

ETS4P4 Terminal Server

Installation Guide



Thank you for purchasing this Lantronix ETS Ethernet Terminal Server. As the newest addition to our successful Ethernet terminal server family, the ETS uses software for multiprotocol Ethernet connections that has over 5 years of real-world feedback and development behind it.

Lantronix is constantly improving the capabilities of our products, and we encourage you to take advantage of new features through our FREE software upgrades (available via ftp over the Internet or BBS.)

Our Flash ROM products, including this ETS, provide the simplest means for upgrades and installation. I hope you find this manual easy to use, and thorough in its explanation of the powerful features you can now access on your network.

Brad Freeburg
President



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1 - Introduction

1.1 Overview

The Ethernet Terminal Server (ETS4P4) connects computing equipment such as personal computers, terminals, modems, or printers to an Ethernet network. The ETS communicates using the AppleTalk (EtherTalk), IPX (NetWare), LAN Manager (NetBIOS/NetBEUI), LAT, and TCP/IP protocols. Each server provides an AUI port, a BNC (10BASE2) port, and an RJ45 (10BASE-T) port for connections to the network. The ETS4P4 provides 4 RJ45 serial ports and 4 DB25 parallel ports to provide connections to devices on the network. The ETS supports a device on each port and the Ethernet simultaneously. It is configurable and can offer its attached devices as services to the network, and conversely, can provide connections to other devices on the network.

NOTE: *All ports can be used simultaneously for printer and terminal connections.*

1.1.1 Configuration

It is possible, depending on the network, to power up the ETS and have it work properly with no additional configuration on the ETS. However if host configuration is required, the EZCon configuration software (shipped with the ETS on the distribution CD-ROM) will guide you through configuration using a point-and-click interface.

NOTE: *Instructions for using EZCon are included on the CD-ROM. EZCon is also available on the Lantronix FTP and BBS servers (See Appendix D, Updating Software).*

Although EZCon is the recommended way to configure the server, the unit may also be configured using any of the following methods:

- By entering commands from a serial port connection
- By logging into the ETS over the network via AppleTalk, NetWare, Telnet, LAT, or NCP/TSM
- Via BOOTP replies from a TCP/IP network host; these replies may be used to define the IP address, loadhost, and download filename
- Via RARP replies from a TCP/IP host; these replies may be used to define the IP address
- By downloading a configuration file from a TCP/IP, LAT, or NetWare host at boot time

1.1.2 Software

The executable code for the ETS is stored in Flash (rewritable) ROM; therefore, software does not need to be downloaded each time the ETS boots. Downloading host software is only needed to update the code in the Flash ROM with a new version of the software. See Appendix D, *Updating Software*, for instructions on downloading new software into the ETS.

1.2 About the Manuals

This manual explains how to install, configure, and use the ETS. For detailed conceptual explanations, both a PostScript and a browsable HTML version of the ETS/EPS Reference Manual are available on the distribution CD-ROM. In addition, the Reference Manual is available at the Lantronix World Wide Web site, <http://www.lantronix.com>.

2 - Installation

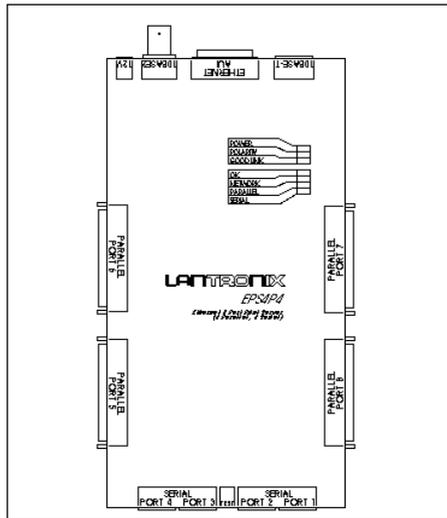
2.1 Overview

This chapter describes how to install the ETS in a network. It assumes that you have a basic understanding of how to install devices in a network. Read this entire section completely before continuing.

2.2 ETS Components

The front panel of the ETS4P4 has 4 RJ45 ports. Each side panel of the ETS4P4 has 2 DB25 ports.

Figure 2-1: ETS4P4



The back panel of the ETS has an AUI port, a 10BASE2 port, a 10BASE-T port, and a power plug. The ETS has seven LEDs on the top panel: PWR, LNK, POL, OK, NET, RCV, and XMT. The following table describes the LED functionality:

Table 2-1: LED functionality

LED	Function
Power LED	Indicates that the unit has power.
Polarity LED	Indicates that the signal polarity is reversed on the wire.
Good Link LED	Indicates that the 10BASE-T cable has a good link with the network.
OK LED	Indicates that the unit is functioning properly.
Network LED	Indicates Ethernet activity.
Parallel LED	Indicates that the parallel port is active.
Serial LED	Indicates that the serial port is active.

2.3 Installation

2.3.1 Selecting a Location for the ETS

When choosing a location for the server, keep in mind the environmental restrictions discussed in Appendix E.

2.3.2 Connecting to the Ethernet

The ETS has dedicated network ports for AUI, 10BASE2, and 10BASE-T. The ETS must be connected to a single Ethernet to function correctly, and will not function correctly if connected to more than one physical Ethernet port.

The ETS must have a valid Ethernet connection to boot. If it detects a network fault, it will not boot. To boot the ETS without attaching it to the network, connect a terminated MAU to the AUI port or the 10BASE2 port or connect the 10BASE-T port to a disabled port on a hub.

2.3.3 Connecting a Terminal

The ETS designates port 1 as a **console port**. A terminal may be connected to the console port 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.*

2.3.4 Supplying Power

Before supplying power to the ETS, be sure that only one physical Ethernet port is used. Plug the power cable into the ETS and then into the wall.

The ETS goes through 2 steps to begin normal operation:

1. It runs through a set of power-up diagnostics for approximately 12 seconds. The group of 7 LEDs shows varying patterns corresponding to the test being run.
2. It tries to obtain TCP/IP configuration information via BOOTP and RARP. This takes approximately 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, as network requests are transmitted.

2.4 Was the Installation Successful?

If the ETS appears to be working (OK LED blinking slowly) 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.
- The EZCon utility (provided on the distribution CD-ROM) can be used to show available print servers.

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



3 - Getting Started

3.1 Overview

This chapter covers the steps needed to get the ETS on-line and running. There are 3 methods to log into the ETS and begin configuration.

1. Incoming (remote) Logins: EZCon is the preferred method of login and configuration.
2. Remote Console Logins: TCP/IP users can connect to port 7000 via Telnet.
3. Serial Port Logins: Users can connect a terminal directly to the serial port, log in, and use the command line to configure the unit.

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

- The ETS's IP address must be configured before any TCP/IP functionality is available. For instructions on setting the IP address, see page 3-2.
- Only one person at a time may be logged into the remote console port, regardless of the protocol being used. This eliminates the possibility of several people simultaneously attempting to configure the ETS.
- Although all other login sessions may be disabled, remote console logins cannot be. Therefore the system manager will always be able to access the unit.
- Logging into the remote console port does not automatically create privileged user status. You must use the **Set Privileged** command to configure the unit.
- The remote console port is password protected.

Default login password: **access**

Default privileged password: **system**

NOTE: For more information on System Passwords, see page 11-1.

3.2 Command Syntax

Set/Define commands appear frequently in this manual; therefore, it is important to note the difference between them. Set makes an immediate change, but is not permanent. Conversely, Define makes a permanent change, but doesn't take effect until the ETS is rebooted or until the affected port is logged out.

The Clear and Purge commands work similarly to the Set and Define commands. Clear removes an item immediately, but does not make a permanent change. Purge removes an item permanently, but it doesn't take effect until the unit is rebooted.

Strings must be enclosed in quotes. If they are not, they will be converted to all uppercase. If you need to add any character other than a letter (A-Z, a-z), you will need to locate the character on an ASCII chart and enter that number as a hexadecimal value.

NOTE: *For more information on the Set/Define and Clear/Purge commands and similar command constructs, refer to the ETS/EPS Reference Manual on the distribution CD-ROM.*

3.3 IP Address Configuration

The ETS's IP address must be configured before any TCP/IP functionality is available. To set the IP address, the following methods can be used: a directed Ping packet, a BOOTP or RARP reply, commands entered at the command line (Local>) interface, or via EZCon (PC and Macintosh users only). All methods of setting the IP address are discussed in the following sections; choose the method that is most convenient for you.

To access the ETS, hosts must know the ETS's IP address. This is typically configured in the host's **/etc/hosts** file (UNIX) or via a nameserver. For configuration instructions, refer to the host's documentation.

3.3.1 Using a Directed Ping Packet

If the ETS has no IP address, it sets its address from the first directed IP ICMP (ping) packet it receives. To generate such a packet, create an entry in the host's ARP table. The following figure shows how to create an entry in the host's ARP table. Note that this requires superuser privileges.

Substitute the intended IP address for the *nnns* and the hardware address for the *xxxs* of the server.

Figure 3-1: Adding to the ARP Table for UNIX hosts

```
# arp -s nnn.nnn.nnn.nnn xx:xx:xx:xx:xx:xx
```

Figure 3-2: Adding to the ARP Table for Windows NT and Windows 95 hosts

```
# arp -s nnn.nnn.nnn.nnn xx-xx-xx-xx-xx-xx
```

NOTE: *The ARP command will not work from Windows NT or Windows 95 hosts if it is the first entry in the ARP table. If there is no other entry in the ARP table, ping a node on the network to add an entry in the table.*

Then ping the server:

Figure 3-3: Ping Command

```
unix% ping nnn.nnn.nnn.nnn
```

NOTE: *If a router is between the server and the ARP host, this procedure won't work.*

When the server receives the ping packet, it notices that its own IP address is not currently set and sends out broadcasts to see if anyone else is using this address. If no duplicates are found, the server uses this IP address and responds to the ping packet.

NOTE: *The ETS will **not** save the IP address permanently; it is set temporarily to enable EZCon to communicate with the server, or to allow an administrator to telnet into the ETS **remote console port**.*

To save the IP address, telnet to the remote console port and specify the ETS's IP address and 7000 as the port number.

The ETS will display the remote console port prompt (#). In order to successfully log into the port, the login password must be entered at this prompt. The default login password is **access**. To change this password, see *System Passwords* on page 11-1.

To make the IP address permanent, use the **Define Server IPaddress** command.

Figure 3-4: Telnetting to the Console Port

```
% telnet nnn.nnn.nnn.nnn 7000
Trying nnn.nnn.nnn.nnn
Connected to nnn.nnn.nnn.nnn
Escape character is '^]'
# access (not echoed)
Lantronix ETS Version n.n/n (yymmdd)
Type Help at the 'Local_>' prompt for assistance.
Enter Username> xxxx
Local> SET PRIVILEGED
Password> system (not echoed)
Local>> DEFINE SERVER IPADDRESS nnn.nnn.nnn.nnn
```

NOTE: *At the Username> prompt any name can be entered to identify the current user.*

3.3.2 Using a BOOTP or RARP Reply

At boot time a host-based BOOTP or RARP server can respond to an ETS request for an available IP address. For information about configuring the BOOTP or RARP servers, see the host documentation. Keep in mind that many BOOTP daemons will not reply to a BOOTP request if the download filename in the configuration file does not exist. If this is the case, create a file with the same pathname specified in the configuration file.

By default, the ETS will attempt BOOTP and RARP queries. You can disable these queries by doing either of the following:

- Within EZCon, use the **Maintenance:Server Boot Parameters** menu.
- At the Local> prompt (accessible via EZCon, Telnet/Rlogin, or by connecting a terminal to the serial console port), enter the **Define Server BOOTP Disabled** and **Define Server RARP Disabled** commands.

3.3.3 Using the Command Line Interface

To get to the command line, you may either connect a terminal to the console port and press Return or log into the ETS via EZCon.

A Username> prompt will be displayed. After you enter a username, you will get the Local> prompt. To set the IP address at this prompt, you need to be the privileged user. See *Privileged Password* on page 11-1. Once you've obtained privileged access, use the **Set/Define Server Ippaddress** command:

Figure 3-5: Set/Define Server IPaddress

```
Local>> DEFINE SERVER IPADDRESS nnn.nnn.nnn.nnn
```

If the Boot> prompt appears when you press Return, the ETS has experienced a boot problem. See Appendix B, *Troubleshooting*.

3.4 Remote Console Logins

3.4.1 EZCon Logins

The EZCon software, shipped with the ETS on the distribution CD-ROM, is the easiest way to log into and configure the unit. EZCon guides you through configuration using a point-and-click interface.

NOTE: *NetWare users must be running Windows version 3.1 or later with the NetWare VLM or a Winsock compliant TCP/IP stack.*

UNIX, Macintosh, Windows/Windows NT, and Novell NetWare versions of EZCon are shipped with the ETS on the distribution CD-ROM. To use the CD-ROM, refer to the instructions on the CD-ROM case. To install EZCon, refer to the appropriate EZCon README file.

All instructions for using EZCon are listed in each README file. For assistance once EZCon is running, refer to the EZCon on-line help.

