Enables or Disables the TCP/IP protocol for the ETS.
	GATEWAY ipaddr	See DEFINE SERVER GATEWAY ipaddr.
	IPADDRESS ipaddr	See DEFINE SERVER IPADDRESS ipaddr.
	LOADHOST ipaddr	See DEFINE SERVER LOADHOST ipaddr.
	NAMESERVER ipaddr	Specifies the IP address of the host that will resolve text host names into their numeric equivalents for TCP/IP connection attempts.
DEFINE PROTO LANMAN option	{EN/DIS}	Enables or Disables the LAN Manager protocol for the ETS.
DEFINE PROTO LAT option	{EN/DIS}	Enables or Disables the LAT protocol for the ETS.
	LICENSE string	Enables LAT on multi-port ETS's. Enter the license string obtained from Lantronix.
DEFINE PROTO NETWARE option	{EN/DIS}	Enables or Disables the NetWare (IPX) protocol for the ETS.
	DSCONTEXT string	Configures the NetWare Directory Services context in which the ETS is located. For more information about NDS contexts, see your NDS documentation.
	DSLICENSE string	Configures the NetWare Directory Services license needed to enable NDS on your ETS. Enter the license string obtained from Lantronix.
	DSTREE string	Configures the NetWare Directory Services tree in which the ETS is located. For more information about NDS trees, see your NDS documentation.

Table F-3: Protocol Commands, cont.

Command	Option(s)	Description
DEFINE PROTO NETWORK ENCAPSULATION option {EN/DIS}	NATIVE	Configures the ETS to use the “native mode” frame format.
	ETHER_II	Configures the ETS to use Ethernet v2 frame format.
	802_2	Configures the ETS to use 802.2 frame format with NetWare SAPs.
	SNAP	Configures the ETS to use 802.2 frame format with SNAP SAPs.
DEFINE PROTO NETWARE LOADHOST server		See DEFINE SERVER NETWARE LOADHOST server.
PURGE IPSECURITY option	ALL	Removes the entire IP security table.
	ipaddress	Removes entries from the IP security table that are related to the specified IP address.
PURGE PROTO NETWARE ACCESS option	ALL	Removes all entries from the NetWare access list.
	server	Removes entries from the NetWare access list that are related to the specified file server.
{SHOW/MONITOR} PROTO protocolname		Displays operating characteristics of the specified protocol.

Warranty Statement

Lantronix warrants for a period of FIVE years from the date of shipment that each ETS4P, ETS8P, ETS16P, ETS16PR, ETS32PR, and ETS422PR Multiport Device Server supplied shall be free from defects in material and workmanship. During this period, if the customer experiences difficulties with a product and is unable to resolve the problem by phone with Lantronix Technical Support, a Return Material Authorization (RMA) will be issued. Following receipt of a RMA number, the customer is responsible for returning the product to Lantronix, freight prepaid. Lantronix, upon verification of warranty will, at its option, repair or replace the product in question, and return it to the customer freight prepaid. No services are handled at the customer's site under this warranty.

Lantronix warrants software for a period of sixty (60) days from the date of shipment that each software package supplied shall be free from defects and shall operate according to Lantronix specifications. Any software revisions required hereunder cover supply of distribution media only and do not cover, or include, any installation. The customer is responsible for return of media to Lantronix and Lantronix for freight associated with replacement media being returned to the customer.

Lantronix shall have no obligation to make repairs or to cause replacement required through normal wear and tear of necessitated in whole or in part by catastrophe, fault or negligence of the user, improper or unauthorized use of the Product, or use of the Product in such a manner for which it was not designed, or by causes external to the Product, such as, but not limited to, power or failure of air conditioning.

There are no understandings, agreements, representations or warranties, express or implied, including warranties of merchantability or fitness for a particular purpose, other than those specifically set out above or by any existing contract between the parties. Any such contract states the entire obligation of Lantronix. The contents of this document shall not become part of or modify any prior or existing agreement, commitment or relationship

The information, recommendation, description and safety notations in this or other documents supplied by Lantronix are based on general industry experience and judgment with respect to such hardware and software. THIS INFORMATION SHOULD NOT BE CONSIDERED TO BE ALL INCLUSIVE OR COVERING ALL CONTINGENCIES. NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, OR WARRANTIES ARISING FROM COURSE OF DEALING OR USAGE OF TRADE, ARE MADE REGARDING THE INFORMATION, RECOMMENDATIONS, DESCRIPTIONS AND SAFETY NOTATIONS CONTAINED HEREBY AND IN HARDWARE AND SOFTWARE SPECIFICATION DOCUMENTATION, OR INSTRUCTIONS SUPPLIED BY Lantronix. In no event will Lantronix be responsible to the user in contract, in tort (including negligence), strict liability or otherwise for any special, indirect, incidental or consequential damage or loss of equipment, plant or power system, cost of capital, loss of profits or revenues, cost of replacement power, additional expenses in the use of existing software, hardware, equipment or facilities, or claims against the user by its employees or customers resulting from the use of the information, recommendations, descriptions and safety notations supplied by Lantronix. Lantronix liability is limited (at its election) to (1) refund of buyer's purchase price for such affected products (without interest); (2) repair of such products, or (3) replacement of such products, provided however, that the buyer follows the procedures set forth herein

Warranty claims must be received by Lantronix within the applicable warranty period. A replaced product, or part thereof, shall become the property of Lantronix and shall be returned to Lantronix at the Purchaser's expense. **All return material must be accompanied by a return material authorization number assigned by Lantronix.**

Declaration of Conformity

(according to ISO/IEC Guide 22 and EN 45014)

**Manufacturer's
Name & Address:**

Lantronix
15353 Barranca Parkway, Irvine, CA 92618 USA

Declares that the product:

Product Name: Terminal Server

**Model
Name/Number:**

ETS4P
ETS8P
ETS16P
ETS16PR
ETS32PR
ETS422PR

Conforms to the following standards or other normative documents:

Safety: EN60950:1988+A1, A2

**Electromagnetic
Emissions:**

EN55022: 1998 (CISPR 22, Class A: 1993, A1: 1995, A2: 1996)
IEC 1000-3-2/A14: 2000
IEC 1000-3-3: 1994

**Electromagnetic
Immunity:**

EN55024: 1998 Information Technology Equipment-Immunity
Characteristics
IEC 6100-4-2: 1995 Electro-Static Discharge Test
IEC 6100-4-3: 1996 Radiated Immunity Field Test
IEC 6100-4-4: 1995 Electrical Fast Transient Test
IEC 6100-4-5: 1995 Power Supply Surge Test
IEC 6100-4-6: 1996 Conducted Immunity Test
IEC 6100-4-8: 1993 Magnetic Field Test
IEC 6100-4-11: 1994 Voltage Dips & Interrupts Test

(L.V.D. Directive 73/23/EEC)

**Supplementary
Information:**

*The product complies with the requirements of the
Low Voltage Directive 72/23/EEC and the EMC Directive 89/336/
EEC.*

**Manufacturer's
Contact:**

Director of Quality Assurance, Lantronix
15353 Barranca Parkway, Irvine, CA 92618 USA

General Tel: 949/453-3990
Fax: 949/453-3995

Index

Symbols

/etc/hosts 5-2

Numerics

10BASE-T port 2-3, 2-4

A

Access list, NetWare 6-2

AppleTalk 8-1–8-2

Chooser 8-1

Configuration 8-1

Router 8-1

Troubleshooting 8-2

Zones 8-1, 8-2

Application port, LAT 7-1

Applications 4-1

ARP table 5-2

AUI port 2-3, 2-4

Autobaud B-4

B

Back panel 2-3, 2-4

Banner 5-3, 5-11

BBS 3-1, D-3

BCP (Boot Configuration Program)