3.4.2 TCP/IP Console Connections

The ETS enables a TCP/IP user to configure the server via a single Telnet connection to the remote console port. The remote console port is designated as **port 7000**:

Figure 3-6: TCP/IP Remote Console Login

```
% telnet nnn.nnn.nnn.nnn 7000
Trying nnn.nnn.nnn.nnn
Connected to nnn.nnn.nnn.nnn
Escape character is '^]'

# access (not echoed)

Lantronix ETS Version n.n/n (yymmmdd)

Type Help at the 'Local_4>' prompt for assistance.

Enter Username> xxxx
```

NOTE: The “#” prompt requires the login password be entered before the connection is allowed to succeed. The default login password is *access*. To change this password, see page 11-2.

3.4.3 VMS Console Connections

From a VMS host machine, a connection to the remote console port can be established using NCP or TSM. First the node must be configured in the NCP database as shown below. Note that the NCP name cannot exceed six characters.

NOTE: *The parameters in the following table are examples of user-supplied parameters. These parameters will be different for you.*

Table 3-1: NCP Remote Console Login

```
$ RUN SYS$SYSTEM:NCP
NCP> SHOW KNOWN CIRCUIT
Known Circuit Volatile Summary as of <date time>
      CircuitState
      QNA-0          on
NCP>
NCP> SET NODE server_name
Node Address          (1.1-63.1023): 13.241
Node Name             (1-6 characters): server_name
NCP> SET NODE server_name SERVICE CIRCUIT QNA-0
NCP> SET NODE server_name HARDWARE ADDRESS 00-80-A3-xx-xx-xx
NCP> CONNECT NODE server_name
# access   (not echoed)

Lantronix ETS Version n.n/n(yymmdd)
Type Help at the 'Local_4>' prompt for assistance.
Enter Username> xxxx
```

NOTE: *Note that this defines the server only in the temporary database. Use define commands to make a permanent entry. Once the node has been created in the database, the "CONNECT" command can be used to establish a session.*

See the NCP and TSM documentation for additional information on how to configure the NCP database and how to establish the remote console connection.

3.5 Incoming Logins

Incoming logins can be made using the EZCon application. Incoming LAT and TCP/IP logins can also be made using the commands entered at the Local> prompt.

By default, incoming LAT connections are **disabled** and Telnet connections are **enabled**. To change these settings, use the **Set/Define Server Incoming** command described in the *Command Reference* chapter of the ETS/ EPS Reference Manual.

3.6 Serial Port Logins

Serial port logins can be made by attaching a terminal to the console port and pressing the Return key. If the unit is not yet configured, or if the ETS could not boot, a Boot prompt is displayed. This prompt enables you to enter a special set of commands, called Boot Configuration Program (BCP) commands, which are discussed in Appendix B.

If the unit passes its power-up diagnostics and completes the boot procedure, the Local> prompt should be displayed. See the *Command Reference* chapter of the ETS/ EPS Reference Manual for the complete ETS command set.

4 - Outgoing Sessions

4.1 Overview

The ETS4P4 server allows local serial users to connect to hosts on the network via LAT or TCP/IP. There are 3 ways to manipulate sessions: initiating, pausing/resuming, and closing.

4.1.1 Initiating a Connection

4.1.1.1 TCP/IP

4.1.1.1.1 Telnet

To start an outgoing Telnet session, type Telnet at the Local prompt, followed by either the host's name or its numeric IP address.

Figure 4-1: Opening a Telnet Connection

```
Local> TELNET nnn.nnn.nnn.nnn
```

4.1.1.1.2 Outgoing Session Support

A nameserver host can be specified to allow text TCP/IP hostnames to be resolved, and a default domain name to use in case a domain is not specified. Specifying a gateway host allows TCP/IP connections to other connected network segments. Figure 4-2 shows an example of the commands needed to configure the nameserver, domain, and gateway.

Figure 4-2: Outgoing Session Configuration

```
Local>> DEFINE SERVER NAMESERVER nnn.nnn.nnn.nnn
Local>> DEFINE SERVER IP DOMAIN "weasel.ctcorp.com"
Local>> DEFINE SERVER GATEWAY nnn.nnn.nnn.nnn
```

NOTE: Backup hosts can be specified in case the primary nameserver or gateway fails; see the ETS/EPS Reference Manual for details.

The TCP/IP security table can be used to restrict incoming or outgoing TCP/IP connections. Managers can restrict connections by address or network on a port by port basis. See the ETS/EPS Reference Manual, or use the **Help Set IPSecurity** command to see the server's on-line help.

4.1.1.2 LAT

To connect to a LAT service, type the word *connect* followed by the name of the desired host or service. The example below shows how to connect to the service named **modem**.

Figure 4-3: Connection to a LAT Service

```
Local> CONNECT modem
```

NOTE: A *service* is a resource accessible to network hosts. For more information on using services, see Chapter 5.

NOTE: To use LAT you must obtain a LAT license number from your dealer or Lantronix Sales. To allow LAT on your ETS **Define Protocol LAT License** command and reboot the server.

To view available LAT nodes and services, enter **Show Node** or **Show Services** at the Local prompt.

4.1.2 Pausing/Resuming a Session

- To return to the Local> prompt from a session, press the <Break> key or a user-defined Local switch character.
- To return to the last-used session from local mode, use the **Resume** command or either the Forward or Backward switch characters.

NOTE: For more advanced pausing and resuming functionality, refer to the ETS/EPS Reference Manual.

4.1.3 Disconnecting a Session

To disconnect a session, use the **Disconnect** command. This closes the last-used session, and leaves any others intact. If the user logs out (or is logged out by the administrator) all sessions are closed.

The **Show Session** command shows all open connections for the current user. The session numbers displayed can be used with the **Disconnect** and **Resume** commands.

Global and per-port session limits are provided to restrict the number of sessions a user can initiate. They are configurable with the **Set Server Session Limit** and **Set Port Session Limit** commands, respectively.

4.1.4 Logging out of the ETS

To log out of the ETS, press Ctrl-D or type **Logout** at the Local> prompt.

NOTE: *This will close all existing sessions.*



5 - Services

5.1 Overview

A service is a resource accessible to network hosts; for example, an AppleTalk user may queue print jobs to a service. Services control which protocols can use the ETS ports and how these ports appear to network users. In general, there has to be at least one service associated with a port before the port can be available to network users.

5.2 Services

The ETS offers a default service on each port. The service names are ETS_XXXXXX_YY where XXXXXX represents the last six numbers of the unit's Ethernet address and YY is the port name, for example S1 or P1.

NOTE: *The default service names are based on the server name; therefore the server name must be no more than 13 characters.*

The default services on the serial ports have the LAN Manager, NetWare, and TCP/IP protocols enabled. LAT is disabled by default on services provided by the ETS because many network managers object to the frequent LAT service announcements.

To modify a default service, use the **Set/Define Service** command with any of the attributes, characteristics, and protocols discussed in the following sections.

If you modify the service name, keep in mind that service names are not case-sensitive, may be up to 16 alphanumeric characters long, and cannot include spaces.

NOTE: *Each service must be associated with at least one port. To associate a port with a service, use the Set/Define Service Ports command.*

If different service characteristics are necessary for printing from different types of host machines, multiple services all pointing to the same physical port can be created. The services can have their own unique characteristics.

5.2.1 Attributes

5.2.1.1 Service Name

Each service has a name.

5.2.1.2 EOJ (End-of-Job) or SOJ (Start-of-Job) String

Each service may have an End-of-Job or Start-of-Job string (or both). EOJ strings will be sent to the printer after every print job; SOJ strings will be sent to the printer before each print job. These strings are typically used to force the printer into a particular mode (such as PostScript or PCL). When specifying a string, use the following syntax:

Figure 5-1: Examples of EOJ and SOJ Strings

```
Local>> DEFINE SERVICE backupprinter SOJ "startchar"  
Local>> DEFINE SERVICE backupprinter EOJ "\23\4e\9atext"
```

NOTE: *The commands that you may want or need to enter in EOJ and SOJ strings are printer-specific; therefore they are not covered in this manual.*

NOTE: *If you are using PostScript printing on an auto-sensing printer, you may not need to enter EOJ or SOJ strings to force the printer into PostScript mode; enabling the PostScript characteristic (see page 5-3) should do this. For more details, refer to your printer's documentation.*

5.2.1.3 Ident String

Each service may have an identification string. This string typically contains a more verbose description of the service and is displayed by LAT when a Show Services command is issued. However, it is ignored by all other protocols.

5.2.1.4 Rating

The rating describes the current state of the service. A non-zero value means the service is available. Zero means that the service is either in use or not available.

5.2.1.5 Ports

The port list shows which port(s) the service is associated with.

5.2.2 Characteristics

These options specify how the ETS appears to network hosts and how it treats print data.

5.2.2.1 Banner

This parameter only affects ETS banner pages when printing via LPD or NetWare. If a host generates its own banner, the ETS treats it as print data. By default, the ETS adds a banner page to LPD and NetWare jobs.

5.2.2.2 Binary

If the binary option is specified, the ETS will not perform character processing on the data. By default (binary disabled) the ETS expands linefeeds into carriage return/linefeeds and performs tab expansion for LPD jobs. The binary option should be enabled for printing graphics jobs.

5.2.2.3 PostScript

If enabled, the ETS sends a small PostScript job to the printer before the print data to force auto-selection printers into PostScript mode. It also attempts to confirm that the printer finished a job before starting the next one. If the printer attached to this service will be used only for PostScript, this option must be enabled.

5.2.2.4 PSConvert

This characteristic allows a PostScript printer attached to the ETS to print non-PostScript jobs. When a file is queued to a service with the PSConvert attribute enabled, the file is encapsulated within a PostScript job. PSConvert is **disabled** by default.

5.2.2.5 TCP Port

The TCP Port characteristic associates a numeric TCP socket (between 4000 and 4999) with the service. Connections to this socket will be accepted only if the service is currently available. This is an 8-bit clean connection.

5.2.2.6 Telnet Port

The Telnet Port characteristic associates a numeric TCP socket (between 4000 and 4999) with the service. Telnet IAC interpretation will be done on the connection. Connections to this socket will be accepted only if the service is currently available.

5.2.3 Protocols

Each service has a protocol list associated with it; this list controls which protocols can access the service. Protocol parameters include AppleTalk, LAN Manager, LAT, NetWare, and RTEL (TCP/IP).

To enable all protocols on a service use multiple **Define Service** commands:

Figure 5-2: Enabling All Protocols on Service Backupprinter

```
Local>> DEFINE SERVICE backupprinter APPLETTALK ENABLED
Local>> DEFINE SERVICE backupprinter LANMANAGER ENABLED
Local>> DEFINE SERVICE backupprinter LAT ENABLED
Local>> DEFINE SERVICE backupprinter NETWARE ENABLED
Local>> DEFINE SERVICE backupprinter RTEL ENABLED
```

NOTE: *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.*

5.3 Displaying Current Services

To examine a service's characteristics, issue the **Show Service** command:

Figure 5-3: Showing Service Characteristics

```
Local> SHOW SERVICE backupprinter CHARACTERISTICS
Service: backupprinter Ident: ETS Serial Port
Rating: 255                Ports: 1
Characteristics: Queueing Rtel Connections Appletalk Netware
Enabled Groups: 0
SOJ: startchar            EOJ: endchar
```

6 - AppleTalk Configuration

6.1 Overview

The following sections cover print configuration for AppleTalk hosts. The examples below show how to configure the ETS using commands entered at the command line interface (Local> prompt); however, the easiest way to configure the server is to use the EZCon point-and-click interface.

A Macintosh version of the EZCon software are shipped with the ETS on the distribution CD-ROM. Macintosh users may use either the AppleTalk or the TCP/IP version of the EZCon software. All instructions for using EZCon are listed in each README file. For assistance once EZCon is running, refer to the EZCon on-line help.

6.2 Bitronics Interface

The ETS advertises its printers as LaserWriters; therefore, printing from a Macintosh requires a PostScript printer and bidirectional communication with that printer. The ETS supports the Bitronics interface (IEEE 1284 nibble mode). This interface, created by Hewlett-Packard, is an extension to the standard Centronics interface. Printers that support Bitronics (for example, the HP LaserJet 4 and greater family) allow bidirectional communication via the parallel port. To enable Bitronics on an ETS parallel port, use the following commands:

Figure 6-1: Enabling Bitronics

```
Local>> DEFINE PORT n BITRONICS ENABLED
Local>> LOGOUT PORT n
```

NOTE: *The printer must support Bitronics and the Bitronics mode must be enabled on the printer. For the HP LaserJet 4 and greater, enable the ADV FNCTNS option in the parallel menu.*

6.3 Macintosh Service Configuration

To print from a Macintosh, you will need to enable both AppleTalk and PostScript. In Figure 6-2 a parallel service (ETS_PRT) is created using a **Set/Define Service** command.

Figure 6-2: Enabling AppleTalk and PostScript on a Service

```
Local>> DEFINE SERVICE backupprinter APPLETALK ENABLED POST-  
SCRIPT ENABLED Port 3
```

Once you've created the service, it should be visible in the Chooser of any Macintosh that is in the same zone as the ETS. If you have multiple zones on your network, the service will appear in the default zone specified by the AppleTalk router. Once you locate the service in the Chooser, select it and complete the appropriate setup options. Close the Chooser window and send a test page to the Macintosh service.

NOTE: *Macintosh computers must have the LaserWriter driver installed; if it is not installed, LaserWriters will not be available in the Chooser.*

6.4 AppleTalk Zones

If the ETS is attached to a network without an AppleTalk router, all devices should be visible to all Macintosh Chooser clients. Note that the ETS will not accept AppleTalk print jobs for 60 seconds after booting while it listens for the nonexistent router.