B-5

Bindery 6-1

Bitronics 2-3, 8-1

Boot prompt B-1, B-4

BOOTP 5-1, 5-3, 6-5, D-4

Troubleshooting B-3

Bracket, rack mount 2-9

C

Cables C-4

CD (Carrier Detect) B-4

Centronics 2-3, 8-1, C-4

Chooser (Macintosh) 8-1

CLI (Command Line Interface) 5-1,
5-3

COM Port Redirector 4-7

Commands F-1–F-7

Components, description of 2-1

Configuration

AppleTalk 8-1

Initial setup 3-1

LAT 7-1

NetWare 6-1

TCP/IP 5-1

Console terminal 3-2

Contact information A-1

D

DB25 C-2

DB25 ports 2-3, 2-4

DB9 C-3

Defaults, restoring B-5

DHCP 5-3, B-2, B-5, D-4

Troubleshooting B-2

Digital Network Port 9-1

Displaying current settings B-6

DOS 5-2

Download file B-3

DSR (Data Signal Ready) B-4

DTR (Data Transmit Ready) B-4

E

Error codes, LAT 7-2

Ethernet

Address B-6

Ethernet address 5-2

- Ethernet connector C-1
- Ethernet, connecting to 2-6, 2-9
- EtherTalk 8-1
- EZWebCon 2-6, 2-9, 3-1, 5-1, 6-1, 7-1, 8-1, 9-1
- Logins 3-2

F

- Factory defaults B-5
- Filters, input/output 5-4
- Flash D-3
 - Troubleshooting D-6
 - Updates B-1, D-3
- Flash ROM B-2
 - Reloading B-5
- Flush NVR B-5
- Front panel 2-1
- FTP 3-1, D-2

H

- Hardware address 5-2, B-3, B-6

I

- Incoming logins 3-2
- Installation
 - Instructions, ETS16/32PR 2-8
 - Instructions, ETS8/16P 2-5
- Installation, testing 2-10
- Introduction 1-1
- IP
 - UDP 4-6
- IP address 3-1, 5-1, 5-7, 6-1, 7-1, 8-1, 9-1, B-1, B-3
 - Configuring 5-1, B-6
 - Configuring via BOOTP 5-3
 - Configuring via command line 5-3
 - Configuring via DHCP 5-3
 - Configuring via Ping 5-1

- Configuring via RARP 5-3
- IPX (NetWare) 6-1–6-4

J

- Java 3-1

L

- LAN Manager ??–9-2
- Lantronix
 - BBS D-3
 - Contact information A-1
 - Technical support 6-1, A-1
 - Web site 6-1
- LAT 3-2, 7-1
 - Application port 7-1
 - Error codes 7-2
 - Logins 3-2
 - Printing to port 7-1
 - Printing to service 7-1
 - Queue 7-1
 - Troubleshooting 7-2
- LEDs 2-1, 2-8, B-1
- Loadfile B-6
- Loadhost B-6
- Local prompt B-2
- Local> prompt 3-2, 5-1
- LocalTalk 8-1
- Login
 - Web browser 3-1
- Logins
 - EZWebCon 3-2
 - Incoming 3-2
 - LAT 3-2
 - Password 3-1, 3-2
 - Remote console 3-1
 - Service 3-2
 - TCP/IP 3-2
- lpc 5-11
- LPD 5-8, 8-1, 9-1

- LPR 5-3, 5-8
 - AIX 5-8
 - HP 5-9
 - Print command 5-8
 - SCO Unix 5-10
 - UNIX (Generic) 5-7
 - Windows NT 5-4
- lpstat 5-11

M

- Macintosh 8-1
 - Chooser 8-1
 - EtherTalk 8-1
 - LocalTalk 8-1
 - OS 8.1 and LPD 8-1
 - Zones 8-2
- Modem
 - Configuration checklist B-4
- Monitoring counters B-4
- MOP
 - Reloading software D-5