NOTE: *Macintoshes that do not support EtherTalk will need a LocalTalk-to-EtherTalk router to use the ETS.*

If there is a router on the network, the ETS will appear in the default zone specified by the router. The zone name can be changed if the default zone is not the desired zone by using the following commands:

Figure 6-3: Setting the AppleTalk Zone

```
Local>> DEFINE PROTOCOL APPLETALK ZONE "radon_lab"
```

6.5 Printing From AppleTalk

6.5.1 LaserPrep

The LaserPrep application saves bandwidth by making files much smaller. All Macintoshes printing to the ETS must be running the same version of LaserPrep; otherwise print jobs can be lost, as reloading the LaserPrep file repeatedly can prevent jobs from printing reliably.

6.5.2 Printing Bitmap Graphics

- Ensure that the laser printer being used is configured to use 8-bit characters. If special characters or bitmaps are not printing correctly, it is typically because the printer is configured to use 7-bit characters.
- If files that contain embedded bitmap graphics print incorrectly, it is because the bitmaps are actual binary data. Binary data cannot be printed via serial or parallel interfaces.

Most major application packages have provisions to print using either "binary postscript" (for printers connected to the network via LocalTalk) or "hex postscript" (for printers connected to the network via a serial or parallel port).

If the application you are using does not have this provision contact your application vendor. There might be an upgrade patch available that adds the "hex postscript" function.



7 - LAN Manager Configuration

7.1 Overview

The EZCon configuration software is the easiest way to setup print queues on the ETS. Windows/Windows NT versions of EZCon are shipped with the ETS on the distribution CD-ROM. All instructions for using EZCon are listed in each README file. For assistance once EZCon is running, refer to the EZCon on-line help.

NOTE: *Windows for Workgroups cannot reliably print jobs to the ETS via LAN Manager. Windows for Workgroups users should spool print jobs to a Windows NT host and print from that machine.*

NOTE: *Printing using an LPD client is the preferred method for sending print jobs to the ETS. To print using the TCP/IP protocol see the LPR on Windows NT section on page 10-14.*

The following sections cover DLC and NetBIOS configuration for LAN Manager hosts. These instructions are designed for Windows NT.

7.2 Windows NT Users

The ETS must be added as a Windows NT printer before it can accept print jobs from a Windows NT host. Windows NT users can print using TCP/IP, the DLC protocol or the NetBIOS protocol. DLC configuration is simpler than NetBIOS configuration; however, NetBIOS is more flexible. Both methods are discussed in the following sections.

NOTE: *The ETS does not support NetBIOS over TCP/IP.*

7.2.1 DLC Configuration

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

To associate DLC with a service, use the **Set/Define Service DLC** command.

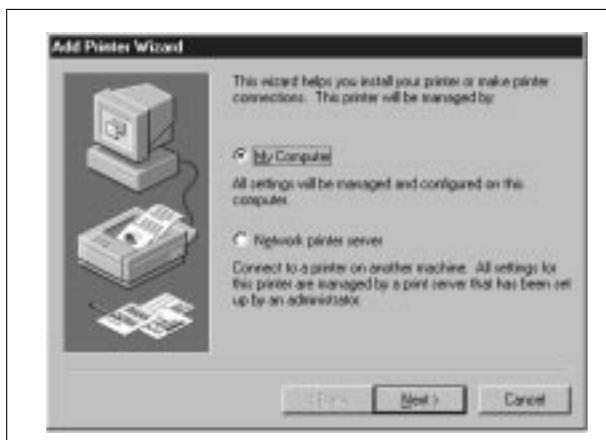
Figure 7-1: Associating DLC with PCL Service

```
Local>> DEFINE SERVICE ETS_PRT DLC ENABLED
```

NOTE: *The following steps are for Windows NT 4.0 users.*

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**. Click **Next**.

Figure 7-2: Selecting Your Printer Management

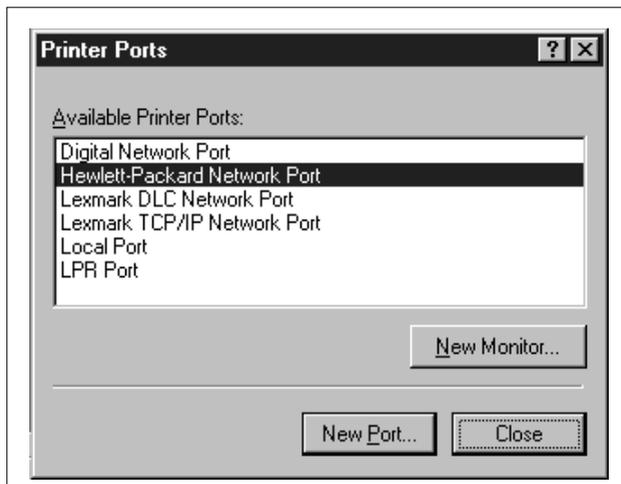


4. Select the **Add Port** button. Click **Next**.

Figure 7-3: Adding a Port



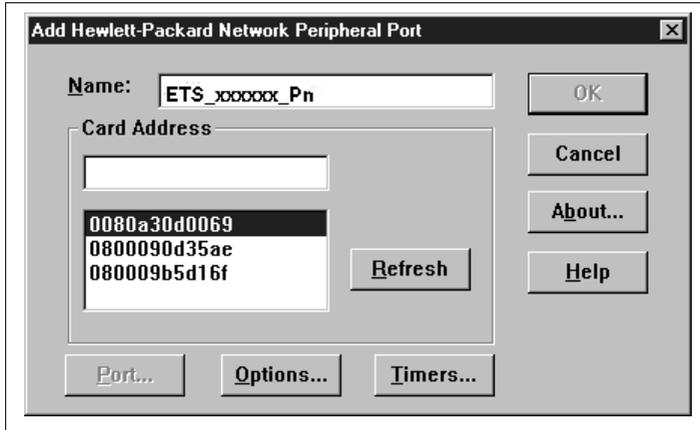
Figure 7-4: Select **Hewlett-Packard Network Port**. Adding a HP Network Port



- 5.
6. Click **New Port**.

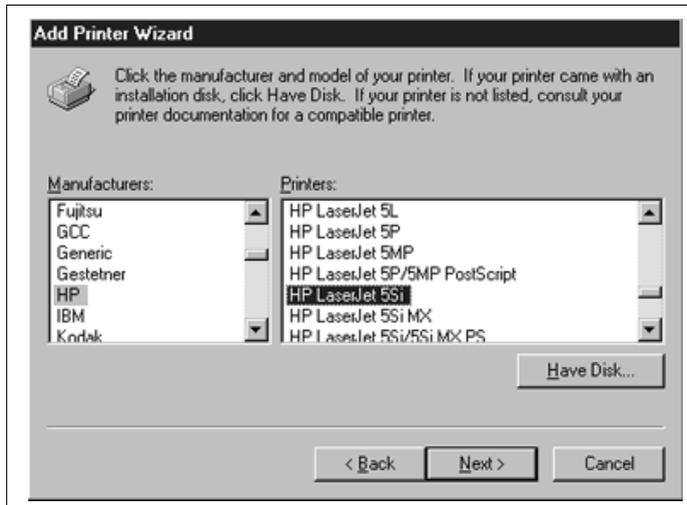
7. Enter the Service name.

Figure 7-5: Entering the Server Name



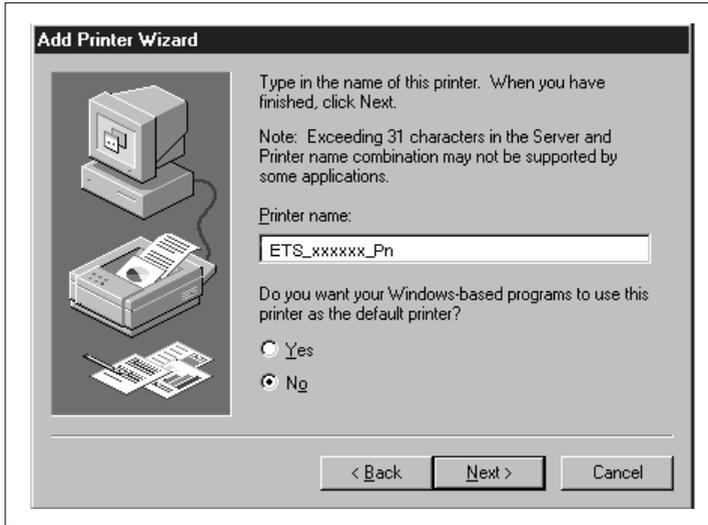
8. Select the manufacturer and printer type.

Figure 7-6: Selecting the Printer Type



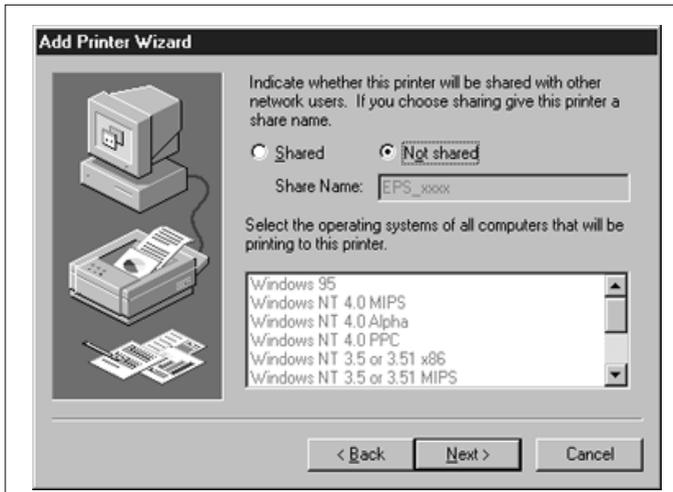
9. Enter the queue name.

Figure 7-7: Entering the Printer Name



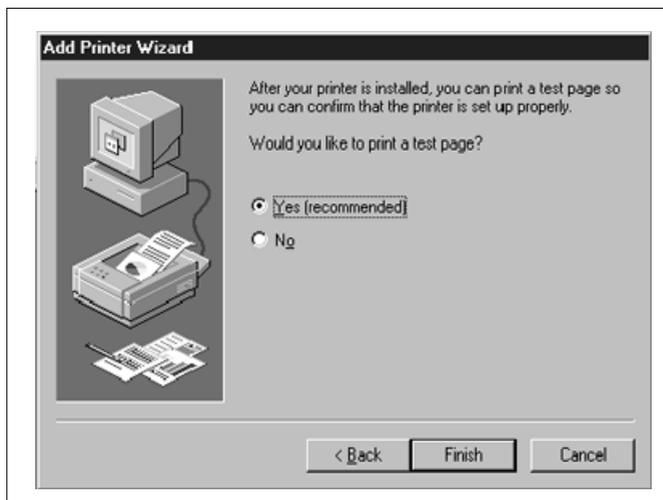
10. If applicable, choose Shared and select the type of operating system that the printer will be working with. (This is not recommended until the print queue is confirmed to be working.)

Figure 7-8: Sharing the Printer



11. Test the printer.

Figure 7-9: Printing a Test Page



7.2.2 NetBIOS Configuration

Ensure that the LAN Manager characteristic is enabled on your service.

To print from NetBIOS, you will need to redirect a port. Redirecting allows the user to use a service on the ETS as if it were on the host machine. Choose one of the LPT ports to redirect (typically the ports to choose from will be LPT1, LPT2, LPT3, or LPT4). Before you select a port to redirect, ensure that it doesn't currently have a printer connected to it.

Double-click the **DOS Command Prompt** icon to open a DOS session. At the DOS prompt, use the **NET USE** command to indicate that the LPT port will be redirected to the ETS service.

Figure 7-10: Net Use Command

```
C:> NET USE LPTn: \\ETS_XXXXXX\ETS_PRT
```

The Windows NT node will attempt to connect to the ETS. If it cannot connect to the ETS, it will inform you of the problem.

At this point, all references to LPTn (the port specified with the NET USE command in Figure) will go to the service that you created. For testing purposes, you can try to use a copy command, if the ETS is ready to accept data.

To make the LPT redirect permanent, use the following command.

Figure 7-11: Making Redirect Permanent

```
C:> NET USE /PERSISTENT:YES
```

When the host is rebooted, the LPT redirect will be remembered and the host will automatically attempt to connect to the ETS.

Exit the MS/DOS shell. Follow the instructions for adding a printer from the Printers Control Panel listed in *DLC Configuration* section on page 7-2. Remember when you reach Figure 7-3 you will be adding an LPT port instead of a Hewlett-Packard Networking port.

NOTE: *If the printer driver isn't already installed, you'll need the Windows NT installation media.*

7.2.3 Windows NT Troubleshooting

If you've followed the setup instructions listed in this chapter, Windows NT printing should run smoothly. However, there are two potential problems:

- When Windows NT determines that insufficient progress is being made on a print job, it will automatically time out (force you to abort or retry) print jobs.

By default, the timeout period is set to 45 seconds. If you have a slow printer, this timeout period may not be long enough; Windows NT may time out your print job when it's queued to the ETS. To change the timeout period, see the **Settings** dialog box in Windows NT.

NOTE: *Editing the timeout period on all known versions for Windows NT does not actually change the 45 second timeout period. When a timeout occurs, Windows NT will try to restart the entire job. If you are unable to change your timeout period, try using LPR instead.*

- Windows NT supports printing via AppleTalk and LAN Manager. The ETS and NT AppleTalk implementations are not compatible at this time; the ETS cannot accept AppleTalk jobs from Windows NT hosts.

8 - LAT Configuration

8.1 Overview

The EZCon configuration software is the easiest way to configure LAT print queues on the ETS. UNIX, Macintosh, Windows/Windows NT, and Novell NetWare versions of EZCon are shipped with the ETS on the distribution CD-ROM. All instructions for using EZCon are listed in each README file. For assistance once EZCon is running, refer to the EZCon on-line help.

NOTE: *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. Printing to a service requires some configuration, but it allows multiple printers to service the same VMS queue. Note that the LAT characteristic must be enabled on any service being used.

NOTE: *Printing directly to a port is the preferred method for printing to the ETS. If you would like a complete discussion on printing to a service, see the ETS/EPS Reference Manual.*

8.2 Printing Directly to a Port

Printing directly to a port is a 2 step process. First, a LAT application port that references an ETS port must be created on the LAT host. The LAT application port is a device that allows programs to treat a LAT connection as a physical port for input and output. For example, a printer might be configured to use port LTA3419, which might be connected or "mapped" to port 1 of the ETS. The LAT port can be mapped to either a service or an exact port on the ETS.

Second, a print queue that uses the LAT application port must be created.

The following example shows how to create a LAT application port:

Figure 8-1: Creating LAT Application Port

```
$ RUN SYS$SYSTEM:LATCP
LATCP> CREATE PORT LTAnnn/APPLICATION
LATCP> SET PORT LTAnnn/node=ETS_XXXXXX/port=Port_x
LATCP> EXIT
```

The *nnnn* is any unused LAT port number (use the **Show Ports** command to see which port numbers are in use). VMS users can then use port *LTAnnnn* as a port to the ETS.

LATCP ports are not permanently configured on a host. To create the required LAT devices after each host reboot, add the necessary commands to the `SYS$MANAGER:LAT$STARTUP.COM` file.

Note that LAT terminal device characteristics may have to be changed to correctly print some files. For example, the VMS terminal driver will change form feeds into an equivalent number of line feeds by default. To disable this behavior, enter the following command:

Figure 8-2: Disabling Line Feeds

```
$ SET TERMINAL/PERM/FORM LTAnnn:
```

NOTE: See the VMS documentation for more information about terminal characteristics.

To create and start a LAT queue on the host that uses this LAT application port, enter the following:

Figure 8-3: Creating and Starting the Queue

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

A print request would then look like:

Figure 8-4: Creating a Print Request

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

8.3 PostScript Printing

Using PostScript printers with LAT queues adds two extra steps to the host queue setup; a PostScript form and a reset module need to be created on the host. The reset module will contain the Ctrl-D that the printer needs to finish and eject the job.

To create the PostScript form use the following commands where **formnum** is any unused form number. Use **Show Queue/Form/All** to see the form numbers that are currently in use.

Figure 8-5: Creating a PostScript Form

```
$ DEF/FORM POSTFORM formnum /STOCK/=DEFAULT/WIDTH=4096/WRAP
```

In the figure above, the longer width prevents the spooler from truncating long (but legal) PostScript command lines.

To create the reset module, use an editor to create a file named EOJ.TXT. Place a Ctrl-D (ASCII 0x4) in this file and insert it into the system device control library.

Figure 8-6: Creating a Reset Module

```
$ LIBRARY/REPLACE SYS$LIBRARY:SYSDEVCTL.TLB EOJ.TXT
```

If the library does not exist, it must be created using the following command:

Figure 8-7: Creating a Control Library

```
$ LIBRARY/CREATE/TEXT SYS$LIBRARY:SYSDEVCTL.TLB
```

Finally, the **INIT/QUEUE** command creates the queue itself. Note the addition of the form specification and the reset module.

Figure 8-8: Creating a Print Queue

```
$ INIT/QUEUE/START/DEFAULT=(NOFEED,NOFLAG,FORM=POSTFORM) /ON=LTAnn:  
/PROCESSOR=LATSYM/RETAIN=ERROR/SEPARATE=(RESET=EOJ) ETS_POST
```

A print request would then look like this:

Figure 8-9: Creating a Print Request

```
$ PRINT/QUEUE=ETS_POST filename.ps
```

8.4 Printing Using DCPS Software

The DCPS software supplied by DEC requires a bidirectional data path. This is only available on the parallel port if the printer supports the Bitronics extensions to the Centronics interface. For more information, see *Bitronics Interface*.

9 - NetWare Configuration

9.1 Overview

The following sections cover print configuration for NetWare hosts. The easiest way to configure the server is to use the EZCon point-and-click interface.

The examples in this chapter show how to configure the ETS using commands entered at the command line interface (Local> prompt). Instructions for configuring NDS print queues on the ETS are outlined in the *Creating NDS Print Queues* section. To create NDS print queues, you must be running NetWare version 4.0 or greater. If you are running versions 2.x, 3.x, or version 4.0 with bindery emulation, see the section titled *Creating Bindery Print Queues*. Bindery print queues may be configured using either EZCon, PCONSOLE, or QINST.

9.2 EZCon

Novell NetWare versions of EZCon are shipped with the ETS on the distribution CD-ROM. All instructions for using EZCon are listed in each README file. For assistance once EZCon is running, refer to the EZCon on-line help.

NOTE: *NetWare users must be running Windows version 3.1 or later with the NetWare VLM, or with a Winsock compliant TCP/IP stack.*

9.3 Creating NDS Print Queues

If you are using NDS, the Quick Set-Up option is the easiest way to create print queues with PCONSOLE.

These steps must be done on each file server that will need access to the ETS queues. The following steps refer to NetWare v4.x or greater.

1. NDS Registration
 - A. To register to use NDS, you must read and complete an NDS registration form. To receive a registration form either:
 - Click **NDS Registration** on either the Lantronix home page (<http://www.lantronix.com>) or the Lantronix Product Information page, or
 - Send email to **nds-info@lantronix.com** and you will receive a blank registration form via email.

NOTE: *If you do not have Internet access, contact a Lantronix sales representative who will assist you with registration. See the Technical Support appendix for contact information.*

- B. Once you have completed the form, click **Submit** on the web page or send the form back to **nds@lantronix.com** via email.
 - C. To allow NDS on the ETS, enter the **Define Protocol NetWare DSLicense** command using the string that you have received from Lantronix.

Figure 9-1: Enabling NDS on the ETS

```
Local>> DEFINE PROTOCOL NETWARE DSLICENSE string
```

2. PCONSOLE Print Queue Set-Up
 - A. Log in as Admin on the file server you will be changing and type PCONSOLE at the F: prompt to start the utility.
 - B. From the main menu choose **Quick Set-Up**.

- C. The Quick Set-Up window will appear. Enter the following information:

Figure 9-2: The Quick Set-Up Window

```
Print Server: ETS_XXXXXX
New Printer: ETS_XXXXXX_YY
New Print Queue: backupprinter

Print Queue Volume: ETS_serv
Banner Type:

Printer Type: Centronics
Location: Marketing
Interrupt:

Port: n
```

The print server name (ETS_XXXXXX) is the name of your ETS. The new printer name (ETS_XXXXXX_YY) is the service name. The new print queue can be any name. The print queue volume is the name of the file server from which the printer receives print requests. The remaining fields can be left in their default settings.

- D. Once you have entered all fields in the Quick Set-Up Window, press F10 to save the print queue information.
3. Print Server Configuration
 - A. Use the **Define Protocol NetWare DSTree** command to define which directory service tree the print server is located on.

Figure 9-3: Defining the Directory Services Tree

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

- B. Use the **Define Protocol NetWare DSContext** command to define the directory services context where the print server is located.

Figure 9-4: Defining the Directory Services Context

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

NOTE: For an explanation of how the NetWare Directory Service tree is structured, see your host documentation.

- C. Enter the **Show Protocol NetWare Access** command to ensure that at least one of the file servers in the directory services tree is in the access list.

By default the access list is set to Local which includes all file servers which are not across a router. To add to this list, enter the **Define Protocol NetWare Access** command.

Figure 9-5: Adding to the Access List

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

- D. Reboot the ETS using the **Init Delay 0** command.

Figure 9-6: Rebooting the Server

```
Local>> INIT DELAY 0
```

It may take up to two minutes for the print server to attach to the queue.

5. Enter the **NETSTAT** command. This will display information about file servers, printers, and queues that the print server has found. If a queue is in JobPoll then the print server has successfully attached to the queue. If the print server does not attached to the queue, refer to the *NetWare Host Troubleshooting* on page B-6.

9.4 Creating Bindery Print Queues

Bindery print queues can be created using either the QINST or PCONSOLE utilities. Instructions for using PCONSOLE are listed in the ETS/EPS Reference Manual.

9.4.1 Using QINST

The QINST utility requires that you use either the **Supervisor** (NetWare 2.2/3.11) or **Admin** (NetWare 4.0) account on the target file server. To use the utility, copy the QINST.EXE file from the distribution CD-ROM into the **Public** directory on the file server, ensure that it is in the executable path, and type **QINST**.

When using NetWare version 4.0 and greater, the QINST program requires access to UNICODE tables to provide character translation. To ensure the utility runs properly, copy it into the NetWare **Public** directory or ensure that the PATH variable includes the required UNICODE tables.

NOTE: *If you wish to enable Bindery emulation, refer to your NetWare documentation.*

The following example shows creating a Novell print queue named backupprinter.

Figure 9-7: Creating Novell Print Queue

```
F:\> \Public\QINST
Q-Install Ver. n.m.

Logged in as ADMIN
Installing on GONZO, NetWare V3.xx

Enter the name of the print server.
: ETS_XXXXXXX <CR>

Enter the name of the queue to create.
: backupprinter <CR>

Adding print queue backupprinter on volume GONZO_SYS
Enter the service name on ETS_XXXXXXX which will service this queue.
: ETS_XXXXXXX_yy

Adding print server ETS_XXXXXXX. Please wait...
Attaching ETS_XXXXXXX to backupprinter
Adding print server ETS_XXXXXXX_yy. Please wait...
Attaching ETS_XXXXXXX_yy to backupprinter

Print queue installed successfully. Resetting ETS_XXXXXXX.
Resetting print server.

Install another queue [y/n]? n
F:\>
```

Use the NPRINT command to print a job to the ETS.

Figure 9-8: NPRINT Command

```
F:\> NPRINT C:\AUTOEXEC.BAT /QUEUE=backupprinter
```

9.5 NetWare Queue Password

The default login password on the ETS is also used to log the ETS into NetWare file servers. If the login password on the ETS is changed, NetWare print queue setups must also be changed to reflect the new password.

9.6 PCL and Other Binary Printing

The Binary attribute must be enabled. Figure 9-9 shows how to enable the Binary attribute.

Figure 9-9: Enabling Binary Attributes

```
Local>> DEFINE SERVICE backupprinter BINARY ENABLED
```

NOTE: For more information about services, refer to Chapter 5.

9.7 PostScript Printing

The PostScript characteristic must be enabled on a service to print PostScript jobs.

Figure 9-10: Enabling PostScript Attributes

```
Local>> DEFINE SERVICE backupprinter POSTSCRIPT ENABLED
```

NOTE: For more information about services, refer to Chapter 5.



10 - TCP/IP Configuration

10.1 Overview

The following sections cover print configuration for TCP/IP hosts. The server must have an IP address before configurations can be made. (See *IP Address Configuration* on page 3-2 for details.) Any host wishing to access the ETS will have to be informed of this IP address, which is typically configured in the UNIX `/etc/hosts` file or via a nameserver. Refer to the host's documentation for additional information.

The ETS provides two major methods of printing via TCP/IP: Berkeley remote-LPR and the RTEL host software. Both methods queue jobs on the host if the ETS is busy with another job. Instructions for host configuration for LPR and RTEL are described in the following sections.

The remote-LPR software allows the ETS to look like a UNIX host that can print files. The Lantronix-supplied RTEL software, which requires installation and configuration on the host, provides more functionality than remote-LPR. It allows the host's `lp` or `lpr` printing system to transparently use the ETS's print devices, and also allows the creation of named pipe devices on the host that map to the ETS's ports. See the documentation included with the distribution CD-ROM for a full discussion of RTEL functionality and configuration.

Raw TCP/IP socket connections can be used with custom queuing software to create queues on the ETS.

10.2 LPR on Generic UNIX Hosts

The Berkeley remote printing system is supported on many machines and is simple to configure for the ETS. Add the host print queue name into the `/etc/printcap`, and then specify the remote node name (the host name of the ETS) and the ETS service name.

NOTE: *There are slight variations in LPR configuration for AIX, HP, SCO UNIX, Solaris, ULTRIX, and Windows NT hosts; after reading this section, refer to the following sections for platform-specific configuration information.*

NOTE: *Neither Windows for Workgroups or Windows 95 support LPR directly, but there are third party solutions available. For a list of third party solutions, see Technical Support FAQ on the Lantronix web site, <http://www.lantronix.com>.*

To add a print queue for an ETS, add the ETS's name and IP address to the `/etc/hosts` file:

Figure 10-1: Adding Name and IP Address

```
nnn.nnn.nnn.nnn          ETS_XXXXXX
```

Edit the `/etc/printcap` file and add an entry of the following form:

Figure 10-2: Editing `/etc/printcap` File

```
ETS_PRT|Printer on LAB ETS:\
      :rm=ETS_XXXXXX:\
      :rp=ETS_XXXXXX_YY:\
      :sd=/user/spool/lpd/ETS_PRT:
```

Note that the punctuation shown is required and whitespace should be avoided within each option. The example creates a 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.