N

- Named pipe interface 5-4
- Nameserver 5-2
- NDPS 6-1
- NDS 6-1
 - Directory service context 6-2
 - Directory service tree 6-2
 - License 6-1, 6-2
- NetWare 6-1–6-4
 - Access list 6-2
 - Administrator 6-1, 6-2
 - Bindery 6-1
 - NDS 6-1, 6-2
 - PCONSOLE 6-3
 - Reloading software D-5
 - Troubleshooting 6-4
- NVR 2-1

- NVRAM B-5

P

- Parallel port C-4
 - Service 3-2
- Passwords
 - Login 3-1, 3-2
 - Privileged 3-1, F-1
- PCONSOLE 6-1, 6-3
- Ping 5-1
- Pinouts C-1
- Ports
 - Parallel C-4
 - Serial C-1
- PostScript 8-1
- Power
 - Cord E-1
 - Specifications E-1
 - Troubleshooting B-1
- Power plug 2-3, 2-4
- Power switch 2-1
- Power-up troubleshooting B-1
- Print pipe 5-11
- Print queue 3-2, 5-4, 5-8, 5-10, 6-3,
7-1, 9-2
- Printcap file 5-10
- Printing to a queue 5-8, 5-9, 7-2
- Privileged password 3-1, F-1
- Problem report procedure A-1
- Prompt, Local> 3-2
- Prompts
 - Boot B-1, B-4
 - Local B-2
- Protocols 1-1
 - AppleTalk 8-1
 - LAT 7-1
 - NetWare 6-1
 - TCP/IP 5-1
- Protocols supported 1-1

Q

- QINST 6-1
- Queue 1-1, 3-2, 5-4, 5-8, 5-10, 6-1, 6-2, 6-3, 7-1, 9-2

R

- Rack mount bracket 2-9
- RARP 5-1, 5-3, B-3, B-6, D-4
 - RARPD process B-3
 - Troubleshooting B-3
- Rebooting B-5
- Redirector 4-7
- Reloading software B-5, D-3
 - MOP D-5
 - NetWare D-5
 - TCP/IP D-4
- Remote console logins 3-1
- Remote printer 3-2
- Remote queue 3-2
- Restoring defaults B-5
- RJ45 C-1, C-2, C-3
- RJ45 ports 2-3, 2-4
- RS-232 C-1
- RS-423 C-1
- RTEL 5-3, 5-4, 5-11

S

- SAM 5-9
- Sample network diagram
 - ETS16/32PR 2-8
 - ETS4P 2-5
 - ETS8/16P 2-5
- Serial port
 - Connectors C-1
 - Service 3-2
- Serial ports 2-3, 2-4
- Serial tunnel 4-6
- Server 3-1
 - Name, default 5-10

- Service 3-1, 3-2, 6-3, 7-1, 8-1
 - Name 5-10
- SMIT 5-8
- Software file B-3, D-3
- Software updates D-1
 - BBS D-3
 - FTP D-2
 - Web D-1
- Specifications E-1
 - Altitude E-2
 - Environmental E-1
 - Power E-1
 - Relative Humidity E-2
 - Temperature E-1
- Spooling directory 5-4
- System Administration Mgr (SAM) 5-9
- System Mgmt Interface Tool (SMIT) 5-8

T

- TCP/IP 5-1–5-11, 9-1, B-1
 - Logins 3-2
 - Reloading software D-4
- Telnet 3-2, 5-2, 5-11
- Test button 2-1
- TFTP D-4
- ThinWeb Manager 3-1
- Troubleshooting B-1–B-6
 - AppleTalk 8-2
 - BOOTP B-3
 - DHCP B-2
 - Flash (software) updates D-6
 - LAT 7-2
 - Modems B-4
 - NetWare 6-4
 - Power-up B-1
 - RARP B-3
 - Unix 5-11
- Tunnel, serial 4-6

U

UDP 4-6

UNIX named pipe interface 5-11

Updating software D-1

V

VMS 7-1, 7-2

W

Web browser interface 3-1

Windows 5-2, 5-3, 9-1

Z

Zones, AppleTalk 8-1, 8-2