The spooling directory will have to be created using the **mkdir** command and should be world writable. Figure 10-3 shows how to create a spooling directory:

Figure 10-3: Creating Spooling Directory

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

In addition, the **mx** option may be used to allow unlimited size files to be printed and the **sh** option may be used 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.

After adding the queue entry to the printcap file, it should be visible via the **lpc status** command:

Figure 10-4: lpc Status Command

```
% lpc status
ETS_PRT:
    queuing is enabled
    printing is enabled
    no entries
    no daemon present
```

Now you can print to the queue using normal lpr commands:

Figure 10-5: Printing to Queues

```
% lpr -PETS_PRT /etc/hosts
```

10.3 Notes About LPR

There are five important things to note about the LPR printing method:

- Because of the way the LPR protocol is typically implemented on the host, the processing options and the banner page are sent after the job data itself. Because of this, 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.

NOTE: *The ETS prints banners at the end of each print job.*

- The ETS cannot print multiple copies of the print job when the “-#<copies>” lpr option is used. For example:

Figure 10-6: lpr Multiple Print Option

```
lpr -#3 /etc/hosts
```

- If banners are not needed, they can be disabled using the ETS commands:

Figure 10-7: Disabling Banners

```
Local>> DEFINE SERVICE ETS_XXXXXX_YY BANNER DISABLED
```

NOTE: *See the Command Syntax section on page 3-2 for a description of the Set and Define command syntax.*

- Many LPR spoolers are not intelligent about using multiple queues on one host. If two queues on the print host refer to two services on the same ETS, they must use separate spooling directories. If only the default directory is used, data from the two queues can be intermixed or sent to the wrong ETS service.
- No special purpose input or output filters can be used when printing via LPR. If filters are necessary, use the named pipe interface program in the RTEL software.

10.3.1 LPR on AIX Hosts

Print queues on AIX hosts can be configured using either UNIX commands or the SMIT application.

10.3.1.1 Using UNIX Commands

Using LPR on AIX hosts involves a slightly different configuration procedure. The queue configuration file is `/etc/qconfig` and the format of the entry is different. Note the lack of colons (:) and the required white space:

Figure 10-8: Adding to Printcap Entry

```
ETS_PRT:
    device = ETS_PRTd
    up = TRUE
    host = ETS_XXXXXX
    s_statfilter = /usr/lpd/bsdshort
    l_statfilter = /usr/lpd/bsdlong
    rq = ETS_XXXXXX_YY

ETS_PRTd:
    backend = /usr/lpd/rembak
```

Note that the device name is simply the queue name with a “d” appended.

10.3.1.2 Using SMIT

The System Management Interface Tool (SMIT) allows you to enable LPD printing and create print queues.

1. At the host prompt type *smit*.
2. From the main window in the application choose **Print Spooling**.
3. Then 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. Click **OK**.

“The lpd subsystem has been started” will appear in the Output section of the next window. Click **Done**.

To add a print queue use the following instructions.

1. From the main window choose **Print Spooling**.
2. Then choose **Manage Print Server** and **Manage Print Queues**. Next, choose **Add a print queue**.
3. From the dialog box that appears choose **remote**.
4. From the next dialog box choose the type of remote printing.
5. Add the following information to the Add a Standard Remote Print queue dialog box:

Figure 10-9: Adding a Print Queue

```
Name of QUEUE to add: ETS_PRT
HOSTNAME of remote server: ETS_XXXXXX
Name of QUEUE on remote server: ETS_XXXXXX_YY
TYPE of print spooler on remote server: BSD
DESCRIPTION of printer on remote server: docuprinter
```

A dialog box will appear with the message “Added print queue ETS_PRT.”

To print, the normal lp syntax is used:

Figure 10-10: Printing to Queues

```
% lp -dETS_PRT filename
```

10.3.2 LPR on HP Hosts

Print queues on HP hosts can be configured using either UNIX commands or the SAM application.

NOTE: *The maximum number of characters for the print server and service names is 13.*

10.3.2.1 Using UNIX Commands

To configure a print queue using LPR, become the superuser and issue the following commands:

Figure 10-11: Configuring a Print Queue Using UNIX Commands

```
# /usr/lib/lpshut
# /usr/lib/lpadmin -pETS_PRT -v/dev/null -mrmodel \
    -ocmrcmodel -osmrsmode1 -ormETS_XXXXXX -orpETS_XXXXXX_YY
# /usr/lib/accept ETS_PRT
# /usr/bin/enable ETS_PRT
# /usr/lib/lpsched
```

Note that issuing the “lpshut” command will stop the HP spooling system, so this command should not be performed when print jobs are active. The “lpadmin” command adds to the print queue. The “accept” command tells the queueing system that the queue is accepting requests and the “enable” command enables the print queue so it can start printing. Finally, the “lpsched” command restarts the queueing system.

To print to this queue, normal lp syntax is used:

Figure 10-12: Printing to Queues

```
# lp -dETS_PRT filename
```

10.3.2.2 Using SAM

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

1. At the HP prompt type *sam*.
2. From the main application window choose **Printers and Plotters**. Click **Open**.
3. Choose **Printers/Plotters** from the Printers and Plotters window.
4. In the pull-down menu select **Add Remote Printer/Plotter** from the **Actions** menu.
5. Enter the following information:

Figure 10-13: Configuring a Print Queue

```
Printer name: ETS_PRT (queue name)
Remote system name: ETS_XXXXXX (printer name)
Remote printer name: ETS_XXXXXX_YY (service name)
Remote cancel model: rcmodel
Remote status model: rsmodel
```

To print to this queue, normal lp syntax is used:

Figure 10-14: Printing to Queues

```
# lp -dETS_PRT filename
```

10.3.3 LPR on SCO UNIX Hosts

To configure a print queue using LPR, check to see if the Berkeley remote printing files and executable programs are installed on the host machine. If not, issue the **mkdev** command to install them.

Figure 10-15: Installing Print Files

```
# mkdev rlp
```

This will install the Berkley remote printing files and executable programs. Note that this should only be done once.

NOTE: *The **mkdev rlp** command should only be entered once. If the command is used repeatedly, serious problems will result with the machine. If this occurs, contact SCO technical support.*

To create a remote printer, use the following command:

Figure 10-16: Creating Remote Printers

```
# rlpconf
```

This command will ask a series of questions and create a printcap entry for the specified queue. The process is shown in the following figure.

Figure 10-17: Configuring the 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): ETS_XXXXXX_YY
Is printer ETS_XXXXXX_YY a remote printer or a local printer? (r/
l) r
Please enter the name of the remote host that ETS_XXXXXX is at-
tached to: ETS_PRT

    The ETS_XXXXXX_YY is connected to host ETS_PRT.
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 ETS_XXXXXX_YY appears in /etc/printcap (in BSD format).
Make sure ETS_XXXXXX_YY has a spool directory on ETS_PRT.
Putting the printer in printer description file and creating spool
directory... done
Updating LP information... done
```

NOTE: *When prompted for the printer name, keep in mind that it must match the service name on the print server.*

NOTE: *If you'd like to change the queue name at a later point, it can be changed by manually editing the printcap file.*

To print to this queue, normal lp syntax is used:

Figure 10-18: Printing to Queue

```
# lp -dETS_PRT filename
```

10.3.4 LPR on Solaris Hosts

NOTE: *Due to problems in the Solaris queueing system, LPR is not reliable on Solaris machines. Users with Solaris hosts should use the Lantronix-supplied RTEL software.*

The following commands configure a BSD print queue on a Solaris 2.3 system. These commands require that you are the superuser and in the bourne shell.

Figure 10-19: Creating a BSD Print Queue

```
# /usr/lib/lpsystem -t bsd ETS_XXXXXX YY
# /usr/lib/lpadmin -p ETS_PRT -s ETS_XXXXXX!ETS_XXXXXX YY
# /usr/lib/accept ETS_PRT
# enable ETS_PRT
```

Figure 10-20: Printing to Queue

```
# lp -dETS_PRT filename
```

10.3.5 LPR on ULTRIX Hosts

ULTRIX hosts will need the following additional information added to the printcap entry.

Figure 10-21: Adding to Printcap Entry

```
ETS_PRT|Printer on LAB ETS:\
      :lp=:ct=remote:\
      :rm=ETS_XXXXXX:\
      :rp=ETS_XXXXXX YY:\
      :sd=/usr/spool/lpd/ETS_PRT:
```

The additional options will show that there is no physical device for this queue and tell the host that this is a remote connection.

To print to this queue, normal lp syntax is used:

Figure 10-22: Printing to Queue

```
# lpr -PETS_PRT filename
```

10.3.6 LPR on Windows NT

The following procedure configures an lpr print queue on Windows NT 4.0.

NOTE: *This installation assumes that the TCP/IP protocol, Simple TCP/IP services, and Microsoft TCP/IP printing have been installed in Windows NT.*

NOTE: *Verify that you are able to Ping or Telnet the server from Windows NT before configuring the print queue.*

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**. Click **Next**.

Figure 10-23: Select Printer Monitoring



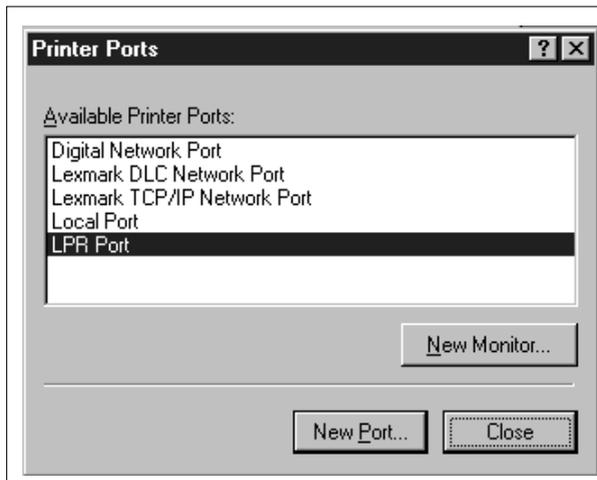
4. Select the **Add Port** button. Click **Next**.

Figure 10-24: Adding a Port



5. Select **LPR Port**.

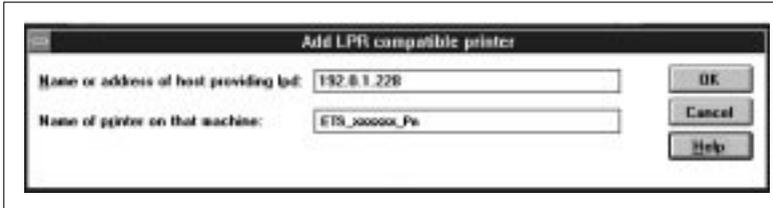
Figure 10-25: Adding a LPR Port



6. Click **New Port**.

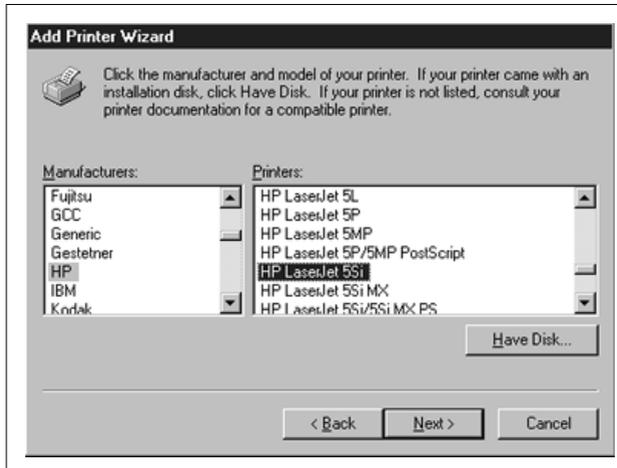
7. In the following window enter the name or address of the ETS and the service name.

Figure 10-26: LPR Dialog Box



8. Select the manufacturer and printer type.

Figure 10-27: Selecting the Printer Type



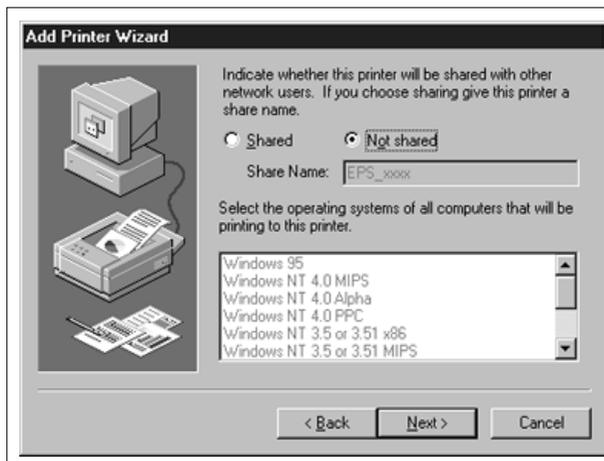
9. Enter the queue name.

Figure 10-28: Entering the Printer Name



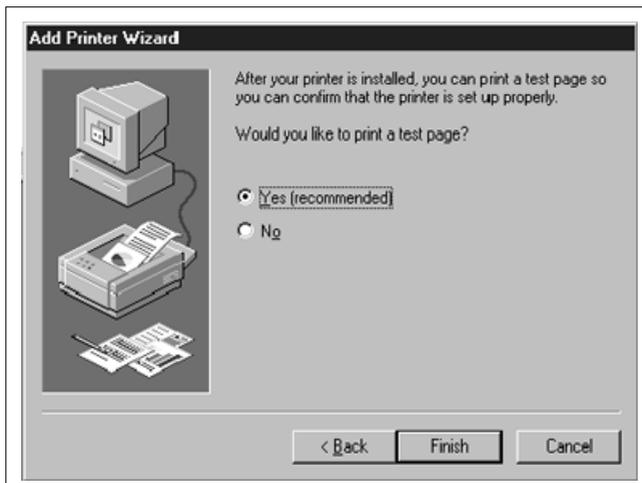
10. If applicable, choose Shared and select the type of operating system that the printer will be working with. (This is not recommended until the print queue is confirmed to be working.)

Figure 10-29: Select Printer Sharing Mode



11. Test the printer.

Figure 10-30: Printing a Test Page



10.4 RTEL Functionality

If the LPR method of printing is not adequate for an application (for example banners are needed before jobs or more flexibility is needed in printing), Lantronix-supplied RTEL software can be configured on the host. Once the software is installed and connections to the ETS have been configured, normal Unix print commands and queue utilities (such as `lpc` and `lpstat`) can be used.

NOTE: *RTEL binaries are provided for many systems and source code is provided for use on non-supported systems. (See the Lantronix Web site, <http://www.lantronix.com>, for a list of the supported systems.)*

To print to the ETS using special formatting or using third-party software packages, it may be necessary 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, copy the file **RTEL_SRC.TAR** from the distribution media to the UNIX host. If copying via the network, a binary copy must be performed. Untar the archive using the following command:

Figure 10-31: Untarring the Archives

```
# tar xvf rtel_src.tar
```

There will be README files in the created directories that describe the contents of the RTEL distribution and documentation that describes the actual software functionality.

10.5 TCP Socket Connections

If custom queuing software has been designed on a host, raw TCP/IP or Telnet connections can be made directly to the physical ETS ports. Opening a TCP session to port $300n$ will form a connection to port n on the ETS. The $300n$ range of ports is 8-bit clean. If Telnet IAC interpretation is needed, form a connection to port $200n$. If the port is in use or its access is set to **Local**, the connection will be refused.

NOTE: For more information about TCP socket connections, refer to the *ETS/EPS Reference Manual*.

10.6 PostScript Printing from TCP/IP

To print postscript jobs, the PostScript attribute must be enabled on the service being used:

Figure 10-32: Enabling PostScript Attribute

```
Local>> DEFINE SERVICE ETS_XXXXXX_YY POSTSCRIPT ENABLED
```

A very common problem when printing PostScript jobs from UNIX queues is including non-PostScript data (i.e. header or banner pages) as part of the job. When printing from a UNIX host machine, verify that header and trailer pages are not sent. See the host's documentation for information on preventing header and trailer pages.



11 - Additional Configuration

11.1 Overview

This chapter discusses some additional ETS configuration. It includes the system passwords, postscript configuration, printer configuration, and port characteristics.

11.2 System Passwords

There are two important passwords on the ETS: the privileged password and the login password.

NOTE: *If you choose to change either password, the new password must be no more than 6 alphanumeric characters. For security purposes, you should use a mix of letters and numbers in each password.*

11.2.1 Privileged Password

Changing any server or port setting requires privileged user status. EZCon will prompt you for the privileged password when it is needed. If you are not using EZCon, you will need to enter the **Set Privileged** command at the Local> prompt to become the privileged user. The default privileged password on ETS is **system**.

Figure 11-1: Set Privileged Command

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

The prompt will change to reflect privileged user status. Only one user can be the privileged user at a time. If another user is currently logged into the ETS as the privileged user, use the Set Privileged Override command to forcibly become the privileged user.

To change the privileged password, use the **Set/Define Server Privileged Password** command. The following figure displays an example of this command.

Figure 11-2: Changing Privileged Password

```
Local> SET PRIVILEGED
Password> system (not echoed)
Local>> DEFINE SERVER PRIVILEGED PASSWORD "pie4me"
```

11.2.2 Login Password

The login password is required for remote console logins and for password-protected serial ports. The default login password is **access**. To change the login password, use the **Set/Define Server Login Password** command. The following is an example.

Figure 11-3: Changing Login Password

```
Local> SET PRIVILEGED
Password> system (not echoed)
Local>> DEFINE SERVER LOGIN PASSWORD "82much"
```

The login password is also used to log the ETS into NetWare file servers. If the login password is changed, NetWare print queue setups must also be changed to reflect the new password. See the PCONSOLE instructions in the ETS/EPSON Reference Manual.

11.3 Simple PostScript Configuration

Figure 11-4 creates a service for a PostScript printer on an ETS parallel port.

Figure 11-4: Creating a Service for a PostScript Printer

```
Local>> DEFINE SERVER NAME BIOLAB
Local>> DEFINE SERVICE BIOLAB_P1 LAT ENABLED
Local>> DEFINE SERVICE BIOLAB_P1 IDENT "BIOLAB PostScript"
Local>> DEFINE SERVICE BIOLAB_P1 POSTSCRIPT ENABLED
Local>> DEFINE SERVICE BIOLAB_P1 NETWARE DISABLED
Local>> INITIALIZE DELAY 0 (reboot now)
```

There are several important points to note in this example:

- LAT is enabled on this service and a descriptive identification string has been defined.

NOTE: *To use LAT you must obtain a LAT license from your dealer or Lantronix and use the Define Protocol LAT license command on your ETS.*

- The PostScript characteristic is defined on the service.
- The NetWare protocol is turned off on the service. NetWare file servers will not be allowed to use this service.
- Since all characteristics have been “defined,” rebooting the server will make them active. Rebooting also verifies that the configuration has been properly stored in the Non-Volatile RAM.

11.4 Serial Port Parameters

Typically the only serial port parameters that will have to be changed are the baud rate, parity, flow control, and character size parameters. The default settings are 9600 baud, no parity, XON/XOFF flow control, and 8-bit characters. To see the serial port characteristics, enter the **Show/List Port Characteristics** command:

Figure 11-5: Serial Port Characteristics

```
Local>> list port 1 characteristics
Port 1: Username:           Physical Port 1 (Idle)
Char Size/Stop Bits: 8/1   Input Speed:           9600
Flow Ctrl:   Xon/Xoff      Output Speed:          9600
Parity:      None          Modem Control:         None
Access:      Remote        Local Switch:          None
Backward:    None          Port Name:              Port_1
Break Ctrl:  Local         Session Limit:          4
Forward:     None          Terminal Type:          Soft()

Preferred Services:  (Lat)
                    (Telnet)

Authorized Groups : 0
(Current) Groups : 0

Characteristics: Verify
```

Use the **Help Set Port** command to see a full listing of serial port options.

11.5 Parallel Port Parameters

The only configurable parallel port parameter is the Printer Type characteristic. By default, the parallel ports have the following characteristics:

Figure 11-6: Parallel Port Characteristics

```

Port 5 : Username:      Physical Port 5(Idle)

Access:      Remote      Local Switch:      None
Backward:    None        Port Name:         Port_5
Break Ctrl:  Local       Session Limit:     N/A
Forward:     None        Printer Type:      Centronics
Printer Status: Not Connected

Authorized Groups : 0
(Current) Groups : 0

Characteristics: Verify

```

If a printer that supports Bitronics mode (for example an HP LaserJet family) is connected to the ETS's parallel port, the Bitronics characteristic can be enabled on the port if necessary.

Figure 11-7: Enabling Bitronics

```

Local>> DEFINE PORT 4 BITRONICS ENABLED
Local>> LOGOUT PORT 4

```

11.6 Port Access

The port access mode controls how the port will respond to network requests and input from external devices. The **Define Port Access** command has the following parameters.

LOCAL	Network connections to this port are completely disabled but terminals may log into the ETS. This setting is useful for configuring and monitoring the ETS.
DYNAMIC	Both local connections (logins on the serial port) and network connections (host-based print requests) are enabled.
REMOTE	Only network connections are allowed. This is the default setting for the parallel port(s).

A - Technical Support

A.1 Overview

If you are experiencing problems with the ETS or have suggestions for improving the product, please contact Lantronix Technical support at the address or phone number listed below. We are also available on the World Wide Web at <http://www.lantronix.com> and Internet electronic mail at support@lantronix.com.

A.2 Lantronix Problem Report Procedure

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

- Your name, and your company name, address, and phone number
- Lantronix model number
- Serial number of the unit
- 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)

Technical Support: 800/422-7044 or 714/453-3990

Technical Support Fax: 714/450-7226 • Internet: support@lantronix.com

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

BBS: 714/367-1051 • FTP server IP address: 192.73.220.84



B - Troubleshooting

B.1 Overview

This appendix discusses how to overcome a number of different types of problems. Please read this section before calling Lantronix Technical Support with a problem; the solution may be a simple one located in this appendix.

If after reading this section you can't solve the problem, contact Lantronix or your dealer. Lantronix contact information is listed in Appendix A.

B.2 Power-up Troubleshooting

There are several possible error situations if the unit does not display the welcome message or the LEDs do not flash:

Table B-1: Power-up Troubleshooting

Power/ Error Message	Error	Diagnosis/Remedy
Power-up diagnostic failure	The LED's will remain in one pattern and the console will not work.	Usually a hardware failure. Contact your dealer or Lantronix.
Power-up error detected	If the error is nonfatal, the ETS will boot but won't try to load the Flash ROM code. Instead it will print a diagnostic message to the serial port and display the Boot> prompt. The OK and Net LEDs will blink in unison two-three times per second.	Verify the Ethernet connection. Once booted and running normally, the OK LED will blink once every two seconds.
The ETS passes power-up diagnostics, but then attempts to download new code from a network host.	The Flash ROM is corrupt.	Both the OK and Parallel LEDs will blink in unison. You will need to reload Flash ROM. Refer to Appendix D, <i>Updating Software</i> .

B.3 Printing Problems

Table B-2: Printing Troubleshooting

Areas to check	Explanation
Check the Physical Connection	<p>To test a non-PostScript printer use the Test Port n Count 100 command. This command will send 100 lines of test data out the port.</p> <p>If print data has been lost or corrupted on the serial printer, verify that RJ45 pins 4 and 5, transmit and receive ground, have both been connected to DB25 pin 7, signal ground. On a parallel printer, verify that a Lantronix-supplied parallel cable is being used.</p> <p>For PostScript printers, refer to <i>PostScript Problems</i> on page B-10.</p>
Verify Serial Flow Control	<p>Verify that the printer and the ETS agree on the method to be used for flow control. The ETS defaults to XON/XOFF flow control. See Chapter 11, for information on changing serial port settings.</p> <p>To verify that flow control is working, issue the Test Port command and take the printer off-line momentarily. This will cause the printer to stop accepting data and will “flow control” the ETS. When the printer is placed back on line, printing should continue with no disruption in the data.</p>
Verify Service Characteristics	<p>Use the Show Service Local Characteristics command from a network login to the ETS to see if the desired service is available. If the service rating is zero, the port is in use.</p> <p>Verify that the protocol list for the service in question has the appropriate protocols enabled.</p>

Areas to check	Explanation
<p>Monitor the Queue Status and the Port Counters</p>	<p>On the host system, print a file using the appropriate print command. Then use the Show/Monitor Queue command to see if a queue entry appears in the ETS queued job list.</p> <p>If a queue entry never appears on the ETS, see the appropriate host troubleshooting section. Many operating systems will not release a second job to a queue, even if there are multiple ports associated with the ETS service.</p> <p>If an active queue entry appears, the next step is to verify that data is actually being sent to the port. Issue the command Monitor Port n Counters. If the output byte counter is incrementing, data is being sent to the print device. If not, verify the connection between the ETS and the printer.</p>

B.3.1 LPD Host Troubleshooting

Table B-3: LPD Host Troubleshooting

Area to Check	Explanation
<p>Verify that the ETS's IP address and name were entered properly in the host's file.</p>	<p>Telnet to or ping the ETS using the name found in the host file. Verify that the ETS's name is resolvable and that the ETS is reachable via the network.</p>
<p>Verify that jobs which appear in the host queue reach the ETS.</p>	<p>Become superuser on the host. Clear and reset the host queue using the following commands: abort queue_name, clean queue_name, enable queue_name, and start queue_name.</p> <p>These commands will kill the currently executing daemon, remove all old entries in the queue, enable the queue to accept new entries, and restart job processing.</p>

B.3.2 VMS 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 B-1: Translating LAT Error Codes

```

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

When configuring a LAT device on a VMS host machine using a port name, check the following:

Table B-4: VMS Host Troubleshooting using a Port Name

Area to check	Explanation
Verify that the specified node name matches the server's node name.	Use the Show Server command on the ETS.
Verify that the specified port name matches the appropriate port name.	Use the List Port command on the ETS. The default port names are Port_ <i>n</i> .

When configuring a LAT device on a VMS host machine using a service, check the following:

Table B-5: VMS Troubleshooting using a Service

Area to check	Explanation
Verify that the specified node name matches the server's node name.	Use the Show Server command on the ETS.
Verify that the service name used matches the appropriate service name.	Use the Show Service Local Characteristics command on the ETS.
Verify that the service rating is non-zero.	Use the Show Service Local Characteristics command from a network login to the ETS to see if the desired ETS service is available. If the service rating is zero, the port is in use.
Verify that the LAT characteristic has been enabled on the service.	Use the Show Service Local Characteristics command from a network login to the ETS to see if the LAT characteristic has been enabled on the service.
Verify that LAT has been licensed on the ETS.	To use LAT you must obtain a LAT license from your dealer or from Lantronix. Then use the Define Protocol LAT License command on your ETS.
Verify that the LAT symbiont was specified as the queue process when the queue was created on the VMS host.	Use the VMS command Show Queue/Full queue_name to see the queue characteristics.
If you are using DCPS, verify the bidirectional path to the printer and verify that the printer is locked into PostScript mode.	Lock the printer in PostScript mode and issue the Test Service PostScript Count n command. This command sends a job to the printer and waits for the response.

If a connection attempt has been unsuccessful when initially configuring a LTA device, the LAT host software may get confused. Deleting and re-creating the LTA port is often required to clean things up.

B.3.3 NetWare Host Troubleshooting

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

Area to check	Explanation
Verify that the Bindery queue created manually using PCONSOLE was created correctly.	Either delete the queue and re-create the queue using QINST or re-verify the steps used to create the queue.
Verify that the server and queue names appear and match the server and service name.	Run PCONSOLE and enter Bindery emulation mode. (If you are using NetWare 4.0, this can be done by pressing F4.)

The following section assumes that the Novell queue was created using PCONSOLE's Quick Set-Up option. If you experience NDS printing problems, try the following steps:

Table B-7: NetWare Host Troubleshooting (NDS)

Area to check	Explanation
Verify that the NetWare access table will allow access to the specified file server.	By default, only local (non-routed) file servers are scanned for queues. See page 9-2 for more information on manipulating the NetWare access lists.
Verify that the login password on the ETS and the queue password on the file server match.	If the passwords do not match, the ETS will not be able to log into the file servers to scan for jobs.
Check the NetWare access list	If there is a significant delay between NetWare jobs, the delay may be a result of scanning too many file servers.
	This delay is often increased if the file servers are distributed across a wide area network. Configure the NetWare access list to only allow scanning for jobs on the file servers of interest. To configure the NetWare access list, see page 9-2.

Area to check	Explanation
<p>Verify that the print server has successfully attached to the queue.</p>	<p>Type NETSTAT at the Local> prompt. This will display information about file servers, printers, and queues that the print server has found. If a queue is in JobPoll then the print server has successfully attached to the queue.</p>
<p>Verify that the DSTree, DSContext, and DSLicensed are correct.</p>	<p>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 NDS server.</p> <p>DSTree is the directory service tree on which the print server is located. DSContext is the context where the print server is located and must match the context on file server. (The DSContext must be of the following form: ou=fruit.o=exotic) DSLicensed should be <i>yes</i>.</p> <p>Table and Table show the failure codes and the NDS error codes that may appear.</p>
<p>Verify that the printer and queue changes that you have made propagate through the NDS tree.</p>	<p>It may take a few minutes for the changes to propagate through the NDS tree. If the print server doesn't attach, reboot the server.</p>

Table B-8: NDS Printing Errors

Failure Code	Failure Code Meaning	Remedy
0	Success	
1	Print server ran out of memory.	Cycle power on the box. If the problem persists, disable the unused protocols and change the NetWare access list to only include file servers which have print queues associated with them.
2	Invalid resolved offset.	Report the problem to Lantronix Technical Support.
3	Resolved name was referred to another server.	Report the problem to Lantronix Technical Support.
4	No printers found for the print server.	Check to make sure that there are printers for the print server and the printer names match the service names on the print server.
5	No queue found for the printer.	Check to make sure that the printers have associated queues.
6	Login failed.	Check to make sure there is a print server object configured with the same name as the print server.
7	Authentication failed.	Check that the login password on the print server is the same as the password for the print server object. If the login password on the print server is the default (access) then there should be no password for the print server object.
8	Print server can not attach to queue.	Check the directory services partitions, replicas, and volumes to make sure that the file server where the queue actually lives has the information about the print server and printers.

Table B-9: NDS Failure Code

Failure code	Failure code meaning	Remedy
0	Success	
0xffffda7	Object could not be found in the given context.	Check the print server name, dscontext, and dstree to make sure that the printer server is set up correctly with PCONSOLE.
0xffffda5	The requested attribute could not be found.	Use PCONSOLE to make sure that the print server has associated printers and that 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	The password is invalid.	Make sure the password for the print server object under PCONSOLE is the same as the login password for the print server. If the login password on the print server is the default (access) then there should be no password for the print server object. If the login password is something other than the default, then the password for the print server object should match.
0xffffd54	Secure NCP violation.	The file server is probably requiring NCP packet signature which is not currently supported. The NCP packet signature level needs to be turned down so that it is not required from the server.

B.4 PostScript Problems

PostScript printers introduce their own set of problems, since they will silently abort jobs if they detect an error. The printer will typically accept the print job, process the job for a few seconds, and then return to the ready state without ejecting any paper or showing any error messages.

The following procedures start at the most basic troubleshooting level, verifying the physical connection between the printer and the ETS and progressively work up to actual printing from the host system.

Table B-10: PostScript Troubleshooting

Areas to Check	Explanation
<p>Verify the Physical Connection</p> <p>Verify that the ETS is communicating with the printer.</p>	<p>Check that the cables on the ETS are secure.</p> <p>To test a PostScript printer use the Test Port n PostScript Count 2 command where n is the port number. This command will generate 2 pages of PostScript data and send it to the port.</p> <p>If print data has been lost or corrupted on the serial printer, verify that RJ45 pins 4 and 5, transmit and receive ground, have both been connected to DB25 pin 7, signal ground. On a parallel printer, verify that a Lantronix-supplied parallel cable is being used.</p> <p>If the serial wiring is correct but characters are still lost, verify that both the printer and the ETS agree on the flow control method being used. By default, the ETS is configured for XON/XOFF flow control with 8-bit, no parity and 1 stop bit characters. See Chapter 11, for serial configuration options.</p>

Areas to Check	Explanation
Verify Service Characteristics	<p>Several common PostScript printing problems are service-based. Use the Show Service Local Characteristics command.</p> <p>In order for a service to be accessible from the network, its rating must be non-zero. If it is zero, the physical port is either inaccessible (access is defined to LOCAL) or is in use.</p> <p>Verify that the PostScript characteristic has been enabled on the service being used. In addition, verify that the protocol list for the service has the appropriate protocols enabled.</p>
Monitor Port Counters	<p>If PostScript jobs appear to print but nothing comes out of the printer, verify the amount of data sent from the host. Then use the Zero Counter All command to zero the counters.</p> <p>Issue the appropriate print command from the host system. After the job has completed, issue the Show Port n Counters command.</p> <p>The bytes output value should be approximately 870 greater than the size of the file on the host system. The extra bytes are from the PostScript handshaking that the ETS performs with the printer.</p> <p>As a last resort, replace the PostScript printer with a terminal attached to the serial port on the ETS and examine the data that appears on the terminal. Remember to disable the PostScript characteristic on the service using the Set Service ServiceName PostScript Disabled command. If this is not done, the port will hang waiting for an end-of-job character (<Ctrl-D>) to be transmitted from the terminal.</p>

B.4.1 AppleTalk Host Troubleshooting

Table B-11: AppleTalk Host Troubleshooting

Area to Check	Explanation
Verify that the printer is visible and can be selected in the Chooser.	If it is not visible, the printer may be configured in the wrong zone. See page 6-2.
Verify that a consistent version of the LaserPrep file is used.	If this is not possible, try testing from only one workstation to reduce version conflicts until printing is working.
Verify that both the printer and the ETS are configured to use 8-bit characters and agree on the type of flow control in use.	See Chapter 11, for ETS port configuration. Refer to the printer's documentation for instructions on configuring the printer.
Verify that the LaserWriter driver is not corrupt.	If the queue was working and then stops, try reinstalling the LaserWriter driver. The LaserWriter driver modifies itself to save configuration information and may become corrupt. Refer to <i>PostScript Problems</i> on page B-7.
Verify bidirectional communication.	Lock the printer in PostScript mode and issue the Test Service PostScript Count n command. This command sends a job to the printer and waits for the response.

B.5 Entering Commands at the Boot Prompt

The Boot Configuration Program (BCP) executes at power-up and provides the commands necessary to configure the ETS to boot up and function normally. The Boot Configuration Program stores parameters in the server's non-volatile memory.

For example, a typical TCP/IP configuration might use the following commands:

Figure B-2: BCP Command Examples

```
Boot> SET SERVER IPADDRESS nnn.nnn.nnn.nnn
Boot> SET SERVER SOFTWARE /tftpboot/ETSP.SYS
Boot> SET SERVER LOADHOST nnn.nnn.nnn.nnn
Boot> SET SERVER SECONDARY nnn.nnn.nnn.nnn
Boot> INIT 451
% Initialization begins in 5 seconds...
```

These commands set the ETS's address, set the software load file name, and set the load host's IP address (as well as that of a backup loadhost). The server then reboots using the Init 451 command. (At this point the ETS attempts to load the file ETSP.SYS from the host at 192.0.1.188.)

Until the server has been able to load its complete set of code from a load host, only a small subset of the server's full command set is available. Any unknown characters will end the command line and cause the command to be aborted.

The following table describes the commands that are available to you from within the Boot Configuration Program (BCP).

Table B-12: Boot Configuration Program Commands

Command	Description
Help	Displays a one-page summary of the commands available and what they do.
Init 451	Reboots the ETS after it has been configured. If the flash is valid, this command loads the software from the flash. If the flash is invalid and it can find the file you specified (with Set Server Software) it will load that file and then restart itself with full functionality. If there are no errors but the loadfile is not found, the server will attempt to load continuously (with longer intervals between attempts.) If there are errors or if the <Return> key is pressed on the console, the BCP will be reentered.
Set Server BOOTP {Enabled, Disabled}	Enables or disables the sending of BOOTP queries during the boot sequence. Default is enabled.
Set Server IPaddress <i>ip_address</i>	Specifies this server's IP address. Uses the standard numeric w.x.y.z format.
Set Server Loadhost <i>ip_address</i>	Specifies the host to attempt to load the file from. <i>ip_address</i> should be in the standard numeric w.x.y.z format (no text names are allowed).
Set Server Netserver <i>fileserver</i>	Specifies the NetWare fileserver to attempt to load the file from.
Set Server RARP {Enabled, Disabled}	Enables or disables the sending of RARP queries during the boot sequence. Default is enabled.
Set Server Reload	Specifies whether the ETS always reloads the Flash. By default the server reloads the Flash only when it is invalid.
Set Server Secondary <i>ip_address</i>	Specifies a backup host to attempt to load the file from. <i>ip_address</i> should be in the standard numeric w.x.y.z format (no text names are allowed). The backup host will be queried if the primary host does not (or cannot) load the server.
Set Server Silent	Enables or disables the startup messages.

Command	Description
Set Server Software <i>filename</i>	<p>Specifies the name of the file to load. The ETS will automatically add "ETSP.SYS" to the filename you specify. Note that all protocols must have a filename specified (either the default or set by the user). The default is ETSP.SYS.</p> <p>For NetWare and TFTP loaders, you can specify the complete path name of the file (15 characters or fewer) if the file is located in a directory other than the default. For TFTP, the case of the filename must match that of the filename loaded onto your host computer.</p>
Show Server	<p>Show is used to display the current settings of the parameters. You should use this command before and/or after you issue other commands to see what the current setup is or has been changed to.</p>
Flush NVR	<p>This command is used to restore the ETS' non-volatile RAM to its factory default settings. It will reset everything that is configurable on the server, including the unit's IP address.</p>
Flash	<p>This command will force the ETS to download its operational code and reprogram it into Flash ROM. This is necessary, for example, if a new version of software is released and you wish to upgrade your units to this version. If the server cannot download the file, the code in Flash ROM will still be usable.</p>



C - Pinouts

C.1 Overview

The ETS4P4 ports consist of 4 RJ45 serial ports and 4 DB25 serial ports.

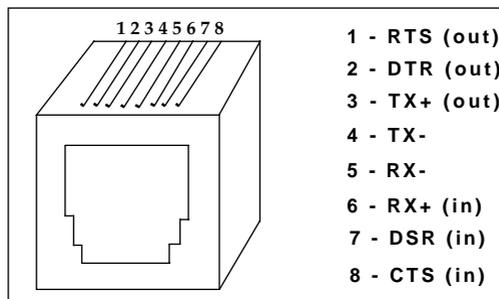
C.2 Serial Information

Lantronix servers are RS-423 compliant, and are thus limited by the equipment at the remote end of the serial line. If the ETS is connected to an RS-232 device, it is subject to the RS-232 limits shown below.

RS-232 lines are limited to 15m (50 ft.) in length at 9600 baud, and to 2m (6 ft.) at 115.2K baud, although they will generally work at longer lengths.

The pinout of the RJ45 Serial Ports is shown below:

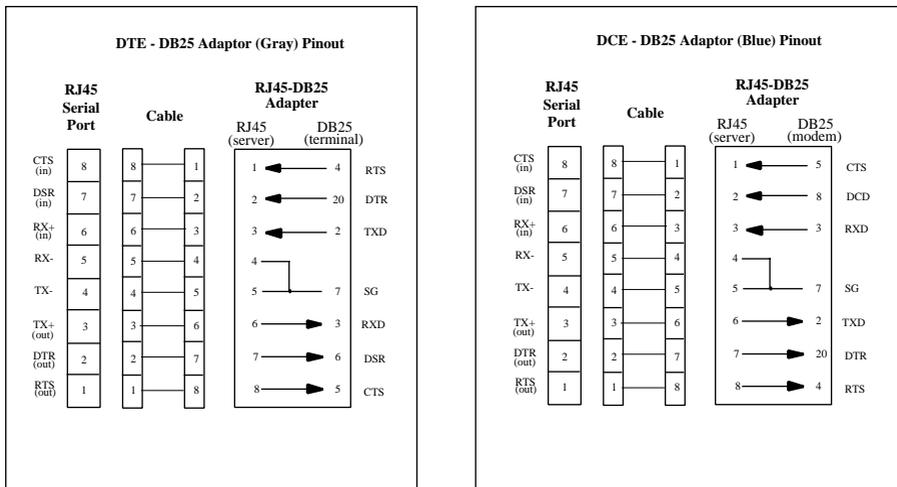
Figure C-1: Pinout of RJ45 Serial Ports



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 (such as a modem), an RJ45-DCE DB25 adapter is required. The pinout information for both connections is displayed below.

Figure C-2: Pinouts of RJ45-DB25 Connections



NOTE: The arrows in Figure C-2 represent the direction of the signal.

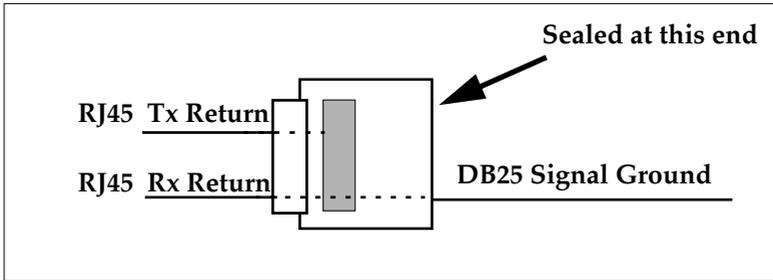
The ETS cable kit provides 8 prewired DCE-DB25 connectors (blue) and 4 unwired female DB25 adapters (gray). In most cases, the blue connectors will be used. If the modem device has a male connector, then a female DCE connector can be built from the using the gray adapters.

Both the transmit and receive ground signals on the ETS connector are wired to the signal ground on a DB25 adapter.

NOTE: The pinouts in Figure C-2 assume that the 8-conductor cable connecting the ETS and the adapter block is a swapped cable.

A crimper block is provided 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-3: Wire Splicer



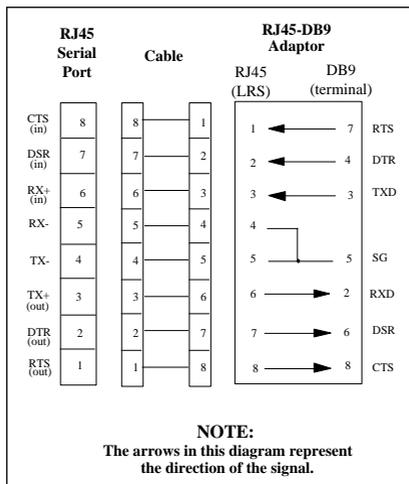
To splice the wires, cut off the end of the wire that does NOT extend through the connector and insert both wires into the connector. Make sure that the wire that **does not** extend through the connector is in as far as possible to ensure a solid connection. Make sure that the wire that **does** extend 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 (IBM PC Standard) Pinouts

If you're connecting an RJ45 serial port to a terminal with a DB9 (IBM PC Standard) connector, you'll need to use an RJ45-DB9 adapter.

To wire this type of adapter, refer to the diagram below.

Figure C-4: Pinout of RJ45-DB9 Connection



NOTE: Note that both the transmit and receive ground signals on the ETS connector are wired to signal ground on the DB9 adapter.

D - Updating Software

D.1 Overview

Current software files are available on the distribution CD. Software updates and release notes for the ETS can be downloaded directly from the Lantronix development systems in one of three ways: via the Lantronix World Wide Web site at <http://www.lantronix.com>, using anonymous FTP through the Internet, and via dial-in modem.

Comments and/or requests for help via email are welcome - send them to **support@lantronix.com** and they will be routed appropriately. Questions or comments regarding the ftp/download process itself can be sent to **ftp@lantronix.com**. Mail can also be sent from within the BBS menu access or from the Lantronix World Wide Web.

D.2 Updating Via the Web

The latest version of the ETSP.SYS can be downloaded from the Lantronix Web site. The following instructions will lead you through the web site to the software file.

1. On the homepage, <http://www.lantronix.com>, click on **Free Software Updates**.
2. In the directory that appears choose **pub/**.
3. Choose the server acronym from the next directory.
4. Next, choose the software volume.
5. Choose ETSP.SYS from the final directory.

NOTE: *As a result of Netscape's configuration, clicking on the software name will not allow you to download the file. To download the file from Netscape, you must save the file as a source document to your host.*

D.3 Updating Using FTP

The server software resides on the Lantronix FTP server (ftp.lantronix.com). The current IP address of the server is 192.73.220.84. This is subject to change at any time; the text name should be used if at all possible. Most of these files are binary data, so the binary option must be used to ftp whenever transferring the files.

To log into the FTP server, use a username of **anonymous** and enter your full email address as the password.

When connected to the Lantronix FTP server, the following text will be displayed:

Figure D-1: Lantronix FTP Session

```
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 1.800.422.7044
230-Questions about this ftp account only to ftp@lantronix.com
230-
230-
230 Guest login ok, access restrictions apply.
Remote system type is UNIX. [your type will be displayed here]
Using binary mode to transfer files.
ftp>
```

All released files are in the pub directory. Always download the README file in the pub directory before downloading anything else; it contains a directory of available versions.

D.4 Updating Using the BBS

The Lantronix system uses high speed modems for the physical connection and allows file transfers using KERMIT, xmodem, ymodem, and zmodem. The modem phone number is (714) 367-1051. The account name is **ets** and the password is **server**.

Remember that the download files (*.SYS) and executable images are image data and should only be transferred in binary mode. If binary mode is not used, the files will be corrupted.

Figure D-2: Lantronix BBS System, New User Entries

```
SunOS UNIX (nexus)
login: ets
Password: server (not echoed)
Last login: Mon Jun 5 13:21:13 from company.com
SunOS Release 4.1.3_U1 (NEXUS) #2: Fri Dec 2 10:08:39 PST 1994
Welcome to the Lantronix BBS. Type 'h' for help
userid ('new' for new user): new
Welcome, new user! Enter a userid, 1-12 characters, no spaces.
Userid: bob
Enter Passwd: platypus (not echoed)
Confirm Passwd: platypus (not echoed)
User Name: bob
Terminal type (default=vt100):
Email address, if any: bob@widgets.com
```

Figure D-3: Lantronix BBS System, Introduction Screen

```
Welcome to the "NEW" Lantronix Bulletin Board System.
To access the files menu, type 'f' at the main menu.
At the files menu, type 'p' to select a download protocol
(a=ascii, k=kermit, x=xmodem, y=ymodem, z=zmodem)
At the files menu, type 'l' to list available software directories.
Select the board name by entering its number.
At any menu, press 'h' to receive additional help.
Press [Return] to continue:
```

D.5 Reloading ETS Software

The ETS stores its software in Flash ROM. This software controls the initialization process, the operation of the ETS, and the processing of commands. The contents of Flash ROM can be updated by downloading a new version of the operational software.

The ETS can be reloaded from network hosts using NetWare, TCP/IP, or MOP. Reloading instructions are given beginning on page D-5. Regardless of which protocol is used to update Flash ROM, the following points are important:

- The Flash ROM software is contained in a file called ETSP.SYS, provided with the ETS on the distribution CD-ROM.
- The ETSP.SYS download file should be world-readable on the host, regardless of which download method is being used. In addition, there is a sixteen character length limit for the path name and a twelve character limit for the filename.
- Define commands are used because configuration done with Set commands are cleared when the ETS boots. Use the **List Server Boot** command to check the ETS settings before using the **Initialize Reload** command.

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

D.5.1 Reloading Sequence

If either BOOTP or RARP is enabled on the ETS it will request assistance from a 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 more than two minutes has elapsed and the server has still not successfully booted, press the button on the front panel of the ETS. A brief page will be queued to the parallel port and printed, describing the problem.

If the download file cannot be found or accessed, the ETS can be rebooted with the code still in Flash ROM. As noted in Chapter 2, the OK 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-7.*

D.5.2 NetWare

The ETSP.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 or password); it can only access files in the login directory itself. On the ETS, specify the file server name, filename and path:

Figure D-4: Reloading Flash ROM From NetWare

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

D.5.3 TCP/IP

Before the ETS downloads the new software, it will send BOOTP and/or RARP queries. (BOOTP and RARP queries are enabled by default; however, they can be disabled using the commands described on page B-14.) Next, the ETS will attempt to download the ETSP.SYS file using TFTP (Trivial File Transfer Protocol).

If a host provides BOOTP or RARP support, it can be used to set the ETS's IP address and loadhost information. Add the ETS's name, IP address, hardware address, and download path and filename to the BOOTP or RARP file (usually `/etc/bootptab`).

Some BOOTP and TFTP implementations require a specific directory for the ETSP.SYS file; in this case the path should not be specified in the bootptab file and the file must be placed in that directory. See your host's documentation for instructions on how to configure the ETSP.SYS file in the directory.

If BOOTP cannot be used to configure the ETS's IP parameters, configure them by hand using the following commands listed below.

NOTE: *For instructions on how to log into the ETS and enter these commands, refer to Chapter 10, TCP/IP Configuration.*

Figure D-5: Reloading Flash ROM From TCP/IP

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

The path and filename are case-sensitive and must be enclosed by quotation marks (" "). If attempting to boot across an IP router, the router must be configured to perform proxy arping for the ETS.

D.5.4 MOP

Copy the ETSP.SYS file to the MOM\$LOAD directory. The ETSP.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, and then reload the server using the following commands:

Figure D-6: Reloading Flash ROM From VMS

```
Local> SET PRIVILEGED
Password> SYSTEM (not echoed)
Local>> INITIALIZE RELOAD
```

NOTE: *If an error message is displayed indicating an invalid record size on the VAX console, the ETSP.SYS file was not transferred in binary mode.*

D.6 Troubleshooting Flash ROM Updates

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

Figure D-7: Troubleshooting Flash ROM Updates

Protocol	Area to Check
NetWare	Make sure 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. Make sure the loadhost name and address are specified correctly and that their case matches the case of the filenames on the host system. Ensure that the host has TFTP enabled; several major UNIX vendors ship their systems with TFTP disabled by default.
MOP	The Ethernet circuit must have the service characteristic enabled. Verify that the MOM\$LOAD search path includes the directory containing the ETSP.SYS file. Verify that the files were transferred in Binary mode.



E - Specifications

E.1 Power Requirements

Adapter Input Voltage:	110 Volts AC (domestic) 110/220 Volts AC (international)
Power Consumption:	12 Watts (maximum)

E.2 Temperature Limitations

Operating range:	5° to 50°C (41° to 122°F)
Storage range:	-40° to 66°C (-40° to 151°F)
Maximum temperature change per hour:	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 outside.

E.3 Altitude Limitations

Operating:	2.4 km (8000 ft.)
Storage:	9.1 km (30,000 ft.)

If operating the ETS above 2.4 km (8000 ft.), decrease the operating temperature rating by 1.8°C for each 1000 m (1°F for each 1000 ft.).

E.4 Relative Humidity Limitations

Operating:	10% to 90% (noncondensing) (40% to 60% recommended)
Storage:	10% to 90% (noncondensing)



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Warranty Statement

Lantronix warrants for a period of FIVE YEARS from the date of shipment that each Lantronix **ETS print 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.

If the product is not under warranty, Lantronix will contact the customer who then has the option of having the unit repaired on a fee basis or having the unit returned.

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.

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Declaration of Conformity

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

Manufacturer's Name: Lantronix
Manufacturer's Address: 15353 Barranca Parkway
Irvine, CA 92718

declares, that the product:

Product Name: Terminal/Printer Server
Model Number(s): ETS4P4

conforms to the following Standards:

Safety: EN 60950:1988 + Amendments 1 and 2
EMC: Based upon EN 55022:1988 class A
EN 50082-1:1992

Supplementary Information:

"The product complies with the requirements of the 89/336/EEC and 73/23/EEC declaratives."

Manufacturer's Contract: Director of Quality Assurance
Lantronix
15353 Barranca Parkway
Irvine, CA 92718
General Tel: 714/453-3990; Fax: 714/453-3995



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The revision date for this manual is February 13, 1997.

Part Number: 900-056
Rev. A

WARNING

This equipment has been tested and found 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.

Warning: 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.

